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October 12, 2001

Mr. Kurt Hileman
Environmental Affairs
AK Steel Corporation
Middletown Works
1801 Crawford Street
Middletown, Ohio 45043-0001

Dear Mr. Hileman:

Re: AK Steel – Middletown Works
NPDES Permit Technical Support Document

Per your request, please find enclosed four copies of the NPDES permit Technical Support Document for the Middletown Works. We suggest you send one copy to Mary O'Sika at the Ohio EPA Southwest District Office and one copy to Mark Mann at Ohio EPA in Columbus. Please let me know if you need additional copies.

Sincerely yours,



Gary A. Amendola, P.E.

Enclosures

cc: Paul Casper,
Frost Brown Todd, LLC
w/enclosure

EXHIBIT 4

**Technical Support Document
for
Proposed NPDES Permit Effluent Limitations**

**AK Steel Corporation - Middletown Works
Ohio EPA Permit No. 11D00001*ED
NPDES Permit No. OH0009997**

**October 2001
Revision 2.0**

**Prepared for
AK Steel Corporation
Middletown Works**

**Amendola Engineering, Inc.
Rocky River, Ohio**

AKS-01-09-001

**Technical Support Document
for
Proposed NPDES Permit Effluent Limitations**

**AK Steel Corporation - Middletown Works
Ohio EPA Permit No. 11D00001*ED**

Executive Summary

This report is a supplement to the NPDES permit application filed with the Ohio EPA by AK Steel Corporation on July 5, 2001, for its integrated steel mill located at Middletown, Ohio (Ohio EPA Permit No. 11D00001*ED). It is an update of a similar report prepared in February 1997 as part of the renewal NPDES permit application for the current NPDES permit that became effective December 1, 1997. The purposes of this report are to set out the bases for: (1) proposed technology-based effluent limitations applicable to the Middletown Works from 40 CFR Parts 420 and 433, including alternative technology-based effluent limitations developed pursuant to 40 CFR Part 420.03 (the steel industry *water bubble* rule); (2) continuation of modified Section 301(g) effluent limitations for ammonia-N and phenols (4AAP) applicable to blast furnace and sintering operations; and, (3) proposed water quality-based effluent limitations (WQBELs) for discharges to Dicks Creek and the Great Miami River developed in accordance with Ohio water quality standards and Ohio EPA NPDES permitting policies.

As with the current permit, the applicable technology-based effluent limitations are proposed at internal monitoring stations and WQBELs are proposed at external outfalls. A new Outfall 007 is proposed for discharge of treated groundwater from AK Steel's Monroe Ditch PCB remediation area.

The current NPDES permit required excessive monitoring of AK Steel external outfalls (four times per week for Outfall 011 discharging to the Great Miami River; three times per week for four outfalls discharging to Dicks Creek). Those monitoring requirements have resulted in an extensive database which was used to conduct *reasonable potential* assessments for establishing recommended WQBELs and revised monitoring requirements in accordance with 40

CFR §122.44(d) and Ohio EPA protocols established at OAC 3745-2-04, 05 and 06. AK Steel selected the period January 1999 to March 2001 from this database to reflect recent high production and current data that represents advances made in wastewater treatment operations. The results of those assessments show that WQBELs are recommended under the Ohio protocols for a limited number of pollutants, namely, oil & grease and pH at all outfalls, and zinc at three Dicks Creek outfalls. AK Steel is also recommending an effluent limitation for PCBs from new Outfall 007.

Tables ES-1 to ES-6 present AK Steel's recommended effluent limitations and monitoring requirements for each internal monitoring station and external outfall. Development of the technology-based effluent limitations is set out in Section 2.0; preliminary WQBELs and the *reasonable potential* assessments are set out in Section 3.0; and, the recommended effluent limitations and monitoring requirements are summarized in Section 4.0 and Tables ES-1 to ES-6 that follow.

Table ES-1

AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Outfalls 011 and 001

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
Outfall 011						
Flow	mgd				Daily	24-Hr Total
Oil & Grease	mg/l		10		2/Month	Grab
Ammonia-N	mg/l				2/Month	24-Hr Comp
TR Zinc	ug/l				2/Month	24-Hr Comp
Free Cyanide	mg/l				2/Month	Grab
pH	su	6.5 to 9.0 su			Weekly	Grab
Internal Outfall 001 - sum of discharges from Outfalls 613 and 614						
Flow	mgd				Daily	Calculated
TSS	mg/l		1,983	6,433	Weekly	Calculated
Oil & Grease	mg/l		174	508	Weekly	Calculated
Total Lead	ug/l		4.35	13.39	Weekly	Calculated
Total Zinc	ug/l		4.23	20.76	Weekly	Calculated

Notes: 1. Compliance with the mass effluent limitations at Internal Outfall 001 shall be determined by the sum of the mass loadings for Internal Monitoring Stations 613 and 614. This is consistent with the current NPDES permit.

Table ES-2

AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Internal Monitoring Stations 613 and 614

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
<i>Internal Monitoring Station 613</i>						
Flow mgd					Daily	24-Hr Total
TSS mg/l					Weekly	24-Hr Comp
Oil & Grease mg/l					Weekly	Grab
Ammonia-N mg/l			205	410	Weekly	24-Hr Comp
Total Cyanide mg/l			9.4	18.7	Weekly	Grab
Phenols ug/l			0.90	1.80	Weekly	24-Hr Comp
Total Lead ug/l					Weekly	24-Hr Comp
Total Zinc ug/l					Weekly	24-Hr Comp
<i>Internal Monitoring Station 614</i>						
Flow mgd					Daily	24-Hr Total
TSS mg/l					Weekly	24-Hr Comp
Oil & Grease mg/l					Weekly	Grab
Total Lead ug/l					Weekly	24-Hr Comp
Total Zinc ug/l					Weekly	24-Hr Comp
Naphthalene ug/l				0.30	Annually	24-Hr Comp
Tetrachloro-ethylene ug/l				0.45	Annually	Grab

Notes: 1. Compliance with the mass effluent limitations at Internal Outfall 001 shall be determined by the sum of the mass loadings determined for Internal Monitoring Stations 613 and 614. This is consistent with the current NPDES permit.

Table ES-3

AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Outfalls 002, 003 and Internal Monitoring Station 631

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
Outfall 002						
Flow mgd					Daily	24-Hr Total
Oil & Grease mg/l		10			Monthly	Grab
Ammonia-N May - October Nov. - April					Monthly Monthly	24-Hr Comp 24-Hr Comp
pH su	6.5 to 9.0				Monthly	Grab
Outfall 003						
Flow mgd					Daily	24-Hr Total
Oil & Grease mg/l		10			Weekly	Grab
TR Zinc ug/l		470		10.14	Weekly	24-Hr Comp
pH su	6.5 to 9.0				Weekly	Grab
Internal Monitoring Station 631						
Flow mgd					Daily	24-Hr Total
TSS mg/l			700	1,288	Weekly	24-Hr Comp
Total Lead ug/l			1.68	6.60	Weekly	24-Hr Comp
Total Zinc ug/l			3.17	6.77	Weekly	24-Hr Comp

Note: 1. The Oil & Grease effluent limitation for Outfall 003 is a net concentration limit. The difference between the concentration measured at Station 11D00001803 and the concentration measured at 11D00001003 shall not exceed this level.

Table ES-4

AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Outfall 004, Internal Monitoring Stations 641 and 642

Effluent Characteristic	Effluent Limitations				Monitoring Requirements		
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type	
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum			
Outfall 004							
Flow	mgd				Daily	24-Hr Total	
Oil & Grease	mg/l		10		Weekly	Grab	
TR Zinc	ug/l		470	6.21	Weekly	24-Hr Comp	
pH	su	6.5 to 9.0			Weekly	Grab	
Internal Monitoring Station 641							
Flow	mgd				Daily	24-Hr Total	
TSS	mg/l			700	1,400	Weekly	24-Hr Comp
Oil & Grease	mg/l			314	878	Weekly	Grab
TR Lead	ug/l			1.75	5.00	Weekly	24-Hr Comp
TR Zinc	ug/l			1.75	3.36	Weekly	24-Hr Comp
Naphthalene	ug/l				1.27	Annually	24-Hr Comp
Tetrachloro-ethylene	ug/l				1.91	Annually	Grab
Internal Monitoring Station 642							
Flow	mgd				Daily	24-Hr Total	
TSS	mg/l	31	60		Weekly	24-Hr Comp	
Oil & Grease	mg/l	26	52		Weekly	Grab	
T. Chromium	ug/l	1,710	2,770		Weekly	24-Hr Comp	
Total Lead	ug/l	430	690		Weekly	24-Hr Comp	
Total Nickel	ug/l	2,380	3,980		Weekly	24-Hr Comp	
Total Zinc	ug/l	1,480	2,610		Weekly	24-Hr Comp	
TTO	ug/l	NA	2,130		Quarterly	24-Hr Comp	

Table ES-5

AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Outfalls 015 and 005

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
<i>Outfall 015</i>						
Flow	mgd				Daily	24-Hr Total
Oil & Grease	mg/l		10		Weekly	Grab
TR Zinc	ug/l		470		Weekly	24-Hr Comp
pH	su	6.5 to 9.0			Weekly	Grab
<i>Internal Outfall 005</i>						
Flow	mgd				Daily	24-Hr Total
TSS	mg/l			959	Weekly	24-Hr Comp
Oil & Grease	mg/l			227	Weekly	Grab
Total Lead	ug/l			2.39	Weekly	24-Hr Comp
Total Zinc	ug/l			3.60	Weekly	24-Hr Comp

Table ES-6

**AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements**

Proposed Outfall 007

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
<i>Outfall 007</i>						
Flow	mgd				Daily	24-Hr Total
Oil & Grease	mg/l		10		Monthly	Grab
PCB-1242	ug/l		< DL		Monthly	24-Hr Comp
pH	su	6.5 to 9.0			Monthly	Grab

Note: 1. Compliance with the PCB effluent limit shall be demonstrated when the effluent monitoring result is non-detect at an analytical detection level of 0.22 ug/L.

**Technical Support Document
for
Proposed NPDES Permit Effluent Limitations
AK Steel Corporation - Middletown Works
Ohio EPA Permit No. 11D00001*ED**

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**Technical Support Document
for
Proposed NPDES Permit Effluent Limitations**

**AK Steel Corporation - Middletown Works
Ohio EPA Permit No. 1ID0001*ED**

1.0 Introduction

1.1 AK Steel Corporation - Middletown Works

On July 5, 2001, AK Steel Corporation (AK Steel) filed a renewal NPDES permit application for its Middletown Works located in Middletown, Ohio. The Middletown Works is a fully integrated steel mill that produces coke, sinter, molten iron, and molten steel as intermediate products, and hot-rolled, cold-rolled and coated steels as final products for the automotive and other flat-rolled steel markets. Annual raw steelmaking capacity at the Middletown Works is more than 3 million tons; however, AK Steel imports steel slabs for finishing from its Ashland, Kentucky mill and from outside sources. Thus, production capacities of the hot strip mill and finishing mills exceed raw steelmaking capacity.

Figure 3-1 is a scale map generated from USGS 7.5 minute quadrangle maps that shows the spatial arrangement of the AK Middletown Works and the Dicks Creek and Great Miami River outfalls. Figure 3-2 is a schematic diagram of Dicks Creek showing the configuration of Shaker Creek and AK Steel Outfalls 004, 015, 003, 002 and proposed Outfall 007. Figure 3-3 is a similar schematic for Outfall 011. Exclusive of Outfalls 008 and 009 which discharge only storm water, the Middletown Works has one outfall (Outfall 011) that discharges treated process wastewaters, non-contact cooling waters, well water, river water and storm water to the Great Miami River and four outfalls (Outfalls 002, 003, 004 and 015) that discharge treated process wastewaters, non-contact cooling waters, well water, river water and storm water to Dicks Creek, a tributary of the Great Miami River. AK Steel has also applied to discharge treated groundwaters from an on-site groundwater remediation system to Dicks Creek through new Outfall 007. Outfall 007 will be located across the Creek and downstream from Outfall 002.

There are six internal NPDES permit monitoring stations for specific process water treatment facilities (Outfalls 613, 614, 631, 641, 642 and 005). Table 1-1 presents a list of the internal and external outfalls, long term average flow rates and the NPDES production rates for tributary steel mill operations.

The Middletown Works has extensive process and non-contact cooling water treatment and recycle systems. The typical discharge of process and cooling water is in the range of 15 million gallons per day (mgd), or less than 1,600 gallons per ton of raw steel produced. This is believed to be the lowest water discharge rate of any integrated steel mill located in the United States. Total process and cooling water discharges at other integrated steel mills may range from five to more than ten times higher than those at the Middletown Works.

1.2 Clean Water Act Requirements

Section 402 of the Clean Water Act (CWA) establishes the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES permit program is designed to limit the discharge of pollutants into navigable waters of the United States through a combination of technology-based and water quality-based effluent limitations and other special conditions. The NPDES permit program for Ohio was delegated to the Ohio Environmental Protection Agency by U.S. EPA. The CWA provides that the Administrator of U.S. EPA, or his designee, must concur with permits issued to major dischargers by delegated state agencies. The AK Steel - Middletown Works has been classified as a major industrial discharger by Ohio EPA and U.S. EPA.

Sections 301, 304, 306 and 307 of the CWA provide that U.S. EPA must promulgate national effluent limitations guidelines and standards of performance for major industrial categories for three classes of pollutants: (1) conventional pollutants (i.e., total suspended solids (TSS), oil and grease, biochemical oxygen demand, fecal coliform and pH); (2) toxic pollutants (e.g., toxic metals such as chromium, lead, zinc); toxic organic pollutants such as benzene, benzo-a-pyrene, naphthalene, tetrachloroethylene); and, (3) non-conventional pollutants (all

pollutants that are not conventional pollutants or toxic pollutants, (e.g., ammonia-N, fluoride and phenols (4AAP)).

