THE USE AND IMPACT OF IRON AND STEEL INDUSTRY INTRA-PLANT TRADES

Prepared for:

Richard Kashmanian
Office of Policy, Planning and Evaluation
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

Prepared by:

Industrial Economics, Incorporated
2067 Massachusetts Avenue
Cambridge, MA 02140

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EXECUTIVE SUMMARY

As part of its examination of innovative approaches to water pollution control, the U.S. Environmental Protection Agency (EPA) is investigating the use and impact of iron and steel industry intra-plant trades, first authorized by the Agency in 1982. Within certain regulatory constraints, these trades offer direct dischargers in the iron and steel industry the option of crediting pollutant reduction beyond discharge limits at one or more outfalls to discharges from other outfalls at the same facility. It is expected that the insights and understanding gained from studying the effect of this trading program will inform the design of future trading policies for reducing water pollution.

The EPA's Permit Compliance System was used to identify steel plants subject to the Agency's effluent guidelines and to obtain data on the production processes and pollutants associated with those plants. To identify permits incorporating intra-plant trading, appropriate EPA national and regional personnel, as well as some state personnel, were contacted. Detailed information on each of the trades was gathered both from documentation related to permits and from environmental managers associated with the different facilities.

The major findings of this study are as follows:

- The use of intra-plant trading is not common. Of 443 direct dischargers currently identified by EPA as members of the iron and steel industry category, six currently hold permits that incorporate intra-plant trading, and another four facilities at one time held permits that incorporated trading. All ten facilities that have traded are in EPA Regions 3 or 5.

- The information available on the ten trades to date suggests that trading is likely to be feasible primarily at facilities with a large number of outfalls. In general, the more outfalls a facility has, the greater the likelihood that trading between two or more outfalls will be both feasible and economical.

- Water quality concerns — in particular, increasing reliance on water quality-based rather than technology-based permit limits — limit the use of intra-plant trading.

- Estimates of the reduction in pollution control costs enabled by trading are available for seven of the ten facilities that have employed trades (five of the permits incorporating these trades are still in effect). The present value of these cost reductions is estimated at $122.7 million (1993 dollars).

- Over the next several years, the EPA's Office of Water is expected to develop new or revised effluent guidelines for several industries. Office of Water officials indicated that for some of these industries, intra-plant trading may be feasible.

BACKGROUND AND PURPOSE

The U.S. Environmental Protection Agency (EPA) is currently studying a variety of innovative approaches for water pollution control. Among the policies under examination is allowing industrial and municipal point sources to "trade" pollution discharge allowances, thereby taking advantage of economies of scale and other efficiencies in reducing pollutant loads. As commonly used, the term "trading" may encompass a number of different approaches for developing discharge limits. In general, however, these approaches hold in common the objective of allocating further load reduction requirements among outfalls or groups of dischargers so that water quality goals are achieved at the lowest total cost.

As part of its examination of innovative approaches to water pollution control, EPA is investigating the use and impact of iron and steel industry intra-plant trades, first authorized by the Agency in 1982.[1] These trades offer direct dischargers in the iron and steel industry the option of crediting pollutant reduction beyond discharge limits at one or more outfalls to discharges from other outfalls at the same facility, within limitations noted below. This policy is known among regulators as the "steel water bubble" policy. It is expected that the insights and understanding gained from studying the effect of this trading program will inform the design of future trading policies for reducing water pollution.

During the course of this investigation, the following information was obtained:

- the location and number of steel plants subject to EPA's effluent guidelines;
- the identity of steel plants that have incorporated approved intra-plant trades in their permits;
- details of the trades, including plant processes and pollutants associated with the outfalls involved in the trades, and the details of the effluent limits calculations;

[1] 40 CFR 420, *Iron and Steel Manufacturing Point Source Category*, 47 FR 23284 (May 27, 1982), 47 FR 41739 (September 22, 1982), 48 FR 46943 (October 14, 1983), 49 FR 21028-21036 (May 17, 1984), 49 FR 24726 (June 15, 1984). 40 CFR 420.03 authorizes intra-plant trading, and was made final in 49 FR 21028-21036 (May 17, 1984). This FR notice is included as Appendix C.

- information on the impact of trading on pollutant loadings and water quality;

- an appraisal of treatment technology that would have been used at each facility in the absence of trading, including capital and operation and maintenance costs;

- an assessment from plant officials, Regional personnel, and steel industry experts regarding the effectiveness of intra-plant trading and its impact on administrative resources; and

- a preliminary assessment of the potential for use of trading in other industries.

The EPA's Permit Compliance System (PCS) was used to identify steel plants subject to the Agency's effluent guidelines and to obtain data on the production processes and pollutants associated with those plants. To identify permits incorporating intra-plant trading, appropriate EPA national and regional personnel, as well as some state personnel, were contacted. Detailed information on each of the trades was gathered both from documentation related to permits and from environmental managers associated with the different facilities. In addition, the American Iron and Steel Institute, the Steel Manufacturers Association, a former EPA employee intimately familiar with the regulation, and personnel at EPA's Office of Water were contacted.

SUMMARY OF FINDINGS

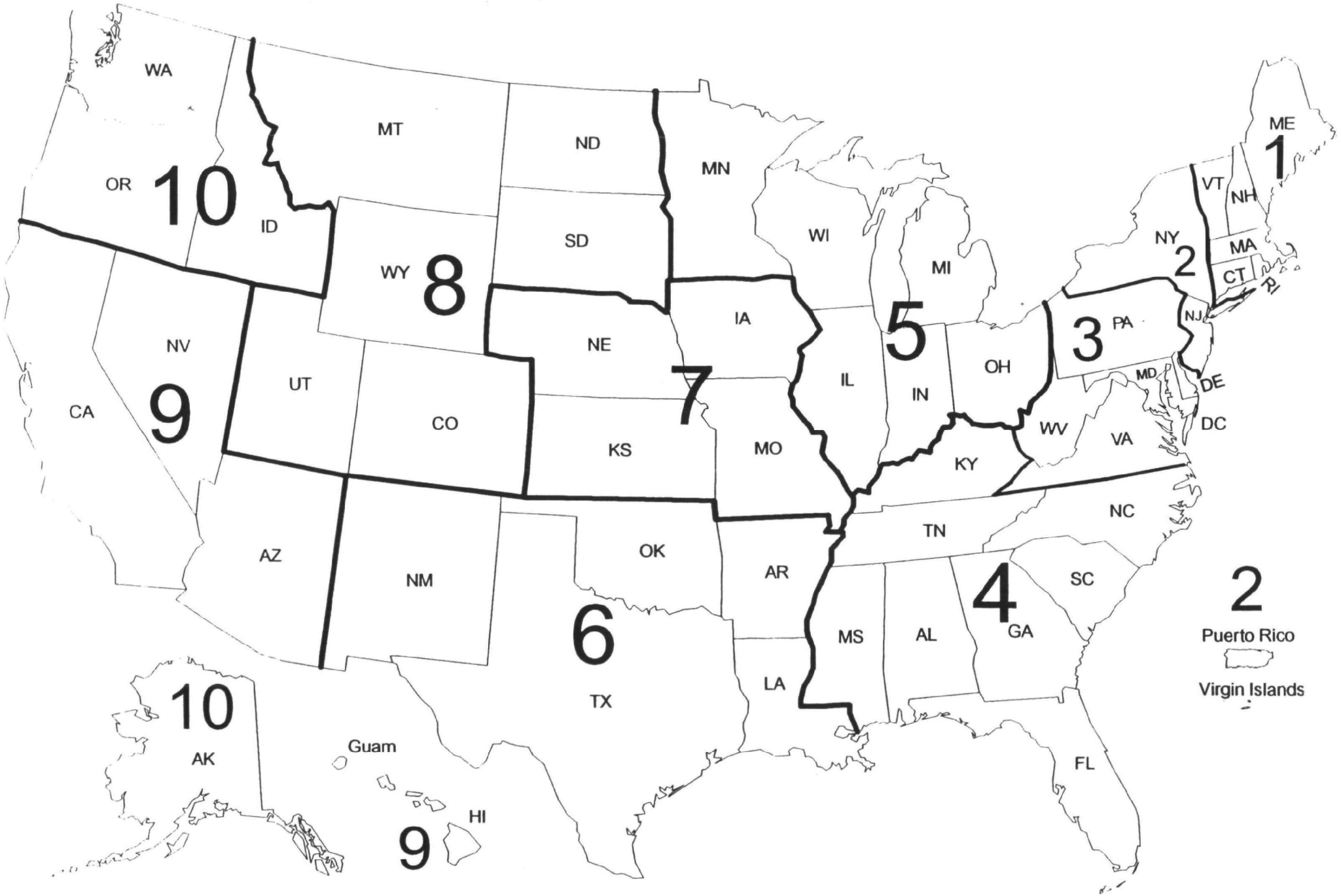
The major findings of this study are as follows:

- The use of intra-plant trading is not common. Of 443 direct dischargers currently identified by EPA as members of the iron and steel industry category, six currently hold permits that incorporate intra-plant trading: five in EPA Region 5 and one in EPA Region 3 (see Figure 1 for the location of the ten EPA Regions). Another four facilities — one in Region 5 and three in Region 3 — at one time held permits that incorporated trading. For reasons ranging from plant shutdown to changes in ownership and plant configuration, these four trades are no longer in effect.

- Industry environmental officials and state and Regional permit authorities are familiar with the regulations allowing intra-plant trading, and are open to its use. A variety of factors, however, limit broader application of trading. For example, 208 of the 443 facilities identified above have only one outfall, and thus are unable to engage in intra-plant trading. Indeed, the information available on the ten trades to date suggests that trading is likely to be feasible primarily at facilities with a large number of outfalls; the fewest outfalls reported for a facility that has engaged in a trade is seven, and the number for those currently engaged in trades ranges from 10 to 38. In general, the more outfalls a facility has, the greater the likelihood that trading between two or more outfalls will be both feasible and economical.

Figu

EPA Regions



- Water quality concerns — in particular, increasing reliance on water quality-based rather than technology-based permit limits — also limit the use of the effluent guidelines' intra-plant trading provision. In addition, retooling and modernization of iron and steel facilities may further constrain trading's use, since trading is restricted to existing sources and does not apply to new sources.

- Despite its relatively infrequent use, the intra-plant trading policy has been applied to a wide range of steel plant processes, and has allowed substantial reductions in pollution control costs. Four pollutants have been subject to trades: total suspended solids (TSS), oil and grease (O&G), lead, and zinc. Estimates of the reduction in pollution control expenditures enabled by trading are available for seven of the ten facilities that have employed trades (five of the permits incorporating these trades are still in effect). The present value of these cost reductions is estimated at $122.7 million (1993 dollars).[2] For the other three plants that have had trades, one of which is still in effect, no information was obtained.

- Over the next several years, the U.S. EPA's Office of Water is expected to develop new or revised effluent guidelines for several industries. The Office is not explicitly evaluating the viability and merits of intra-plant trading for each industry being considered. However, Office of Water officials expressed a willingness to conduct such an evaluation, and indicated that for some of the source categories, intra-plant trading may be feasible.

ORGANIZATION OF THE REPORT

The remaining chapters of this report discuss the analysis of intra-plant trading in greater detail. Chapter 2 provides a brief overview of the regulations governing intra-plant trading and identifies facilities whose permits make or previously made use of intra-plant trading. Chapter 3 discusses the impact of intra-plant trades on pollutant loads and water quality, the effect of trading on pollution control costs, and other impacts of intra-plant trading on permit authorities and dischargers. Chapter 4 identifies industries for which EPA will soon develop or revise effluent guidelines regulations, and discusses the potential application of intra-plant trading to these industries.

The report also includes several appendices that provide additional information on the intra-plant trading regulation, the iron and steel industry, and the application of intra-plant trading within this industry. Specifically, Appendices A and B contain information on facilities subject to the iron and steel industry effluent guidelines; Appendix C contains background information on the development of the intra-plant trading regulation; Appendix D contains a detailed glossary of iron and steel industry terms; Appendix E contains detailed writeups of the use and impact of trading at each of the ten facilities identified; Appendix F contains an explanation of the methodology used to estimate the reduction in treatment costs enabled by trading; Appendix G walks the reader through the steps necessary to calculate effluent limits in a permit incorporating trading; and Appendix H contains a copy of the September 9, 1992 *Federal Register* notice announcing the EPA's Effluent Guidelines Plan.

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[2] See Exhibit 3-3 for plant by plant details of cost reductions.

IDENTIFICATION OF IRON AND STEEL PLANTS MAKING USE OF INTRA-PLANT TRADING

CHAPTER 2

INTRODUCTION

Intra-plant trading is available only to those plants permitted subject to the Iron and Steel Effluent Guidelines (40 CFR 420). Research first focused on identifying these plants, and, from among them, those plants where trading is most likely to be feasible. Following this, the investigation identified ten permits incorporating intra-plant trading.

OVERVIEW OF THE REGULATION

Under the authority of the Clean Water Act, the EPA develops effluent guidelines for categories of pollutant dischargers. The EPA's effluent guidelines for the iron and steel industry point source category were made final in the early 1980s.[1] The regulation divides the industry into twelve subcategories, A through L, as shown in Exhibit 2-1. For each of these subcategories, the guidelines specify effluent limitations for the best practicable technology (BPT), best available technology (BAT), and new source performance standards (NSPS). In addition, one section of the regulation allows affected facilities to develop alternative effluent limitations for existing point sources.[2] Under this section, commonly referred to as the steel bubble policy, a facility that achieves beyond-BAT control at some outfalls is not required to provide BAT-level control at other outfalls, provided that the total discharge of any pollutant(s) involved in such exchanges is less than would be discharged under normal BAT requirements.[3] This flexibility is designed to allow facilities to reduce their total pollution control costs, provided that they can simultaneously achieve better overall pollution control.

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[1] 40 CFR 420.

[2] 40 CFR 420.03.

[3] "The alternative effluent limitations for each pollutant are determined for a combination of outfalls by totaling the mass limitations of each pollutant allowed under subparts A through L and subtracting from each total an appropriate net reduction amount." [40 CFR 420.03]. The regulation originally did not require a net reduction in loading limits, but rather forbade a net increase.

Exhibit 2-1

SUBPARTS OF 40 CFR 420:
IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY
EFFLUENT GUIDELINES

Steelmaking Subcategory	Subpart of 40 CFR 420	Steelmaking Subcategory	Subpart of 40 CFR 420
A: Cokemaking	40 CFR 420.10	G: Hot Forming	40 CFR 420.70
B: Sintering	40 CFR 420.20	H: Salt Bath Descaling	40 CFR 420.80
C: Ironmaking	40 CFR 420.30	I: Acid Pickling	40 CFR 420.90
D: Steelmaking	40 CFR 420.40	J: Cold Forming	40 CFR 420.100
E: Vacuum Degassing	40 CFR 420.50	K: Alkaline Cleaning	40 CFR 420.110
F: Continuous Casting	40 CFR 420.60	L: Hot Coating	40 CFR 420.120

The formulation of intra-plant trading changed several times during the rulemaking process in the early 1980s. The final regulation was a result of compromise arrived at in negotiations involving the Natural Resources Defense Council, the American Iron and Steel Institute, and EPA. This regulation places four restrictions on the use of these exchanges:[4]

1) Resultant discharges cannot cause a violation of any applicable state water quality standards.

2) For ease of administration, each outfall must be assigned specific, fixed effluent limitations for the pollutants governed by the regulation.

3) Process wastewaters from cokemaking (subcategory A) and cold forming (subcategory J) are not eligible for use in these exchanges.

4) The net discharge of traded pollutants must be less than the discharge allowed without the trade. The magnitude of the reduction in net discharge is a specified factor of the amount(s) by which any wastewater stream(s) involved in the trade exceed otherwise allowable effluent limitations. The reduction factor must be approximately 15 percent for total suspended solids and oil and grease, and 10 percent for all other pollutants. Appendix G walks the reader through the calculation of such a reduction.

These restrictions are designed to ensure that trading does not adversely affect water quality or pose unacceptable difficulties in administrating and enforcing discharge permits. Documents charting the evolution of the intra-plant trading regulation are included in Appendix C.

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[4] 40 CFR 420.03 (b). The reasoning behind the first three restrictions is detailed in 47 FR 23273 (May 27, 1982). The fourth restriction arises from the Settlement Agreement to a lawsuit challenging the regulation (*National Steel Corp. v. EPA*). The Settlement Agreement is summarized in 49 FR 21024-21025. These *Federal Register* notices are included in Appendix C.

PLANTS SUBJECT TO EPA IRON AND STEEL EFFLUENT GUIDELINES

As a first step in analyzing the extent of the use of trading, researchers identified all plants potentially eligible to make use of the provision; that is, all plants permitted subject to the Iron and Steel Effluent Guidelines. The EPA's Permit Compliance System (PCS) was used for this analysis.

The PCS contains information on all active National Pollutant Discharge Elimination System (NPDES) permits. Using this system, 443 active permits issued under the authority of 40 CFR 420 were identified.[5] A list of these permits is attached as Appendix A. Each permit covers discharges from a single facility. The PCS identifies the effluent guideline under which a particular permit was issued by matching the Standard Industrial Classification (SIC) code associated with the entire facility with the subsection of 40 CFR 420 that primarily governs discharges from that industry. Because there is an inexact correspondence between the SIC codes and the subsections of 40 CFR 420, it is possible that discharges from some of these facilities are actually not governed by 40 CFR 420, or that some facilities with discharges regulated by 40 CFR 420 are not included.[6] It is not possible to precisely determine the regulation governing the issuance of a permit without actually reading the permit.

Intra-plant trading is allowed among points of a single facility where the permit requires effluent to be monitored. These points are generally referred to as "outfalls," although many of them are internal monitoring points or internal outfalls into further conveyance rather than outfalls directly into receiving waters. The PCS records information on each permitted outfall, allowing the number of outfalls for each permitted facility to be calculated. A total of 1,775 outfalls are regulated at the 443 facilities identified above. Exhibit 2-2 indicates the distribution of the 443 steel facilities by the number of permitted outfalls recorded in the PCS. As noted in the exhibit, 208 of the facilities have only one outfall. Because a trade requires a minimum of two outfalls, these facilities are unable to engage in intra-plant trading.

