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 **Warren Steel Holdings, LLC**

Public Notice No.: 08-01-026
Public Notice Date: January 16, 2008
Comment Period Ends: February 18, 2008

OEPA Permit No.: **3ID00050*ID**
Application No.: (OH #) **OH0011207**

Name and Address of Applicant:

Warren Steel Holdings, LLC
4000 Mahoning Avenue
Warren, Ohio 44483

Name and Address of Facility Where Discharge Occurs:

Warren Steel Holdings, LLC
4000 Mahoning Avenue
Warren, Ohio 44483
Trumbull County

Receiving Water: **Mahoning River**

Subsequent Stream Network: **Beaver River**
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.

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
Lazarus Government Center
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
Water Resource Management Section
Lazarus Government Center
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.

The application, fact sheet, public notice, permit including effluent limitations, special conditions, comments received and other documents are available for inspection and may be copied at a cost of 25 cents per page at the Ohio Environmental Protection Agency at the address shown above any time between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Copies of the Public Notice are available at no charge at the same address.

Location of Discharge/Receiving Water Use Classification

Warren Steel Holdings, LLC discharges to the Mahoning River at River Mile (RM) 41.83. The Mahoning River which flows into the Beaver River in Pennsylvania has the following designated uses: Warmwater Habitat (WWH); Agricultural Water Supply (AWS); Industrial Water Supply (IWS); and Primary Contact Recreation (PCR). This section of the Mahoning River is identified by Ohio EPA River Code 18-001, U.S. EPA River Reach number 05030101007, and is located in the Erie/Ontario Drift Lake Plain Ecoregion. The approximate location of the facility is shown in Figure 1.

Facility Description

The CSC Industries/Copperweld Steel plant (now Warren Steel Holdings, LLC) began operations in 1939. Copperweld filed for Chapter 11 bankruptcy protection on November 22, 1993. The company emerged from bankruptcy as CSC Ltd. In 1995, the company was acquired by Hamlin Holdings, Inc. New treatment facilities were constructed in late 1992. Operations were shut down on March 31, 2001 and much of the historical complex was disassembled.

CSC Limited manufactured steel bars of which 80 percent of the product was commercial grade alloy steel while 20 percent was carbon steel grade. Historical operations at the facility included:

- melting using electric arc furnaces;
- hot forming using a 35 inch blooming mill and a 12 inch mill;
- cold forming;
- acid pickling;
- continuous casting; and
- vacuum degassing.

Warren Steel Holdings began refurbishing the facility in 2006 - 2007. The facility is presently undergoing quality control testing and anticipates being in full production during 2008 with an operating capacity of up to 800,000 tons/year. The former hot forming, cold forming, and acid pickling operations will not be utilized.

The process operations are categorized under the Standard Industrial Classification (SIC) Code 3312, "Steel Works, Blast Furnace, Rolling and Finishing Mills." Process wastewater discharges from this facility are regulated under the Federal Effluent Guidelines, 40 CFR Part 420.

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 24 outfalls from 6 municipal WWTPs and 7 industrial facilities, as follows:

Warren Steel Holdings (CSC Industries)	Thomas Steel Strip
Warren Consolidated Industries	ISG (Mittal) Steel
Warren WWTP	Reactive Metals Inc.

Orion Power Midwest, Niles Plant	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.

Parameter Selection

Effluent data for Warren Steel Holdings were used to determine what parameters should undergo wasteload allocation. No new effluent data was available for this report. The sources of effluent data are as follows:

Self-monitoring data (LEAPS)	January 1996 through June 2001
Ohio EPA data (compliance, survey)	September 1999

The effluent data were checked for outliers and the following values were eliminated from the data set: cadmium, 102.4 μg/L; silver, 167 μg/L; and antimony, 75.9 μg/L. The average and maximum projected effluent quality (PEQ) values are presented in Table 3. For a summary of the screening results, refer to the parameter groupings at the end of this section.

Water Quality Standards

Ohio water quality standards (WQS) were used for all parameters except for chronic cadmium and chronic lead. 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 5), and allocations cannot exceed the Inside Mixing Zone Maximum criteria. The data used in the WLAs are listed in Tables 4 and 5. The wasteload allocation results to maintain all applicable criteria are presented in Table 6. The current permit limits for NH_3-N were evaluated and found to be adequate to maintain the instream WQS for NH_3-N. Therefore, NH_3-N will not be addressed further in this report.