U.S. EPA must promulgate six types of effluent limitations guidelines and standards for each major industrial category:

<u>Abbreviation</u>	<u>Effluent Limitation Guideline or Standard</u>
BPT	Best Practicable Control Technology Currently Available
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
NSPS	New Source Performance Standards
PSES	Pretreatment Standards for Existing Sources
PSNS	Pretreatment Standards for New Sources

Pretreatment standards for existing and new sources are applicable to industrial facilities with wastewater discharges to publicly owned treatment works (POTWs), which generally are municipal wastewater treatment plants. Effluent limitations guidelines and new source performance standards are applicable to industrial facilities with direct discharges to navigable waters. AK Steel discharges pretreated coke plant process wastewaters to the City of Middletown POTW. All other process wastewaters are treated and discharged directly to Dicks Creek or the Great Miami River. Consequently, for purposes of the renewal NPDES permit, the BPT, BAT and BCT effluent limitations guidelines and NSPS are applicable to the Middletown Works. NSPS are applicable to a limited number of facilities constructed after promulgation of 40 CFR Part 420.

Section 301 of the CWA, as amended by the Water Quality Act of 1987, requires that BPT effluent limitations were to have been achieved by July 1, 1977. BAT effluent limitations for toxic pollutants, BAT effluent limitations for non-conventional pollutants, and BCT effluent limitations for conventional pollutants must be achieved within three years from date of promulgation but no later than March 31, 1989. Section 402(a)(1) of the CWA provides that in the absence of promulgated effluent limitations guidelines or standards, the Administrator, or his designee, may establish effluent limitations for individual discharges on a case-by-case basis. U.S. EPA NPDES permit regulations provide that these limits may be

established using "best professional judgement" (BPJ) taking into account proposed effluent limitations guidelines and standards and other relevant scientific, technical and economic information.

The effluent limitations guidelines and standards applicable to AK Steel are found at 40 CFR Part 420 for sintering, ironmaking, steelmaking, vacuum degassing, continuous casting, hot forming, acid pickling, cold rolling, alkaline cleaning and hot coating operations; and, at 40 CFR Part 433 for electroplating operations. 40 CFR Part 420 was promulgated in May 1982, and amended in May 1984. The compliance date for achieving the BAT effluent limitations contained in 40 CFR Part 420 was originally July 1, 1984. Cokemaking operations are also regulated by 40 CFR Part 420; however, because AK Steel disposes of its cokemaking process wastewaters by discharge to the City of Middletown sewerage system, cokemaking process wastewaters are not regulated under the NPDES permit program. 40 CFR Part 433 was promulgated on July 15, 1983; the original compliance date was also July 1, 1984.

Section 304(l) of the CWA requires States to develop lists of impaired waters; identify point sources and amounts of pollutants they discharge that cause toxic impacts; and, develop an individual control strategy (ICS) for each point source. A principal purpose of Section 304(l) is to focus national surface water quality protection programs on areas with known water quality problems due entirely or substantially to point source discharges of "priority pollutants" listed in accordance with Section 307(a) of the CWA. In most cases where Section 304(l) applies, the NPDES permit for an affected discharger serves as the ICS. Dicks Creek and the Great Miami River have not been identified as impaired waters by the Ohio EPA. Consequently, an ICS is not required for the Middletown Works.

The applicable Ohio water quality standards for Dicks Creek and the Great Miami River are set out at Chapter 3745-1 of the Ohio Administrative Code. These standards were last revised on July 31, 1999, and were federally approved by U.S. EPA Region 5.

Table 1-1
AK Steel Corporation - Middletown Works
NPDES Permit Outfalls and NPDES Permit Production Rates

NPDES Permit Outfalls (Typical Flow, mgd)				Process Operations and Sources of Effluent Discharge	NPDES Permit Production Rates (tons/day)
External Outfall		Internal Monitoring Station			
011	(7.18)			Non-contact cooling water, well water, river water, storm water, Outfalls 613/614	
		613	(0.84)	Blast Furnace Sinter Plant	6,920 2,851
		614	(0.43)	#5 & #6 Cold Temper Mills #3 Zinc Grip H ₂ SO ₄ Pickler #2 Terme Line HCl Pickler #2 Terme Line HCl Fume Scrubber (1) #2 Terme, #3 Zinc Grip Alkaline Cleaners #2 Terme, #3 Zinc Grip, #4 Aluminize Hot Coating Lines #2 Terme Hot Coating Fume Scrubber (1)	8,873 1,861 451 2,312 3,920
002	(0.87)			Non-contact cooling water, well water, river water, storm water	NA Indirect Discharge
003	(2.97)			Non-contact cooling water, well water river water, storm water, Outfall 631	
		631	(0.17)	BOF Steelmaking - Suppressed Combustion	9,580
004	(2.79)			Non-contact cooling water, well water, storm water, river water, Outfalls 641 & 642	
		641	(2.13)	#3 Cold Mill (combination) #7 Cold Temper Mill - (da/ss) #4 & #5 HCl Picklers #4 & #5 HCl Picklers Fume Scrubbers (4) #2 EGL H ₂ SO ₄ Pickler #2 EGL Alkaline Cleaning	10,260 3,065 12,649 2,487 2,487
		642	(0.24)	#2 Electro-galvanizing Line	2,487
015	(0.74)			Non-contact cooling water, well water, storm water, river water, Outfall 005	
		005	(0.42)	Vacuum Degasser and CAS-OB Degasser Continuous Caster Hot Strip Mill	11,283 8,895 18,566
007	(~ 0.058)			Proposed new outfall; treated groundwater	
008 009				Storm water	

2.0 Technology-Based Effluent Limitations

2.1 Technology-Based Effluent Limitations Derived from Categorical Effluent Limitations Guidelines and Standards and Best Professional Judgement (BPJ) Determinations

Attachment A presents the derivation of technology-based effluent limitations from the applicable effluent limitations guidelines and standards for AK Steel Internal Monitoring Stations 613, 614, 631, 641 and 642, and for Internal Outfall 005. For each of the basic steelmaking and steel finishing operations, the NPDES production rates developed by AK Steel (see Table 1-1; Appendix A of the NPDES permit application) were used in combination with the BPT, BAT or BCT effluent limitations guidelines and NSPS from 40 CFR Part 420, as appropriate, to compute the allowable discharges of the regulated pollutants. The applicable technology-based effluent limitations from 40 CFR Part 433 were used for Internal Monitoring Station 642. For purposes of the draft NPDES permit, Internal Monitoring Stations 613 and 614 are treated as one compliance point (Outfall 001) per conditions in the existing permit.

In all but two cases the effluent limitations guidelines were used to compute the applicable technology-based effluent limitations with no adjustments to take into account site-specific circumstances on a best professional judgement (BPJ) basis. AK Steel co-treats approximately 150 gallons per minute (gpm) of water treatment residuals and boiler wastewaters with process wastewaters from blast furnace and sintering operations at Internal Monitoring Station 613. The water treatment and boiler wastewaters are not regulated by §420.22/23 or §420.32/33. Consequently, BPJ effluent limitations were included for TSS, oil & grease, total lead and total zinc for these wastewaters. Effluent concentrations used by EPA to develop the sintering and ironmaking effluent limitations guidelines were used as the bases for the BPJ effluent limitations. Also, BAT effluent limitations for total lead and total zinc for the hot strip mill (Outfall 005) were derived in accordance with information presented in the 1982 Development Document for 40 CFR Part 420 for hot strip mills with BAT-type high rate recycle process water systems, (see Volume IV, page 345 and 47 FR 23266, May 27, 1982).

2.2 Alternative Technology-Based Effluent Limitations

40 CFR Part 420 at §420.03 provides for alternative technology-based effluent limitations through a regulatory flexibility mechanism developed specifically for the iron and steel industry. This regulatory flexibility mechanism is known generally as the “*water bubble*”. The water bubble provides for trading pollutant discharge limitations among two or more NPDES permit compliance monitoring stations provided certain conditions are met:

- (1) Pollutant trading among a group of outfalls can only occur for like pollutants (e.g., TSS at one outfall for TSS at another outfall; TSS cannot be traded for oil & grease, ammonia-N or total lead);
- (2) The trades must involve a “*minimum net reduction amount*”. The minimum net reduction amount is set at 15 per cent of the traded amount for TSS and oil & grease and 10 per cent for other pollutants;
- (3) Any trades must comply with applicable water quality standards;
- (4) Each outfall subject to pollutant trading for the effluent limitations guidelines must have fixed effluent limitations; and,
- (5) Alternative, less stringent effluent limitations for cokemaking and cold forming process wastewaters are not allowed.

AK Steel is proposing several trades under the water bubble rule involving internal Outfalls 005 and internal monitoring stations 613, 631 and 641. These trades are set out in Tables 2-1 through 2-3 for TSS, total lead and total zinc, respectively. These trades meet the above conditions set out at §420.03. Trades are proposed only among like pollutants; the minimum net reduction amounts set out in the regulation are satisfied; each internal outfall and monitoring station has fixed effluent limitations; and, no alternative, less stringent effluent limitations are proposed for cokemaking or cold rolling operations.

Table 2-1
AK Steel Corporation - Middletown Works
Alternative Technology-Based Effluent Limitations - 40 CFR §420.03

Total Suspended Solids
Outfalls 613, 631, 641 and 005

Effluent Limitations in kg/day

Outfall	Generally Applicable Effluent Limitations	Desired Effluent Limitations	Difference	Available to Bubble (85 per cent)	Transfer to Outfalls 001 and 631	Alternative Effluent Limitations
Monthly Average						
613	248				1,288	1,536
631	91	700			609	700
641	942	700	242	206		700
005	2,939	950	1,989	1,691		959
Total	4,220		2,231	1,897	1,897	3,895
Daily Maximum						
613	746				4,676	5,422
631	272				1,016	1,288
641	2,072	1,400	672	571		1,400
005	7,925	1,900	6,025	5,121		1,926
Total	11,015		6,697	5,692	5,692	10,036

Note: 1. Per §420.03(a), alternative less stringent effluent limitations are not authorized for facilities subject to NSPS in water bubble trades. To account for this restriction, the generally applicable effluent limitations shown above for Outfall 005 do not include the NSPS monthly average limit of 9 kg/day and the daily maximum limit of 26 kg/day for the CAS-OB vacuum degasser, (see Attachment A). The CAS-OB NSPS limits were included in the proposed more stringent alternative effluent limitations for Outfall 005 to develop appropriate proposed alternative technology-based effluent limitations.

Table 2-2

AK Steel Corporation - Middletown Works
Alternative Technology-Based Effluent Limitations - 40 CFR §420.03

Total Lead
Outfalls 613, 631, 641 and 005

Effluent Limitations in kg/day

Outfall	Generally Applicable Effluent Limitations	Desired Effluent Limitations	Difference	Available to Bubble (90 per cent)	Transfer to Outfalls 001 and 631	Alternative Effluent Limitations
Monthly Average						
613	1.18				1.09	2.27
631	0.55				1.13	1.68
641	4.22	1.75	2.47	2.22		1.75
005	2.28	2.28				2.39
Total	8.23		2.47	2.22	2.22	8.09
Daily Maximum						
613	3.55				3.60	7.15
631	1.64				4.96	6.60
641	12.66	5.00	7.66	6.89		5.00
005	6.86	5.00	1.86	1.67		5.34
Total	24.71		9.52	8.56	8.56	24.09

- Note: 1. Per §420.03(a), alternative less stringent effluent limitations are not authorized for facilities subject to NSPS in water bubble trades. To account for this restriction, the generally applicable effluent limitations shown above for Outfall 005 do not include the NSPS monthly average limit of 0.11kg/day and the daily maximum limit of 0.34 kg/day for the CAS-OB vacuum degasser, (see Attachment A). The CAS-OB NSPS limits were included in the proposed more stringent alternative effluent limitations for Outfall 005 to develop appropriate proposed alternative technology-based effluent limitations.

Table 2-3

**AK Steel Corporation - Middletown Works
Alternative Technology-Based Effluent Limitations - 40 CFR §420.03**

**Total Zinc
Outfalls 613, 631, 641 and 005**

Effluent Limitations in kg/day

Outfall	Generally Applicable Effluent Limitations	Desired Effluent Limitations	Difference	Available to Bubble (90 per cent)	Transfer to Outfalls 001 and 631	Alternative Effluent Limitations
Monthly Average						
613	1.77					1.77
631	0.82				2.35	3.17
641	4.36	1.75	2.61	2.35		1.75
005	3.43	3.43				3.60
Total	10.38		2.61	2.35	2.35	10.29
Daily Maximum						
613	5.33				8.04	13.37
631	2.46				4.31	6.77
641	13.07	3.36	9.71	8.74		3.36
005	10.30	6.29	4.01	3.61		6.79
Total	31.16		14.22	12.35	12.35	30.29

- Note: 1. Per §420.03(a), alternative less stringent effluent limitations are not authorized for facilities subject to NSPS in water bubble trades. To account for this restriction, the generally applicable effluent limitations shown above for Outfall 005 do not include the NSPS monthly average limit of 0.17 kg/day and the daily maximum limit of 0.50 kg/day for the CAS-OB vacuum degasser, (see Attachment A). The CAS-OB NSPS limits were included in the proposed more stringent alternative effluent limitations for Outfall 005 to develop appropriate proposed alternative technology-based effluent limitations.

2.3 AK Steel Section 301(g) Modified Effluent Limitations

AK Steel applied for, and was granted, modified effluent limitations for ammonia-N and phenols (4AAP) provided for by federal NPDES permit regulations and Section 301(g) of the Clean Water Act for the currently effective NPDES permit for the Middletown Works. The modified limitations were granted by U.S. EPA and included in AK Steel NPDES permit No. 1ID00001*BD issued by Ohio EPA. The modified limits have been carried forward in each subsequent NPDES permit issued to AK Steel or its predecessor companies.

Ammonia-N and phenols (4AAP) from sintering and blast furnace operations are non-conventional pollutants for purposes of Section 301(g) of the CWA. Section 301(g) provides that modified effluent limitations for non-conventional pollutants from the generally applicable BAT effluent limitations may be granted provided the following conditions are met:

- (1) The proposed modified effluent limitations (PMELs) will meet the categorical BPT effluent limitations or applicable water quality-based effluent limitations, whichever are more stringent;
- (2) The proposed modified effluent limitations will not result in any additional requirements on other point or non-point sources;
- (3) The proposed modified effluent limitations will not interfere with the attainment or maintenance of water quality which will protect public water supplies, aquatic life and recreational activities; and,
- (4) The proposed modified effluent limitations will not result in the discharge of pollutants in quantities which may reasonably be anticipated to pose an unacceptable risk to human health or the environment because of bioaccumulation, persistency in the environment, acute toxicity, chronic toxicity (including carcinogenicity, mutagenicity or teratogenicity), or synergistic propensities.