Based on the presence of more than one outfall, the remaining 235 facilities are potentially eligible to trade. An in-depth 1981 study of four steel plants, however, concludes that the technical and economic feasibility of trading is likely to increase with the number of outfalls at a facility.[7] To focus on those facilities most likely to be able to make use of trading, Appendix B lists the 46 facilities with ten or more outfalls. As shown in Exhibits 2-3 and 2-4, 38 of these 46 plants are located in EPA Regions 3 or 5; 26 of these 38 are located in Ohio or Pennsylvania. After actual trades were identified, researchers contacted several of these plants that did not trade to determine why trading was not utilized. These results are discussed in Chapter 3 of this report.

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[5] This information is current as of March 5, 1993.

[6] For example, 112 of the 443 permits are identified as having been issued under subsection L of 40 CFR 420. Subsection L governs discharges associated with the hot coating of steel. However, the SIC codes used to identify hot coating operations also cover coating operations not regulated by 40 CFR 420 (e.g., jewelry enameling).

[7] U.S. EPA, *The Effect of the Water Bubble Policy on Individual Iron and Steel Facilities*, prepared by Temple, Barker and Sloane, April 1981, pp. 9-10.

Exhibit 2-2

DISTRIBUTION OF FACILITIES PERMITTED UNDER 40 CFR 420 BY NUMBER OF OUTFALLS

Number of Outfalls	Number of Facilities
1	208
2	89
3 to 5	67
5 to 9	33
10 to 19	30
Over 20	16

Exhibit 2-3

LOCATION OF FACILITIES WITH TEN OR MORE OUTFALLS BY STATE

State	Number of Facilities	State	Number of Facilities
AL	1	NJ	1
IL	1	NY	2
IN	5	OH	12
KY	3	PA	14
MD	1	TX	1
MI	3	WV	2

Exhibit 2-4

LOCATION OF FACILITIES WITH TEN OR MORE OUTFALLS BY EPA REGION

EPA Region	Number of Facilities	EPA Region	Number of Facilities
1	0	6	1
2	3	7	0
3	17	8	0
4	4	9	0
5	21	10	0

IDENTITY OF PERMITS INCORPORATING INTRA-PLANT TRADING

NPDES permits incorporating intra-plant trades are issued in the same form as permits not incorporating trading: limits for specified parameters are stated for each outfall. Because the PCS simply records information on the issued permit, it cannot be used to identify permits incorporating intra-plant trading. Moreover, there is no other centralized system for recording the issuance of such permits. According to EPA and industry sources, the only certain way to identify permits incorporating intra-plant trades is to read the Fact Sheets/Briefing Memoranda for each permit issued under 40 CFR 420. A research effort of this magnitude is beyond the scope of this study. The same sources note, however, that because use of intra-plant trading is a relative rarity, those approving or reviewing a permit incorporating it are likely to recall it. This institutional memory has been relied on to identify active permits incorporating intra-plant trading.

As a first step in identifying active permits incorporating intra-plant trading, NPDES personnel in EPA Regions 1 through 8 were contacted. EPA Regions 9 and 10 were not contacted because the PCS lists no permits in these regions for steel industry facilities with more than one outfall. Regional personnel were able to identify four steel manufacturing facilities that use intra-plant trading, all located in Region 5. Knowledgeable EPA personnel in other Regions indicated no permits incorporating intra-plant trades, or directed researchers to state officials who reported no such permits.[8] However, subsequent contacts with representatives of the iron and steel industry revealed two additional plants that use trading, one in Region 5 and one in Region 3. Thus, this study identifies six currently valid NPDES permits issued under 40 CFR 420 that incorporate intra-plant trading.

As a supplement to the main research effort, a June 1984 paper analyzing the use of intra-plant trades in the steel industry was consulted.[9] This paper listed seven permits incorporating such trades. Three of these permits are among the six noted above. Of the remaining four permits, one was issued to a facility now closed, and three no longer incorporate trading. Thus, this report contains information on ten permits incorporating trading: six currently in effect and four no longer in effect. Exhibit 2-3 lists these ten facilities, provides some background information, and describes the current status of each permit.[10]

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[8] State officials were contacted in Connecticut, New Jersey, New York, and Utah. See the sources section of this report for details.

[9] John Palmisano and Debora Martin, "The Use of Nontraditional Control Strategies in the Iron and Steel Industry: Air Bubbles, Water Bubbles, and Multimedia Based Control Strategies," prepared for presentation at the 77th annual meeting of the Air Pollution Control Association, San Francisco, CA, June 24-29, 1984, p. 13.

[10] The exhibit includes information on the total number of outfalls at each facility. In the case of currently valid permits, this information is from the PCS. In the case of expired permits, this information was obtained from available permit documents.

Exhibit 2-3

IRON AND STEEL INDUSTRY PLANT PERMITS INCORPORATING INTRA-PLANT TRADING

Facility	Pollutants Traded	Total Number of Outfalls	Number of Outfalls Involved in Trade	Date Issued	Status in February 1994
Armco Steel Middletown, OH	TSS, O&G, Lead, Zinc	25	5	03/31/87	Current permit (12/01/92) incorporates trading.
Babcock and Wilcox Beaver Falls, PA	TSS, O&G, Lead, Zinc	12	2	11/18/83	Facility changed ownership in the late 1980s, and outfalls involved in trade are no longer owned by a single entity. No follow-on operations hold permits incorporating trading.
Bethlehem Steel Sparrows Point, MD	Zinc	10	2	10/10/85	Still in administrative effect.
Inland Steel East Chicago, IN	Lead, Zinc	38	3	03/06/84	Still in administrative effect.
LTV Steel Indiana Harbor, IN	O&G, Lead, Zinc	16	4	10/01/86	Still in administrative effect.
Republic Steel Massillon, OH	TSS, O&G	7	2	08/22/83	Facility changed ownership in the late 1980s, and some Massillon operations have been sold or closed. No follow-on operations hold permits incorporating trading.
Rouge Steel Dearborn, MI	TSS, Lead, Zinc	20	2	07/19/84	Current permit (01/01/94) incorporates trading.
U.S. Steel Clairton, PA	TSS	46	2	03/09/84	Current permit does not incorporate trading. One of the outfalls involved in the trade is no longer in use.
U.S. Steel Gary, IN	TSS, O&G	33	3	06/01/83	Permit is still in administrative effect; some outfalls involved in trade are no longer used. See Appendix E for details.
U.S. Steel Homestead, PA	TSS, O&G	16	3	03/09/84	Facility was closed in the late 1980s.

INTRODUCTION

Following identification of the ten iron and steel plants known to have undertaken intra-plant trades, research focused on characterizing the trades' impacts. The issues of greatest interest included the types of effluents and pollutants subject to trades, the impact of trades on pollutant loads and water quality, the effect of trades on pollution control costs, the effect of trading on the use of innovative treatment technologies, the impact of trading on agencies administering the NPDES permit program, and the attitudes toward trading held by industry and regulatory personnel.

To analyze the trades' impacts, researchers contacted state and Regional personnel to obtain copies of permits, briefing memoranda, fact sheets, limit calculations, and any other relevant documentation. If states or Regions were not able to provide this material, it was sought from representatives of the iron and steel facilities involved in the trade. In some instances, a facility had closed or changed ownership; in these cases, corporate officials or former employees of the facilities were contacted. Based on the information these sources provided, brief case studies of each of the ten intra-plant trades were developed. These case studies, which are presented in Appendix E, are the primary basis of this report's discussion of trading's impacts.[1]

In addition to gathering relevant documents, researchers conducted informal, open-ended interviews with industry and regulatory personnel, and also interviewed other knowledgeable experts. These interviews provided information on trading's immediate impacts, and also addressed factors that encourage or discourage trading. As part of this effort, researchers contacted representatives of eight iron and steel facilities that do not engage in intra-plant trading; interviews of these officials provide additional insight to the factors that have limited the application of intra-plant trading within the iron and steel industry.[2]

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[1] Each of the case studies has been reviewed for accuracy either by a representative of the plant that engaged in the trade, or, in the case of some expired trades, by individuals associated with the plant while the trade was active. The case studies identify all information sources upon which they rely, including permit documents and regulatory or industry officials. Copies of all relevant documents are included as Attachment 1 to this report.

[2] All individuals interviewed and documents employed are listed in the sources section of this report except those included in Attachment 1 to this report.

The following discussion summarizes the principal findings of this analysis of trading's impacts.

PLANT PROCESSES AND POLLUTANTS SUBJECT TO INTRA-PLANT TRADES

Exhibit 3-1 identifies the pollutants involved in trading at each of the ten facilities analyzed. The exhibit also indicates, on an outfall-by-outfall basis, whether the permit limits for a particular pollutant were set above or below the effluent limitation guidelines. As the exhibit shows, all of the trades involve one or more of only four pollutants: total suspended solids (TSS), oil and grease (O&G), lead, and zinc. TSS is the pollutant most often traded (seven trades), followed by oil and grease (six), zinc (six), and lead (five). It is interesting to note that all trades involving lead also involve zinc. Although this is a limited number of trades upon which to base broad conclusions, the likely explanation is a high degree of correlation between lead and zinc loadings at a given outfall; these pollutants tend to be found together in untreated iron and steel wastewater, and can often be controlled to a similar degree with the same technology.

The effluents associated with the outfalls involved in trades come from a wide range of production processes, including sintering, steelmaking, vacuum degassing, continuous casting, hot forming, and acid pickling operations (see Appendix D for a glossary of iron and steel terminology). It is often the case that an outfall involved in a trade conveys wastewater from more than one production process. In several instances, these mixed wastewaters included effluent from operations not eligible for trading, e.g., effluent from cold forming operations or from operations governed by the effluent guidelines for industries other than iron and steel. In these cases, the effluent associated with ineligible processes is excluded from the trading calculation. In at least one case, however — the trade at U.S. Steel's Clairton Works — a trade involved effluent from cokemaking operations, which the current regulation specifically prohibits. No explanation for this apparent discrepancy was provided, but as a result of a reconfiguration of outfalls, the trade is no longer in effect.

IMPACT OF INTRA-PLANT TRADES ON POLLUTANT LOADS AND WATER QUALITY

Pollutant Loads

Trading requires that the sum of pollutant limits for outfalls involved in the trade be reduced below effluent limitation guideline (ELG) limits. As noted previously, the minimum net reduction must be approximately fifteen percent for TSS and O&G, and ten percent for all other traded pollutants. The trading calculations performed by NPDES permit authorities and presented in Appendix E incorporate these net reductions (see Appendix G for sample calculations). In all cases, the resulting permit limits meet or exceed the net reduction requirements. Exhibit 3-2 summarizes, for each of the ten facilities that have employed trades, the net reductions in permit limits provided by trading. As the exhibit indicates, the net reduction in permitted loadings ranges from less than a pound per day for most trades involving lead and zinc to several thousand pounds per day for some trades involving TSS.[3]

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[3] As noted in Appendix E, the permit limits currently in effect for some facilities differ from the draft permit limits suggested by the permit Fact Sheets/Briefing Memoranda. In most cases, the differences are minor. In the case of the Armco Steel plant in Middletown, Ohio, however, current permit limits for TSS, O&G, and lead are much more stringent than those suggested by the available

Exhibit 3-1

OUTFALLS AND POLLUTANTS SUBJECT TO INTRA-PLANT TRADING

Facility	Outfall	Pollutant			
		TSS	O&G	Lead	Zinc
Armco Steel, Middletown, OH	005	–	–	–	–
	613	+	*	+	+
	614	+	*	+	+
	631	+	*	+	+
	641	+	+	–	–
Babcock & Wilcox, Beaver Falls, PA	113	+	+	+	+
	115	–	–	–	–
Bethlehem Steel, Sparrows Point, MD	101	*	*	*	+
	014	*	*	*	–
Inland Steel, East Chicago, IN	601	*	*	+	+
	614	*	*	+	+
	618	*	*	–	–
LTV Steel, Indiana Harbor, IN	011	*	–	+	+
	101	*	–	–	–
	111	*	+	*	*
	211	*	*	–	–
Republic Steel, Massillon, OH	004	+	+	*	*
	603	–	–	*	*
Rouge Steel, Dearborn, MI	04B1	+	*	+	+
	001	–	*	–	–
U.S. Steel, Clairton, PA	102	+	*	*	*
	120	–	*	*	*
U.S. Steel, Gary, IN	028	+	+	*	*
	030	+	+	*	*
	605	–	–	*	*
U.S. Steel, Homestead, PA	008	–	–	*	*
	010	+	+	*	*
	115	–	–	*	*

Key: + = limit above that set in Effluent Guidelines
– = limit below that set in Effleuent Guidelines
* = not involved in trade

documentation, while the limits for zinc are less stringent; no explanation for this discrepancy has been provided. The discussion above reflects the permit limits as calculated in the Fact Sheets/Briefing Memoranda.

Exhibit 3-2

NET DECREASES BELOW ELG LIMITS
FOR TRADED POLLUTANTS (lbs/day)

Facility	Type of Limit	Pollutant			
		TSS	O&G	Lead	Zinc
Armco Steel, Middletown, OH	30-Day Average	379	9	0.44	0.57
	Daily Maximum	999	29	1.32	1.54
Babcock & Wilcox, Beaver Falls, PA	30-Day Average	8.00	1.30	0.01	*
	Daily Maximum	25.00	3.00	0.04	0.03
Bethlehem Steel, Sparrows Point, MD	30-Day Average	*	*	*	1.4
	Daily Maximum	*	*	*	4.0
Inland Steel, East Chicago, IN	30-Day Average	*	*	0.19	0.14
	Daily Maximum	*	*	0.61	0.40
LTV Steel, Indiana Harbor, IN	30-Day Average	*	*	0.49	0.49
	Daily Maximum	*	237.9	1.43	1.48
Republic Steel, Massillon, OH	30-Day Average	42	*	*	*
	Daily Maximum	120	176	*	*
Rouge Steel, Dearborn, MI	30-Day Average	55	*	0.13	0.19
	Daily Maximum	60	*	0.38	0.22
U.S. Steel, Clairton, PA	30-Day Average	4,121	*	*	*
	Daily Maximum	6,271	*	*	*
U.S. Steel, Gary, IN	30-Day Average	2,575	*	*	*
	Daily Maximum	*	823	*	*
U.S. Steel, Homestead, PA	30-Day Average	3,137	*	*	*
	Daily Maximum	8,548	3,451	*	*

* = not involved in trade

While it is clear that trading has reduced the sum of permitted discharges, its effect on actual discharges in comparison to standard application of the effluent limitations guidelines is less clear. In none of the ten cases analyzed did trading lead to the implementation of pollution controls beyond those needed to control to BAT limits. Instead, in each case, trading was possible because existing treatment or other circumstances at one or more outfalls had already reduced discharges below the levels required by the effluent guidelines. This "excess control" was applied as an offset to discharges from other outfalls, enabling facilities to forego installation of additional pollution control systems that would otherwise have been needed. In the immediate term, therefore, standard application of the effluent limitations guidelines would likely have resulted in a greater reduction in actual discharges than that which occured under trading. In the longer term, however, it is

possible that trading will prove to be a constraint on increases in pollutant loads, since plant managers must operate existing treatment systems at peak performance, in order to maintain the "excess control" used to offset the need for pollutant reductions elsewhere.

Water Quality

Detailed assessments of the water quality impacts of trading were not conducted by regulatory agencies as part of the permitting process for any of the permits incorporating trading. The regulation governing intra-plant trading, however, specifically precludes its use when it would result in any violation of state water quality guidelines. This requirement has been adhered to in all cases. In fact, as noted later in this report, engineers at several steel plants not making use of trading reported that they were prevented from doing so due to water quality constraints.

IMPACT OF INTRA-PLANT TRADES ON POLLUTION CONTROL COSTS

Intra-plant trading is attractive to steel plants primarily because it reduces their pollution control costs.[4] For all ten plants, trading provided permit limits that could be met without installing treatment beyond that necessary to achieve the effluent guideline limits. To determine how treatment and related costs would have differed without the trade, personnel associated with each of the facilities were contacted. In some cases, officials based their appraisal of reduced treatment costs on analyses done at the time the trade originated. In most cases, however, appraisals were developed post-hoc. These assessments are presented in detail in Appendix E.

Exhibit 3-3 presents summary information on the present value of reductions in pollution control costs due to trading. Cost estimates are provided for both capital and operation and maintenance (O&M) expenses, and are available for seven of the ten facilities that have engaged in trades.[5] Five of the permits incorporating these trades are still in effect. For the seven cases, the present value of reduced costs attributable to trading ranges from $3.2 million to $69.8 million. The present value of total reduced costs for the seven plants is $122.7 million. For the other three plants that have had trades, one of which is still in effect, no information was obtained. Explanation of the methodology and assumptions used to calculate the present value of the reduced costs is provided in Appendix F.

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[4] In addition, one plant reported that trading provided a "buffer" at one outfall, making permit violations less likely.

[5] The cost data do not take tax considerations into account.

Exhibit 3-3

REDUCTION IN TREATMENT COSTS DUE TO TRADING

Plant	Reduced Capital Expenditures (1993 dollars)	Present Value of Reduced Capital Expenditures Through 1993	Annual Reduced O&M Expenditure (1993 dollars)	Present Value of Reduced O & M Expenditures Through 1993	Present Value of Total Reduced Expenditures Through 1993
Armco Steel Middletown, OH	$2,000,000	$3,934,303	$150,000	$2,367,540	$6,301,843
Babcock and Wilcox Beaver Falls, PA	NA	NA	NA	NA	NA
Bethlehem Steel Sparrows Point, MD	$1,374,676	$2,361,949	$206,201	$2,469,878	$4,831,827
Inland Steel East Chicago, IN	$1,125,000	$2,068,267	$84,375	$1,165,763	$3,234,029
LTV Steel Indiana Harbor, IN	NA	NA	NA	NA	NA
Republic Steel Massillon, OH	$5,238,534	$10,304,990	$392,890	$3,941,811	$14,246,801
Rouge Steel Dearborn, MI	$3,000,000	$5,515,378	$225,000	$3,108,701	$8,624,078
U.S. Steel Clairton, PA	$4,832,007	$8,883,448	$724,801	$6,796,101	$15,679,549
U.S. Steel Gary, IN	$29,313,285	$57,663,668	$2,198,496	$12,144,047	$69,807,715
U.S. Steel Homestead, PA	NA	NA	NA	NA	NA
Totals		$90,732,002		$31,993,841	$122,725,843

INTRA-PLANT TRADING AND INNOVATIVE TREATMENT

None of the environmental engineers at the plants making use of trading indicated that trading had spurred the use of innovative pollution control technologies. A recent report on waivers issued for the use of innovative treatment technology under section 301(k) of the Clean Water Act indicates that one of the plants making use of trading, Inland Steel, also made use of the innovative treatment waiver.[6] According to the fact sheet for Inland Steel's permit, however, none of the outfalls involved in trading were associated with this waiver.