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.

Figure 1. Mahoning River Study Area

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 127 cfs (Leavittsburg 1Q10 low flow) and 135 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 Warren Steel Holdings for the six metals.

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 (Warren Steel Holdings)

	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.	0.41[E]	7.7	16.
Chromium, total	-	100.	130.	2600.	5500.
Copper	1300.	500.	15.[D]	23.[D]	45.
Lead	-	100.	6.1[D,E]	230.[D]	470.
Nickel	610.[E]	200.	78.	700.	1400.
Zinc	69000.	25000.	180.	180.	370.

[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 160 mg/L.

[C] Based on effluent hardness of 166 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)	0.0	0.0	0.0	STORET
Lead (μg/L)	1.242	0.739	0.135	STORET
Nickel (μg/L)	0.0	0.0	0.0	STORET
Zinc (μg/L)	8.966	0.507	0.093	STORET
Mosquito Creek at mouth				
Flow (MGD)	80.65	1.44	0.263	USGS/SWIMS
Cadmium (μg/L)	0.0	0.0	0.0	STORET
Chromium, total (μg/L)	0.0	0.0	0.0	STORET
Copper (μg/L)	1.916	0.326	0.060	STORET
Lead (μg/L)	3.7	0.383	0.070	STORET
Nickel (μg/L)	0.0	0.0	0.0	STORET
Zinc (μg/L)	18.45	0.607	0.111	STORET
Meander Creek at mouth				
Flow (MGD)	3.706	0.330	0.060	SWIMS
Cadmium (μg/L)	0.0	0.0	0.0	STORET
Chromium, total (μg/L)	0.0	0.0	0.0	STORET
Copper (μg/L)	2.614	0.895	0.163	STORET
Lead (μg/L)	1.509	1.192	0.218	STORET
Nickel (μg/L)	0.0	0.0	0.0	STORET
Zinc (μg/L)	28.394	0.468	0.085	STORET
Little Squaw Creek at mouth				
Flow (MGD)	2.808	0.537	0.098	SWIMS
Cadmium (μg/L)	0.095	2.425	0.443	SWIMS
Chromium, total (μg/L)	2.722	1.229	0.224	SWIMS
Copper (μg/L)		7.603	1.155	0.211
		SWIMS		
Lead (μg/L)	0.0	0.0	0.0	SWIMS
Nickel (μg/L)	2.644	2.621	0.479	SWIMS
Zinc (μg/L)	70.56	0.949	0.173	SWIMS
Mill Creek at mouth				
Flow (MGD)	44.52	2.23	0.407	USGS
Cadmium (μg/L)	0.12	0.48	0.088	STORET
Chromium, total (μg/L)	0.0	0.0	0.0	STORET

Copper (μg/L)		2.37	0.70	0.127
		STORET		
Lead (μg/L)	4.12	1.95	0.356	STORET
Nickel (μg/L)	28.1	0.30	0.055	STORET
Zinc (μg/L)	13.5	1.87	0.34	STORET

Table 2. Monte Carlo Model Inputs (continued)

		Coefficient of Variation		
Parameter	Mean	Acute	Chronic	Source
Discharger flows (MGD)				
Warren Steel Holdings (CSC)		0.657	0.905	0.165
SWIMS				
Thomas Steel Strip	1.11	0.336	0.061	SWIMS
Warren Consolidated Industries				
003	0.094	0.528	0.096	SWIMS
006	0.002	0.340	0.062	SWIMS
007	2.48[C]	0.314	0.057	SWIMS
008	6.50	0.179	0.033	SWIMS
Intake[B]	--.--	--.--	--.--	---
013	38.25	0.188	0.034	SWIMS
010	0.442	0.473	0.086	SWIMS
011	0.601	0.346	0.063	SWIMS
012	0.158	0.184	0.034	SWIMS
Mittal 014	3.512	0.359	0.066	SWIMS
Warren WWTP	14.28	0.440	0.080	SWIMS
Reactive Metals Inc.	0.374	0.408	0.075	SWIMS
Orion Power				
002	3.437	0.300	0.055	SWIMS
008	0.001	0.0	0.0	SWIMS
Niles WWTP	5.512	0.558	0.102	SWIMS
McDonald Steel	0.725	0.310	0.057	SWIMS
Youngstown WWTP	37.25	0.313	0.057	SWIMS
Campbell WWTP	1.624	0.515	0.094	SWIMS
Struthers WWTP	4.643	0.306	0.056	SWIMS
Lowellville WWTP		0.358	0.666	0.122
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 WCI effluent flows plus the Mittal flow, multiplied by 0.871. (12.9% of the WCI / Mittal flow comes from sources other than the intake.)