By its renewal NPDES permit application, AK Steel requested the modified limitations be continued in the next NPDES permit issued for the Middletown Works. AK Steel has reviewed the existing modified effluent limitations in the context of Ohio EPA's currently

applicable water quality standards and procedures for conducting wasteload allocations and finds that the conditions under which the modified effluent limitations were granted remain applicable. A review of ammonia-N discharges to the Middletown area segment of the Ohio River shows substantial available capacity well above the AK Steel Section 301(g) modified effluent limitations. There are no Ohio water quality standards for phenols (4AAP), and the PMELs for phenols (4AAP) are less than the respective BPT effluent limitations. Accordingly, AK Steel proposes to continue the Section 301(g) modified effluent limitations for ammonia-N and phenols (4AAP) in the next NPDES permit.

The modified PMELs will result in compliance with Ohio water quality standards and all Section 301(g) conditions listed above have been met. Consequently, there should be no issues associated with approval of the modified PMELs subject to public review and comment on the proposed NPDES permit.

2.4 AK Steel Technology-Based Effluent Limitations

Tables 2-4 through 2-8 present comparisons of the generally applicable technology-based effluent limitations for the Middletown Works derived from 40 CFR Parts 420 and 433 and the proposed alternative technology-based effluent limitations based on application of §420.03 and AK Steel's Section 301(g) modified effluent limitations for ammonia-N and phenols (4AAP) applicable at Internal Monitoring Station 613.

Table 2-4

**AK Steel Corporation - Middletown Works
Proposed Technology-Based Effluent Limitations**

Internal Monitoring Stations 613/614: Blast Furnace/Sinter Plant; Finishing Operations

Pollutant	Generally Applicable Effluent Limitations		Alternative Effluent Limitations & Section 301(g) Limitations	
	30-Day Average (kg/day)	Daily Maximum (kg/day)	30-Day Average (kg/day)	Daily Maximum (kg/day)
Total Suspended Solids	695	1,757	1,983	6,433
Oil & Grease	174	508	174	508
Ammonia-N	31	94	205	410
Total Cyanide	9.4	18.7	9.4	18.7
Phenols (4AAP)	0.31	0.63	0.90	1.80
Total Lead	3.38	10.16	4.35	13.39
Total Zinc	4.40	13.21	4.23	20.76
Naphthalene	NA	0.30	NA	0.30
Tetrachloroethylene	NA	0.45	NA	0.45

Table 2-5

**AK Steel Corporation - Middletown Works
Proposed Technology-Based Effluent Limitations**

Internal Monitoring Station 631: Basic Oxygen Furnaces

Pollutant	Generally Applicable Effluent Limitations		Alternative Effluent Limitations	
	30-Day Average (kg/day)	Daily Maximum (kg/day)	30-Day Average (kg/day)	Daily Maximum (kg/day)
Total Suspended Solids	91	272	700	1,288
Total Lead	0.55	1.64	1.68	6.60
Total Zinc	0.82	2.46	3.17	6.77

Table 2-6

**AK Steel Corporation - Middletown Work
Proposed Technology-Based Effluent Limitations**

Outfall 005: Continuous Caster, Vacuum Degassers, Hot Strip Mill

Pollutant	Generally Applicable Effluent Limitations		Alternative Effluent Limitations	
	30-Day Average (kg/day)	Daily Maximum (kg/day)	30-Day Average (kg/day)	Daily Maximum (kg/day)
Total Suspended Solids	2,949	7,951	959	1,926
Oil & Grease	664	1,991		227
Total Lead	2.39	7.19	2.39	5.34
Total Zinc	3.60	10.80	3.60	6.79

Note: The daily maximum oil & grease effluent limitation is a BPJ effluent limitation carried over from the current permit.

Table 2-7

**AK Steel Corporation - Middletown Works
Proposed Technology-Based Effluent Limitations**

Internal Monitoring Station 641: Steel Finishing Operations

Pollutant	Generally Applicable Effluent Limitations		Alternative Effluent Limitations	
	30-Day Average (kg/day)	Daily Maximum (kg/day)	30-Day Average (kg/day)	Daily Maximum (kg/day)
Total Suspended Solids	942	2,072	700	1,400
Oil & Grease	314	878	314	878
Total Lead	4.22	12.66	1.75	5.00
Total Zinc	4.36	13.07	1.75	3.36
Naphthalene	NA	1.27	NA	1.27
Tetrachloroethylene	NA	1.91	NA	1.91

Table 2-8
AK Steel Corporation
Proposed Technology-Based Effluent Limitations
Internal Monitoring Station 642: Electroplating

Pollutant	Technology-Based Effluent Limitations	
	30-Day Average (mg/L)	Daily Maximum (mg/L)
Total Suspended Solids	31	60
Oil & Grease	26	52
Total Chromium	1.71	2.77
Total Nickel	2.38	3.98
Total Zinc	1.48	2.61
Total Toxic Organics	NA	2.13

- Notes: 1. Typical process wastewater flow is 250 gpm (0.360 mgd).
2. Outfall 642 is the only significant source of chromium and nickel to Outfall 004. Cyanide and other metals limited by 40 CFR Part 433 (i.e., cadmium, copper, lead, silver) are not part of the process.

3.0 Preliminary Water Quality-Based Effluent Limitations

Development of proposed water quality-based effluent limitations is a two step process. The first is to develop *preliminary* WQBELs for each outfall based on application of Ohio water quality standards for pollutants known or suspected to be present in discharges from AK Steel at levels which may be significant from a water quality standpoint. The second step is to develop proposed *final* WQBELs based on assessments of *reasonable potential* as required by the NPDES permit regulations at 40 CFR Part 122.44(d) and Ohio water quality implementation policies set out at OAC 3745-2-04, 05 and 06. Development of preliminary WQBELs for each Outfall is described below in Sections 3.1 and 3.2. Assessments of *reasonable potential* are reviewed in Section 3.3.

3.1 Process Wastewater Discharges from Dicks Creek Outfalls 004, 015, 003, 002; Treated Groundwater Discharge from Dicks Creek Outfall 007

Dicks Creek and its tributaries are designated for the following water quality uses for the indicated segments:

<u>Segment</u>	<u>Use Designations</u>
Dicks Creek	
> Cincinnati-Dayton Road to Yankee Road (RM 5.4 to 2.4)	MWH, AWS, IWS, PCR
> all other segments	WWH, AWS, IWS, PCR
North Branch of Dicks Creek	
> headwaters to Breiel Boulevard (RM 1.0)	WWH, AWS, IWS, PCR
> Breiel Boulevard to mouth	MWH, AWS, IWS, PCR
Shaker Creek and Millers Creek	WWH, AWS, IWS, PCR

where,	MWH	modified warm water habitat
	WWH	warm water habitat
	AWS	agricultural water supply
	IWS	industrial water supply
	PCR	primary contact recreation

Discrete segments of Dicks Creek and the North Branch of Dicks Creek are classified MWH because of extensive channel modifications which render the stream segments unsuitable for full warm water habitat uses.

All of the AK Steel outfalls discharge to segments of the North Branch of Dicks Creek or Dicks Creek that are classified as modified warm water habitat (MWH). For purposes of this analysis, the North Branch of Dicks Creek and the main stem of Dicks Creek upstream of AK Steel outfalls are considered to be intermittent, low flow streams with water quality design flows of zero cubic feet per second (cfs). The water quality design flow of Shaker Creek is reported by Ohio EPA to be 0.15 cfs. The discharges from AK Steel are interactive. That is, discharges from upstream outfalls can affect WQBELs for downstream outfalls.

Outfall 004 is the most upstream outfall and discharges to the North Branch near its confluence with the main stem of Dicks Creek. Outfalls 015, 003 and 002 discharge directly to the main stem downstream of Shaker Creek and upstream of the Yankee Road bridge which is the downstream boundary of the MWH use designation and the upstream boundary of the warm water habitat (WWH) use designation. The proposed discharge from new Outfall 007 would also be in the MWH section and would be located across the Creek and downstream of Outfall 002.

AK Steel discharges comprise essentially all of the flow in Dicks Creek during dry weather periods. The only other component of the dry weather water quality design flow is 0.15 cfs from Shaker Creek. Because AK Steel contributes essentially all of the flow to Dicks Creek during extended dry weather conditions, development of preliminary WQBELs must proceed with Outfall 004, the most upstream outfall, and follow with development of preliminary WQBELs for each subsequent downstream outfall (i.e., Outfalls 015, 003, 002 and 007).

Water quality assessments and *reasonable potential* analyses (see 40 CFR 122.44(d)(1)) conducted by Ohio EPA and AK Steel for the current NPDES permit show that WQBELs were required for only a limited number of pollutants at AK Steel Dicks Creek outfalls. These are

summarized in Table 3-1. There have been some changes in long term average flows and pollutant discharges from AK Steel and modifications to the water quality standards for metals since the last permit was issued. Impacts of those changes are reviewed below.

Table 3-1

**AK Steel Corporation - Middletown Works
Water Quality-Based Effluent Limitations
NPDES Permit 11D00001*FD (December 1, 1997)
Dicks Creek Outfalls Outfall 004, 015, 003, 002**

Pollutant	Concentration Limitations		Mass Limitations	
	30-Day Average (mg/L)	Daily Maximum (mg/L)	30-Day Average (kg/day)	Daily Maximum (kg/day)
<i>Outfall 004</i>				
Oil & Grease	NA	10	NA	NA
TR Copper	0.063	0.106	0.64	1.08
TR Zinc	0.417	0.457	NA	4.7
<i>Outfall 015</i>				
Oil & Grease	NA	10	NA	NA
TR Zinc	0.417	0.457	NA	1.2
<i>Outfall 003</i>				
Oil & Grease	NA	10	NA	NA
TR Zinc	0.417	0.457	NA	2.2
<i>Outfall 002</i>				
Oil & Grease	NA	10	NA	NA
Ammonia-N March - November	2.6	11.8	9.7	44.2
December - February	NA	9.9	NA	37.4

Attachment B is a printout from a spreadsheet, mass balance water quality model of Dicks Creek that was used to calculate preliminary WQBELs for AK Steel Dicks Creek outfalls. This assessment incorporates current long term average flows for Outfalls 004, 015, 003 and 002, as well as current Ohio Water Quality Standards. The hardness in Dicks Creek is usually above 500 mg/L. The current standards (OAC 3734-1-34, Table 34-2) indicate a default stream hardness of 400 mg/L when stream hardness exceeds 400 mg/L. This makes any WQBELs derived for hardness-dependent metals more conservative than would be derived with a hardness of 500 mg/L, or with application of the underlying equations for each metal at the actual Dicks Creek stream hardness that exceeds 500 mg/L, particularly during low flow periods. The WQBELs for zinc contained in the current permit were derived with a stream hardness of 500 mg/L. For purposes of deriving preliminary WQBELs for metals for this report, AK Steel also used a stream hardness of 500 mg/L. This is judged to be a reasonable approach given the MWH stream designation and because actual stream hardness would exceed 500 mg/L at low flow periods, particularly in the area immediately downstream of Outfall 004.

Following is an outfall-by-outfall review of the preliminary WQBELs and corresponding technology-based effluent limitations:

Outfall 004

Outfall 004 contains the discharges from Internal Monitoring Stations 641 (steel finishing) and 642 (No. 2 Electro-galvanizing Line), non-contact cooling water, well water, river water and storm water. The long term average discharge flow is 2.79 mgd. Following are assumptions made to develop the preliminary WQBELs for Outfall 004

- › there is no upstream flow in the North Branch of Dicks Creek during extended dry weather periods;
- › WQBELs for metals will be expressed as *total recoverable metals*; the water quality standards for metals will apply directly to the discharge from Outfall 004;
- › effluent hardness is greater than 500 mg/l, and thus in-stream hardness during dry weather periods will also be greater than 500 mg/l. As with the current permit, AK Steel used a hardness concentration of 500mg/L to derive preliminary

WQBELs for hardness-dependent total recoverable metals based on the respective formulae set out in Table 34-2 of OAC 3734-1-34; and,

- › the water quality standard oil & grease concentration of 10 mg/l (daily maximum) was applied as an NPDES permit effluent limitation.

Outfall 015

Outfall 015 contains the discharge from Internal Outfall 005 (vacuum degasser, CAS-OB degasser, continuous caster, hot strip mill), a limited amount of non-contact cooling water, well water, river water and storm water. The long term average discharge flow is 0.74 mgd. Each of the assumptions listed above for Outfall 004 are applicable to Outfall 015. The minor amount of natural background stream flow from Shaker Creek (0.15 cfs) was not assigned to Outfall 015.

Outfall 003

Outfall 003 contains the discharge from Internal Monitoring Station 631 (approximately 0.17 mgd), non-contact cooling water, river water, well water and storm water for on site as well as from the City of Middletown. The long term average discharge flow is approximately 2.97 mgd. All of the assumptions listed above for Outfall 015 are applicable to Outfall 003.

Outfall 002

Outfall 002 discharges non-contact cooling water, river water, well water and storm water. The typical discharge flow is approximately 0.87 mgd. Preliminary WQBELs for metals were calculated in the same manner and with the same assumptions used for Outfalls 015 and 003. Because free cyanide is not present in the discharge from Outfalls 004, 015 and 003, preliminary WQBELs for free cyanide are based on the total assimilative capacity of the stream (see Attachment B).

Preliminary WQBELs for ammonia-N discharges to Dicks Creek from Outfall 002 are based on the stream assimilative capacity minus relatively background contributions from Outfalls 004, 015 and 003. Ammonia-N was assumed to be a conservative substance for purposes of this assessment. Also shown are alternative ammonia-N effluent limitations for Outfall 002 that would apply if Dicks Creek was a warm water habitat. The WWH use

designation does not apply to Dicks Creek. The respective daily maximum outside-the-mixing zone WWH and Modified WWH Ammonia-N criteria are the same for both summer and winter conditions. Consequently, the preliminary daily maximum WQBELs are identical. The same is true for the December to February 30-day average criteria and preliminary WQBELs. There is a difference in preliminary WQBELs only for the March to November period where the WWH limitation would be 11.6 kg/day and the Modified WWH limitation would be 20.0 kg/day.

Outfall 007

See Section 3.3.1.