According to a former EPA employee who was intimately involved in intra-plant trading issues in the mid-1980s, and who currently works as a consultant to the steel industry, no innovative

[6] U.S. Environmental Protection Agency, Office of Water, "The 301(k) Innovation Waiver and Pollution Prevention," prepared by Kerr and Associates, 1994.

treatment techniques have been developed as a result of the application of intra-plant trading.[7] There is no indication that any treatment technologies other than those considered BAT in the effluent guideline development documents have been used on traded outfalls.

RESOURCE OR ADMINISTRATIVE IMPACTS ON PERMIT AUTHORITIES AND DISCHARGERS

Like all NPDES permits, those incorporating trading have explicit limits set for each outfall; the actual permit document looks the same as a permit not incorporating trading. In the regulation, the Agency explicitly requires that "specific, fixed effluent limitations" be set for each outfall involved in trading.[8] According to a 1982 *Federal Register* notice, this requirement was necessary to avoid increasing the administrative burden on permit authorities.[9] The requirement appears to have been successful in achieving this goal. None of the state or EPA personnel contacted indicated that administering or enforcing a permit that incorporates trading differs in any respect from administering or enforcing a standard permit.

The only administrative change imposed by a permit that incorporates trading is in the permit development stage. State permit authorities, EPA Regional personnel, and industry sources noted that the initial formulation and subsequent checking of the calculations required to include trading in a permit has a small impact on the time needed to issue a permit. According to an individual involved in the negotiation of several of the permits incorporating intra-plant trading, the development of a permit for a large integrated steel plant typically takes two to four weeks of a permit writer's time. Trading adds about one day to this time. This individual indicated that when trading is under consideration, the permit writer's involvement is generally limited to checking trading calculations provided by the facility.[10] Although not trivial, the calculations are not especially complicated, and are relatively easy to follow, especially compared to other calculations required for a permit (e.g., the calculations relating production to maximum loadings permitted under ELGs). Moreover, materials related to trading typically constitute only a small portion of the background documentation compiled in issuing a permit. For example, the State of Pennsylvania provided copies of all calculations associated with the Babcock and Wilcox permit. These calculations filled 32 pages. Calculations associated with the trade took up part of one page. Available calculations for other permits incorporating trading show a similar portion associated with trades. Although purely anecdotal, the limited documentation required for review of trades provides further evidence that intra-plant trading does not result in a significant burden on permit authorities.

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[7] Gary Amendola, Amendola Engineering, Incorporated, telephone conversations, May through November 1993. Mr. Amendola worked as a Senior Iron and Steel Industry Specialist for EPA until 1989, and was the information contact noted in the *Federal Register* notice of the final regulation. He has been involved in negotiations for several of the permits incorporating trading.

[8] 40 CFR 420.03(b)(2).

[9] 47 FR 23272, included as part of Appendix C.

[10] Gary Amendola, telephone conversation, 8 November 1993.

ATTITUDES TOWARD INTRA-PLANT TRADING

The state and Regional regulatory personnel contacted were generally familiar with the intra-plant trading provision for iron and steel facilities, voiced no objections to its use, and appeared willing to consider its application. Staff turnover in the years since most intra-plant trades were first developed, however, limited the ability of many of those contacted to comment on the details of the process. In addition, the high degree of turnover made it impossible to determine the extent to which regulators' attitudes toward trading may have evolved over time. Like their government counterparts, the steel facility environmental managers contacted were also quite familiar with the regulations governing intra-plant trading; these individuals often had been instrumental in suggesting its use.

While state and Regional permit writers voiced no objections to the intra-plant trading policy, they, along with industry officials, noted a number of factors that limit its use. One industry source noted that the exclusion of effluent from the cold forming and cokemaking subcategories had in some cases prevented an intra-plant trade.[11] In addition, because intra-plant trading provisions do not apply to new sources, and because many older iron and steel mills have closed in recent years, the number of facilities eligible to trade has declined over time. This trend is likely to continue, particularly as the steel industry brings new equipment, such as continuous casting machinery and electric arc furnaces, on line. Finally, several state officials and industry sources noted a trend toward increased reliance on water quality-based permitting, particularly in Ohio. As water quality-based permitting becomes increasingly prevalent, the flexibility that the intra-plant trading regulation allows in writing technology-based permits becomes less relevant.[12]

PLANTS NOT MAKING USE OF INTRA-PLANT TRADING

To develop a better understanding of factors that have limited broader use of intra-plant trading, environmental managers at several large iron and steel plants whose permits do not incorporate trading were interviewed. The plants contacted were selected either because they are among the largest in the nation, or because the PCS indicated that they maintain multiple outfalls, and thus might be candidates for trading.

The interviews indicate that there is no single reason why the plants contacted have not used trading; however, lack of familiarity with trading provisions does not appear to have been a factor. All managers contacted were aware of the intra-plant trading rule, and indicated that in negotiating permit limits with regulatory authorities they would not hesitate to call for its use. While they were reluctant to generalize about factors limiting trading, they were able to describe the specific circumstances that prohibited its use at their facility. These factors are summarized below.

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[11] J. David Moniot, General Manager, Environmental Affairs, USX—U.S. Steel Group. Telephone conversation, 16 November 1993.

[12] It is important to note that the principles of intra-plant trading can be applied to a facility that is subject to a water quality-based permit. This report, however, confines itself to the consideration of intra-plant trading under technology-based permits.

National Steel Corporation[13]

Great Lakes Division, River Rouge, MI

National Steel Corporation's Great Lakes Division, located in River Rouge, Michigan, is not able to make use of the intra-plant trading provision because state water quality requirements constrain the discharge of lead and cadmium to levels below federal BAT-based limits. It is interesting to note, however, that Michigan provides the plant with a total lead limit that it can allocate among its outfalls. In this case, the implementation of the water quality-based limit for lead in effect permits intra-plant trading, albeit not as defined by the intra-plant trading regulation.

Granite City Division, Granite City, IL

National Steel Corporation's Granite City Division is located in Granite City, Illinois. All wastewater from the plant's operations is treated in an on-site central treatment plant with a single outfall. Thus, there is no opportunity for trading at this facility.

Armco Steel Company, Ashland, KY[14]

Armco Steel Company's Ashland Works is located in Ashland, Kentucky. The company has an on-site central treatment plant for all process wastewater. Effluent from the central treatment plant flows to a central reservoir from which cooling water is drawn and returned. Flow from this reservoir is monitored at a single point prior to entering the Ohio River through several outfalls. Due to the presence of a central treatment plant and a single monitoring point, there is no opportunity for trading at this facility.

Bethlehem Steel Corporation[15]

Burns Harbor Division, Burns Harbor, IN

Bethlehem Steel Corporation's Burns Harbor Division is located in Burns Harbor, Indiana. The facility has two outfalls, one for treated process water and one for treated cooling water. It is not able to make use of trading in its permit because the pollutants controlled at these outfalls do not match in a way that allows a trade to occur.

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[13] John Olashuk, Environmental Engineer, National Steel Corporation. Telephone conversation, 2 December 1993.

[14] Steve Custer, Manager, and Bill Cody, Senior Environmental Engineer, Environmental Affairs Department, Armco Steel Ashland Works. Telephone conversations, 26 January 1994 and 28 January 1994.

[15] Barbara E. Bachman, Senior Environmental Engineer, Bethlehem Steel Corporation. Telephone conversations, 2 December 1993 and 18 February 1994.

Bethlehem Division, Bethlehem, PA

Bethlehem Steel Corporation's Bethlehem Division is located in Bethlehem, Pennsylvania. Trading was considered in writing the facility's permit. However, Bethlehem was unable to identify any combination of outfalls that could successfully engage in a trade.

LTV Steel Company, Cleveland, OH[16]

According to information in the PCS, LTV Steel Company's Cleveland Works has 32 outfalls. The corporate environmental manager for water is aware of the trading provision and was involved in negotiating the trading permit now in effect for LTV's Indiana Harbor Works. Due to water quality constraints, however, he has been unable to find an opportunity to use trading in the Cleveland Works' permit.

Wheeling Pittsburgh Steel Corporation[17]

Wheeling Pittsburgh's main steelmaking facility is its Steubenville Complex, made up of two separately permitted facilities: the North Works, in Steubenville, Ohio, and the South Works, in Mingo Junction, Ohio. The North Works has 20 outfalls (11 process and 9 stormwater), and the South Works has 23 outfalls (16 process and 7 stormwater). Environmental officials at the plant are familiar with the trading provision; however, they were not able to make use of it at either facility. Permit limits at all process outfalls are water quality constrained for all parameters except total suspended solids and oil and grease. Controlling the water quality constrained parameters to permit limits has reduced TSS and O&G discharges to levels below ELG limits. Thus, there is no opportunity at this facility to make use of trading.

Geneva Steel, Provo, UT[18]

Geneva Steel, a large independent steel manufacturer, has an on-site central treatment plant with a single outfall, and thus cannot make use of trading.

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[16] John Etchison, Manager, Water, Corporate Environmental Control. Telephone conversation, 8 September 1993.

[17] Dr. William Samples, Manager, Engineering and Environmental Control, and Tom Waligura, Assistant Manager of Environmental Control. Telephone conversations, 2 December 1993 and 22 February 1994.

[18] Steve McNiel, Utah Department of Environmental Quality, Department of Water Quality. Telephone conversation, 17 May 1993.

A preliminary assessment of the feasibility of using intra-plant trading in effluent categories other than Iron and Steel was conducted through informal interviews with officials of EPA's Office of Water who are involved with issuing effluent guidelines.[1] Over the next several years, the EPA is expected to develop new or revised effluent guidelines for several industries. According to an official of the Engineering and Analysis Division of EPA's Office of Water, rulemaking is currently in progress for the Industrial Laundries and Metal Products and Machinery categories. The Industrial Laundries category is made up almost exclusively of small indirect dischargers (i.e., facilities that discharge to POTWs), which are not likely candidates for intra-plant trading. The same generally holds true for the Metals Products and Machinery category; although there are a few large dischargers with multiple outfalls, most dischargers in this category are small indirect dischargers, and thus not likely candidates for intra-plant trading.[2] Note, however, that these facilities may be candidates for inter-plant pretreatment trading.[3]

In addition to the industries cited above, the Office of Water is in the initial stages of considering revision of effluent guidelines for five categories of dischargers: Iron and Steel Manufacturing, Steam Electric Power Generation Facilities, Textile Manufacturing, Inorganic Chemical Manufacturing, and Petroleum Refining. Like the Iron and Steel Manufacturing category, the remaining four categories are made up largely of direct dischargers, many with multiple outfalls. Thus, intra-plant trading may be feasible for facilities in these categories. Although the Office of Water is not currently planning to explicitly evaluate the viability and merits of intra-plant trading for any of these industries, officials expressed a willingness to conduct such an evaluation. In

[1] The Agency's plan for developing new and revised effluent guidelines was announced in the *Federal Register* September 8, 1992. Appendix H contains a copy of this notice.

[2] Eric Strassler, Engineering and Analysis Division, Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency. Telephone conversation, 2 February 1994.

[3] For a discussion of pretreatment trading, see *Use of Market-Based Allocations to Meet Local Limits for Pretreatment: A Report in Support of Clean Water Act Reauthorization*, prepared for Richard Kashmanian, U.S. EPA, Office of Policy, Planning and Evaluation, by Industrial Economics, Incorporated and Science Applications International Corporation, March 1994.

addition, several officials at the Office of Water familiar with these industries discussed their initial impressions of the potential for intra-plant trading.[4]

According to these sources, most of the water from the steam power generation industry is likely to be non-contact cooling water, blowdown water from steam recycling operations, runoff water, or water from air pollution control devices. It is unclear to what extent this effluent is likely to be a viable candidate for trading. The Chief of the Energy Branch of the Engineering and Analysis Division of the Office of Water suggested that the feasibility of trading would be "small to medium" for the Petroleum Refining, Textile, and Inorganic Chemical categories; he based this assessment both on the number of facilities in each industry with multiple outfalls and on his initial impression of the likelihood that these outfalls discharge similar pollutants.[5] The Office of Water's studies regarding these categories are scheduled to be completed over the next year.[6] In addition, he noted a "medium to large" feasibility for intra-plant trading in the Organic Chemicals category, although the current guidelines, promulgated in November 1987, do not permit intra-plant trading. These guidelines are not among those currently scheduled for revision.

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[4] Strassler; Marvin Rubin, Chief, Energy Branch, Engineering and Analysis Division, Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency, telephone conversation, 4 February 1994; Elwood Forscht, Chief (acting), Metals Branch, Engineering and Analysis Division, Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency, telephone conversations, 24 and 25 February 1994.

[5] Telephone conversation, 4 February 1994.

[6] A schedule of expected completion dates should be published in the *Federal Register* in late Spring.

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Appendix A

ACTIVE IRON AND STEEL INDUSTRY PERMITS IDENTIFIED USING THE EPA'S PERMIT COMPLIANCE SYSTEM

Permit Number	Facility Name	City Name	State	Region	Number of Outfalls
AL0000027	SOU RECLAMATION, COLBERT CO	SHEFFIELD	AL	4	1
AL0000485	APPLIED INDUSTRIAL MAT CORP	BRIDGEPORT	AL	4	2
AL0000680	KOPPERS IND INC, WOODWARD FAC	DOLOMITE	AL	4	2
AL0001155	NATL STANDARD, COLUMBIANA	COLUMBIANA	AL	4	1
AL0001554	SMI STEEL INC, BIRMINGHAM	BIRMINGHAM	AL	4	3
AL0001767	EMPIRE COKE CO, TUSCALOOSA	TUSCALOOSA	AL	4	1
AL0003247	SLOSS INDUSTRIES CORPORATION	BIRMINGHAM	AL	4	3
AL0003417	ABC COKE DIV/DRUMMOND CO INC	BIRMINGHAM	AL	4	5
AL0003646	USX CORP./USS FAIRFIELD WORKS	FAIRFIELD	AL	4	15
AL0003735	BIRMINGHAM STEEL CORPORATION	BIRMINGHAM	AL	4	2
AL0025216	GLOBE METALLURGICAL, SELMA	SELMA	AL	4	1
AL0025321	HART & COOLEY, HUNTSVILLE	HUNTSVILLE	AL	4	1
AL0050164	REYNOLDS METALS CO	SHEFFIELD	AL	4	1
AL0050776	POLYMER COIL COATER, FAIRFIELD	FAIRFIELD	AL	4	2
AL0054941	TUSCALOOSA STEEL CORP.	TUSCALOOSA	AL	4	2
AL0055239	GULF STATES STEEL INC, GADSDEN	GADSDEN	AL	4	1
AL0056499	HANNA STEEL CORPORATION	FAIRFIELD	AL	4	1
AR0034550	ARKANSAS STEEL ASSOCIATES	NEWPORT	AR	6	2
AR0036552	BEKAERT STEEL WIRE CORP-VAN BU	VAN BUREN	AR	6	3
AR0038181	DAIWA STEEL TUBE INDUSTRIES CO	PINE BLUFF	AR	6	3
AR0039730	QUANEX CORP-FT SMITH	FORT SMITH	AR	6	3
AR0046523	MAVERICK TUBE CORP.	BLYTHEVILLE	AR	6	3
CA0005002	USS-POSCO/PITTSBURG WORKS	PITTSBURG	CA	9	1
CA0005690	CONT'L-WHITE CAP		CA	9	1
CA0027928	KAISER STEEL CORP.		CA	9	1
CA0028282	U.S. NAVY		CA	9	1
CA0029513	FASS METAL COMPANY		CA	9	1
CA0082511	STANLEY-BOSTITCH, INC		CA	9	1
CA0105899	MORTON INTERNATIONAL		CA	9	1
CO0000621	CF&I STEEL, L.P.	PUEBLO	CO	8	2
CT0000132	BARNES GROUP INC-STEEL DIVISION	BRISTOL	CT	1	1
CT0000159	ATLANTIC WIRE CO.	BRANFORD	CT	1	1

Permit Number	Facility Name	City Name	State	Region	Number of Outfalls
CT0000612	HOLO-KROME CO	WEST HARTFORD	CT	1	4
CT0001601	DRAWN METAL TUBE COMPANY	THOMASTON	CT	1	2
CT0001694	CONSOLIDATED INDUSTRIES	CHESHIRE	CT	1	5
CT0002399	ADVANCED PRODUCTS CO.	NORTH HAVEN	CT	1	2
CT0002623	RISDON MFG. COMPANY	DANBURY	CT	1	3
CT0003042	CARPENTER TECH CORP-STEEL DIV	READING	CT	1	5
CT0003573	UNION CARBIDE CORP-MATLS-SYS	NORTH HAVEN	CT	1	1
CT0003701	ALLEGHENY LUDLUM STEEL	IVORYTOWN	CT	1	1
CT0021822	NEWMET PRODUCTS		CT	1	1
CT0022331	LOOS & CO		CT	1	1
CT0022926	SMITH GATES CORP	FARMINGTON	CT	1	1
CT0022969	ARISTOL INC	FAIRFIELD	CT	1	1
CT0022977	J&S METALS INC	FORESTVILLE	CT	1	1
CT0023191	HOUSATONIC WIRE CO INC	SEYMOUR	CT	1	1
CT0024848	J.J. RYAN CORPORATION	PLANTSVILLE	CT	1	1
CT0024970	PLASMA COATINGS, INC.	WATERBURY	CT	1	1
CT0024996	PLASTONICS, INC.	HARTFORD	CT	1	1
CT0025046	MORIN COIL COATING CO., INC.	BRISTOL	CT	1	1
DE0000264	PHOENIX STEEL CORP CLAYMONT PT	CLAYMONT	DE	3	1
DE0051021	CITISTEEL USA INCORPORATED		DE	3	1
FL0001139	FL WIRE & CABLE JAX	JACKSONVILLE	FL	4	6
FL0002771	CLEANERS HANGER CO.- JAX	JACKSONVILLE	FL	4	4
FL0030121	ADCOM WIRE-JAX	JACKSONVILLE	FL	4	2
FL0041840	WELLSTREAM CORPORATION	PANAMA CITY	FL	4	1
GA0000230	GEORGIA TUBING CORP.	CEDAR SPRINGS	GA	4	2
IA0003352	KEOKUK FERRO-SIL, INC.	KEOKUK	IA	7	8
IA0003841	NORTHERN ENGRAVING CO		IA	7	1
IA0061972	NORTH STAR STEEL COMPANY		IA	7	1
IA0072818	KEOKUK FERRO-SIL,INC.-LEACHATE	KEOKUK	IA	7	1
IL0000329	NATIONAL STEEL-GRANITE CITY	GRANITE CITY	IL	5	5
IL0000612	LACLEDE STEEL-ALTON	ALTON	IL	5	1
IL0001309	TSC ENTERPRISES, INC.	LEMONT	IL	5	5