[C] Recommended by Erm Gomes; outfall is submerged and no recent flows are available

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 (see Section 2.1). CONSWLA is the model Ohio EPA typically uses in multiple discharger situations. Contrary to the Monte Carlo model, described in Section 2.1, 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.

Table 3. Effluent Data for Warren Steel Holdings

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
Outfall 005					
Self-Monitoring (SWIMS) Data					
Antimony	µg/L	245	4	7.88	10.8
Cadmium	µg/L	241	2	0.112	0.154
Chromium^{+6}, diss	µg/L	5	0	–	–
Copper	µg/L	242	25	18.41	24.97
Lead	µg/L	241	17	6.33	8.67
Thallium	µg/L	246	4	1.91	2.61
Silver	µg/L	245	17	9.25	9.99
Zinc	µg/L	249	224	50.8	76.1
Ohio EPA Data					
Ammonia	mg/L	1	1	0.656	0.899
Barium	µg/L	1	1	122.	167.
Calcium	mg/L	1	1	208.	285.
Chloride	mg/L	1	1	380.	521.
Dissolved Solids, Total	mg/L	1	1	1539.	2108.
Iron	µg/L	1	1	6880.	9424.
NO2+NO3-N	mg/L	1	1	1.53	2.09
Magnesium	mg/L	1	1	67.9	93.
Manganese	µg/L	1	1	932.	1277.
Phosphorus	mg/L	1	1	0.407	0.558
Potassium	mg/L	1	1	22.6	31.
Sodium	mg/L	1	1	208.	285.
Strontium	µg/L	1	1	1005.	1376.

Table 4. Water Quality Criteria in the Study Area

		Outside Mixing Zone Criteria				
		Average				Inside Maximum Mixing Zone Maximum
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Antimony	μg/L	14.[C]	–	190.	900.	1800.
Arsenic	μg/L	50.[C]	100.	150.	340.	680.
Bis(2-Ethylhexl)Phthalate	μg/L	1.8 [C]	–	8.4	1100.	2100.
Barium	μg/L	2400.[C]	–	220.	2000.	4000.
Boron	μg/L	3100.[C]	–	950.	8500.	17000.
Bromomethane	μg/L	4000.	–	16.	38.	75.
Bromodichloromethane	μg/L	460.	–	–	–	–
Butylbenzyl phthalate	μg/L	300.[C]	–	23.	130.	260.
Chlorine, tot. res.	μg/L	–	–	11.	19.	38.
Chloroform	μg/L	5.7 [C]	–	140.	1300.	2600.
Chromium $^{+6}$, diss.	μg/L	–	–	10.[C]	16.	31.
Cobalt	μg/L	–	–	24.	220.	440.
Cyanide, free	μg/L	700.[C]	–	5.2 [C]	22.[C]	92.
1,4-Dichlorobenzene	μg/L	2600.	–	9.4	57.	110.
Dichloromethane	μg/L	16000.	–	1900.	11000.	22000.
Di-n-butyl phthalate	μg/L	2700.[C]	–	21.[C]	110.[C]	–
Fluoride	μg/L	–	2000.	–	–	–
Iron	μg/L	–	5000.	–	–	–
Mercury [A]	μg/L	0.012	10.	0.91	1.7	3.4
Molybdenum	μg/L	–	–	20000.	190000.	370000.
Naphthalene	μg/L	–	–	21.	170.	340.
Nitrate+Nitrite	mg/L	–	100.	–	–	–
Phenol	μg/L	21000.[C]	–	400.	4700.	9400.
Selenium	μg/L	11000.	50.	5.0	–	–

[A] Bioaccumulative Chemical of Concern (BCC)
[C] Pennsylvania Water Quality Criteria.