3.2 Discharge to the Great Miami River - Outfall 011

AK Steel discharges treated process wastewaters from Internal Monitoring Stations 613 (blast furnace, sinter plant) and 614 (steel finishing), non-contact cooling water, river water, well water and storm water to the Great Miami River through Outfall 011, (see Figure 3-1). The average dry weather discharge is approximately 7.18 mgd. The current NPDES permit established Internal Outfall 001 as a compliance monitoring point for the sum of the discharges from Internal Monitoring Stations 613 and 614, (see Figure 3-3).

The designated water quality uses of the Great Miami River at Middletown are warm water habitat, agricultural water supply, industrial water supply and primary contact recreation. In previous Ohio EPA waste load allocations, the Great Miami River was water quality-limited only for ammonia-N in the reach of the river near AK Steel. Available data show the River is no longer water quality-limited for ammonia-N, but there are still interactive discharges which require allocations of ammonia-N. Consequently, preliminary WQBELs for Outfall 011 for all pollutants of concern except for ammonia-N are based on near-field impacts of the discharge. Absent a revised Ohio EPA wasteload allocation for ammonia-N, the AK Steel WQBELs for ammonia-N are assumed to be the same as the current Section 301(g) effluent limitations applicable to the Outfall 613 discharge.

3.3 Assessment of *Reasonable Potential*

The NPDES permit regulations at 40 CFR §122.44(d) set out the requirements and obligations of permitting authorities to establish WQBELs in NPDES permits. The regulations require that a permitting authority establish WQBELs if it first determines there is a *reasonable potential* for a discharge to cause or contribute to exceedances of state numerical or narrative water quality standards. When making this determination, the permitting authority must use procedures which account for the following:

- › existing controls on point and non-point sources of pollution;
- › the variability of the pollutant in the discharge;
- › sensitivity of the designated species to toxicity testing, when evaluating whole effluent toxicity; and,
- › where appropriate, dilution of the effluent in the receiving water.

Ohio EPA has established specific protocols for assessing *reasonable potential* as required by 40 CFR §122.44(d)(1) at OAC 3745-2-04, 05 and 06. Following is AK Steel's assessment of reasonable potential for Outfalls discharging to Dicks Creek and for Outfall 011 that discharges to the Great Miami River. Comparisons are made between the preliminary WQBELs derived for each outfall presented earlier and AK Steel monitoring data for the period January 1998 to March 2001. This period is judged to be representative of recent high production and reflects advances made in wastewater treatment operations at the Middletown Works. For ammonia-N, the period of record is July 1999 to March 2001. The biological treatment system for the sinter plant and blast furnace wastewaters was upgraded in June 1999. Selection of data from this period for evaluating performance at the Middletown Works is consistent with OAC 3745-2-04(D)(1).

AK Steel's assessments of reasonable potential follow the protocols established at OAC 3745-2-04, 05 and 06. In short, AK Steel NPDES permit monitoring data for the period January 1998 to March 2001, and monitoring data for the current NPDES permit application were

evaluated to determine pollutants present in the discharges. Monthly average and daily maximum predicted effluent quality (PEQ) was determined for each pollutant characteristic of each discharge in accordance with 3745-2-04(D)(2) and (3). That regulation establishes the monthly average and daily maximum PEQs at the 95th percentile of the monthly average and daily maximum discharges, respectively. No outliers were excluded from the AK Steel monitoring data for these assessments of reasonable potential.

For Dicks Creek outfalls, preliminary water quality-based effluent limitations (PELs) were developed based upon a simplified mass balance water quality model, (see Attachments B-1, B-2 and C). The respective ambient water quality standards for each pollutant of concern were applied to the respective flows from each outfall. In the case of ammonia-N, available assimilative capacity upstream of Outfall 002 was assigned to Outfall 002, after accounting for background mass discharges from Outfalls 004, 015 and 003. The assimilative capacity for PCBs based on the aquatic life criterion was assigned to the proposed discharge from new Outfall 007. The human health non-drinking water quality criterion was also considered. All pollutants were treated as conservative substances.

Comparisons were made between the PEQs and PELs in accordance with OAC 3745-2-06 to determine whether WQBELs and/or effluent monitoring requirements should be recommended for each outfall. For reference purposes, presented below is a summary of the pollutant groups established at OAC 3745-2-06(B) for purposes of determining whether effluent limitations and/or monitoring requirements should be recommended:

- | | |
|---------|--|
| Group 5 | Effluent limitations and monitoring recommended |
| i. | Monthly Average PEQ \geq Monthly Average PEL, or
Daily Maximum PEQ \geq Daily Maximum PEL |
| | or |
| ii. | Monthly Average PEQ \geq 75 % of Monthly Average PEL, or
Daily Maximum PEQ \geq 75 % of Daily Maximum PEL, and
the total load of the pollutant downstream of the discharge is $>$ 75 % of the
loading capacity of the receiving water |

Group 4	Effluent monitoring recommended Monthly Average PEQ \geq 50 % of Monthly Average PEL, or Daily Maximum PEQ \geq 50 % of Daily Maximum PEL
Group 3	Evaluation of effluent monitoring recommended Monthly Average PEQ \leq 50 % of Monthly Average PEL, Daily Maximum PEQ \leq 50 % of Daily Maximum PEL
Group 2	Effluent monitoring not recommended Monthly Average PEQ \leq 25 % of Monthly Average PEL, or Daily Maximum PEQ \leq 25 % of Daily Maximum PEL
Group 1	Wasteload allocations and PELs cannot be developed because of lack of available data to develop numeric water quality criteria

In addition, the regulation provides a monitoring tracking requirement in accordance with OAC 3745-33-07 shall be recommended where the monthly average or daily maximum PEQ is $>$ 75 % of the respective monthly average or daily maximum PEL, and the total load of the pollutant downstream of the discharge is $>$ 75 % of the loading capacity of the receiving water. There are no pollutants for which tracking requirements are recommended for AK Steel outfalls. The sum of the daily maximum PEQs for Outfalls 004, 015, 003 and 002 for zinc are only 39 % of the downstream TMDL for zinc of 13.11 lbs/day, (see also Attachment C).

3.3.1 Discharges to Dicks Creek - Outfalls 004, 015, 003, 002, 007

Tables 3-2 to 3-5 show the above-referenced comparisons for Outfalls 004, 015, 003 and 002, respectively. An outfall-by-outfall review is presented below.

Outfall 004

Under the protocols established at OAC 3745-2-06(B), the results presented in Table 3-2 show that oil & grease, copper and lead are Group 2 pollutants (monitoring not recommended); ammonia-N is a Group 3 pollutant (monitoring evaluation recommended); and, zinc is in Group 4, (monitoring recommended).

In addition to those pollutants that have been monitored routinely, the AK Steel NPDES permit application shows the following pollutants were detected in the monitoring program conducted for the application. For comparative purposes, any Ohio aquatic life and human health ambient water quality standards are shown:

Pollutant	Application Data		Ambient WQS		
	Value	Unit	Value	Unit	Standard
Fluoride	0.52	mg/L	1.80	mg/L	HH, drinking water
Iron	4.89	mg/L	0.30	mg/L	HH, drinking water
Manganese	0.124	mg/L	0.050	mg/L	HH, drinking water
Magnesium	109	mg/L	NA		no WQ criteria
Nitrite & Nitrate-N	1.88	mg/L	10	mg/L	HH, drinking water
Sulfate	694	mg/L	250	mg/L	HH, drinking water

There are no ambient water quality standards for protection of aquatic life for these pollutants and Dicks Creek is not designated or used as a public water supply. Note also that the human health drinking water standards are applicable at the point of withdrawal for the water supply after conventional potable water supply treatment. The drinking water standard for iron is for dissolved iron, while the AK Steel NPDES monitoring data are for total iron. Based on these considerations, the discharge from Outfall 004 does not pose a reasonable potential to cause or contribute to exceedances of Ohio water quality standards. Section 4 sets out AK Steel's proposed effluent limitations and monitoring requirements for each outfall.

Outfall 015

For Outfall 015, the results of the reasonable potential analyses presented in Table 3-3 show the following:

Group 2	ammonia-N, lead
Group 3	zinc
Group 4	oil & grease

Pollutants detected in the Outfall 015 monitoring program for the NPDES permit application and the respective ambient water quality standards for those pollutants are shown below:

Pollutant	Application Data		Ambient WQS		
	Value	Unit	Value	Unit	Standard
Fluoride	11.4	mg/L	1.80	mg/L	HH, drinking water
Iron	0.61	mg/L	0.30	mg/L	HH, drinking water
Manganese	0.077	mg/L	0.050	mg/L	HH, drinking water
Magnesium	42.5	mg/L	NA		no WQ criteria
Nitrite & Nitrate-N	4.46	mg/L	10	mg/L	HH, drinking water
Phosphate-P	0.13	mg/L	1.0	mg/L	nuisance growth
Sulfate	273	mg/L	250	mg/L	HH, drinking water

There are no ambient water quality standards for protection of aquatic life for these pollutants. As noted above, Dicks Creek is not designated or used as a public water supply, thus the human health drinking water standards are not applicable. Based on these considerations, the discharge from Outfall 015 does not pose a reasonable potential to cause or contribute to exceedances of Ohio water quality standards.

Outfall 003

The results of the reasonable potential analyses for Outfall 003 for routinely monitored pollutants with applicable water quality standards are shown in Table 3-4, and are summarized below:

Group 2	oil & grease, lead, PCBs
Group 3	zinc, ammonia-N (monthly average)

Reference is made to Attachment B-2 for the derivation of PELs for ammonia-N for Outfall 003. In this case, the assimilative capacity of Dicks Creek to the point of discharge of Outfall 003 was considered.

Pollutants detected in the Outfall 003 monitoring program for the NPDES permit application and the respective ambient water quality standards for those pollutants are shown below:

Pollutant	Application Data		Ambient WQS		
	Concentration	Unit	Value	Unit	Standard
Bis (2-ethylhexyl) phthalate	0.131	mg/L	2.2	mg/L	IMZM
			1.1	mg/L	OMZM
			0.0084	mg/L	OMZA
Chloroform	0.0024	mg/L	3.6	mg/L	IMZM
			1.8	mg/L	OMZM
			0.079	mg/L	OMZA
			1.80	mg/L	HH, drinking water
Fluoride	0.53	mg/L	0.050	mg/L	HH, drinking water
Manganese	0.028	mg/L	NA		no WQ criteria
Magnesium	36.5	mg/L	NA		no WQ criteria
Nitrite & Nitrate-N	2.34	mg/L	10	mg/L	HH, drinking water
Phenols, Total	0.029	mg/L	NA		no WQ criteria
Sulfate	93	mg/L	250	mg/L	HH, drinking water

The concentration of bis (2-ethylhexyl) phthalate from the NPDES permit application sampling exceeded the OMZA aquatic life water quality standard. AK Steel does not use phthalate compounds as raw materials or intentionally as part of any process or wastewater treatment operation. AK Steel believes the presence of bis (2-ethylhexyl) phthalate in the discharge from Outfall 003 may be due to one or both of the following factors:

- contamination introduced as part of the environmental monitoring process. Phthalate compounds are ubiquitous in the environment and their presence is often attributable to field or laboratory contamination;
- contamination from off-site sources. Outfall 003 collects drainage from a considerable portion of the City of Middletown. Consequently, the presence of phthalate compounds may be attributable to off-site sources.

The latter appears to be a likely factor because phthalate compounds were not detected in NPDES permit application sampling for other outfalls that do not collect drainage from off-site. AK Steel is planning to conduct supplemental monitoring for bis (2-ethylhexyl) phthalate at Outfall 003, Internal Monitoring Station 803 and its Great Miami River water intake to assess the potential presence of this compound.

No other aquatic life water quality standards were exceeded from the NPDES permit application sampling for Outfall 003; neither were any human health drinking water quality standards, which are not applicable to Dicks Creek. Based on these considerations, the discharge from Outfall 003 does not pose a reasonable potential to cause or contribute to exceedances of Ohio water quality standards.

Outfall 002

Table 3-5 presents the reasonable potential analyses for Outfall 002 for pollutants that are monitored routinely.

Group 2: oil & grease, ammonia-N, free cyanide, zinc, PCBs

Pollutants detected in the NPDES permit application monitoring are reported below:

Pollutant	Application Data		Ambient WQS		
Fluoride	0.31	mg/L	1.80	mg/L	HH, drinking water
Manganese	0.092	mg/L	0.050	mg/L	HH, drinking water
Magnesium	44	mg/L	NA		no WQ criteria
Nitrite & Nitrate-N	1.39	mg/L	10	mg/L	HH, drinking water
Sulfate	179	mg/L	250	mg/L	HH, drinking water

The reasonable potential analyses for Outfall 002 for routinely monitored pollutants shows that effluent limitations and monitoring are not recommended under OAC 3745-2-06(B). Because human health drinking water standards are not applicable to Dicks Creek, there is also no reasonable potential for the discharge from Outfall 002 to cause or contribute to exceedances of human health drinking water standards for the above-listed pollutants.

Outfall 007

Outfall 007 is a new proposed outfall that would discharge to Dicks Creek downstream and across the Creek from Outfall 002. The average discharge is expected to be in the range of 40 gpm (0.058 mgd), and results from treatment of groundwater for PCBs at AK Steel's Monroe Ditch collection trench treatment system. The principal groundwater treatment units are two granular activated carbon (GAC) columns operated in series. AK Steel monitors the influent, at an intermediate point between the two GAC columns and the treated effluent. Reference is made to Attachment 3 of the NPDES permit application that presents AK Steel monitoring data for the period January 6, 1998 to June 8, 2001. The results show that PCBs (Aroclor 1242) have been

detected consistently in the influent (untreated wastewaters) at concentrations ranging up to 8 ug/L, but have not been detected in the treated effluent. The analytical detection levels ranged from 0.20 ug/L to a maximum of 0.22 ug/L, (0.00022 mg/L).

There are no federal categorical effluent limitations guidelines for treatment of groundwater resulting from site remediation programs. NPDES permit technology-based effluent limitations for such discharges must be developed on a case-by-case basis under authority of the CWA Section 402(a)(1), and the implementing NPDES permit regulations at 40 CFR §125.3. Factors to be considered in developing BPJ BAT effluent limitations at §125.3(d) include the age of equipment and facilities involved; engineering aspects of the application of various types of control techniques; process changes; the cost of achieving such effluent reductions; and, non-water quality environmental impacts (including energy requirements). At §125.3(c)(2), the permit issuing authority must also consider the appropriate technology for the class of point sources of which the permittee is a member and any unique factors relating to the permittee.