Permit Number	Facility Name	City Name	State	Region	Number of Outfalls
IL0001678	CHS ACQUISITION CORP	CHICAGO HEIGHTS	IL	5	1
IL0002101	ACME STEEL CO.-CHICAGO	CHICAGO	IL	5	6
IL0002119	ACME STEEL CO.-RIVERDALE	RIVERDALE	IL	5	5
IL0002526	KEYSTONE STEEL AND WIRE	PEORIA	IL	5	9
IL0002593	LTV STEEL-CHICAGO	CHICAGO	IL	5	4
IL0002631	LTV STEEL-HENNEPIN	HENNEPIN	IL	5	3
IL0002674	AMERICAN STEEL AND WIRE-JOLIET	JOLIET	IL	5	2
IL0002691	USX-USS SOUTH WORKS	CHICAGO	IL	5	10
IL0003751	ATWOOD VACUUM MACHINE CO	STOCKTON	IL	5	2
IL0003794	NORTHWESTERN STEEL AND WIRE CO	STERLING	IL	5	4
IL0004855	ST. CHARLES ACQUISITION LMTD	ST. CHARLES	IL	5	2
IL0035297	BIRMINGHAM BOLT COMPANY, INC.	BOURBONNAIS	IL	5	2
IL0059234	PITTSBURG TUBE-INTL DIV	FAIRBURY	IL	5	1
IL0060968	AMEROCK CORP	ROCKFORD	IL	5	1
IL0061816	ROCK PLASTIC PRODUCTS	ROCKFORD	IL	5	1
IL0061891	ROCKFORD BOLT & STEEL CO	ROCKFORD	IL	5	1
IL0062511	RAYNOR MANUFACTORING CO.	DIXON	IL	5	1
IL0069779	RYERSON STEEL COIL-ELK GROVE	ELK GROVE VILLAGE	IL	5	1
IN0000094	INLAND STEEL COMPANY	EAST CHICAGO	IN	5	38
IN0000175	BETHLEHEM STEEL CORPORATION	CHESTERTON	IN	5	10
IN0000205	LTV STEEL COMPANY	EAST CHICAGO	IN	5	16
IN0000281	USX CORP., USS GARY WORKS	PITTSBURGH	IN	5	33
IN0000337	NATIONAL STEEL, MIDWEST DIV.	PORTAGE	IN	5	11
IN0000639	UNIVERSAL TOOL AND STAMPING	BUTLER	IN	5	3
IN0000655	ITT AEROSPACE/OPTICAL DIVISION	FORT WAYNE	IN	5	1
IN0001074	LANDIS & GYR METERING, INC.	LAFAYETTE	IN	5	4
IN0001295	INDIANA STEEL & WIRE DIVISION	MUNCIE	IN	5	2
IN0001481	FAIRFIELD MANUFACTURING	LAFAYETTE	IN	5	2
IN0002445	MIDSTATES WIRE	CRAWFORDSVILLE	IN	5	4
IN0002909	CONTINENTAL STEEL CORPORATION	INDIANAPOLIS,	IN	5	4
IN0003107	UNITED TECH. AUTOMOTIVE, ESD	UNION CITY	IN	5	4
IN0004278	WARSAW BLACK OXIDE	BURKET	IN	5	1

Permit Number	Facility Name	City Name	State	Region	Number of Outfalls
IN0004847	PLYMOUTH TUBE CO.	WINAMAC	IN	5	2
IN0032352	DELTA FAUCET	GREENSBURG	IN	5	2
IN0038172	ROLL COATER, INC.	KINGSBURY	IN	5	2
IN0045284	ALLEGHENY LUDLUM STEEL	NEW CASTLE	IN	5	3
IN0046248	NUCOR FASTENER PLANT	ST. JOE	IN	5	1
IN0050415	SOMMER METALCRAFT CORP	CRAWFORDSVILLE	IN	5	1
IN0051136	VULCRAFT DIV.,NUCOR CORP.	ST. JOE	IN	5	2
IN0052302	B & B CUSTOM PLATING	HOAGLAND	IN	5	1
IN0053732	FEENY MANUFACTURING COMPANY	MUNCIE	IN	5	1
IN0054488	U.S. ARMY RESERVE TRAINING CTR	KINGSBURY	IN	5	1
IN0054682	NUCOR STEEL	CRAWFORDSVILLE	IN	5	4
IN0109541	RANDALL DIV. OF TEXTRON, INC.	MORRISTOWN	IN	5	3
KY0000485	ARMCO STEEL CO LP	ASHLAND	KY	4	30
KY0000507	CONTECH CONST PROD INC	ASHLAND	KY	4	2
KY0000558	ARMCO INC COKE PLT	ASHLAND	KY	4	5
KY0001571	GREEN RIVER STEEL	OWENSBORO	KY	4	8
KY0002712	NEWPORT STEEL CORP WILDER PLT	NEWPORT	KY	4	17
KY0003531	SKW METALS & ALLOYS INC	CALVERT CITY	KY	4	4
KY0028720	SKILCRAFT MFG CO	BURLINGTON	KY	4	1
KY0033979	KY ELECTRIC STEEL CO	ASHLAND	KY	4	5
KY0035394	FLORIDA STEEL CORP	LOUISVILLE	KY	4	1
KY0043168	LLOYDS MECHANICAL ERECTION	OWENSBORO	KY	4	1
KY0049255	ROLL FORMING CORP SHELBYVILLE	SHELBYVILLE	KY	4	2
KY0058301	PLYMOUTH CO	HOPKINSVILLE	KY	4	5
KY0060399	ARMCO STEEL NORTON FOUNDRY	ASHLAND	KY	4	4
KY0072231	NORTH STAR STEEL KY	CALVERT CITY	KY	4	4
KY0092118	WORLDSOURCE COIL COATINGS INC	HAWESVILLE	KY	4	6
KY0094293	STEEL TECHNOLOGIES INC	EMINENCE	KY	4	1
KY0095877	NORTH AMERICAN STAINLESS	CARROLLTON	KY	4	12
KY0096482	BUNDY CORP	CYNTHIANA	KY	4	2
KY0097781	INDUSTRIAL POWDER COATING	NORWALK	KY	4	1
KY0098221	DOFASCO INC GALLATIN CO STEEL	HAMILTON ONT L8N 3J5	KY	4	1

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LA0006777	STUPP CORP-E BATON ROUGE	BATON ROUGE	LA	6	1
LA0026638	US STEEL SUPPLY HOUSTON DISTRI		LA	6	1
LA0055859	LAFAYETTE WELL TESTING-LAFAYET		LA	6	1
LA0061867	AMF TUBOSCOPE INC-AMELIA		LA	6	1
LA0063924	BAKER HUGHES VETCO SERVICES		LA	6	1
LA0065862	CAMERON IRON WORKS-VILLE PLATT		LA	6	1
LA0084123	HOBSON GALVENIZING/POWER STRUC		LA	6	1
LA0092878	WESTSIDE COATING SERVICES INC-		LA	6	1
LA0094129	ENERGY COATINGS CO. INC.-HARVE		LA	6	1
MA0000647	EASTERN ETCHING & MFG CO	CHICOPEE	MA	1	1
MA0002411	SIMPLEX TIME RECORDER COMPANY	GARDNER	MA	1	2
MA0002721	INDUSTRIAL CHROMIUM CORP.	HOLYOKE	MA	1	1
MA0003336	TELEDYNE-RODNEY METALS	NEW BEDFORD	MA	1	1
MA0005801	TREMONT NAIL CO	WAREHAM	MA	1	1
MA0022471	FALL RIVER PLATING CO.		MA	1	1
MA0026743	COATINGS ENGINEERING CORP	SUDBURY	MA	1	1
MA0027375	RATHBONE CORPORATION	PALMER	MA	1	1
MD0000981	EASTERN STAINLESS CORP.	BALTIMORE	MD	3	2
MD0001201	BETHLEHEM STEEL CORP SPARROW P	SPARROWS POINT	MD	3	10
MD0001694	MARYLAND SPECIALTY WIRE, INC.	COCKEYSVILLE	MD	3	2
MD0001970	ARMCO STAINLESS: ALLOY PRODUCT	BALTIMORE	MD	3	5
MD0024848	PITTSBURG-DES MOINES STEEL COM	BALTIMORE	MD	3	1
MI0001571	BESSER CO	ALPENA	MI	5	2
MI0001902	QUANEX CORP-MICH SEAMLESS TUBE	SOUTH LYONS	MI	5	1
MI0002313	NAT STEEL CORP-GLS-ECORSE	ECORSE	MI	5	14
MI0002399	MCLOUTH STEEL-TRENTON	TRENTON	MI	5	13
MI0002755	HASTINGS BUILDING PRODUCTS	HASTINGS	MI	5	1
MI0003361	FORD-ROUGE MFG COMPLEX	DEARBORN	MI	5	7
MI0004219	HOFMANN IND-MICH TUBE DIV	EAU CLAIRE	MI	5	1
MI0004227	MCLOUTH STEEL-GIBRALTAR	GIBRALTAR	MI	5	5

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MI0026778	NAT STEEL CORP-GLS-80" MILL	ECORSE	MI	5	2
MI0026794	NAT STEEL CORP-GLS-MICH PLT	ECORSE	MI	5	4
MI0027596	NAT STANDARD-LAKE ST	NILES	MI	5	4
MI0027812	HITACHI MAGNETICS CORP	EDMORE	MI	5	3
MI0028461	QUANEX CORP-MAC STEEL DIV	JACKSON	MI	5	3
MI0039179	NAT STANDARD-CITY COMPLEX	NILES	MI	5	5
MI0042269	SUMITEC INC	BENTON HARBOR	MI	5	1
MI0043524	ROUGE STEEL CO	DEARBORN	MI	5	20
MI0043991	ROOD INDUSTRIES INC	STURGIS	MI	5	1
MI0044415	ROUGE-USX CORP-DOUBLE EAGLE	DEARBORN	MI	5	2
MI0044539	JACK-POST CORP	BUCHANAN	MI	5	1
MI0047571	SPECTRUM IND INC	GRAND RAPIDS	MI	5	1
MI0048747	GOLD STAR COATINGS INC	WEST BRANCH	MI	5	1
MN0001325	PEERLESS CHAIN CO	WINONA	MN	5	1
MO0001627	BOHN AND DAWSON INC.	ST. LOUIS	MO	7	1
MO0101231	BULL MOOSE TUBE CO.	GERALD	MO	7	3
MO0111635	STEEL PROCESSORS DIVISION	SPRINGFIELD	MO	7	2
MO0111643	HUTCHENS INDUSTRIES	SPRINGFIELD	MO	7	2
MO0112101	TALBOT INDUS INC PLANT II	NEOSHO	MO	7	2
MO0112119	TALBOT INDUS INC PLANT I	NEOSHO	MO	7	2
MS0032921	COPIAH COUNTY INDUSTRIAL PARK	HAZLEHURST	MS	4	2
NC0065064	RICHTER PRECISION, INC.	GREENSBORO	NC	4	1
NE0111287	NUCOR STEEL NORFOLK	NORFOLK	NE	7	8
NE0114626	VULCRAFT DIVISION, NUCOR CORP.	NORFOLK	NE	7	1
NE0123846	GREAT PLAINS POLYMERS, INC.	OMAHA	NE	7	3
NE0128082	INDUSTRIAL MACHINE SPECIALTIES	LINCOLN	NE	7	2
NJ0000035	NATIONAL-STANDARD COMPANY	NILES	NJ	2	2
NJ0002615	OKONITE COMPANY	RAMSEY	NJ	2	17
NJ0003719	METAL IMPROVEMENT CO INC	CARLSTADT	NJ	2	3
NJ0023523	OKONITE COMPANY THE	RAMSEY	NJ	2	1
NJ0031178	RARITAN RIVER STEEL COMPANY	PERTH AMBOY	NJ	2	2
NJ0031186	ECD INC	HILLSIDE	NJ	2	2

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NJ0032611	NATIONAL METALLIZING	CRANBURY	NJ	2	1
NJ0035807	APLHA CHEMICAL & PLASTICS CO	NEWARK	NJ	2	1
NJ0052931	CARPENTER TECHNOLOGY-TUBE DIV.	READING	NJ	2	2
NJ0062464	EAST COAST SPRAYING INC	NORTH BERGEN	NJ	2	1
NM0020460	AMERICAN SMELT & REF CO-PORT N	VANADIUM	NM	6	1
NY0000787	JORDAN ROAD INDUSTRIAL DIV	SKANEATELES FALLS	NY	2	2
NY0000825	SPECIALTY METALS DIV	SYRACUSE	NY	2	1
NY0001368	LACKAWANNA FACILITIES	LACKAWANNA	NY	2	54
NY0002399	TONAWANDA COKE CORP	TONAWANDA	NY	2	7
NY0003034	ENARC-O MACHINE PRODUCTS INC	HONEOYE FALLS	NY	2	1
NY0003395	VALEO ENGINE COOLING SYSTEMS	JAMESTOWN	NY	2	3
NY0003719	ELLICOTT (T) SD#6	CELORON	NY	2	3
NY0004073	AIR FORCE PLANT #59	JOHNSON CITY	NY	2	4
NY0007081	AL TECH SPECIALTY STEEL CORP	WATERVLIET	NY	2	20
NY0007129	SPECIAL METALS CORP	NEW HARTFORD	NY	2	8
NY0025453	NAVAL WEAPONS INDUST DOD 466	CALVERTON	NY	2	4
NY0030210	DOWCRAFT CORPORATION	FALCONER	NY	2	8
NY0072231	HADCO CORP	OWEGO	NY	2	1
NY0075833	STANDARD MICROSYSTEMS CORP.	HAUPPAUGE	NY	2	2
NY0075884	E.B. STIMPSON CO., INC.	BAYPORT	NY	2	2
NY0078221	R S M ELECTRON POWER INC.	DEER PARK	NY	2	3
NY0083623	SIVACO NEW YORK	TONAWANDA	NY	2	5
NY0084689	MARKIN TUBING INC	WYOMING	NY	2	1
NY0084841	AUTH ELECTRIC CO INC	DEER PARK	NY	2	1
NY0086495	EG&G ROTRON INC	WOODSTOCK	NY	2	3
NY0097845	OAK-MITSUI, INC	HOOSICK FALLS	NY	2	5
NY0108090	DOVER FINDINGS INC.	SAINT JAMES	NY	2	2
NY0108189	JOINING MATERIALS & ANALYSIS	DEER PARK	NY	2	3
NY0108359	AMERICAN TECH. CERAMICS-STEPAR	HUNTINGTON STATION	NY	2	2
NY0108626	PCK TECHNOLOGY	MELVILLE	NY	2	2
NY0108979	MERCURY AIRCRAFT INC	HAMMONDSPORT	NY	2	3

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NY0110701	API ELECTRONICS, INC	HAUPPAUGE	NY	2	2
NY0171638	MENNEN MEDICAL INC	CLARENCE	NY	2	4
NY0191809	SPIELMAN, MICHAEL	HUDSON	NY	2	4
NY0191868	CERAMASEAL INC O.P.D. BLDG.	NEW LEBANON	NY	2	5
NY0199401	NUMAX ELECTRONICS	HAUPPAUGE	NY	2	1
NY0204374	HERITAGE CUTLERY, INC	BOLIVAR	NY	2	2
NY0218855	THE VIRTIS CO INC	GARDINER	NY	2	2
OH0000426	MOEN INCORPORATED	ELYRIA	OH	5	4
OH0000850	LTV STEEL COMPANY, INC.	CLEVELAND	OH	5	7
OH0000957	LTV STEEL COMPANY, INC.	CLEVELAND	OH	5	32
OH0001295	LTV STEEL COMPANY, INC.	ELYRIA	OH	5	2
OH0001562	USS/KOBE STEEL CO	LORAIN	OH	5	22
OH0002160	AMERICAN STEEL AND WIRE CORP.	CUYAHOGA HTS	OH	5	3
OH0004006	ELKEM METALS COMPANY	MARIETTA	OH	5	10
OH0004171	THE TIMKEN COMPANY	WOOSTER	OH	5	6
OH0004219	TIMKEN COMPANY	CANTON	OH	5	11
OH0004260	ARMCO INC.	COSHOCTON	OH	5	3
OH0004910	ARMCO INC.	DOVER	OH	5	6
OH0004995	THE ROBERTSON FENCE COMPANY	MT.STERLING	OH	5	2
OH0005312	EATON CORPORATION	MASSILLON	OH	5	2
OH0005606	GREER STEEL COMPANY	DOVER	OH	5	6
OH0005622	NCR CORPORATION		OH	5	4
OH0006068	NEW BOSTON COKE CORPORATION	NEW BOSTON	OH	5	8
OH0006840	ARMCO INC.	MANSFIELD	OH	5	13
OH0006858	ARMCO INCORPORATED	ZANESVILLE	OH	5	4
OH0006912	REPUBLIC ENGINEERED STEELS	CANTON	OH	5	20
OH0006921	REPUBLIC ENGINEERED STEEL	CANTON	OH	5	3
OH0006939	REPUBLIC ENGINEERED STEEL	MASSILLON	OH	5	5
OH0007188	J&L SPECIALTY PRODUCTS CORP	LOUISVILLE	OH	5	6
OH0008338	COPPERWELD CORP	SHELBY	OH	5	15
OH0009989	ARMCO STEEL COMPANY L. P.	MIDDLETON	OH	5	5
OH0009997	ARMCO STEEL COMPANY L. P.	MIDDLETOWN	OH	5	25