Table 4. Water Quality Criteria in the Study Area - Continued.

		Outside Mixing Zone Criteria				
		Average				Inside Maximum Mixing Zone Maximum
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Silver (Seg. 1)	μg/L	–	–	1.3	9.4[E]	51.[E,F]
Silver (Seg. 2)	μg/L	–	–	1.3	25[E,F]	75.[E,F]
Silver (Seg. 3)	μg/L	–	–	1.3	23.[E,F]	110.[E,F]
Silver (Seg. 4)	μg/L	–	–	1.3	22.[E,F]	55.[E,F]
Silver (Seg. 6)	μg/L	–	–	1.3	22.[E,F]	37.[E,F]
Silver (Seg. 9)	μg/L	–	–	1.3	23.[E,F]	51.[E,F]
Strontium	μg/L	–	–	5300.	48000.	95000.
Thallium	μg/L	1.7[C]	–	13.[C]	65.[C]	160.
Total Dissolved Solids	mg/L	–	–	1500.	–	–
Toluene	μg/L	6800.[C]	–	62.	560.	1100.

[C] Pennsylvania Water Quality Criteria.

[E] Local river hardness at critical low design flow was used to determine the water quality criteria. Segment 1 is at the Ohio Pennsylania state line (RM 11.43, hardness = 179 mg/L), Segment 2 is from the Orion Power Intake to the Ohio Pennsylania state line (RM 29.7 - RM11.43, hardness - 177 mg/L), Segment 3 is the WCI Intake to the Orion Power Intake (RM 36.5 to Rm 29.7, hardness = 168 mg/L), Segment 4 is from Leavittsburg to the WCI Intake (RM 45.5 to RM 36.5, hardness = 165 mg/L), Segment 6 is an unnamed tributary to the Mahoning that Mittal discharges to (hardness = 165 mg/L), and Segment 9 is Little Squaw Creek (hardness = 171 mg/L).

[F] Effective Criteria Based on Application of Dissolved Metal Translator.

Table 5. Instream Conditions and Discharger Flow for CONSWLA Model

Parameter	Units/Outfall		Value	Basis
Mahoning River Upstream				
7Q10	cfs	annual	135	USGS gage #03094000, 1969-06 data
1Q10	cfs	annual	127	USGS gage #03094000, 1969-06 data
30Q10	cfs	summer	178	USGS gage #03094000, 1969-06 data
	cfs	winter	191	USGS gage #03094000, 1969-06 data
HMQ	cfs	annual	379	USGS gage #03094000, 1969-06 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		2.17	NEDO
Thomas Steel Strip	001		2.79	NEDO	
Warren Consolidated		007		3.84	NEDO
Industries	008		9.78	NEDO	
	010		0.71	NEDO	
	011		0.99	NEDO	
	012		0.248	NEDO	
	013		53.38	NEDO	
	015		1.72	NEDO	
	016		1.81	NEDO	
ISG (Mittal) Steel	014		7.27	NEDO	
Warren WWTP	001		24.8	NEDO	
Reactive Metals, Inc.	001		0.696	NEDO	
Niles WWTP	001		9.59	NEDO	
McDonald Steel	001		1.45	NEDO	

Table 5. Instream Conditions and Discharger Flow for CONSWLA Model - Continued.