Because this is not a process wastewater discharge, many of the factors cited above are not relevant to a determination about whether the technology installed by AK Steel represents BAT. However, the engineering aspects of the application of the GAC control technology were considered by AK Steel, and the demonstrated performance of the system results in removal of PCBs to non-detect analytical results using sensitive analytical methods. On the basis of the demonstrated and consistent performance of the GAC treatment system, AK Steel believes the GAC treatment system represents the best available technology for treatment of PCBs for the proposed Outfall 007 discharge. As such, the BAT technology-based effluent limitation for this discharge should be a non-detect analytical result at the analytical detection level of 0.22 ug/L (0.00022 mg/L).

Under OAC 3745-2-04(B)(1), development of preliminary WQBELS (PELs) for PCBs is not required because all available data for the treated groundwater that will comprise the

discharge from Outfall 007 are non-detect. Nonetheless, AK Steel evaluated potential PELs as described below.

The outside-the mixing-zone average (OMZA) aquatic life criterion for PCBs is 0.001 ug/L (0.000001 mg/L). The human health water quality standards are 0.00079 ug/L (0.00000079 mg/L) for a carcinogenic endpoint for non-drinking water uses, and zero for drinking water uses. Neither Dicks Creek nor the Great Miami River downstream of AK Steel is designated for public water supply. There are no public water supplies that use Dicks Creek as source water and there are no public water supplies on the Great Miami River downstream of Dicks Creek. Consequently, application of the human health standard for drinking water uses is not appropriate. There is the potential that sport or subsistence fishers might consume fish from the Great Miami River. It is highly unlikely that people would consume fish taken from Dicks Creek because of habitat considerations and because Dicks Creek is comprised primarily of treated wastewater discharges and point and non-point source storm water discharges. Consequently, AK Steel considered the OMZA aquatic life criterion as the appropriate PCB criterion for Dicks Creek, (see Attachment E and table below).

Ohio Water Quality Standards for PCBs (ug/L)		Dicks Creek TMDL for PCBs at Outfall 007 (kg/day)	Outfall 007 Preliminary WQBELs for PCBs (ug/L)
Aquatic Life, OMZA	0.001	0.0000285	0.13

The preliminary WQBEL using the OMZA criterion is approximately sixty per cent of the analytical detection level of 0.22 ug/L.

Note the preliminary WQBEL using the human health non-drinking water criterion would be 0.10 ug/L instead of 0.13 ug/L, or 45% of the analytical detection level. In either case, the following recommendation would apply.

On the basis of the above considerations, AK Steel recommends that a daily maximum effluent limitation of non-detect for PCB 1242 be established for Outfall 007 at a detection level of 0.22 ug/L. This is consistent with Ohio EPA policy for establishing WQBELs when the WQBEL would not be detectable with sensitive analytical methods. This approach has been used in other NPDES permits where PCB remediation programs are in place. Given the performance of the Outfall 007 GAC treatment system and the consistent non-detect values obtained in the immediate range of the preliminary WQBELs, AK Steel believes this limit both represents BAT and will be protective of water quality.

3.3.2 Discharge to Great Miami River - Outfall 011

Table 3-6 sets out the mass preliminary WQBELs for Outfall 011 derived from IMZM water quality standards for oil & grease, ammonia-N, free cyanide, TR lead, TR zinc, naphthalene and tetrachloroethylene. The PELs for ammonia-N are the AK Steel Section 301(g) modified effluent limitations. The reasonable potential pollutant groupings for the routinely monitored pollutants are as follows:

- Group 2: oil & grease, free cyanide, copper, lead, naphthalene, tetrachloroethylene, zinc
- Group 3: ammonia-N

The following pollutants were detected in the Outfall 011 effluent from the NPDES permit application monitoring program:

Pollutant	Application Data		Ambient WQS		
	Value	Unit	Value	Unit	Criteria
Fluoride	1.51	mg/L	1.80	mg/L	HH, drinking water
Iron	4.22	mg/L	0.30	mg/L	HH, drinking water
Manganese	0.166	mg/L	0.050	mg/L	HH, drinking water
Magnesium	39.4	mg/L	NA		no WQ criteria
Nitrite & Nitrate-N	5.16	mg/L	10	mg/L	HH, drinking water
Sulfate	166	mg/L	250	mg/L	HH, drinking water

For the pollutants monitored routinely, ammonia-N falls in Group 3 (monitoring evaluation recommended); and, oil & grease, free cyanide, copper, lead, naphthalene,

tetrachloroethylene and zinc fall in Group 2 (monitoring not recommended). As noted above, the Great Miami River is not designated for public water supply downstream of Outfall 011. Consequently, the discharge from Outfall 011 does not result in a reasonable potential to cause or contribute to exceedances of Ohio water quality standards.

Table 3-2

AK Steel Corporation - Middletown Works
Assessment of Reasonable Potential

Outfall 004

Pollutant	Preliminary WQBELs (PELs)		AK Steel Monitoring Data January 1999 - March 2001 95 th Percentiles			Reasonable Potential Demonstration OAC 3745-2-06(B)	
	30-Day Average	Daily Maximum	Data > DL/ No. of Data	30-Day Average	Daily Values	30-Day Average	Daily Maximum
Oil & Grease mg/l	NA	10	3/351	NA	< DL	NA	Group 2
Ammonia-N kg/day							
March - November	9.5	58.1	152/351	4.6	5.6	Group 3	Group 2
December - February	11.6	61.3	152/351	4.6	5.6	Group 3	Group 2
TR Copper kg/day	0.39	0.68	1/351	< DL	< DL	Group 2	Group 2
TR Lead kg/day	0.53	10.03	0/351	< DL	< DL	Group 2	Group 2
TR Zinc kg/day	4.96	4.96	294/351	2.14	2.83	Group 3	Group 4

- Notes: 1. PELs calculated based on aquatic life OMZA and OMZM criteria applied to the long term average discharge flow.
2. AK Steel 95th percentile discharge loadings calculated on the basis of non-detect analytical measurements equal to zero.
3. AK Steel monitoring data for ammonia-N not separated by March to November and December to February periods.

Table 3-3
AK Steel Corporation - Middletown Works
Assessment of Reasonable Potential

Outfall 015

Pollutant	Preliminary WQBELs (PELs)		AK Steel Monitoring Data January 1999 - March 2001 95 th Percentiles			Reasonable Potential Demonstration OAC 3745-2-06(B)	
	30-Day Average	Daily Maximum	Data > DL/ No. of Data	30-Day Average	Daily Values	30-Day Average	Daily Maximum
Oil & Grease mg/l	NA	10	24/353	NA	5	NA	Group 4
Ammonia-N kg/day							
March - November	2.5	15.4	14/353	< DL	0.26	Group 2	Group 2
December - February	3.1	16.2	14/353	< DL	0.26	Group 2	Group 2
TR Lead kg/day	0.14	2.66	0/353	< DL	< DL	Group 2	Group 2
TR Zinc kg/day	1.32	1.32	230/353	0.34	0.64	Group 3	Group 3

- Notes:
1. PELs calculated based on aquatic life OMZA and OMZM criteria applied to the long term average discharge flow.
 2. AK Steel 95th percentile discharge loadings calculated on the basis of non-detect analytical measurements equal to zero.
 3. AK Steel monitoring data for ammonia-N not separated by March to November and December to February periods.

Table 3-4

**AK Steel Corporation - Middletown Works
Assessment of Reasonable Potential**

Outfall 003

Pollutant	Preliminary WQBELs (PELs)		AK Steel Monitoring Data January 1999 - March 2001 95 th Percentiles			Reasonable Potential Demonstration OAC 3745-2-06(B)	
	30-Day Average	Daily Maximum	Data > DL/ No. of Data	30-Day Average	Daily Values	30-Day Average	Daily Maximum
Oil & Grease mg/l	NA	10	309/341	NA	< DL	NA	Group 2
Ammonia-N kg/day							
March - November	19.2	130.9	98/353	6.14	7.27	Group 3	Group 2
December - February	24.2	138.4	98/353	6.14	7.27	Group 3	Group 2
TR Lead kg/day	0.56	10.68	0/353	< DL	< DL	Group 2	Group 2
TR Zinc kg/day	5.22	5.22	88/353	0.87	1.44	Group 2	Group 3
PCBs kg/day	NA	NA	0/27	< DL	< DL	NA	Group 2

- Notes:
1. PELs calculated based on aquatic life OMZA and OMZM criteria applied to the long term average discharge flow. PEL for PCBs not required per OAC 3745-2-04(B)(1) - all monitoring data not detect for PCBs. PELs for ammonia-N based on Dicks Creek assimilative capacity at point of discharge for Outfall 003, (see Attachment B-2).
 2. AK Steel 95th percentile discharge loadings calculated on the basis of non-detect analytical measurements equal to zero.
 3. AK Steel monitoring data for ammonia-N not separated by March to November and December to February periods.

Table 3-5
AK Steel Corporation - Middletown Works
Assessment of Reasonable Potential

Outfall 002

Pollutant	Preliminary WQBELs (PELs)		AK Steel Monitoring Data January 1999 - March 2001 Maximum Values Recorded			Reasonable Potential Demonstration OAC 3745-2-06(B)	
	30-Day Average	Daily Maximum	Data > DL/ No. of Data	30-Day Average	Daily Values	30-Day Average	Daily Maximum
Oil & Grease mg/l	NA	10	4/351	NA	< DL	NA	Group 2
Ammonia-N kg/day Modified Warmwater Habitat							
March - November	20.0	141	294/351	3.7	4.7	Group 2	Group 2
December - February	25.7	149	294/351	3.7	4.7	Group 2	Group 2
Warmwater Habitat							
March - November	11.6	141	294/351	3.7	4.7	Group 3	Group 2
December - February	25.7	149	294/351	3.7	4.7	Group 2	Group 2
Free Cyanide kg/day	0.34	1.30	1/351	< DL	< DL	Group 2	Group 2
TR Zinc kg/day	1.55	1.55	32/351	0.13	0.25	Group 2	Group 2
PCBs kg/day	NA	NA	0/28	< DL	< DL	NA	Group 2

- Note:
1. PELs for ammonia-N calculated by subtracting the sum of background loadings (Outfalls 004, 015,003) from allowable Dicks Creek in-stream 30-day average and daily maximum loadings at the point of discharge for Outfall 002.
 2. PELs calculated based on aquatic life OMZA and OMZM criteria applied to the long term average discharge flow.
 3. PEL for PCBs not required per OAC 3745-2-04(B)(1) - all monitoring data not detect for PCBs.
 4. AK Steel 95th percentile discharge loadings calculated on the basis of non-detect analytical measurements equal to zero.
 5. AK Steel monitoring data for ammonia-N not separated by March to November and December to February periods.

Table 3-6
AK Steel Corporation - Middletown Works
Assessment of Reasonable Potential

Outfall 011

Pollutant	Preliminary WQBELs (PELs)		AK Steel Monitoring Data January 1999 - March 2001 95 th Percentile			Reasonable Potential Demonstration OAC 3745-2-06(B)	
	30-Day Average	Daily Maximum	Data > DL/ No. of Data	30-Day Average	Daily Values	30-Day Average	Daily Maximum
Oil & Grease mg/l	NA	10	4/469	NA	< DL	NA	Group 2
Ammonia-N kg/day							
March - November	205	410	446/470	77.5	130	Group 3	Group 3
December - February	205	410	446/470	77.5	130	Group 3	Group 3
Free Cyanide kg/day	NA	2.50	19/470	< DL	< DL	Group 2	Group 2
TR Copper kg/day	NA	2.36	1/470	< DL	< DL	Group 2	Group 2
TR Lead kg/day	NA	32.8	22/470	< DL	0.12	NA	Group 2
TR Zinc kg/day	NA	18.8	258/470	3.00	4.55	NA	Group 2
Naphthalene kg/day	NA	8.70	NA	NA	0.25	NA	Group 2
Tetrachloroethylene kg/day	NA	29.9	NA	NA	0.37	NA	Group 2

- Notes:
1. PELs for ammonia-N are proposed modified effluent limitations (PMELs) from Section 301(g) variance. PELs for free cyanide, TR lead and TR zinc are based on IMZM aquatic life criteria applied to long term average effluent flow from Outfall 011, (Attachment D).
 2. Values reported as AK Steel monitoring data for naphthalene and tetrachloroethylene are technology-based effluent limitations for internal Outfall 614.
 3. AK Steel monitoring data for ammonia-N are for the period July 1999 to March 2001 and are not separated by March to November and December to February periods.

4.0 Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Tables 4-1 through 4-6 set out AK Steel's proposed NPDES permit effluent limitations and monitoring requirements for each of the internal and external process wastewater outfalls discharging to Dicks Creek and the Great Miami River, and for the discharge of treated groundwater from proposed Outfall 007. The effluent limitations are based on: (1) the determinations of applicable technology-based effluent limitations; (2) alternative technology-based effluent limitations provided for in effluent guideline and NPDES permit regulations; (3) determination of preliminary water quality-based effluent limitations; and, (4) assessments of *reasonable potential*.

Effluent Limitations

The following conventions were used to set proposed effluent limitations taking into account the reasonable potential determinations from Section 3.3 and Ohio EPA permitting policies:

- the proposed effluent limitations are structured such that technology-based effluent limitations apply at internal outfalls and water quality-based effluent limitations apply at external outfalls;
- for external process wastewater and treated groundwater outfalls discharging to Dicks Creek and the Great Miami River, daily maximum concentration limits of 10 mg/L for oil & grease are proposed;
- pH effluent limitations were set at 6.5 to 9.0 su for each external outfall, consistent with the current permit. pH effluent limitations are not proposed for internal outfalls because AK Steel has demonstrated consistent compliance with the more restrictive pH effluent limitations applied at external outfalls during the term of the current permit;
- where reasonable potential was not demonstrated and there are abundant data available to demonstrate the discharge of the respective pollutants are low in concentration or typically not detected, no effluent limitations or monitoring requirements are proposed (e.g., TR chromium, TR lead and TR nickel at external outfalls discharging to Dicks Creek); and,
- monitoring requirements are proposed at daily for discharge flow and weekly for most limited pollutants and pH.