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OH0010481	ARMCO INC.	PIQUA	OH	5	3
OH0011207	CSC INDUSTRIES, INC.	WARREN	OH	5	1
OH0011266	WARREN CONSOLIDATED IND	NILES	OH	5	3
OH0011274	LTV STEEL COMPANY	WARREN	OH	5	21
OH0011312	LTV STEEL COMPANY, INC.	YOUNGSTOWN	OH	5	3
OH0011321	LTV STEEL COMPANY	CAMPBELL	OH	5	7
OH0011339	WHEELING PITTSBURG STEEL		OH	5	2
OH0011347	WHEELING-PITTSBURGH STEEL	STEUBENVILLE	OH	5	10
OH0011355	WHEELING PITTSBURG STEEL	MINGO JUNCTION	OH	5	20
OH0011363	THOMAS STEEL STRIP CORP.	WARREN	OH	5	7
OH0011371	WHEELING PITTSBURG STEEL	YORKVILLE	OH	5	7
OH0011878	BABCOX AND WILCOX	ALLIANCE	OH	5	3
OH0012122	OHIO FERRO-ALLOYS CORP.	CANTON	OH	5	2
OH0012572	OHIO FERRO ALLOYS - BRILLIANT		OH	5	1
OH0031437	SPS TECHNOLOGIES	CLEVELAND	OH	5	1
OH0051802	KALT MANUFACTURING CO	N.RIDGEVILLE	OH	5	1
OH0051853	THE HOOVER COMPANY	NORTH CANTON	OH	5	1
OH0052329	SPENCER MANUFACTURING CO.	SPENCER	OH	5	1
OH0052701	NATIONAL STEEL SERVICE CEN.	TOLEDO	OH	5	1
OH0054003	MARION STEEL COMPANY	MARION	OH	5	3
OH0057991	SIMS BROTHERS INC.	MARION	OH	5	1
OH0079898	ZIMNOX COAL CO		OH	5	1
OH0083852	BRAINARD ACQUISITION CORP	WARREN	OH	5	6
OH0092444	MERCURY STAINLESS INC	MASSILLON	OH	5	5
OH0101079	WARREN CONSOLIDATED INDUSTRY	WARREN	OH	5	21
OK0034193	SOUTHWEST TUBE MFG CO-SAND SPR	SAND SPRINGS	OK	6	2
OK0041912	PARAGON INDUSTRIES, INC.-SAPUL		OK	6	1
OR0000451	OREGON STEEL MILLS INC	PORTLAND	OR	10	1
OR0000469	OREGON STEEL MILLS INC	PORTLAND	OR	10	1
OR0027260	CASCADE STEEL ROLLING MILLS	MCMINNVILLE	OR	10	1
OR0027693	SCHNITZER STEEL PRODUCTS CO	PORTLAND	OR	10	1
OR0030180	PACIFIC FABRICATORS INC	PORTLAND	OR	10	1

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PA0000264	WESTERN PA WATER CO-NEW CASTLE	NEW CASTLE	PA	3	1
PA0000868	WHEATLAND TUBE-CO	WHEATLAND	PA	3	1
PA0001406	BRAEBURN ALLOY STEEL DIV PLANT	PITTS.	PA	3	1
PA0001481	SHARON STEEL CORPORATION	GREENVILLE	PA	3	6
PA0001554	MONESSEN, INC.	FARRELL	PA	3	6
PA0001562	WHEELING-PGH STEEL CORP-ALLEN	WHEELING	PA	3	12
PA0001660	EDGEWATER CORP	OAKMONT	PA	3	1
PA0001902	JESSOP STEEL CO WASH PLANT	WASHINGTON	PA	3	3
PA0002046	TELEDYNE PITTS TOOL STEEL	MONACA	PA	3	1
PA0002160	PITTSBURGH TUBE CO-MONACA	MONACA	PA	3	1
PA0002429	SHARON STEEL-FARELL	SHARON	PA	3	13
PA0002437	SHENANGO INC-NEVILLE COKE&IRON	PITTSBURGH	PA	3	9
PA0002585	TELEDYNE VASCO COLONIAL PLANT	MONACA	PA	3	2
PA0002593	TELEDYNE SCOTTDALE PLANT	PITTSBURGH	PA	3	1
PA0002607	TELEDYNE CARNEGIE PLANT	PITTSBURGH	PA	3	1
PA0002721	WASHINGTON STEEL CORP	WASHINGTON	PA	3	1
PA0002739	WASHINGTON STEEL CORP	WASHINGTON	PA	3	1
PA0002879	UNION ELEC STEEL CORP-HARMON	CARNEGIE	PA	3	1
PA0002887	UNION ELEC STEEL CORP-CARNEGIE	CARNEGIE	PA	3	1
PA0002992	BETHLEHEM STEEL CORP-JOHNSTOWN	JOHNSTOWN	PA	3	16
PA0003000	UNITED DOMINION INDUSTRIES INC	CHARLOTTE	PA	3	1
PA0003239	BABCOCK & WILCOX CO TUB PROD	KOPPEL	PA	3	3
PA0003255	LATROBE STEEL COMPANY	LATROBE	PA	3	1
PA0003603	ARMCO STANLESS & ALLOY PRODUC	BRIDGEVILLE	PA	3	6
PA0003620	PITTSBURGH FLATROLL CO.	PITTSBURGH	PA	3	4
PA0003697	CYTEMP SPECIALITY STEEL DIVISI	TITUSVILLE	PA	3	1
PA0003875	US STEEL CORP - JOHNSTOWN	PITTSBURGH	PA	3	1
PA0003891	US STEEL-IMPERIAL WORKS	PITTS	PA	3	1
PA0004073	USS IRVIN PLANT	DRAVOSBURG	PA	3	9
PA0004154	BLAIR STRIP STEEL CO NEWCASTLE	NEW CASTLE	PA	3	1

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PA0004278	STANDARD LAFARGE	CANFIELD	PA	3	2
PA0004464	USX CORP-NATIONAL WORKS	LORAIN	PA	3	12
PA0004472	USS,DIV. OF USX CORPORATION	CLAIRTON	PA	3	14
PA0004766	NATIONAL FORGE CO-IRVINE DIV	IRVINE	PA	3	1
PA0005240	TELEDYNE VASCO LATROBE	LATROBE	PA	3	1
PA0005754	J & L SPECIALTY PRODUCTS CORP	MIDLAND,	PA	3	5
PA0005762	ELECTRALLOY CORP	OIL CITY	PA	3	1
PA0006114	LTV STEEL (ALIQUIPPA)	ALIQUIPPA	PA	3	8
PA0006131	LTV STEEL COMPANY	PITTSBURGH	PA	3	17
PA0006238	NAPCO INC VALENCIA	VALENCIA	PA	3	1
PA0006327	ALLEGHENY LUDLUM STEEL CORP	PITTSBURGH	PA	3	37
PA0006335	KOPPEL STEEL CORP	BEAVER FALLS	PA	3	1
PA0006351	CYCLOPS CORPS SAWHILL TUBULAR	SHARON	PA	3	1
PA0006378	CYCLOPS CORP	SHARON	PA	3	3
PA0007889	ALUMINUM COMPANY OF AMERICA-LE	LEBANON	PA	3	1
PA0008095	MILTON MFG CO DIV OF CECO CORP	MILTON	PA	3	1
PA0008184	WHARTON, TAYLOR		PA	3	1
PA0008303	BETHLEHEM STEEL-STEELTON	DAUPHIN COUNTY	PA	3	3
PA0008575	WILLIAMSPORT WIREROPE WORKS,	WILLIAMSPORT	PA	3	3
PA0009164	STANDARD STEEL DIV OF FREEDOM	MIFFLIN COUNTY	PA	3	33
PA0009598	SANDVIK STEEL INC SCRANTON WKS	SCRANTON	PA	3	1
PA0009725	JERSEY SHORE STEEL CO PLANT	SEY SHORE	PA	3	1
PA0011011	PLYMOUTH TUBE COMPANY	HORSHAM	PA	3	1
PA0011177	BETHLEHEM STEEL CORP BETHLEHEM	BETHELEM	PA	3	46
PA0011436	HANDY HARMAN TUBE CO	NORRISTOWN	PA	3	1
PA0011568	LUKENS STEEL CORP COATESVILLE	COATESVILLE	PA	3	12
PA0011851	SUPERIOR TUBE CO NORRISTOWN		PA	3	1
PA0012441	DAILY CORP A RUSSEL ENTERPRISE	MONTGOMERYVIL	PA	3	1
PA0013056	PHOENIX PIPE & TUBE	PHOENIXVILLE	PA	3	1
PA0013129	CARPENTER TECHNOLOGY	BERKS COUNTY	PA	3	15
PA0013463	USX, INC - FAIRLESS HILLS	FAIRLESS	PA	3	12

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PA0013641	BISHOP TUBE CO-DIVISION	FRAZER	PA	3	1
PA0013820	ALLEGHENY LUDLUM STEEL	BRACKENBRIDGE	PA	3	12
PA0014311	REPUBLIC STEEL UNION DRAWN DIV	BEAVER FALLS	PA	3	1
PA0028037	NATIONAL - STANDARD COMPANY	MT JOY	PA	3	1
PA0034665	STANDARD STEEL SPECIALTY CO-SU	MONACA	PA	3	1
PA0040274	UNITED STATES STEEL CORP., VAN	PITTSBURGH	PA	3	1
PA0040312	MOLYCORP INC	WASHINGTON	PA	3	4
PA0041378	STAR MANUFACTURING CO	HOMER CITY	PA	3	1
PA0042617	UNIFORM TUBES,INC	COLLEGEVILLE	PA	3	1
PA0042781	MOUNT JOY WIRE CORPORATION	MOUNT JOY	PA	3	1
PA0045021	PRE FINISH METALS, INC.	MORRISVILLE	PA	3	2
PA0050326	LUKENS STEEL COMPANY	COATESVILLE	PA	3	1
PA0050440	SPRA-CO., INC.	IVYLAND	PA	3	1
PA0054372	NATIONAL ROLLING MILLS, INC.	PAOLI	PA	3	1
PA0060364	DRESSER MANUFACTURING DIV DRES	WELLSBORO	PA	3	1
PA0084620	RICHTER PRECISION, INC.	EAST PETERSBURG	PA	3	1
PA0094510	USS STEEL EDGAR THOMPSON	DRAVOSBURG	PA	3	12
PA0094811	USS,DIV. OF USX CORPORATION	CLAIRTON	PA	3	9
PA0095737	PITTSBURGH TUBE COMPANY	MONACA	PA	3	1
PA0095796	PITTSBURGH TUBE COMPANY	MONACA	PA	3	1
PA0096792	METALTECH	PITTSBURGH	PA	3	1
PA0097870	LTV STEEL COMPANY	BEAVER	PA	3	1
PA0100382	ERIE COKE CORP	PITTSBURGH	PA	3	1
PA0102709	SHARON STEEL CORPORATION	GREENVILLE	PA	3	1
PA0103411	ELLWOOD UDDEHOLM STEEL COMPANY	NEW CASTLE	PA	3	1
PA0204315	J & L STRUCTUAL INC.	ALIQUIPPA	PA	3	1
PA0205109	JOHNSTOWN CORPORATION		PA	3	1
PA0205222	KOPPLE STEEL CORP	KOPPEL	PA	3	1
PA0206121	DOVERSPIKE BROTHERS COAL CO.	PUNXSUTAWNEY	PA	3	1
PA0598771	M. B. ENERGY, INC.	INDIANA	PA	3	1
RI0001139	STANLEY - BOSTITCH	EAST GREENWICH	RI	1	1

Permit Number	Facility Name	City Name	State	Region	Number of Outfalls
RI0001449	OCEAN STATE STEEL INC	EAST PROVIDENCE	RI	1	1
RI0021393	ACS INDUSTRIES INC	WOONSOCKET	RI	1	1
RI0021423	TECHNICAL MATERIALS, INC.	LINCOLN	RI	1	1
SC0001431	GEORGETOWN STEEL CORP	GEORGETOWN	SC	4	1
SC0004014	MACALLOY CORP-CHARLESTON	CHARLESTON	SC	4	3
SC0034029	HUDSON INTERNATIONAL CONDUCTOR	INMAN	SC	4	1
SC0034304	WISCONSIN WIRES	GREENVILLE	SC	4	1
SC0035238	NUCOR STEEL	DARLINGTON	SC	4	1
TN0001686	CHEMETALS	HUMPHREYS COUNTY	TN	4	2
TN0027715	RAYOVAC MATERIALS DIVISION	TIPTON COUNTY	TN	4	4
TN0027804	FLORIDA STEEL COMPANY	KNOX COUNTY	TN	4	3
TN0064661	MILL BUSINESS FURNITURE	PUTNAM COUNTY	TN	4	3
TN0064751	TAC ALLOYS-KIMBALL PLANT	KIMBALL	TN	4	1
TN0067628	LTV STEEL COMPANY-COUNCE	HARDIN COUNTY	TN	4	4
TX0000027	LONE STAR STEEL COMPANY	LONE STAR	TX	6	13
TX0003026	QUANEX CORP-GULF STATES TUBE D	ROSENBERG	TX	6	4
TX0004898	CAMERON IRON WORKS USA, INC.	HOUSTON	TX	6	5
TX0007307	TEK-RAP, INCORPORATED	HOUSTON	TX	6	2
TX0007706	US STEEL CORP-BAYTOWN	BAYTOWN	TX	6	4
TX0008524	ARMCO STEEL CORP-HOUSTON	HOUSTON	TX	6	8
TX0030031	ROMAN WIRE CO-SOUTHMAYD	SHERMAN	TX	6	1
TX0033758	SULLIVAN LAND AND CATTLE CO	GALVESTON	TX	6	1
TX0057371	JONES & LAUGHLIN STEEL CORP-GA	GAINESVILLE	TX	6	1
TX0067695	N STAR STEEL TEXAS INC	VIDOR	TX	6	8
TX0075370	BAKER TUBULAR SERVICES, INC.	HOUSTON	TX	6	1
TX0076945	SEQUA CORPORATION-HOUSTON	HOUSTON	TX	6	2
TX0083178	STRUCTURAL METALS, INC-SEGUIN	SEGUIN	TX	6	3
TX0086177	VETCO SERVICES, INC.		TX	6	1
TX0086576	GORE, W L & ASS INC	AUSTIN	TX	6	1
TX0088404	ARMCO INC GREEN BAYOU LANDFILL		TX	6	1
TX0091227	LUBRIZOL CORP- PASADENA		TX	6	1

Permit Number	Facility Name	City Name	State	Region	Number of Outfalls
TX0093513	CDC COATING CO-CHANNELVIEW		TX	6	1
TX0093769	B & D COATING, INC.		TX	6	1
TX0095427	HAWKINS INC-HOUSTON		TX	6	1
TX0097012	TEX-TRAC,INC DBA OLD RIVER BUL		TX	6	1
TX0101729	CARGILL INC-STEEL & WIRE DIV		TX	6	1
TX0107191	NORTHWESTERN STEEL & WIRE CO		TX	6	1
UT0000361	GENEVA STEEL	PROVO	UT	8	8
VA0001341	ROANOKE ELECTRIC STEEL SALEM	ROANOKE	VA	3	1
VA0001589	ROANOKE ELECTRIC STEEL CORPORA	ROANOKE	VA	3	1
VA0051047	C-K COMPANY	SOUTH BOSTON	VA	3	1
WA0000744	SALMON BAY STEEL CORP	BELLEVUE	WA	10	1
WA0002046	SALMON BAY STEEL CORP	SEATTLE	WA	10	1
WA0002861	SILICON METALTECH, INC.		WA	10	1
WA0022250	ACE GALVANIZING INC		WA	10	1
WA0031305	SALMON BAY STEEL CORPORATION	SEATTLE	WA	10	1
WI0002771	NORTHERN ENGRAVING CORP SPARTA	SPARTA	WI	5	2
WI0026417	AMRON CORPORATION	WAUKESHA	WI	5	2
WI0038938	TRENT TUBE DIVISION PLANTS 2 A	EAST TROY	WI	5	2
WI0043877	ROLLEX CORPORATION	ELK GROVE VILLAGE	WI	5	2
WI0054500	METALLICS INC	ONALASKA	WI	5	4
WV0000167	ELKEM METALS COMPANY	ALLOY	WV	3	10
WV0000426	AMERICAN ALLOYS, INC.	NEW HAVEN	WV	3	1
WV0002330	ACME FISHING TOOL CO	PARKERSBURG	WV	3	1
WV0003336	WEIRTON STEEL CORPORATION	WEIRTON	WV	3	12
WV0003425	SIGNODE SUPPLY CORPORATION	WEIRTON	WV	3	2
WV0004499	WHEELING-PITTSBURGH STEEL CORP	WHEELING	WV	3	6
WV0004502	WHEELING NISSHIN STEEL CORP	FOLLANSBEE	WV	3	5
WV0004511	WHEELING-PITTSBURGH STEEL CORP	WHEELING	WV	3	8
WV0004634	SHARON STEEL CORPORATION	SHARON	WV	3	3
WV0005746	NATL STEEL CORPBROWNS ISLAND 3	WEIRTON	WV	3	1
WV0023281	WHEELING-PITTSBURGH STEEL CORP	WHEELING	WV	3	2

Permit Number	Facility Name	City Name	State	Region	Number of Outfalls
WV0043176	PITTSBURGH TUBE CO JANE LEWS	JANE LEW	WV	3	1
WV0046744	ARMCO STEEL CORP	MIDDLETON	WV	3	1
WV0076198	AMERICAN ALLOYS, INCORPORATED	NEW HAVEN	WV	3	1
WV0111961	WHEELING PITTSBURGH STEEL CORP	WHEELING	WV	3	1