Parameter	Units/Outfall		Value	Basis
Discharger Flow	cfs			
Mosquito Creek WWTP			001	6.5 NEDO
Meander Creek WWTP			001	6.19 NEDO
Boardman WWTP	001		7.74	NEDO
Orion Power	001		298.6	NEDO
	002		6.19	NEDO
	008		0.002	NEDO
Girard WWTP	001		7.74	NEDO
Youngstown WWTP	001		54.2	NEDO
Campbell WWTP	001		2.94	NEDO
Struthers WWTP	001		9.28	NEDO
Lowellville WWTP	001		0.792	NEDO
Mixing Assumption	%	average	100	Stream-to-discharge ratio
	%	maximum	100	Stream-to-discharge ratio
Instream Temperature	°C	summer	22	STORET [C]; 38 values, 0<MDL, 1990-98
		winter	4.1	STORET [C]; 27 values, 0<MDL, 1990-98
Instream pH	S.U.	summer	7.8	STORET [C]; 38 values, 0<MDL, 1990-98
		winter	7.9	STORET [C]; 27 values, 0<MDL, 1990-98
Background Water Quality				
Ammonia	mg/L	summer	0.09	STORET; 42 values, 8<MDL, 1999-2005
		winter	0.13	STORET; 16 values, 0 <MDL, 1999-2005
Arsenic	μg/L	annual	2.0	STORET; 124 values, 54<MDL, 1999-2005
Antimony	μg/L	annual	0.0	No representative data available
Barium	μg/L	annual	36.	STORET; 124 values, 0<MDL, 1999-2005
Boron	μg/L	annual	0.	No representative data available
Bis(2E)Phthalate	μg/L	annual	0.	No representative data available
Butylbenzl phthalate	μg/L	annual	0.	No representative data available
Cadmium	μg/L	annual	0.	STORET [C]; 82 values, 82<MDL, 1999-2006
Chlorine, total res	μg/L	annual	0.	No representative data available
Chromium, tot.	μg/L	annual	0.	STORET [C]; 82 values, 81<MDL, 1999-2006
Chromium^{+6}, diss	μg/L	annual	0.	No representative data available
Chloroform	μg/L	annual	0.	No representative data available

Copper	μg/L	annual	0.	STORET [C]; 82 values, 81<MDL, 1999-2006
Cyanide free	μg/L	annual	0.	No representative data available
Fluoride	μg/L	annual	0.	No representative data available
Iron	μg/L	annual	747.	STORET; 124 values, 0<MDL, 1999-2005
Lead	μg/L	annual	1.24	STORET [C]; 82 values, 70<MDL, 1999-2006
Mercury	μg/L	annual	0.	No representative data available
Molybdenum	μg/L	annual	0.	No representative data available

Table 5. Instream Conditions and Discharger Flow for CONSWLA Model - Continued

Parameter	Units		Value	Basis
Background Water Quality (Cont.)				
Naphthalene	μg/L	annual	0.	No representative data available
Nickel	μg/L	annual	0.	STORET [C]; 82 values, 82<MDL, 1999-2006
Phenol	μg/L	annual	0.	No representative data available
Selenium	μg/L	annual	0.	STORET; 15 values, 15<MDL,
Silver	μg/L	annual	0.	No representative data available
Strontium	μg/L	annual	151.	STORET; 124 values, 0<MDL, 1999-2005
Thallium	μg/L	annual	0.	No representative data available
Toluene	μg/L	annual	0.	No representative data available
TDS	mg/L	annual	307.	STORET; 109 values, 0<MDL, 1999-2005
Zinc	μg/L	annual	8.97	STORET [C]; 82 values, 55<MDL, 1999-2006

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

2.3 Reasonable Potential

After appropriate effluent limits are calculated (using the Monte Carlo and CONSWLA models), the reasonable potential of the discharger to violate the WLA (and the WQS) must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the most restrictive average WLA and the maximum WLA were selected from Table 6. The average PEQ value (Table 3) is compared to the average PEL, and the maximum PEQ value is compared to the maximum PEL. Based on the calculated percentage of the respective average and maximum comparisons, the parameters are assigned to “groups”, as listed in Table 7.

Table 6. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Average Human Health	Average Agri Supply	Average Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Outfall 005						
Barium	µg/L	1005.	--	585.	1376.	4000.
Cadmium	µg/L	--	--	1.97 [E]	16. [A]	16.
Copper	µg/L	--	--	35. [D]	43.7 [D]	45.
Iron	µg/L	--	27010.	--	--	--
Lead	µg/L	--	--	16.5 [D, E]	302. [D]	470.
Silver	µg/L	--	--	9.0	167. [A D]	44. [D]
Thallium	µg/L	102. [E]	--	174. [A]	802. [A]	160
Total Dissolved Solids	µg/L	--	--	33970.	--	--
Zinc	µg/L	--	--	370.	312.	370.

[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, WQS 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] Pennsylvania water quality criteria was applied

Table 7. Parameter Assessment for Outfall 005

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

Calcium	Chloride	Magnesium
Manganese	Phosphorus	Potassium
Sodium		

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

Antimony	Chromium^{+6}, diss.	Nitrate+Nitrite
Strontium		

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

Barium	Cadmium	Iron
Lead	NH_3-N (S&W)	TDS
Thallium	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.