- The monthly average and daily maximum water quality criteria applicable to Dicks Creek are the same (i.e., 0.470 mg/L at 500 mg/L total hardness). The reasonable potential assessments show that zinc is a Group 4 pollutant for Outfalls 004 (monitoring recommended); a Group 3 pollutant for Outfalls 015 and 003 (monitoring evaluation recommended); and a Group 2 pollutant for Outfall 002 (monitoring not recommended). AK Steel is recommending effluent limitations for zinc at Outfalls 004, 015 and 003 because the recommended effluent limits are equivalent to the ambient criteria and Dicks Creek is a low flow stream that would not exist during dry weather periods were it not for AK Steel's treated discharges. Because the average and maximum water quality criteria for TR zinc are the same, AK Steel is recommending only daily maximum effluent limitations.

Absent contribution from an unknown source other than AK Steel, water quality standards will be met 100 per cent of the time in Dicks Creek when the water quality criteria are met in AK Steel discharges on a concentration basis. Consequently, there is no need for corresponding mass limitations to ensure compliance with the standards. Notwithstanding, Ohio EPA believes it is necessary to also impose mass limitations on a daily maximum basis. The current permit established the daily maximum limitations based on the long term average flow from each outfall. That is not appropriate because each outfall can contain significant storm water flows from the site. Outfall 003 also drains a portion of the City of Middletown. Ohio EPA and AK Steel have agreed that an appropriate basis for calculating the daily maximum limitations is the 95th percentile of the measured flows for each outfall, as shown below:

	<u>95th percentile flow</u>
Outfall 004	3.49 mgd
Outfall 015	1.27 mgd
Outfall 003	5.70 mgd

The daily maximum mass limitations for TR zinc recommended by AK Steel in Tables 4-3, 4-4 and 4-5 are based on the above discharge flow rates.

- Based on the results of the reasonable potential analysis, AK Steel is planning to conduct a supplemental monitoring program for bis (2-ethylhexyl) phthalate for Outfall 003, Monitoring Station 803 (off-site storm water entering the Outfall 003 drainage system), and the Great Miami River water intake. AK Steel anticipates that the results of this monitoring program will be provided to Ohio EPA prior to public notice of the draft renewal NPDES permit.

Monitoring Requirements

The current NPDES permit issued in 1997 contains monitoring requirements of three times per week for Dicks Creek outfalls and four times per week for Outfall 011 that discharges to the Great Miami River. These monitoring frequencies exceed by a significant amount the norm in Ohio and other states for integrated steel mills with multiple outfalls and internal monitoring stations. AK Steel's compliance record for the current permit demonstrate the high monitoring frequencies contributed unnecessarily to high costs with no apparent environmental benefit. Consequently, AK Steel is proposing less frequent monitoring at external outfalls as described below. When developing these monitoring frequencies, AK Steel considered the extensive data collected and summarized in Tables 3-2 to 3-6.

Outfall 011 (Table 4-1)

Monitoring frequencies of twice monthly are proposed for oil & grease, ammonia-N, free cyanide, and zinc. Oil & grease was detected in less than 1 per cent of the samples taken during the period of record (4 out of 469 samples collected from January 1999 to March 2001). Free cyanide was detected in about 4 per cent of the samples taken and the 95th percentiles of the monthly average and daily discharges were non-detect. Although ammonia-N was detected regularly, ammonia-N is limited at internal monitoring station 613 and the 95th percentiles of the monthly and daily discharges at Outfall 011 are approximately 39 % and 32 % of the respective monthly average and daily maximum internal limits applied at Internal Monitoring Station 613. Zinc was detected in about 55 per cent of the samples taken, and the daily maximum PEQ is only 24 per cent of the respective daily maximum PEL.

Outfall 002 (Table 4-3)

Monitoring frequencies of monthly are recommended for oil & grease and ammonia-N. Oil & grease was detected in only 4 of 351 samples. Ammonia-N was detected consistently in the discharge from Outfall 002; however, the monthly and daily PEQs are well below the respective PELs (about 17 percent of the most stringent applicable monthly average PEL; about 3.5 per cent of the most stringent applicable daily maximum PEL).

Outfall 003 (Table 4-3)

Monitoring frequencies of weekly are recommended for oil & grease and zinc at Outfall 003. These pollutants were detected regularly at Outfall 003.

Outfalls 004 (Table 4-4), 015 and 005 (Table 4-5)

Although oil & grease was not detected at Outfalls 004 and 005 as frequently as at Outfall 003, weekly monitoring frequencies are recommended to coincide with those proposed for zinc.

Outfall 007 (Table 4-6)

Monthly monitoring for PCBs is proposed for Outfall 007 based on the consistent non-detect results reported in Appendix 3 of the NPDES permit application.

Table 4-1
AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements
Outfalls 011 and 001

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
<i>Outfall 011</i>						
Flow mgd					Daily	24-Hr Total
Oil & Grease mg/l		10			2/Month	Grab
Ammonia-N mg/l					2/Month	24-Hr Comp
TR Zinc ug/l					2/Month	24-Hr Comp
Free Cyanide mg/l					2/Month	Grab
pH su	6.5 to 9.0 su				Weekly	Grab
<i>Internal Outfall 001 - sum of discharges from Outfalls 613 and 614</i>						
Flow mgd					Daily	Calculated
TSS mg/l			1,983	6,433	Weekly	Calculated
Oil & Grease mg/l			174	508	Weekly	Calculated
Total Lead ug/l			4.35	13.39	Weekly	Calculated
Total Zinc ug/l			4.23	20.76	Weekly	Calculated

Notes: 1. Compliance with the mass effluent limitations at Internal Outfall 001 shall be determined by the sum of the mass loadings for Internal Monitoring Stations 613 and 614. This is consistent with the current NPDES permit.

Table 4-2

**AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements**

Internal Monitoring Stations 613 and 614

Effluent Characteristic	Effluent Limitations				Monitoring Requirements		
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type	
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum			
<i>Internal Monitoring Station 613</i>							
Flow	mgd				Daily	24-Hr Total	
TSS	mg/l				Weekly	24-Hr Comp	
Oil & Grease	mg/l				Weekly	Grab	
Ammonia-N	mg/l			205	410	Weekly	24-Hr Comp
Total Cyanide	mg/l			9.4	18.7	Weekly	Grab
Phenols	ug/l			0.90	1.80	Weekly	24-Hr Comp
Total Lead	ug/l					Weekly	24-Hr Comp
Total Zinc	ug/l					Weekly	24-Hr Comp
<i>Internal Monitoring Station 614</i>							
Flow	mgd					Daily	24-Hr Total
TSS	mg/l					Weekly	24-Hr Comp
Oil & Grease	mg/l					Weekly	Grab
Total Lead	ug/l					Weekly	24-Hr Comp
Total Zinc	ug/l					Weekly	24-Hr Comp
Naphthalene	ug/l				0.30	Annually	24-Hr Comp
Tetrachloro-ethylene	ug/l				0.45	Annually	Grab

Notes: 1. Compliance with the mass effluent limitations at Internal Outfall 001 shall be determined by the sum of the mass loadings determined for Internal Monitoring Stations 613 and 614. This is consistent with the current NPDES permit.

Table 4-3
AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements
Outfalls 002, 003 and Internal Monitoring Station 631

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
Outfall 002						
Flow mgd					Daily	24-Hr Total
Oil & Grease mg/l		10			Monthly	Grab
Ammonia-N May - October Nov. - April					Monthly Monthly	24-Hr Comp 24-Hr Comp
pH su	6.5 to 9.0				Monthly	Grab
Outfall 003						
Flow mgd					Daily	24-Hr Total
Oil & Grease mg/l		10			Weekly	Grab
TR Zinc ug/l		470		10.14	Weekly	24-Hr Comp
pH su	6.5 to 9.0				Weekly	Grab
Internal Monitoring Station 631						
Flow mgd					Daily	24-Hr Total
TSS mg/l			700	1,288	Weekly	24-Hr Comp
Total Lead ug/l			1.68	6.60	Weekly	24-Hr Comp
Total Zinc ug/l			3.17	6.77	Weekly	24-Hr Comp

- Note: 1. The oil & grease effluent limitation for Outfall 003 is a net concentration limit. The difference between the concentration measured at Station 803 and the concentration measured at Outfall 003 shall not exceed this level.
2. AK Steel will conduct a short-term monitoring program for bis (2-ethylhexyl) phthalate at Outfall 003, Monitoring Station 803 and the Great Miami River water intake comprising three 24-hour composite samples to be collected over a one month period. The purpose of the monitoring program is to determine whether bis (2-ethylhexyl) phthalate is present in the discharge from Outfall 003 and whether continued monitoring or effluent limitations are warranted.

Table 4-4

**AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements**

Outfall 004, Internal Monitoring Stations 641 and 642

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
Outfall 004						
Flow	mgd				Daily	24-Hr Total
Oil & Grease	mg/l		10		Weekly	Grab
TR Zinc	ug/l		470	6.21	Weekly	24-Hr Comp
pH	su	6.5 to 9.0			Weekly	Grab
Internal Monitoring Station 641						
Flow	mgd				Daily	24-Hr Total
TSS	mg/l		700	1,400	Weekly	24-Hr Comp
Oil & Grease	mg/l		314	878	Weekly	Grab
TR Lead	ug/l		1.75	5.00	Weekly	24-Hr Comp
TR Zinc	ug/l		1.75	3.36	Weekly	24-Hr Comp
Naphthalene	ug/l			1.27	Annually	24-Hr Comp
Tetrachloro-ethylene	ug/l			1.91	Annually	Grab
Internal Monitoring Station 642						
Flow	mgd				Daily	24-Hr Total
TSS	mg/l	31	60		Weekly	24-Hr Comp
Oil & Grease	mg/l	26	52		Weekly	Grab
T. Chromium	ug/l	1,710	2,770		Weekly	24-Hr Comp
Total Lead	ug/l	430	690		Weekly	24-Hr Comp
Total Nickel	ug/l	2,380	3,980		Weekly	24-Hr Comp
Total Zinc	ug/l	1,480	2,610		Weekly	24-Hr Comp
TTO	ug/l	NA	2,130		Quarterly	24-Hr Comp

Table 4-5
AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Outfalls 015 and 005

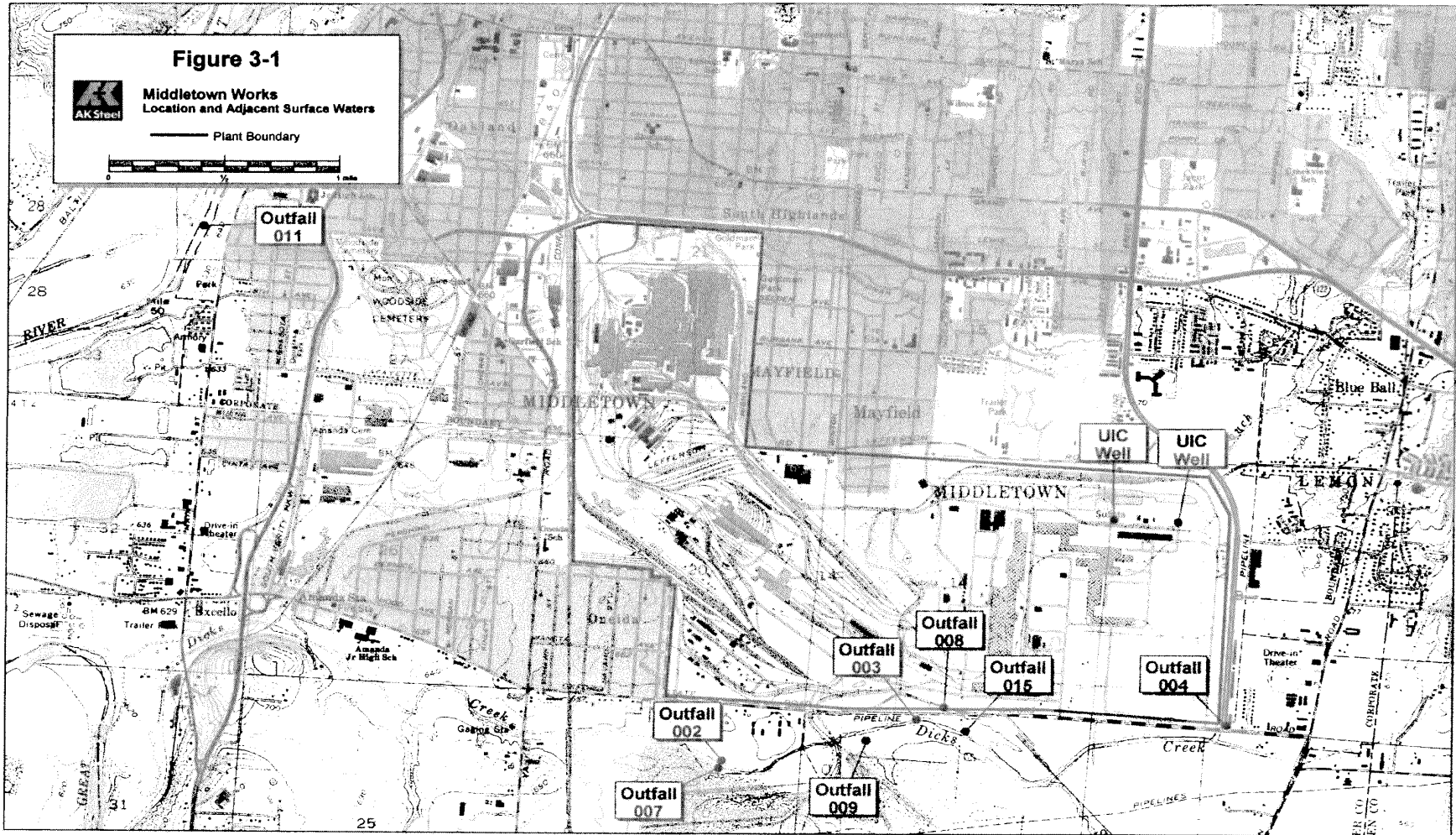
Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
<i>Outfall 015</i>						
Flow	mgd				Daily	24-Hr Total
Oil & Grease	mg/l	10			Weekly	Grab
TR Zinc	ug/l	470		2.26	Weekly	24-Hr Comp
pH	su	6.5 to 9.0			Weekly	Grab
<i>Internal Outfall 005</i>						
Flow	mgd				Daily	24-Hr Total
TSS	mg/l		959	1,926	Weekly	24-Hr Comp
Oil & Grease	mg/l			227	Weekly	Grab
Total Lead	ug/l		2.39	5.34	Weekly	24-Hr Comp
Total Zinc	ug/l		3.60	6.79	Weekly	24-Hr Comp

Table 4-6
AK Steel Corporation - Middletown Works
Proposed NPDES Permit Effluent Limitations and Monitoring Requirements

Proposed Outfall 007

Effluent Characteristic	Effluent Limitations				Monitoring Requirements	
	Concentration		Mass Loading (kg/day)		Measurement Frequency	Sample Type
	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum		
<i>Outfall 007</i>						
Flow	mgd				Daily	24-Hr Total
Oil & Grease	mg/l		10		Monthly	Grab
PCB-1242	ug/l		< DL		Monthly	24-Hr Comp
pH	su	6.5 to 9.0			Monthly	Grab

Note: 1. Compliance with the PCB effluent limit shall be demonstrated when the effluent monitoring result is non-detect at an analytical detection level of 0.22 ug/L.