Appendix B

IRON AND STEEL INDUSTRY PERMITS WITH TEN OR MORE OUTFALLS IDENTIFIED USING THE EPA'S PERMIT COMPLIANCE SYSTEM

Permit Number	Facility	City	State	EPA Region	Number of Outfalls
AL0003646	USX CORP./USS FAIRFIELD WORKS	FAIRFIELD	AL	4	15
IL0002691	USX-USS SOUTH WORKS	CHICAGO	IL	5	10
IN0000094	INLAND STEEL COMPANY	EAST CHICAGO	IN	5	38
IN0000175	BETHLEHEM STEEL CORPORATION	CHESTERTON	IN	5	10
IN0000205	LTV STEEL COMPANY	EAST CHICAGO	IN	5	16
IN0000281	USX CORP., USS GARY WORKS	PITTSBURGH	IN	5	33
IN0000337	NATIONAL STEEL, MIDWEST DIV.	PORTAGE	IN	5	11
KY0000485	ARMCO STEEL CO LP	ASHLAND	KY	4	30
KY0002712	NEWPORT STEEL CORP WILDER PLT	NEWPORT	KY	4	17
KY0095877	NORTH AMERICAN STAINLESS	CARROLLTON	KY	4	12
MD0001201	BETHLEHEM STEEL CORP	SPARROWS POINT	MD	3	10
MI0002313	NAT STEEL CORP-GLS-ECORSE	ECORSE	MI	5	14
MI0002399	MCLOUTH STEEL-TRENTON	TRENTON	MI	5	13
MI0043524	ROUGE STEEL CO	DEARBORN	MI	5	20
NJ0002615	OKONITE COMPANY	RAMSEY	NJ	2	17
NY0001368	LACKAWANNA FACILITIES	LACKAWANNA	NY	2	54
NY0007081	AL TECH SPECIALTY STEEL CORP	WATERVLIET	NY	2	20
OH0000957	LTV STEEL COMPANY, INC.	CLEVELAND	OH	5	32
OH0001562	USS/KOBE STEEL CO	LORAIN	OH	5	22
OH0004006	ELKEM METALS COMPANY	MARIETTA	OH	5	10
OH0004219	TIMKEN COMPANY	CANTON	OH	5	11
OH0006840	ARMCO INC.	MANSFIELD	OH	5	13
OH0006912	REPUBLIC ENGINEERED STEELS	CANTON	OH	5	20
OH0008338	COPPERWELD CORP	SHELBY	OH	5	15
OH0009997	ARMCO STEEL COMPANY L. P.	MIDDLETOWN	OH	5	25
OH0011274	LTV STEEL COMPANY	WARREN	OH	5	21
OH0011347	WHEELING-PITTSBURGH STEEL	STEUBENVILLE	OH	5	10
OH0011355	WHEELING PITTSBURG STEEL	MINGO JUNCTION	OH	5	20
OH0101079	WARREN CONSOLIDATED INDUSTRY	WARREN	OH	5	21
PA0001562	WHEELING-PGH STEEL CORP-ALLEN	WHEELING	PA	3	12

Permit Number	Facility	City	State	EPA Region	Number of Outfalls
PA0002429	SHARON STEEL-FARELL	SHARON	PA	3	13
PA0002992	BETHLEHEM STEEL CORP	JOHNSTOWN	PA	3	16
PA0004464	USX CORP-NATIONAL WORKS	LORAIN	PA	3	12
PA0004472	USS,DIV. OF USX CORPORATION	CLAIRTON	PA	3	14
PA0006131	LTV STEEL COMPANY	PITTSBURGH	PA	3	17
PA0006327	ALLEGHENY LUDLUM STEEL CORP	PITTSBURGH	PA	3	37
PA0009164	STANDARD STEEL DIV OF FREEDOM	MIFFLIN COUNTY	PA	3	33
PA0011177	BETHLEHEM STEEL CORP	BETHELEM	PA	3	46
PA0011568	LUKENS STEEL CORP COATESVILLE	COATESVILLE	PA	3	12
PA0013129	CARPENTER TECHNOLOGY	BERKS COUNTY	PA	3	15
PA0013463	USX, INC - FAIRLESS HILLS	FAIRLESS	PA	3	12
PA0013820	ALLEGHENY LUDLUM STEEL	BRACKENBRIDGE	PA	3	12
PA0094510	USS STEEL EDGAR THOMPSON	DRAVOSBURG	PA	3	12
TX0000027	LONE STAR STEEL COMPANY	LONE STAR	TX	6	13
WV0000167	ELKEM METALS COMPANY	ALLOY	WV	3	10
WV0003336	WEIRTON STEEL CORPORATION	WEIRTON	WV	3	12

Appendix C

FEDERAL REGISTER NOTICES AND OTHER DOCUMENTS RELATING TO INTRA-PLANT TRADING IN THE IRON AND STEEL INDUSTRY

federal register

Thursday
May 27, 1982

Part II

Environmental Protection Agency

Iron and Steel Manufacturing Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

Some commenters opposed the condition which requires that each outfall have a specific discharge limit because they believed that it would preclude opportunities to implement efficient control strategies. They suggested that the Agency adopt a bubble policy which allows effluent limitations to be established on a plantwide basis: the so-called, "floating bubble". Under the suggested "floating bubble", dischargers would be allowed to vary the mix of controls at the various outfalls within a plant on a daily, weekly, or monthly basis, as long as the plantwide limitation is not exceeded.

The Agency has carefully evaluated the advantages and disadvantages of the "floating bubble" and has concluded that fixed limits on each outfall are necessary to ensure optimum operation of treatment facilities; enforcement of permit limitations; and, to minimize the administrative burden of the water bubble. The floating bubble would make it difficult for permit authorities to determine compliance using normal sampling techniques. To confirm compliance with a floating bubble permit, the control authority would need simultaneous samples from each outfall for which limitations are established under the policy. Reporting requirements and inspection procedures would have to be significantly modified and would require significant additional resources.

EPA recognizes that in theory, the flexibility to vary the mix of treatment within a plant at different times could reduce the cost of compliance with this regulation. However, despite requests to do so, industry representatives have not provided any data in support of their contention that the floating bubble would allow steel industry dischargers to use control strategies that are not feasible under a policy requiring fixed limits on each outfall. EPA believes the major savings associated with the bubble policy will result from changes in fixed control costs. Dischargers can take advantage of these savings under the policy adopted by the Agency.

The Agency solicited comments on the resource and administrative burden that the bubble policy might place on permit authorities. Several commenters expressed concern that the policy would present an additional burden that permit authorities would be unable to bear. The Agency has tried to design the bubble policy to minimize its administrative burden. First, the Agency has specified that dischargers must initiate bubble proposals at their own expense. In addition, as discussed above, EPA has sought to minimize the resource burden by requiring that bubble permits have fixed enforceable limits on each outfall. Once these limitations are determined, the cost of reviewing inspection and self-monitoring reports will be comparable to the administrative costs associated with traditional permit practices.

increase in toxic pollutants discharged. To ensure that permits issued under the bubble policy do not result in an increase in pollutants discharged, the Agency has imposed the following subcategory limitations:

(i) *Cokemaking.* Permits issued under the bubble policy which involve trades with cokemaking wastewaters will not be allowed. The Agency believes that the number and amounts of toxic organic pollutants found in cokemaking wastewaters cannot be effectively controlled under the bubble policy.

(ii) *Cold Forming.* Permits issued under the bubble policy which involve trades with cold forming wastewaters will not be allowed. The Agency believes that the variability and amounts of toxic organic pollutants associated with cold forming wastewaters are such that it is not possible to ensure effective control of toxic organic pollutants under the water bubble policy.

2. *Dischargers must meet water quality standards.* A change in the distribution of pollutant loadings may adversely affect water quality even if total loadings discharged do not increase. Permit authorities may not approve a bubble application if it would result in a violation of water quality standards.

3. *Each outfall must have a specific discharge limit.* Water bubble permits may not allow limitations to be set on a plant-wide "floating" basis. For the reasons discussed in Section XVI of this preamble, the Agency has decided not to allow the policy to be applied on a "floating" basis.

c. Trades involving certain subcategory waste streams will be limited.

EPA has identified certain process subcategories with wastewaters that are significantly different than those from other steel industry subcategories. Unrestricted trades with these subcategories could result in a net

federal register

Thursday
May 17, 1984

Part VII

Environmental Protection Agency

40 CFR Parts 403 and 420

Iron and Steel Manufacturing Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards; and General Pretreatment Regulations; Final Rule

 2/023

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 403 and 420

[FRL 2550-4]

Iron and Steel Manufacturing Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards; and General Pretreatment Regulations

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final regulation.

SUMMARY: EPA is promulgating modifications to the regulation which limits effluent discharges to waters of the United States and the introduction of pollutants into publicly owned treatment works from facilities engaged in manufacturing iron and steel. EPA agreed to propose these modifications in a Settlement Agreement which resolved the various lawsuits brought against EPA by the steel industry and the Natural Resources Defense Council, Inc., challenging the final iron and steel industry regulation promulgated by EPA on May 27, 1982, 47 FR 23258. This promulgation satisfies EPA's obligations under that Settlement Agreement.

The modifications include: (1) An amendment to the "water bubble" rule; (2) certain modifications of the effluent limitations guidelines for "best practicable control technology currently available: (BPT); "best available technology economically achievable" (BAT); "best conventional pollutant control technology" (BCT); and, "new source performance standards" (NSPS) for direct dischargers; and (3) certain modifications to the pretreatment standards for new and existing indirect dischargers (PSES and PSNS). In addition, EPA agreed to publish additional preamble language regarding the steel industry regulation. The Agency is also promulgating an amendment to the General Pretreatment Regulations (40 CFR Part 403) which permits reclassification of non-contact cooling water flows contaminated with significant quantities of pollutants from "dilute" to "unregulated" for purposes of the combined waste stream formula contained in 40 CFR § 403.6(e).

DATES: This regulation shall become effective on July 2, 1984.

The compliance date for the BAT regulations is as soon as possible, but in any event, no later than July 1, 1984. The compliance date for new source performance standards (NSPS) and pretreatment standards for new sources (PSNS) is the date the new source begins operations. The compliance date for pretreatment standards for existing sources (PSES) is July 10, 1985.

Under Section 509(b)(1) of the Clean Water Act, judicial review of this regulation can be made only by filing a petition for review in the United States Court of Appeals within 90 days after the regulation is considered issued for purposes of judicial review. Under Section 509(b)(2) of the Clean Water Act, the requirements in this regulation may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements. In accordance with 40 CFR 100.01 (45 FR 26048), this regulation shall be considered issued for purposes of judicial review at 1:00 p.m. eastern time on May 31, 1984.

ADDRESSES: Mr. Ernst P. Hall, Effluent Guidelines Division (WH-552), Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460. Attention EGD Docket Clerk, Proposed Iron and Steel Rules (WH-552).

The supporting information and all comments on this regulation are available for inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library). The EPA information regulation provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gary Amendola, Senior Iron and Steel Industry Specialist, (216) 835-5200.

SUPPLEMENTARY INFORMATION:

Organization of this document:

I. Legal Authority

The regulation described in this notice is promulgated under authority of sections 301, 304, 306, 307, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 USC 1251 et seq., as amended by the Clean Water Act of 1977, P.L. 92-517).

II. Background

A. Prior Regulation

On January 7, 1981, EPA proposed a regulation to establish Best Practicable Control Technology Currently Available (BPT), Best Available Technology Economically Achievable (BAT), and Best Conventional Pollutant Control Technology (BCT) effluent limitations guidelines and New Source Performance Standards (NSPS), Pretreatment Standards for Existing Sources (PSES), and Pretreatment Standards for New Sources (PSNS) for the iron and steel manufacturing point source category (steel industry), 46 FR 1858. EPA promulgated that steel industry regulation on May 27, 1982, 47 FR 23258. The preamble to the final steel industry regulation describes the history of the rulemaking action.

B. Challenges to the Prior Regulation

After publication of the steel industry regulation, certain members of the steel industry, the American Iron and Steel Institute, and the Natural Resources Defense Council, Inc., filed petitions to review the regulation. Those challenges were consolidated into one lawsuit by the Third Circuit Court of Appeals. (*National Steel Corp. v. EPA*, No. 82-3225 and Consolidated Cases).

C. Settlement Agreement

(1) *Agreement to Modifications and Changes.* On February 24, 1983, the parties in the consolidated lawsuits entered into a comprehensive Settlement Agreement which resolved all issues related to the steel industry regulation raised by the petitioners. As a result of that Settlement Agreement, the United States Court of Appeal issued an order on March 9, 1983 which stayed briefing in the law suits. In the Settlement Agreement, EPA agreed to

publish a notice of proposed rulemaking ... to solicit comments regarding ... in modifications to the final steel ...stry regulation. In addition, EPA agreed to publish an amendment as an interim final rule. EPA also agreed to publish proposed additions to the preamble to the regulation. The petitioners agreed that, if, after EPA has taken final action under the Settlement Agreement each individual provision of the final steel industry regulation and each addition to the preamble is substantially the same as, and does not alter the meaning of, language set forth in the settlement agreement, the petitioners will dismiss the various lawsuits challenging the final steel industry regulation. Petitioners also agreed that, pending completion of this rulemaking ...ney would abide by the regulatory language described in the Settlement Agreement.

EPA also agreed to take final action on a proposed amendment to the general pretreatment regulations (40 CFR Part 403) which would allow reclassification of non-contact cooling waters contaminated with significant quantities of pollutants from "dilute" to "unregulated" for purposes of the ...bined waste stream formula to 40 ... 403.6(e).

...) *Stay of Certain Effluent Limitations.* As part of the Settlement Agreement, the parties jointly requested the United States Court of Appeals for the Third Circuit in *National Steel Corp. v. EPA*, to stay the effectiveness of certain sections of 40 CFR Part 420 pending final action by EPA on each respective modification or addition. Copies of the Settlement Agreement were promptly sent to EPA Regional Offices and State NPDES permit issuing authorities after it was executed. On March 9, 1983, the Court entered an order staying those sections of the regulation promulgated on May 27, 1982 which EPA proposed to amend.

All limitations and standards contained in the final steel industry regulation published in May 27, 1982 which are not specifically listed in the attached proposed regulation were not stayed by the order entered by the court. EPA is not deleting or modifying any of those limitations and standards in this notice.

III. Response to Public Comments

The Agency received twelve (12) ...ers containing comments on the ...posed regulation published on October 14, 1983. All of the comments received are supportive of the proposed changes to the steel industry regulation originally promulgated on May 27, 1982, and also supportive of the proposed modification of § 403.6(e) of the General Pretreatment Regulation. A comment from petitioner American Iron and Steel Institute (AISI) indicated that it spoke for and on behalf of its members.

Independently of the Settlement Agreement, two commenters recommended that the clarifying language added to the preamble to the steel industry regulation for four pretreatment issues (See section V. A) be extended to all industrial point source categories. One commenter recommended that EPA delete the words "... ... or could have been ... ..." from subpart (c) of the dilution flow (Fd) definition in the combined waste stream formula in the general pretreatment regulation. EPA is now reviewing the propriety of making complementary amendments to the general pretreatment regulation for the pretreatment issues, and, is also reviewing the definition of dilution flows (Fd).

IV. Modifications to the Iron and Steel Manufacturing Point Source Category Regulation

EPA is making the following changes to the steel industry regulation:

A. Alternative Effluent Limitations (Water Bubble) (§ 420.03)

The amendments to the water bubble rule for the iron and steel manufacturing point source category regulation provide that the alternative effluent limitations established under the water bubble must result in a decrease in the discharge of traded pollutants from the amount allowed by the generally applicable limitations. The water bubble rule established by the final regulation published on May 27, 1982, provided that there could be no increase in the discharge of pollutants beyond that allowed by the generally applicable limitations. The preamble amendments presented below describe the revisions to the water bubble rule. The following preamble language is substantially the same as the language in the Settlement Agreement.

As part of the settlement, EPA is amending its bubble rule for the steel industry. As originally promulgated, the rule provided that a discharger could qualify for alternative effluent limitations as long as its discharge from a combination of outfalls met certain requirements (water quality standards) and restrictions and would not exceed the total mass of each pollutant otherwise allowed under the regulation. Under the revised rule being promulgated today, a discharger would have to meet the same requirements and restrictions, but would qualify for alternative effluent limitations only if it achieves a net reduction from the total mass of each traded pollutant.

The amended regulation provides that the permit issuing authority must determine an "appropriate net reduction amount" in each case. In making that determination, it is intended that the permit writer will examine historical discharge levels and seek to achieve those reductions that are attainable at a facility through good engineering practices, improved operations and supervision of existing treatment systems or other feasible modifications, e.g., non-process flow segregation or chemical addition, if they can be achieved without requiring significant additional expenditures. It is intended that in reviewing opportunities for appropriate reductions, the permit writer will require only those measures which result in non-trivial (substantial) effluent reductions and which will not require significant additional expenditures.

The minimum net reduction in all cases for each pollutant traded is to be the amount specified in the regulation. The amount is expressed in terms of percentages of the amount by which a discharger proposes to exceed the otherwise applicable effluent limitations established in this regulation. The amounts the Agency is specifying in this rule are approximately 15 percent for TSS and O&G and approximately 10 percent for all other traded pollutants.

In the simplest case, for example, a discharger might propose to exceed the allowable limitation for TSS on Outfall A by 100 pounds and then make up the amount on Outfall B by reducing its allowable discharge by 100 pounds. The net reduction provision would require that, at a minimum, the allowable discharge for Outfall B (or any other outfall which the discharger has included in the bubble trade) be reduced by approximately 115 pounds. In making a determination of the "appropriate net reduction amount," the permit writer will require further, non-trivial (substantial) reductions only if he determines that they can be achieved without significant additional expenditures.

This amendment results from settlement of litigation among several parties with significantly divergent views of the water bubble rule. This provision does not represent the Agency view on whether it is either a legally required condition of a bubble rule under the Clean Water Act or any other environmental statute or required as a matter of policy, nor shall it be taken as an indicator of what the Agency may or may not require in any other regulations establishing effluent limitations guidelines under the Clean Water Act.

In reaching this accord, the parties do not imply any changes in their positions. In the interest of avoiding protracted litigation and of expediting the installation of pollution controls for this industry, the parties have reached an overall settlement of many issues that they view as beneficial. In that context, the parties have agreed to resolve their differences with this settlement.

B. Calculation of Mass-Based Pretreatment Standards

The effluent limitations guidelines, new source performance standards and

pretreatment standards for existing and new sources established in 40 CFR Part 420 (iron and steel manufacturing point source category) are "mass-based" limitations and standards. These mass-based limitations and standards establish the maximum amount of a pollutant which may be discharged per 1.000 pounds of product. The Agency's NPDES permit regulations. 40 CFR 122.45(b)(2). establish a method for deriving the applicable product basis for applying the effluent limitations and standards for direct dischargers. However. neither the General Pretreatment Regulations (40 CFR Part 403) nor the steel industry pretreatment standards (40 CFR Part 420) presently contain a comparable method for deriving the production basis for those who discharge wastewaters to publicly owned treatment works (POTWs).

In accordance with the Settlement Agreement. the Agency is promulgating a regulation which establishes the method for calculating the applicable mass-based pretreatment standard. This regulation. in large measure. mirrors the existing regulation by which mass-based effluent limitations for direct dischargers are calculated.