Copper

Group 5: Maximum PEQ $\geq$ 100% of the maximum PEL or average PEQ $\geq$ 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

Limits			Applicable	Recommended Effluent	
	Parameter	Units	Period	Average	Maximum
	Silver	μg/L	annual		9.0

Whole Effluent Toxicity

The allowable effluent toxicity (AET) is a factor considered in evaluating whole effluent toxicity. The AET calculations are similar to those for aquatic life criteria (using the chronic toxicity unit (TU_c) and 7Q10 for average and the acute toxicity unit (TU_a) and 1Q10 for maximum). An assessment of the biological and hydraulic data in the vicinity of Warren Steel Holdings indicated that the effluent acute toxicity is not interactive with other dischargers. For Warren Steel Holdings, the AET values are 1.0 TU_a and 63.2 TU_c.

Effluent Limits/Hazard Management Decisions

The final effluent limits are determined by evaluating the groupings in conjunction with all applicable rules and regulations. Federal and State laws/regulation require that dischargers meet both treatment-technology-based effluent limits and any more stringent standards needed to comply with state WQS. Permit limits are based on the more restrictive of the two. The technology-based effluent limits for Warren Steel Holdings, found in 40 CFR Part 420, are based on the kilograms of pollutants allowed to be discharged per 1,000 kilograms of product produced. Table 8 shows the draft NPDES permit limits for outfall 005 for Warren Steel Holdings. *Since this facility has not been operating and the nature of the effluent when operations do resume is unknown, the draft permit includes limits and monitoring requirements for the same parameters as the existing permit. If the new waste load allocation has resulted in a more stringent limit for a given parameter, or recommends new limits or monitoring requirements, those changes have been incorporated into the draft permit. If a limit to maintain applicable water quality criteria as presented in Table 6 are more stringent than existing permit limits, even though the parameter in question would not require a limit based upon the most recent risk assessment, the limits in Table 6 have been included in the draft permit. Under these circumstances, the limits in Table 6 have been included in the draft permit in order to avoid authorizing discharge of pollutants at levels which would violate water quality criteria.*

The limits and monitoring requirements are as follows:

Outfall 005: Table 8

The limits and monitoring requirements in the existing permit have been continued in the draft permit, with exceptions as discussed above. The limits for total suspended solids and oil and grease are based upon Best Practical Control Technology (BPT) limits found in 40 CFR Part 420 and treatment plant design. The limits for Zinc and Lead have been continued from the previous permit.

The 30-day concentration limit for cadmium is based on the current WLA value (1.97 ug/l) because this applicable water quality-based limit is more stringent than the existing limit (8.2 ug/l). The same is the case with 30-day concentration limit for lead. The WLA value of 16.5 ug/l has been recommended because it is more stringent than the existing limit of 20 ug/l.

A limit for Silver has been introduced in the draft permit based on reasonable potential assessment.

Besides continuance of existing limits zinc and copper, monitoring for thallium and antimony have remained in the draft permit.

Mercury and acute toxicity biomonitoring requirements have remained in the draft permit at a frequency of semi-annual and annual monitoring, respectively. Mercury monitoring, utilizing EPA Method 1631 or 245.7, is proposed to continue in order to ensure that concentrations remain at low levels. Annual acute toxicity biomonitoring will help to characterize the discharge from this facility once it resumes operations and will ensure that toxicity is not a concern.

Outfall 601: Table 9

This outfall has been continued in the draft permit in order to monitor the discharge from the sewage treatment plant prior to being combined with the process wastewaters at outfall 005. The limits for total suspended solids and $CBOD_5$ are based upon secondary treatment standards found in the Federal Effluent Guidelines, 40 CFR Part 133. The remaining parameters included for this outfall are typically monitored for sanitary discharges to ensure adequate treatment and effluent quality.

The remainder of the monitoring stations in the permit are designed to measure the amount of stormwater flow (stations 006 and 007), sludge removed from the sewage treatment plants (station 588), intake strainer backwash (station 003), intake traveling screen backwash (station 004), and intake water from the Mahoning River (station 801). In addition to permit compliance, monitoring data is used to assist in evaluating effluent quality and treatment plant performance, designing plant improvements, and conducting future stream studies.