**Figure 3-2
AK Steel Corporation
Dicks Creek Outfalls**

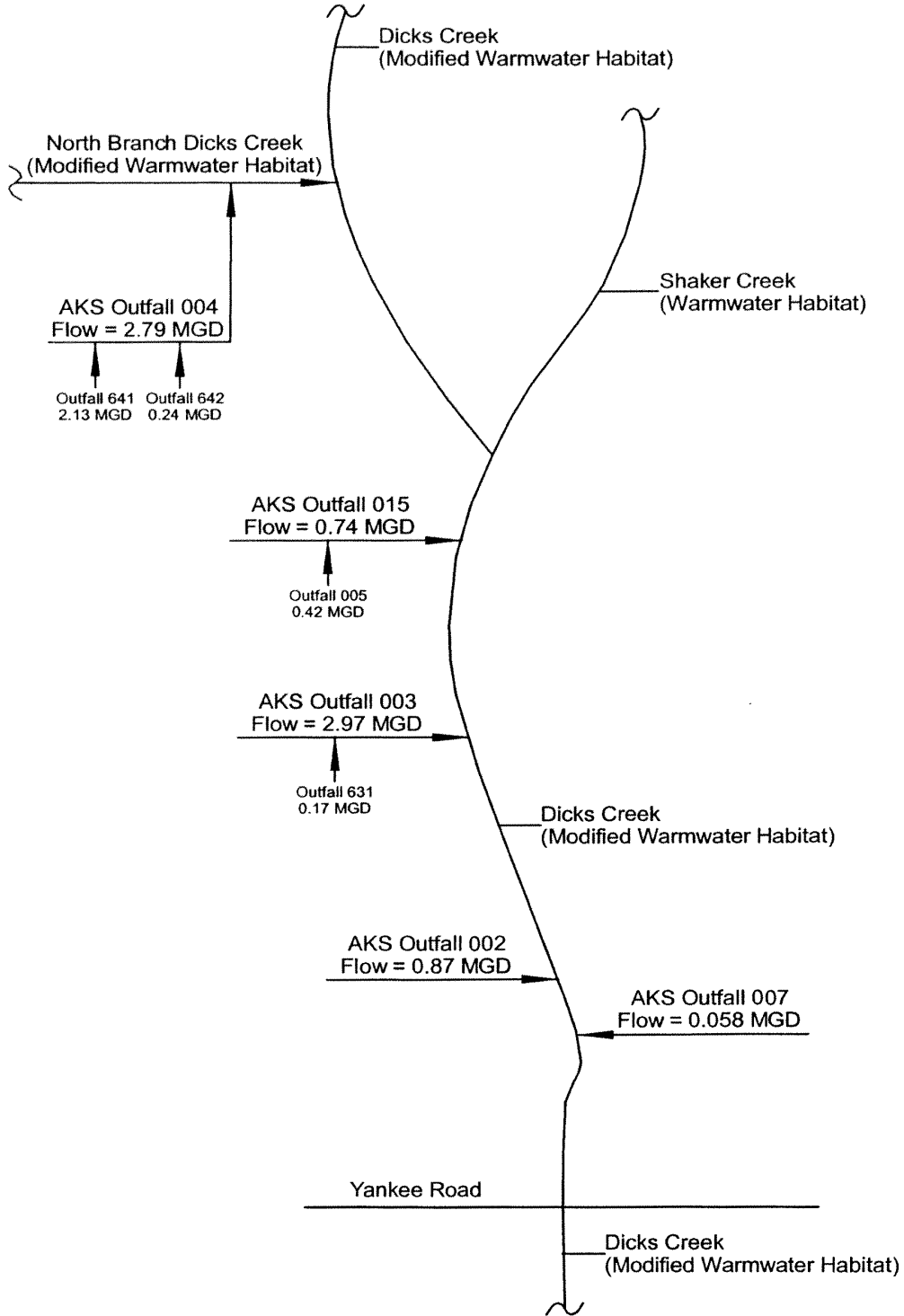
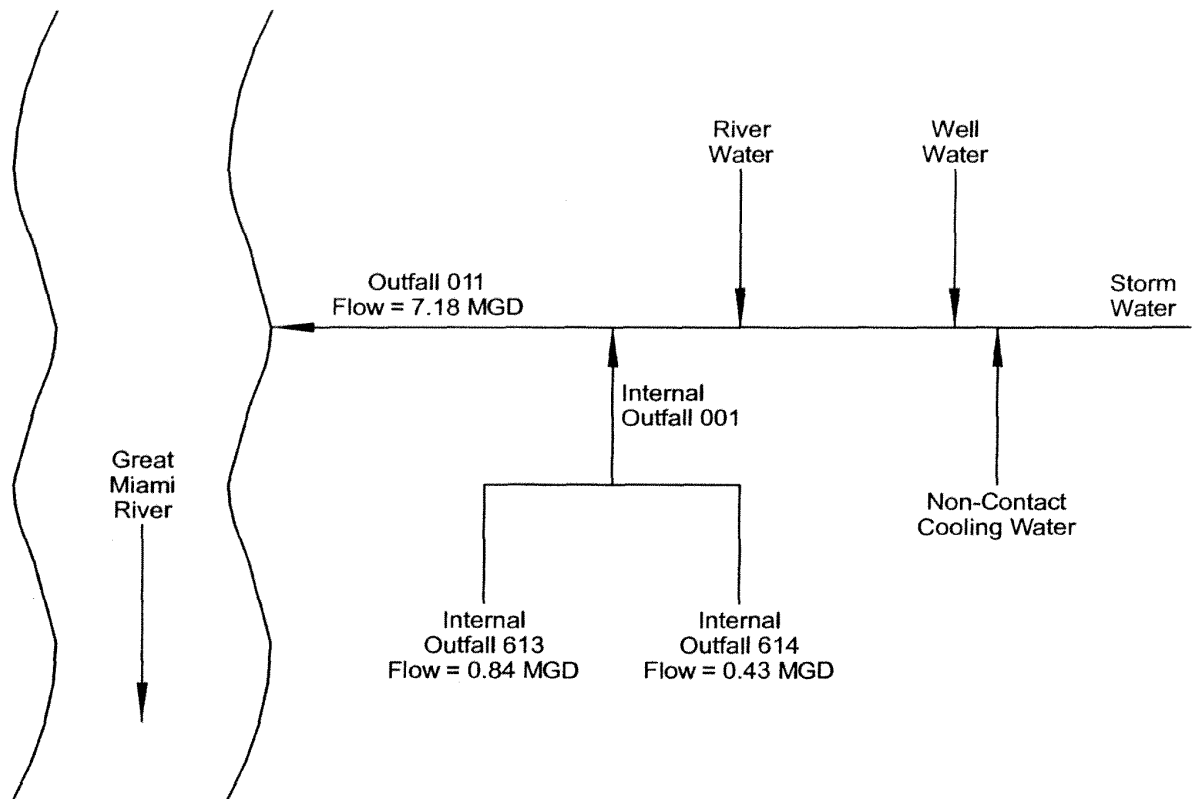


Figure 3-3
AK Steel Corporation
Outfall 011 - Discharge to Great Miami River



ATTACHMENT A

**AK Steel - Middletown Works
Technology-Based Effluent Limitations
40 CFR Parts 420 and 433**

OUTFALL: 613 9/21/2001

APPLICATION OF 1982 ELGs - TECHNOLOGY-BASED EFFLUENT LIMITATIONS
40 CFR Part 420

PLANT: AK Steel Corporation - Middletown Works
LOCATION: Middletown, Ohio

PROCESSES: Blast Furnace, Sinter Plant

PROCESS	EFFLUENT GUIDELINE	PRODUCTION* (TONS/DAY)	TSS		OIL & GREASE		AMMONIA - N		TOTAL CYANIDE		PHENOLS (4AAP)		TOTAL LEAD		TOTAL ZINC		TRC
			AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	MAX
Ironmaking	420.32/34	6,920	0.026 380	0.0782 1082			0.00292 40	0.00876 121	0.000876 12.12	0.00175 24.22	0.0000292 0.40	0.0000584 0.81	0.0000876 1.21	0.000263 3.64	0.000131 1.81	0.000394 5.45	0.000146 2.02
Sintering	420.22/23	2,851	0.025 143	0.0751 428	0.00501 29	0.015 86	0.00501 29	0.015 86	0.0015 8.55	0.003 17.11	0.0000501 0.29	0.0001 0.57	0.00015 0.86	0.000451 2.57	0.000225 1.28	0.000676 3.85	0.00025 1.43
BPJ for Non-Guideline Process Wastewaters (150 ppm, 0.216 mgd)		0.216	25 45	75 135	15 27	45 81			0.00 0.00	0.00 0.00			0.30 0.54	0.90 1.62	0.45 0.81	1.35 2.43	

GENERALLY APPLICABLE EFFLUENT LIMITATIONS

TOTAL Outfall 613	(lbs/day)	547	1646	56	167	69	207	20.7	41.3	0.69	1.38	2.61	7.83	3.91	11.74	3.45
	(kg/day)	248	746	25	76	31	94	9.4	18.7	0.31	0.63	1.18	3.55	1.77	5.33	1.56
APPROVED SECTION 301(g) LIMITATIONS	(kg/day)					205	410			0.90	1.80					

- Notes: 1 Effluent limitations guidelines for Total Residual Chlorine (TRC) only applicable if chlorine is applied as part of the wastewater treatment process.
2 BPJ limits for metals for non-guideline process wastewaters based on effluent guideline concentrations from 1982 EPA Development Document, Volume 1, Table I-3, (EPA 440/1-82-024, May 1982).

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OUTFALL: 614 9/21/2001

APPLICATION OF 1982 ELGs - TECHNOLOGY-BASED EFFLUENT LIMITATIONS
40 CFR Part 420

PLANT: AK Steel Corporation - Middletown Works
LOCATION: Middletown, Ohio

PROCESSES: COLD FORMING (#5,#6 Cold Temper Mills); Hot Coating (#2 Terme, #3 Zinc Grip, #4 Aluminize)

PROCESS	PRODUCTION (TONS/DAY)	TSS		OIL & GREASE		TOTAL LEAD		TOTAL ZINC		TOTAL CHROMIUM		NAPH	TCE
		AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	MAX	MAX
420.102(a)(4),103(a)(4) Cold Forming dir app s/s #5 Cold Temper	8,873	0.0113 201	0.0225 399	0.00376 67	0.00939 167	0.0000563 1.00	0.000169 3.00	0.0000376 0.67	0.000113 2.01	0 0.00	0 0.00	0.0000376 0.67	0.0000563 1.00
420.92(a)(3), 93(a)(3) Pickling Strip/Sulfuric #3 Zinc Grip	1,861	0.0225 84	0.0526 196	0.00751 28	0.0225 84	0.000113 0.42	0.000338 1.26	0.00015 0.56	0.000451 1.68	0.00 0.00	0.00 0.00		
420.92(b)(2), 93(b)(2) Pickling Strip/HCl #2 Terme	451	0.035 32	0.0818 74	0.0117 11	0.035 32	0.000175 0.16	0.000526 0.47	0.000234 0.21	0.000701 0.63	0.00 0.00	0.00 0.00		
420.92(b)(4), 93(b)(4) H2SO4/HCl Scrubbers #2 Terme	1	2.45 5	5.72 13	0.819 2	2.45 5	0.0123 0.03	0.0368 0.08	0.0164 0.04	0.0491 0.11	0.00 0.00	0.00 0.00		
420.112(b) Alkaline Cleaning Cont. #2 Terme	451	0.0438 40	0.102 92	0.0146 13	0.0438 40	0.15 0.00	0.45 0.00	0.20 0.00	0.60 0.00	0.00 0.00	0.00 0.00		
420.122(a)(1), 123(a)(1) Hot Coating Galv./Strip #3 Zinc Grip, #2 Terme, #4 Aluminize	3,920	0.0751 589	0.175 1372	0.025 196	0.0751 589	0.000376 2.95	0.00113 8.86	0.00005 3.92	0.0015 11.76	0 0.00	0 0.00		
420.122(c), 123(c) Hot Coating Fume Scrubber #2 Terme	1	16.3 36	38.1 84	5.45 12	16.3 36	0.0123 0.03	0.0368 0.08	0.0164 0.04	0.0491 0.11	0 0.00	0 0.00		

GENERALLY APPLICABLE EFFLUENT LIMITATIONS													
TOTAL Outfall 614	(lbs/day)	985	2229	328	952	4.58	13.75	5.43	16.29	0.00	0.00	0.67	1.00
	(kg/day)	447	1011	149	432	2.08	6.24	2.46	7.39	0.00	0.00	0.30	0.45

OUTFALL: 631 9/21/2001

**APPLICATION OF 1982 ELGs - TECHNOLOGY-BASED EFFLUENT LIMITATIONS
40 CFR Part 420**

PLANT: AK Steel Corporation - Middletown Works
LOCATION: Middletown, Ohio
PROCESS: Steelmaking

PROCESS	EFFLUENT GUIDELINE	PRODUCTION (TONS/DAY)	TSS		OIL & GREASE		TOTAL LEAD		TOTAL ZINC	
			AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX
Steelmaking	420.42/43(b) BOF-SC	9,580	0.0104 199	0.0312 598	NA	NA	0.0000626 1.20	0.000188 3.60	0.0000939 1.80	0.000282 5.40