C. Removal Credits for Phenols (4AAP) (§ 420.06)

EPA is promulgating § 420.06 which specifies that pretreatment removal credits for phenols (4AAP) may be granted when phenols (4AAP) is used as an indicator or surrogate pollutant. Under the general pretreatment regulations. a categorical pretreatment standard may be revised to reflect removal of indicator or surrogate pollutants if the standard specifies that such revisions are permissible (40 CFR 403.7(a)). The final regulation published on May 27. 1982. did not specify that removal credits could be granted for phenols (4AAP). The Agency believes that the biological treatment systems employed at publicly owned treatment works will. in large measure. remove those pollutants for which phenols (4AAP) is used as an indicator pollutant to the same degree as they remove phenols (4AAP). Accordingly. EPA is revising the steel industry regulation to provide that removal credits may be granted for phenols (4AAP).

The following preamble language is substantially the same as the language in the Settlement Agreement.

Removal allowances pursuant to 40 CFR 403.7(a)(1) may be granted for phenols (4AAP) limited in 40 CFR Part 420 when used as an indicator or surrogate pollutant. Of course. when phenols (4AAP) are not used as an indicator or surrogate pollutant. removal allowances may also be granted

D Subparts B and C—Sintering and Ironmaking Subcategories

The modified BAT. NSPS. PSES. and PSNS ironmaking and sintering limitations and standards for lead and zinc are slightly higher than those contained in the final steel industry regulation published on May 27. 1982. After promulgating the final regulation. EPA learned that the final limitations for ironmaking operations (blast furnaces) were based in part upon data obtained at a plant with treatment operations more extensive than the EPA model treatment system. Therefore. these data may not be an appropriate basis for the limitations and standards. The limitations and standards promulgated today are based upon data obtained from steelmaking operations using the applicable BAT model treatment system. The model treatment systems used to develop the limitations and standards for steelmaking operations are the same as those considered for sintering and ironmaking operations. Because wastewaters from steelmaking operations are similar in character and treatability to wastewaters from sintering and ironmaking operations with respect to toxic metal pollutants. the Agency believes that it is appropriate to rely upon that data in promulgating modified lead and zinc limitations and standards for sintering and ironmaking operations. Volume I of Development Document (EPA 440/1–82/024. May 1982. pages 13. 18. 19. 27. 31. 34. 35. 40. 41. 46. 51. 55. 59. 63. 64. 66–68. and 409–427) contains the relevant data relating to steelmaking operations.

EPA is modifying the BAT limitations and PSES for total cyanide and establishing a new segment for existing indirect blast furnace dischargers that contain standards which are the same as the generally applicable PSES except that the promulgated ammonia-N and phenols (4AAP) standards are less stringent. These standards are only applicable to the two existing iron blast furnace operations which discharge their wastewater into POTWs. These operations are located in Chicago. Illinois and discharge their wastewater into the Metropolitan Sanitary District system. Compliance with the cyanide BAT limitations and PSES could be accomplished through the use of wastewater treatment technologies other than the model BAT and PSES alkaline chlorination technology. The changes would. accordingly. give the industry added flexibility. EPA is not. however. promulgating any changes to the BAT limitations and pretreatment standards (except as noted above for existing indirect dischargers) for ammonia-N and phenols (4AAP) contained in the final regulation.

E. 301(g) Water Quality Variance for Ammonia-N and Phenols (4AAP)

The availability of variances from the BAT limitations for non-toxic nonconventional pollutants as allowed under section 301(g) of the Clean Water Act can significantly affect the cost of compliance for a discharger. Section 301(g) variances can. however. only be granted in cases where the granting of the variance will not interfere with attainment of existing water quality standards. Certain parties to the Settlement Agreement have sought a clarification regarding the availability o section 301(g) variances for steel industry discharges. The following preamble language is substantially the same as the language in the Settlement Agreement.

The BPT referred to in section 301(g) of the Clean Water Act is either (a) the requiremen applicable to the facility as a result of the BPT limitation contained in the steel industr regulation. or (b) the requirement applicable to a facility as a result of the BPT limitation contained in the steel industry regulation which is or may be modified after February 24. 1983 by a fundamentally different factors ("FDF") variance. (40 CFR 125.31). or the net gross provisions of the NPDES permit regulations (40 CFR 122.63(b)). Section 301(g) variances may be granted for ammonia-N discharges from blast furnaces and from sinter plants when sinter plant wastewaters are treated with blast furnace wastwaters. Section 301(g) variances may also be granted for phenols (4AAP) discharges from blast furnaces and from sinter plants when sinter plant wastewaters are treated with blast furnace wastewaters if the applicant discharging phenols performs appropriate analyses (*e.g.*, GC or GC/MS) of the effluent which demonstrate that the effluent does not contain significant amounts of toxic pollutants. Of course. no variance may be granted pursuant to section 301(g) unless the demonstration called for by that section has been made.

F. Blast Furnace Flow: Related Safety Issue

The following preamble language is substantially the same as the language in the Settlement Agreement.

It has been brought to the Agency's attention that one facility contends that it may encounter a safety problem related to the maintenance of gas seal pressures resulting from efforts to reduce its blast furnace flows to those contemplated by the EPA model. Such a safety related flow problem may result in difficulty in meeting blast furnace mass limitations at the facility. Safety related issues were not raised prior to promulgation of the effluent limitations guidelines and were therefore. not considered by the Agency in the rulemaking.

The Agency has not received any information that this may be a problem at any other facility. If it appears that there is a safety problem at that particular site related to flow reduction for the total cost of compliance with the BAT requirements including the cost of remedying the safety problem is substantially greater than the EPA model treatment system cost estimate, then either or both of those circumstances may be an appropriate basis for a FDF variance for that facility. Any application for such a variance shall be in accordance with and satisfy the requirements of 40 CFR Part 125 Subpart D.

G. Subpart I—Acid Pickling Subcategory: Sulfuric and Hydrochloric Acid Pickling Segments

In accordance with the settlement agreement the BPT and BAT limitations and NSPS, PSES and PSNS for zinc promulgated in this regulation are slightly higher than those contained in the regulation promulgated on May 27, 1982.

H. Subpart J—Cold Forming Subcategory, Cold Worked Pipe and Tube Segments

The regulation promulgated on May 27, 1982, limited all cold worked pipe and tube operations to zero discharge at each level of treatment (BPT, BAT, NSPS, PSES, PSNS, and BCT). The model treatment system relied upon by the Agency as the basis for those limitations and standards includes recycle of the oil or water solution and, when appropriate, contract hauling of a small oil solution blowdown. This regulation permits nominal discharges of the spent oil or water solution (rather than contract hauling), and also specifies that appropriate limitations and standards for process wastewaters which are not regulated by the prior regulation are to be developed on a case-by-case basis. The effluent limitations and standards for cold worked pipe and tube operations are based upon the cold rolling model treatment systems and a model flow rate of 5 gallons per ton.

I. Subpart L—Hot Coating Subcategory

This regulation contains modified effluent limitations and standards for zinc. These limitations and standards are based upon the same effluent concentration as are the zinc limitations and standards for acid pickling operations (0.20 mg/l). This regulation contains a provision requiring that hot coating treatment facilities presently achieving zinc discharge levels more stringent than the limitations and standards continue to do so. This regulation also provides that the limitations may be used as a basis for determining alternative limitations under 40 CFR 420.03 (water bubble rule) even for those facilities presently achieving discharge levels more stringent than the limitations and standards.

V. Amendments to the Preamble to the Regulation

A. Pretreatment Issues

(1) *Flow Monitoring for Combined Wastestream Formula.* The following preamble language is substantially the same as the language in the Settlement Agreement.

Under § 403.12(b)(4) of the General Pretreatment Regulations, a facility must monitor the flow of regulated process streams and other streams as necessary to allow use of the Combined Wastestream Formula. A facility must monitor the flows of its regulated streams. However, a facility can avoid monitoring its other streams (unregulated and dilute) under this section by agreeing to meet a mass limitation at least as stringent as the one which would be calculated under the Combined Wastestream Formula if these other streams were taken into consideration. An integrated iron and steel facility combining regulated process streams with either unregulated or dilute streams, or both, can avoid monitoring the flows of those streams if it agrees to meet the mass limit calculated solely through use of the limits applicable to the regulated streams. Such a limit would be as stringent as any which could possibly be derived under the formula if either the unregulated or dilute streams, or both, were taken into consideration. If, however, the facility desires to take into account potential pollutants contained in these unregulated or dilute streams, monitoring of these streams will be required to enable calculation of the alternative limit under the formula.

It should be noted that it is an entirely different matter where concentration-based rather than mass-based limits are involved. A facility cannot, for example, avoid monitoring unregulated or dilute streams by agreeing to meet the concentration limit applicable to its regulated streams. This is because application of the formula could result in a more stringent concentration-based limit if the unregulated or dilute streams were taken into consideration.

(2) *Monitoring Data for Temporarily Closed Plants.* The following preamble language is substantially the same as the language in the Settlement Agreement.

The pretreatment regulations should be construed to establish that temporarily closed plants are required to submit a baseline monitoring report if recommencement of discharge is expected, but need not include the monitoring information unless the plant wants to submit historical data and this is acceptable to the Control Authority. Monitoring data should be submitted within a reasonable time after reopening the plant. For those plants that are operating at a reduced rate of production, a complete baseline monitoring report is required. The report should include monitoring data based upon the present average rate of production. If the plant calculates its limits through use of the Combined Wastestream Formula, it will be necessary to inform the Control Authority of any significant change in the values used to calculate this limit. *See* 40 CFR 403.6(e) (1982).

(3) *Flow Estimates for Combined Wastestream Formula.* The following preamble language is substantially the same as the language in the Settlement Agreement.

Flows from integrated facilities can be estimated when it is difficult or nearly impossible to monitor the flows to achieve an actual reading. 40 CFR 403.12(b)(4) (1982) lists the flow measurement requirements, and states in part that "the Control Authority may allow for verifiable estimates of these flows [regulated streams and other streams necessary to allow use of the Combined Wastestream Formula] where justified by cost or feasibility considerations."

(4) *Mass-Based and Concentration-Based Pretreatment Standards.* The following preamble language is substantially the same as the language in the Settlement Agreement.

If an integrated plant is required to comply with a categorical pretreatment standard expressed only in mass-based limits and with another categorical pretreatment standard expressed only in concentration-based limits, a mass-based limit should be applied to the combined flow. To accomplish this under the formula, the concentration limit may be converted to a mass limit by multiplying the concentration limit by the average or other appropriate flow of the regulated stream to which that limit applies.

B. Central Treatment

The following preamble language is substantially the same as the language in the Settlement Agreement.

Industry petitioners believe that they are entitled to obtain a FDF variance under 40 CFR Part 125 subpart D for an individual process (a) where the removal costs are wholly out of proportion to the removal costs considered during development of the national limits, or (b) where other factors solely related to that individual process would result in a non-water quality environmental impact (including energy requirements) fundamentally more adverse than the impact considered during development of the national limits, even though EPA may have considered such costs or such other factors in making its determination pursuant to 40 CFR 420.01(b). EPA does not concede that petitioners' contention is a correct interpretation of

applicable law, but does agree that the discussion in the preamble (47 FR 23267 (Column 1) (May 27, 1982)) was not intended to preclude this contention

VI. Modification to the General Pretreatment Regulation, § 403.6(e)

In the combined wastestream formula, the term "dilution stream" is defined to include boiler blowdown and non-contact cooling water streams, among others. However, in certain circumstances (e.g., where recycled cooling water is treated with algaecides) non-contact cooling water or boiler blowdown could contain significant concentrations of regulated pollutants. The Agency today is refining the meaning of dilution stream to address this situation. Where non-contact cooling water or a boiler blowdown stream contains a significant amount of a pollutant, and an industrial user combines this wastewater with its regulated process wastestream(s) prior to treatment, resulting in a substantial reduction of that particular pollutant, the Control Authority is authorized to exercise its discretion to classify this stream as either a dilution or an unregulated stream. The term "Control Authority" refers either to the POTW if it has an approved pretreatment program, or to the Approval Authority (EPA or the NPDES State) if the POTW has no approved program

Before the Control Authority can exercise its discretion to classify such a stream, the industrial user must provide engineering, production, and sampling and analysis information sufficient to allow a determination by the Control Authority on how the stream should be classified.

VII. Environmental Impact of the Modifications to the Steel Industry Regulation

EPA's estimates of the industry-wide direct discharges of toxic metals and total cyanide under the steel industry regulation promulgated on May 27, 1982 and this regulation are presented below. Volume I of the Development Document contains a compilation of estimated industry-wide discharges on a subcategory specific basis. The estimated discharges of other pollutants limited by the steel industry regulation promulgated on May 27, 1982 are the same under this regulation. These estimates do not take into account the change in the water bubble rule which would result in a decrease in the amount of pollutants discharged at those facilities using the rule

PRIOR REGULATION (MAY 27, 1982)

(Discharge in tons per year)

	Untreated wastewaters	BPT	BAT
Toxic Metals	121,900	462	273
Total Cyanide	17,000	43	98

THIS REGULATION

(Discharge in tons per year)

	Untreated wastewaters	BPT	BAT
Toxic Metals	121,900	466	260
Total Cyanide	17,00	431	100

VIII. Executive Order 12291

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. The Agency previously prepared such an analysis regarding the May 27, 1982 final steel industry regulation. Today's regulation is not major because it does not fall within the criteria for major regulations established in Executive Order 12291.

IX. Regulatory Flexibility Analysis

Under the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, EPA must prepare a Regulatory Flexibility Analysis for all proposed regulations that have a significant impact on a substantial number of small entities. In the preamble to the May 27, 1982 final steel industry regulation, the Agency concluded that there would not be a significant impact on any segment of the regulated population, large or small. For that reason, the Agency determined that a formal regulatory flexibility analysis was not required. That conclusion is equally applicable to this regulation. The Agency has not, therefore prepared a formal analysis for this regulation.

X. OMB Review

This regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291. Any comments from OMB to EPA and any EPA response to those comments are available for public inspection at Room M2404, U.S. EPA, 401 M Street SW., Washington, D.C. 20460 from 9:00 a.m. to 4:00 p.m. Monday through Friday, excluding Federal holidays.

XI. List of Subjects:

A. *40 CFR Part 403:* Confidential business information, reporting and recordkeeping requirements, waste treatment and disposal, water pollution control

B. *40 CFR Part 420* Iron, steel, water pollution control, wastewater treatment and disposal

Dated April 27, 1984

William D. Ruckelshaus,

Administrator

For the reasons set out in the preamble, EPA is amending 40 CFR Part 420 as follows:

PART 420—[AMENDED]

1. The authority citation for Part 420 reads as follows:

Authority: Sections 301, 304 (b), (c), (e), and (g); 306 (b) and (c), 307, 308 and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, as amended by the Clean Water Act of 1977) (the "Act"); 33 U.S.C. 1311; 1314 (b), (c), (e), and (g); 1316 (b) and (c); 1317, 1318; and 1361; 86 Stat. 816 Pub. L. 92-500, 91 Stat. 1567; Pub. L. 95-217

2. By revising § 420.03 to read as follows:

§ 420.03 Alternative effluent limitations representing the degree of effluent reduction attainable by the application of best practicable control technology currently available, best available technology, and best conventional technology.

(a) Except as provided in paragraphs (b)(1) through (b)(3) of this section, any existing point source subject to this part may qualify for alternative effluent limitations to those specified in Part 420, Subparts A through L for a number of its processes representing the degree of effluent reduction attainable by the application of best practicable control technology currently available, best available technology economically achievable, and best conventional technology. The alternative effluent limitations for each pollutant are determined for a combination of outfalls by totaling the mass limitations of each pollutant allowed under subparts A through L and subtracting from each total an appropriate net reduction amount. The permit authority shall determine an appropriate net reduction amount for each pollutant traded based upon consideration of additional available control measures which would result in non-trival (substantial) effluent reductions and which can be achieved without requiring significant additional expenditures at any outfall(s) in the combination for which the discharge is projected to be better than required by this regulation.

(b) In the case of Total Suspended Solids (TSS) and Oil and Grease (O&G), the minimum net reduction amount shall be approximately 15 percent of the amount(s) by which any waste stream(s)

in the combination will exceed otherwise allowable effluent limitations. For all other traded pollutants, the minimum net reduction amount shall be appoximately 10 percent of the amount(s) by which the discharges from any waste stream(s) in the combination will exceed otherwise allowable effluent limitations for each pollutant under this regulation

(1) A discharger cannot qualify for alternative effluent limitations if the application of such alternative effluent limitations would result in violation of any applicable State water quality standards.

(2) Each outfall from which process wastewaters are discharged must have specific, fixed effluent limitations for each pollutant limited by the applicable Subparts A through L.

(3) Subcategory-Specific Restrictions:

(i) There shall be no alternate effluent limitations for cokemaking process wastewaters:

(ii) There shall be no alternate effluent limitations for cold forming process wastewaters.

3. By adding a new § 420.04 as follows:

§ 420.04 Calculation of pretreatment standards.

(a) Pretreatment standards shall be calculated for each operation using the applicable average rate of production reported by the owner or operator of the facility to the Control Authority in accordance with 40 CFR 403.12(b)(3).

(b) The average rate of production reported by the owner or operator in accordance with 40 CFR 403.12(b)(3) shall be based not upon the design production capacity but rather upon a reasonable measure of actual production of the facility, such as the production during the high month of the previous year, or the monthly average for the highest of the previous 5 years. For new sources of new dischargers, actual production shall be estimated using projected production.

(c) If, due to a change of circumstances, the average rate of production for an operation reported by the owner or operator of the facility to the Control Authority in accordance with 40 CFR 403.12(b)(3) does not represent a reasonable measure of actual production of that operation, the owner or operator must submit to the Control Authority a modified average rate production.

4. By adding a new § 420.06 to read as follows:

§ 420.06 Removal credits for phenols (4AAP).

Removal allowances pursuant to 40 CFR 403.7(a)(1) may be granted for phenols (4AAP) limited in 40 CFR Part 420 when used as an indicator or surrogate pollutant.

5. The table in § 420.23 is amended by revising the entries for cyanide, lead, and zinc as follows:

§ 420.23 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

. . . . .

SUBPART B

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/1kg (pounds per 1,000 lb) of product	
. . . . .		
Cyanide [1]	0.00300	0.00150
. . . . .		
Lead	0.000451	0.000150
Zinc	0.000676	0.000225

. . . . .

6. The table in § 420.24 is amended by revising the entries for lead and zinc as follows:

§ 420.24 New source performance standards (NSPS).