Whole Effluent Toxicity

Whole effluent toxicity or “WET” is the total toxic effect of an effluent on aquatic life in the receiving stream 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. WET values are then compared to a calculated allowable effluent toxicity “AET” value. This comparison along with an assessment of the instream community are two ways in which whole effluent toxicity is evaluated.

AET calculations are similar to aquatic life criteria wasteload allocation calculations. The $Q_{7,10}$ flow and chronic toxicity units (Tu_c) are used to calculate the average allowable AET, and the $Q_{1,10}$ flow and acute toxicity units (Tu_a) are used to calculate the maximum allowable AET. An assessment of the biological and hydraulic data in the vicinity of CSC Industries indicated that the effluent acute toxicity is not interactive with other dischargers. For CSC, the AET values are 1.0 TU_a and 63.2 TU_c.

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

$$TU_c = \frac{100}{IC_{25}}$$

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):

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

The acute toxicity unit (TU_a) is defined as 100 divided by the LC50 for the most sensitive test species:

$$TU_a = \frac{100}{LC50}$$

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

Ohio EPA conducted toxicity testing in September 1999 using the effluent from outfall 005, and found that the effluent was not acutely toxic. The composite test resulted in five percent mortality for fathead minnows and 10 percent mortality for Ceriodaphnia dubia. The acute mixing zone samples resulted in zero percent mortality for both species.

Table 8. Final Effluent Limits and Monitoring Requirements for Outfall 005

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
pH	S.U.	- - - - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - - -				EP/WQS
Suspended Solids	mg/l	16	48	85.5	256	EP /BPJ
Oil and Grease	mg/l	4	12	21.3	64	EP/BPJ
Thallium	µg/l	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]/EP
Silver, T. R.	µg/l	9.0	44	0.048	0.233	M[c]/WLA
Antimony	µg/l	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]/EP
Mercury	µg/l	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]/BPJ
Zinc, T. R.	µg/l	30	90	0.16	0.48	M[c]/EP/FEG/PD
Lead, T. R.	µg/l	16.5	65	0.041	0.34	M[c]/EP/FEG/WLA
Copper, T. R.	µg/l	35	43.7	0.09	0.11	M[c]/WLA
Cadmium	µg/l	1.97	15.2	0.005	0.04	M[c]/EP/WLA
Flow	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]/EP
Acute Toxicity	TU_a					
Ceriodaphnia dubia		- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]/BPJ
Fathead minnows		- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]/BPJ

[a] Loadings for suspended solids and oil and grease are based upon a flow of 1.4 MGD used in the CONSLWA Model. Loadings for copper, lead (30-day average) and cadmium are based upon a flow of 0.657 MGD used for the Monte Carlo Model parameters. Loadings for lead (daily max.) and zinc are based upon BAT standards. TSS and O&G loads are based on production figure of 2740 (1000 lb/day).

[b,c] See the next page for definition of terms and explanation of monitoring requirements.

Table 9. Final Effluent Limits and Monitoring Requirements for Outfall 601

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Suspended Solids	mg/l	30	45	--	--	M[c] /STS
Color, Severity	Units	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Nitrogen, Ammonia	mg/l	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Mercury	µg/l	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Odor, Severity	Units	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Turbidity, Severity	Units	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
Fecal Coliform	#/100 ml	2000	1000	--	--	M[c]/BPJ
Chlorine, Tot.Res.	mg/l	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]
CBOD5	mg/l	25	40	--	--	M[c]/STS
Flow	GPD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c]

[b,c] See the next page for definition of terms and explanation of monitoring requirements.

[b] Definitions: **ABS** = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l)); **AD** = Antidegradation (OAC 3745-1-05);
BPJ = Best Professional Judgment;
EP = Existing Permit;
FEG = Federal Effluent Guidelines, Best Available Technology, 40 CFR Part 420;
M = Monitoring;
PD = Plant Design Criteria;
RP = Reasonable Potential for exceeding water quality standards, and requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A));
STS = Secondary Treatment Standards, 40 CFR Part 133;
WET = Whole Effluent Toxicity (OAC 3745-33-07(B)) ;
WLA = Wasteload Allocation procedures (OAC 3745-2);
WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum;
WQS = Ohio Water Quality Standards (OAC 3745-1).

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

[d] Daily maximum limit.