GENERALLY APPLICABLE EFFLUENT LIMITATIONS										
TOTAL OUTFALL 631		(lbs/day)	199	598	NA	NA	1.20	3.60	1.80	5.40
		(kg/day)	91	272	NA	NA	0.55	1.64	0.82	2.46

OUTFALL: 641 9/21/2001

APPLICATION OF 1982 ELGs - TECHNOLOGY-BASED EFFLUENT LIMITATIONS
40 CFR Part 420

PLANT: AK Steel Corporation - Middletown Works
LOCATION: Middletown, Ohio

PROCESSES: PICKLING (#4, #5 PICKLER, #2 EGL); COLD ROLLING (#3 COLD MILL, #7 TEMPER MILL); ALKALINE CLEANING (#2EGL)

PROCESS	PRODUCTION (TONS/DAY)	TSS		OIL & GREASE		TOTAL LEAD		TOTAL ZINC		TOTAL CHROMIUM		NAPH	TCE
		AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	MAX	MAX
420.102(a)(3), 103(a)(3) Cold Forming combination #3 Cold Mill	10,260	0.0376 772	0.0751 1541	0.0125 257	0.0313 642	0.000188 3.86	0.000563 11.55	0.000125 2.57	0.000376 7.72	0.00	0.00	0.000125 2.57	0.000188 3.86
420.102(a)(4), 103(a)(4) Cold Forming dir app s/s #7 Cold Temper	3,065	0.0113 69	0.0225 138	0.00376 23	0.00939 58	0.0000563 0.35	0.000169 1.04	0.0000376 0.23	0.000113 0.69	0.00	0.00	0.0000376 0.23	0.0000563 0.35
420.92(a)(3), 93(a)(3) Pickling Strip/Sulfuric #2EGL	2,487	0.0225 112	0.0526 262	0.00751 37	0.0225 112	0.000113 0.56	0.000338 1.68	0.00015 0.75	0.000451 2.24	0.00	0.00	0.00	0.00
420.92(b)(2), 93(b)(2) Pickling Strip/HCl #4 HCl Picklers	12,649	0.035 885	0.0818 2069	0.0117 296	0.035 885	0.000175 4.43	0.000526 13.31	0.000234 5.92	0.000701 17.73	0.00	0.00	0.00	0.00
420.92(b)(4), 93(b)(4) Pickling HCl/Scrubbers #4 HCl Picklers	4	2.45 22	5.72 50	0.819 7	2.45 22	0.0123 0.11	0.0368 0.32	0.0164 0.14	0.0491 0.43				
420.112(b) Alkaline Cleaning Cont. #2EGL	2,487	0.0438 218	0.102 507	0.0146 73	0.0438 218								

GENERALLY APPLICABLE EFFLUENT LIMITATIONS

TOTAL OUTFALL 641	(lbs/day)	2,078	4,568	693	1937	9.30	27.90	9.61	28.82	0.00	0.00	2.80	4.20
	(kg/day)	942	2,072	314	878	4.22	12.66	4.36	13.07	0.00	0.00	1.27	1.91

OUTFALL: 642 9/21/2001

APPLICATION OF 1982 ELGs - TECHNOLOGY-BASED EFFLUENT LIMITATIONS
40 CFR Part 433

PLANT: AK Steel Corporation - Middletown Works
LOCATION: Middletown, Ohio

PROCESSES: METAL FINISHING, #2 ELECTROGALVANIZING LINE

PROCESS	GPM	MGD	TSS		OIL & GREASE		TOTAL LEAD		TOTAL ZINC		TOTAL CHROMIUM		TOTAL NICKEL		TTO
			AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX	MAX
433/13(a), 14(a) Met. Finishing	250	0.360	31 93.1	60 180.3	26 78.1	52 156.2	0.43 1.29	0.69 2.07	1.48 4.45	2.61 7.84	1.71 5.14	2.77 8.32	2.38 7.15	3.98 11.96	2.13 6.40
OUTFALL 642		(lbs/day) (kg/day)	93.1 42.2	180.3 81.8	78.1 35.4	156.2 70.9	1.29 0.59	2.07 0.94	4.45 2.02	7.84 3.56	5.14 2.33	8.32 3.77	7.15 3.24	11.96 5.42	6.40 2.90

OUTFALL: 005 9/21/2001

APPLICATION OF 1982 ELGs - TECHNOLOGY-BASED EFFLUENT LIMITATIONS
 40 CFR Part 420

PLANT: AK Steel Corporation - Middletown Works
 LOCATION: Middletown, Ohio

PROCESSES: HOT FORMING - Hot Strip Mill; CONTINUOUS CASTING; VACUUM DEGASSING

PROCESS	ELG	PRODUCTION (TONS/DAY)	TSS		OIL		TOTAL LEAD		TOTAL ZINC	
			AVE	MAX	AVE	MAX	AVE	MAX	AVE	MAX
HOT FORMING BPJ FOR METALS FROM DEVELOPMENT DOCUMENT VOLUME IV, PAGE 345										
Hot Forming Hot Strip	420.72(c)(1) HSM	18,566	0.16 5941	0.427 15855	1324	0.107 3973	0.000108 4.01	0.000325 12.07	0.000163 6.05	0.000488 18.12
Continuous Casting	420.62/63 BPT/BAT	8,895	0.026 463	0.078 1388	0.0078 139	0.0234 416	0.0000313 0.56	0.0000939 1.67	0.0000469 0.83	0.000141 2.51
Vacuum Degassing	420.52/53 BPT/BAT	7,335	0.00521 76	0.0156 229	0	0	0.0000313 0.46	0.0000939 1.38	0.0000469 0.69	0.000141 2.07
Vacuum Degassing CAS-OB	420.52/53 NSPS	3,948	0.00261 21	0.0073 58	0	0	0.0000313 0.25	0.0000939 0.74	0.0000469 0.37	0.000141 1.11

GENERALLY APPLICABLE EFFLUENT LIMITATIONS										
TOTAL OUTFALL 005	(lbs/day)	6,501	17,529	1,463	4,389	5.27	15.86	7.95	23.81	
	(kg/day)	2,949	7,951	664	1,991	2.39	7.19	3.60	10.80	

- Notes:
- 1 BPJ monthly average oil & grease effluent limitation for Hot Strip Mill set at 1/3 of daily maximum effluent limitation.
 - 2 BAT effluent limitations for metals for the Hot Strip Mill based on 1982 EPA Development Document, Volume IV, page 345. EPA 440/1-82/024, May 1982).

ATTACHMENT B

**AK Steel - Middletown Works
Preliminary WQBELs for Dicks Greek Outfalls
Ammonia-N**

Attachment B-1

AK Steel - Middletown Works

Preliminary WQBELs for Dicks Creek Outfalls - Ammonia-N (Outfall 002)

Water quality design flow

Criteria for Ammonia-N: pH 8.2; Temp 26C summer, 20C winter

<u>Source</u>	<u>mgd</u>		<u>Modified WWH</u>	(Tables 7-8, 7-3)
004	2.790		<u>WWH</u>	(Tables 7-8, 7-6)
Shaker Ck.	0.097	low flow of 0.15 cfs		
015	0.740			
003	2.970			
002	0.870			
Total	7.467			

Ammonia-N assumed to be a conservative substance

Dicks Creek TMDLs	Ammonia-N				
	30-Day	30-Day	Daily	Daily	
	Average	Average	Maximum	Maximum	
	Mar - Nov	Dec - Feb	Mar - Nov	Dec - Feb	
WQS - MWH	0.90	1.10	5.50	5.80	mg/L
WQS - WWH	0.60	1.10	5.50	5.80	mg/L
TMDL - MWH	25.44	31.09	155.45	163.93	kg/day
TMDL - WWH	16.96	31.09	155.45	163.93	kg/day

Current Discharges from Outfalls 004, 015, 003

Current discharge ammonia-N concentrations
(January 1999 to March 2001)

						average	maximum	
004	2.85	2.85	5.07	5.07	kg/day	0.27	0.48	mg/L
015	0.42	0.42	1.37	1.37	kg/day	0.15	0.49	mg/L
003	2.14	2.14	8.09	8.09	kg/day	0.19	0.72	mg/L
Sub-total	5.41	5.41	14.54	14.54	kg/day			

Allocation available for Outfall 002

MWH	20.03	25.68	140.92	149.40	kg/day
MWH	6.08	7.80	42.79	45.37	mg/L
WWH	11.55	25.68	140.92	149.40	kg/day
WWH	3.51	7.80	42.79	45.37	mg/L

Attachment B-2

AK Steel - Middletown Works

Preliminary WQBELs for Dicks Creek Outfalls - Ammonia-N (Outfall 003)

Water quality design flow

Criteria for Ammonia-N: pH 8.2; Temp 26C summer, 20C winter

Source	mgd		Modified WWH	(Tables 7-8, 7-3)
004	2.790		WWH	(Tables 7-8, 7-6)
Shaker Ck.	0.097	low flow of 0.15 cfs		
015	0.740			
003	2.970			
002	0.870			
Total	7.467			

Ammonia-N assumed to be a conservative substance

Dicks Creek TMDLs	Ammonia-N				
	30-Day Average	30-Day Average	Daily Maximum	Daily Maximum	
	Mar - Nov	Dec - Feb	Mar - Nov	Dec - Feb	
WQS - MWH	0.90	1.10	5.50	5.80	mg/L
WQS - WWH	0.60	1.10	5.50	5.80	mg/L
TMDL to 003 - MWH	22.47	27.47	137.34	144.83	kg/day
TMDL to 003 - WWH	14.98	27.47	137.34	144.83	kg/day

Current Discharges from Outfalls 004, 015, 003

Current discharge ammonia-N concentrations (January 1999 to March 2001)

						average	maximum	
004	2.85	2.85	5.07	5.07	kg/day	0.27	0.48	mg/L
015	0.42	0.42	1.37	1.37	kg/day	0.15	0.49	mg/L
003	2.14	2.14	8.09	8.09	kg/day	0.19	0.72	mg/L
Sub-total	3.27	3.27	6.44	6.44	kg/day			

Allocation available for Outfall 003

MWH	19.20	24.20	130.90	138.39	kg/day
MWH	5.83	7.35	39.75	42.02	mg/L
WWH	11.71	24.20	130.90	138.39	kg/day
WWH	3.56	7.35	39.75	42.02	mg/L

ATTACHMENT C

**AK Steel - Middletown Works
Preliminary QBELs for Dicks Creek Outfalls
Free Cyanide, Oil & Grease, Metals**

Attachment C

AK Steel - Middletown Works

Preliminary WQBELs for Dicks Creek Outfalls - Free Cyanide, Oil & Grease, Metals

Water quality design flow Criteria for metals: Dicks Creek hardness 500 mg/L

Source	mgd
004	2.790
Shaker Ck.	0.097
015	0.740
003	2.970
002	0.870
Total	7.467

low flow of 0.15 cfs

Dicks Creek TMDLs

	Free Cyanide		O&G	TR Copper		TR Chromium		TR Lead		TR Nickel		TR Zinc		mg/L
	30-Day Average	Daily Maximum	Daily Maximum	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum	30-Day Average	Daily Maximum	
Water quality criteria:	0.012	0.046	10	0.037	0.064	0.320	6.700	0.050	0.950	0.200	1.800	0.470	0.470	
TMDLs - Dicks Creek	0.34	1.30	282.64	1.05	1.81	9.04	189.37	1.41	26.85	5.65	50.88	13.28	13.28	kg/day

Allocation to Outfalls 004, 015, 003, 002 (Shaker Creek low flow considered only for free cyanide)

004	NA	NA	105.6	0.39	0.68	3.38	70.76	0.53	10.03	2.11	19.01	4.96	4.96	kg/day
015	NA	NA	28.0	0.10	0.18	0.90	18.77	0.14	2.66	0.56	5.04	1.32	1.32	kg/day
003	NA	NA	112.4	0.42	0.72	3.60	75.32	0.56	10.68	2.25	20.24	5.28	5.28	kg/day
002	0.34	1.30	32.93	0.12	0.21	1.05	22.06	0.16	3.13	0.66	5.93	1.55	1.55	kg/day
Total	0.34	1.30	279.0	1.03	1.79	8.93	186.91	1.39	26.50	5.58	50.22	13.11	13.11	kg/day

ATTACHMENT D

**AK Steel - Middletown Works
Preliminary WQBELs for Outfall 011
Discharge to Great Miami River**

Attachment D

AK Steel - Middletown Works

Preliminary WQBELs for Outfall 011 - Discharge to Great Miami River

Criteria for metals: Great Miami River hardness, 350 mg/L

1. Great Miami River is not water quality limited for free cyanide or metals of concern.
2. Current AK Steel Section 301(g) variance water quality-based effluent limitations will meet any revised Ohio EPA wasteload allocation for ammonia-N for the Great Miami River.
3. IMZM criteria for the protection of aquatic life will be the basis for preliminary WQBELs for free cyanide and metals.
4. Outfall 011 effluent flow 7.18 mgd

	Oil & Grease	Free Cyanide	TR Copper	TR Lead	TR Zinc	Naphthalene	Tetrachloro-ethylene	
	Daily Maximum	Daily Maximum	Daily Maximum	Daily Maximum	Daily Maximum	Daily Maximum	Daily Maximum	
IMZM water quality criteria	10	0.092	0.087	1.206	0.692	0.320	1.100	mg/L
Preliminary WQBELs	271.8	2.50	2.36	32.78	18.81	8.70	29.90	kg/day

ATTACHMENT E

**AK Steel - Middletown Works
Development of Preliminary WQBELs for PCBs
Outfall 007**

Attachment E

9/27/2001

**AK Steel Corporation - Middletown Works
Proposed Outfall 007**

Development of Preliminary WQBELs for PCBs

Dicks Creek water quality design flow upstream of Outfall 007	7.467 mgd
Outfall 007 flow	0.058 mgd
Dicks Creek water quality design flow at Outfall 007	7.525 mgd

Calculation of Preliminary WQBELs	Ohio WQS (ug/L)	Dicks Creek TMDL (kg/day)	Outfall 007 Effluent Concentration (ug/l)
OMZA aquatic life	0.00100	0.0000285	0.13
Human health, non-drinking water	0.00079	0.0000225	0.10
Analytical detection level			0.22