. . . . .

SUBPART B

Pollutant or pollutant property	New source performance standards	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/1kg (pounds per 1,000 lb) of product	
. . . . .		
Lead	0.000451	0.000150
Zinc	0.000676	0.000225

. . . . .

7. The table in § 420.25 is amended by revising the entries for cyanide, lead and zinc as follows:

§ 420.25 Pretreatment standards for existing sources (PSES).

. . . . .

SUBPART B

Pollutant or pollutant property	Pretreatment standards for existing sources	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/1kg (pounds per 1,000 lb) of product	
. . . . .		
Cyanide [1]	0.00300	0.00150
. . . . .		
Lead	0.000451	0.000150
Zinc	0.000676	0.000225

. . . . .

The table in § 420.26 is amended by revising the entries for lead and zinc as follows:

§ 420.26 Pretreatment standards for sources (PSNS).

. . . . .

SUBPART B

Pollutant or pollutant property	Pretreatment standards for new sources	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/1kg (pounds per 1,000 lb) of product	
. . . . .		
Lead	0.000451	0.000150
Zinc	0.000676	0.000225

. . . . .

9. By adding a new paragraph (c) to § 420.31 as follows:

§ 420.31 Specialized Definitions

. . . . .

(c) The term "existing indirect dischargers" means only those two iron blast furnace operations with discharges to publicly owned treatment works prior to May 27, 1982.

10. The table in paragraph (a) of § 420.33 is amended by revising the entries for cyanide, lead, and zinc as follows:

§ 420.33 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

. . . . .

(a) . . .

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue
Argonne, Illinois 60439

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EVALUATION OF OPPORTUNITIES FOR EFFLUENT TRADING IN THE STEAM-ELECTRIC, PETROLEUM-REFINING, AND COAL MINING INDUSTRIES

by

Michael J. Davis

Energy and Environmental Systems Division
Integrated Assessments and Policy Evaluation Group

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Safety and Emergency Preparedness
Office of Environmental Analysis

WATER BUBBLE FOR THE IRON AND STEEL INDUSTRY

This appendix contains the following: EPA's comments on the use of the water bubble concept in the iron and steel industry,[1] the original regulation,[1] EPA's comments on the modified rule,[2] and the amended rule.[2]

A.1 EPA'S COMMENTS

8. *Alternate Effluent Limitations—Water Bubble.* In the preamble of the proposed regulation, the Agency announced it was considering whether to adopt an alternate effluent limitations policy ("water bubble"). The Agency solicited comments on whether it should adopt such a policy and, if so, what conditions on the policy might be imposed.

Under the water bubble policy, dischargers with multiple outfalls may discharge greater amounts of pollutants from outfalls where treatment costs are high in exchange for an equivalent decrease in pollutants discharged from outfalls at the same plant where abatement is less expensive. Thus, the same reduction in pollutant loadings can be obtained at less cost.

In this regulation, the Agency has adopted a water bubble policy for the steel industry. The policy is reviewed in detail in Section XXVI of this preamble. Following are the Agency's responses to the most significant comments received concerning the proposed policy outlined in the preamble to the proposed regulation.

Several commenters stated that the bubble concept would be inconsistent and incompatible with the use of indicator pollutants. Specifically, commenters raised concern that under the bubble policy, dischargers would be allowed to discharge an increased amount of those pollutants for which specific limitations have not been established. The Agency shared this concern and examined the issue carefully in developing its final policy. The final policy contains conditions on the use of the water bubble. The Agency found that unless conditions were imposed upon the use of the policy involving cokemaking, hot forming, and cold rolling operations, there was a probability that there would be a net increase in toxic pollutant discharges under the policy. The conditions established by the Agency are designed to ensure there will not be a net increase in the discharge of toxic pollutants.

Some commenters stated that most of the restrictions set out in the preamble to the proposed regulation were unnecessary and burdensome. With respect to EPA's proposed restriction against trading one pollutant for another, one commenter suggested that EPA develop a method to determine the water quality impact of different combinations of pollutants and allow cross-pollutant trades under the water bubble policy when the water quality impact of the discharges under the bubble policy would be the same as without its use. The Agency has decided not to adopt that approach for the following reasons. The administrative burden associated with implementing such a policy would be unreasonably high. EPA's water bubble policy for the steel industry is an alternative method of achieving a reduction of pollutants discharged that is, at a minimum, *equivalent* to the level of discharge achieved by traditional effluent limitations. The bubble policy proposed by these commenters would involve a water pollution control strategy altogether different from the strategy called for by the Clean Water Act. This strategy would replace the technology based strategy with an alternative, water quality based strategy. The Agency's intent in developing a water bubble policy is to allow dischargers to save money in meeting the technology based limitations imposed by the Clean Water Act; not to provide an alternative regulatory program.

Some commenters opposed the condition which requires that each outfall have a specific discharge limit because they believed that it would preclude opportunities to implement efficient control strategies. They suggested that the Agency adopt a bubble policy which allows effluent limitations to be established on a plantwide basis: the so-called, "floating bubble". Under the suggested "floating bubble", dischargers would be allowed to vary the mix of controls at the various outfalls within a plant on a daily, weekly, or monthly basis, as long as the plantwide limitation is not exceeded. The Agency has carefully evaluated the advantages and disadvantages of the "floating bubble" and has concluded that fixed limits on each outfall are necessary to ensure optimum operation of treatment facilities; enforcement of permit limitations; and, to minimize the administrative burden of the water bubble. The floating-bubble would make it difficult for permit authorities to determine compliance using normal sampling techniques. To confirm compliance with a floating bubble permit, the control authority would need simultaneous samples from each outfall for which limitations are established under the policy. Reporting requirements and inspection procedures would have to be significantly modified and would require significant additional resources.

EPA recognizes that in theory, the flexibility to vary the mix of treatment within a plant at different times could reduce the cost of compliance with this regulation. However, despite requests to do so, industry representatives have not provided any data in support of their contention that the floating bubble would allow steel industry dischargers to use control strategies that are not feasible under a policy requiring fixed limits on each outfall. EPA believes the major savings associated with the bubble policy will result from changes in fixed control costs. Dischargers can take advantage of these savings under the policy adopted by the Agency.

The Agency solicited comments on the resource and administrative burden that the bubble policy might place on permit authorities. Several commenters expressed concern that the policy would

present an additional burden that permit authorities would be unable to bear. The Agency has tried to design the bubble policy to minimize its administrative burden. First, the Agency has specified that dischargers must initiate bubble proposals at their own expense. In addition, as discussed above, EPA has sought to minimize the resource burden by requiring that bubble permits have fixed enforceable limits on each outfall. Once these limitations are determined, the cost of reviewing inspection and self-monitoring reports will be comparable to the administrative costs associated with traditional permit practices.

Some commenters were opposed to the condition in the Agency's proposed policy which required all wastestreams to meet applicable BPT requirements because it would restrict the utility and cost saving potential of the bubble. EPA reconsidered this condition and has concluded that the requirement would significantly limit opportunities available to dischargers to implement efficient control strategies, particularly in the hot forming subcategory. The Agency originally considered including this requirement to provide an additional measure of water quality protection. The Agency believes that the conditions imposed upon the adopted policy along with the requirements that permits issued under the policy achieve the same pollutant removal as traditional permits and that dischargers meet water quality standards, are adequate to protect water quality. Thus, EPA has decided to not include a condition that all outfalls at plants employing the policy comply with applicable BPT limitations.

In the preamble to the proposed regulation, EPA announced that it was considering restricting its consideration of applications for use of the policy during the normal permit issuance and reissuance process. The Agency still believes this approach is appropriate. In order to keep the administrative burden associated with this policy to a minimum, the Agency believes that application for use of the policy should be raised and considered during normal permit reissuance. Several commenters suggested that dischargers be allowed to submit proposals to modify existing permits to include a water bubble. The Agency has considered that suggestion and has decided to accept bubble applications at any time during the period of currently effective permits where a bubble was not specifically considered during permit issuance. This will permit those dischargers which did not have the opportunity to seek a permit based upon the bubble policy to do so as soon as possible without waiting for reissuance. However, it avoids the long term administrative burdens associated with allowing dischargers to apply for permits based on the bubble policy when they had an adequate opportunity when the permit was last reissued.

One commenter interpreted the proposed bubble policy as excluding new source permittees from eligibility and suggested that such a limitation was inappropriate. This interpretation is correct as the Agency does not believe that it would be appropriate to permit a new source to install less stringent treatment than is required by NSPS because of the bubble policy. Under the Clean Water Act new sources are to achieve the "Best Demonstrated Technology" and therefore, the bubble policy should not be used to permit the discharger to install less stringent treatment.

One commenter stated that it would be inappropriate to address the bubble in the effluent limitation guidelines and suggested instead that all issues relating to a water bubble policy be resolved during the permit issuance process. EPA believes that this regulation is an appropriate vehicle for implementing the water bubble policy. The Agency recognizes that circumstances affecting the use of the bubble will vary from plant to plant. However, the Agency believes that the bubble policy contained in this regulation allows adequate flexibility to address such circumstances.

The final water bubble policy as it pertains to the steel industry is outlined below and presented in the regulation (§ 420.03).

Under the water bubble policy, a discharger could discharge no more total pounds of pollutants than it could without the bubble. However, with the policy, the discharger would have the flexibility to allocate the discharge among its outfalls in the least costly manner. Properly applied, this policy should promote greater economic efficiency and increased innovation by providing plant managers with an economic incentive to develop new control strategies.

EPA recommends that permitting authorities (1) inform sources that the bubble approach is available, (2) explain the advantages and conditions of the use of the bubble, and (3) be receptive to proposals from sources that want to use a more cost-effective mix of controls.

To ensure that permits using the water bubble policy are equivalent to traditional permits in enforceability and environmental impact, EPA has imposed the following conditions on the use of the policy:

1. *Under the alternate limitations, no more pounds of pollutants can be discharged from a single plant than would be discharged under the traditional process specific limitations.* To satisfy this general condition, permits issued for facilities under the bubble policy must meet the following specific conditions:

a. Trades must not result in an increase in the discharge of pollutants over that allowed by the generally applicable limitations.

b. Trades must involve the same pollutant. EPA will allow dischargers to trade a pollutant in one wastewater only against the same pollutant in another wastewater. For example, zinc can be traded for zinc but not for chromium or lead.

c. Trades involving certain subcategory waste streams will be limited.

EPA has identified certain process subcategories with wastewaters that are significantly different than those from other steel industry subcategories. Unrestricted trades with these subcategories could result in a net increase in toxic pollutants discharged. To ensure that permits issued under the bubble policy do not result in an increase in pollutants discharged, the Agency has imposed the following subcategory limitations:

(i) *Cokemaking.* Permits issued under the bubble policy which involve trades with cokemaking wastewaters will not be allowed. The Agency believes that the number and amounts of toxic organic pollutants found in cokemaking wastewaters cannot be effectively controlled under the bubble policy.

(ii) *Cold Forming.* Permits issued under the bubble policy which involve trades with cold forming wastewaters will not be allowed. The Agency believes that the variability and amounts of toxic organic pollutants associated with cold forming wastewaters are such that it is not possible to ensure effective control of toxic organic pollutants under the water bubble policy.

2. *Dischargers must meet water quality standards.* A change in the distribution of pollutant loadings may

adversely affect water quality even if total loadings discharged do not increase. Permit authorities may not approve a bubble application if it would result in a violation of water quality standards.

3. *Each outfall must have a specific discharge limit.* Water bubble permits may not allow limitations to be set on a plant-wide "floating" basis. For the reasons discussed in Section XVI of this preamble, the Agency has decided not to allow the policy to be applied on a "floating" basis.

In the preamble to the proposed regulation, the Agency announced that it was considering imposing a condition on the policy which would require all wastewaters to meet applicable BPT limitations. EPA has decided not to include this requirement in the bubble policy for the steel industry. Such a requirement could significantly restrict the savings associated with the water bubble and is not necessary to achieve levels of removal equivalent to traditional permits, protect water quality, or ensure enforceability. Permits issued under this policy may allow certain wastewaters to exceed applicable BPT limitations if sufficient reductions can be achieved at other outfalls and the other conditions for bubble permits set out in this regulation are met.

Implementing the Water Bubble

It is the permittee's responsibility to initiate proposals for implementing the water bubble policy for its facilities. Permitting authorities will continue to develop effluent limitations using the traditional approach of setting technology and water quality based limits on each discharge pipe. During the permit issuance process, the discharger may propose a different set of effluent limitations for its outfalls using the bubble concept. The permittee must demonstrate, to the satisfaction of the permit issuing authority, that its proposal results in a total discharge equivalent to the level required by the technology and water quality based limitations. When the discharger makes such a demonstration to the satisfaction of the permit issuing authority, its NPDES permit may be based upon the alternative discharge limitations.

EPA will accept proposals to modify existing NPDES permits based upon this policy at any time during the life of a permit for which a bubble proposal was not considered at the time of permit issuance. In no case however, may a water bubble proposal delay compliance with pollution control requirements. When a discharger presents a bubble proposal which appears to be capable of achieving the same total removal as required by the existing permit limitations and attaining the goals of the current compliance schedule, the permit authority will review the proposal to verify the equivalency of the alternative limitations. Dischargers will be required to meet their existing schedules until the permit authority approves the bubble permit.

Eligibility

In the preamble to the proposed regulation, the Agency announced that it was considering restricting non-complying dischargers from using the bubble policy. The Agency has decided to allow non-complying dischargers to propose the use of the bubble policy at its facilities with conditions under which they could come into compliance. The Agency believes that the flexibility to develop compliance strategies that use the bubble concept will result in faster compliance with effluent limitations and achieve the same total overall treatment of effluent.

A.2 ORIGINAL RULE

§ 420.02 Alternative effluent limitations representing the degree of effluent reduction attainable by the application of practicable control technology currently available, best available technology, and best conventional technology.

Except as provided in paragraphs (a) through (c) below, any existing point source subject to this part may qualify for alternative effluent limitations to those specified in Part 420, Subparts A through L for a number of its processes representing the degree of effluent reduction attainable by the application of best practicable control technology currently available, best available technology economically achievable, and best conventional technology. The alternative effluent limitations are determined for a combination of processes by totaling the mass allowances of each pollutant allowed by the applicable Subparts A through L. The point source must achieve the total mass limitation for each pollutant for the combination of processes.

(a) A discharger cannot qualify for alternative effluent limitations if the application of such alternative effluent limitations would result in an increase in the amount of pollutants discharged from a combination of processes over that allowed under the limitations established by applicable Subparts A through L.

(b) A discharger cannot qualify for alternative effluent limitations if the application of such alternative effluent limitations would result in violation of any applicable state water quality standards.

(c) Each outfall from which process wastewaters are discharged must have specific, fixed effluent limitations for each pollutant limited by the applicable Subparts A through L.

(d) Subcategory—Specific Restrictions

(1) There shall be no alternate effluent limitations for cokemaking process wastewaters.

(2) There shall be no alternate effluent limitations for cold forming process wastewaters.

A.3 EPA'S COMMENTS ON THE MODIFIED RULE

A. Section 420.03 Alternative Effluent Limitations (Water Bubble)

The proposed amendments to the water bubble rule for the iron and steel manufacturing point source category regulation provide that the alternative effluent limitations established under the water bubble must result in a decrease in the discharge of traded pollutants from the amount allowed by the generally applicable limitations. The water bubble rule established by the final regulation published on May 27, 1982, provided that there could be no increase in the discharge of pollutants beyond that allowed by the generally applicable limitations. The preamble amendments presented in Section V of this notice describes the proposed revisions to the water bubble rule.

In the settlement agreement, the Agency agreed to propose to amend the preamble to the regulation as follows:

As part of the settlement, EPA is proposing to amend its bubble rule for the steel industry. As originally promulgated, the rule provided that a discharger could qualify for alternative effluent limitations as long as its discharge from a combination of outfalls met certain requirements (water quality standards) and restrictions and would not exceed the total mass of each pollutant otherwise allowed under the regulation. Under the revised rule being proposed today, a discharger would have to meet the same requirements and restrictions, but would qualify for alternative effluent limitations only if it achieves a net reduction from the total mass of each traded pollutant.

The amended regulation provides that the permit-issuing authority must determine an "appropriate net reduction amount" in each case. In making that determination, it is intended that the permit writer will examine historical discharge levels and seek to achieve those reductions that are attainable at a facility through good engineering practices, improved operations and supervision of existing treatment systems or other feasible modifications, *e.g.*, non-process flow segregation or chemical addition, if they can be achieved without requiring significant additional expenditures. It is intended that in reviewing opportunities for appropriate reductions, the permit writer will require only those measures which result in non-trivial (substantial) effluent reductions and which will not require significant additional expenditures.

The minimum net reduction in all cases for each pollutant traded is to be the amount specified in the regulation. The amount is expressed in terms of percentages of the amount by which a discharger proposes to exceed the otherwise applicable effluent limitations established in this regulation. The Agency proposes approximately 15 percent for Total Suspended Solids (TSS) and Oil and Grease (O&G) and approximately 10 percent for all other traded pollutants.

In the simplest case, for example, a discharger might propose to exceed the allowable limitation for TSS on Outfall A by 100 pounds and then make up the amount on Outfall B by reducing its allowable discharge by 100 pounds. The net reduction provision would require that, at a minimum, the allowable discharge from Outfall B (or any other outfall which the discharger has included in the bubble trade) be reduced by approximately 115 pounds. In making a determination of the "appropriate net reduction amount," the permit writer will require further non-trivial (substantial) reductions only if he determines that they can be achieved without significant additional expenditures.

This amendment results from settlement of litigation among several parties with significantly divergent views of the water bubble rule. This provision does not represent the Agency view on whether it is either legally required condition of a bubble rule under the Clean Water Act or any other environmental statute or required as a matter of policy, nor shall it be taken as an indicator of what the Agency may or may not require in any other regulations establishing effluent limitations guidelines under the Clean Water Act.

In reaching this accord, the parties do not imply any changes in their positions. In the interest of avoiding protracted litigation and of expediting the installation of pollution controls for this industry, the parties have reached an overall settlement of many issues that they view as beneficial. In that context, the parties have agreed to resolve their differences with this settlement.

A.4 AMENDED RULE

§ 420.03 Alternative effluent limitations representing the degree of effluent reduction attainable by the application of best practicable control technology currently available, best available technology, and best conventional technology.

(a) Except as provided in paragraphs (b)(1) through (b)(3) of this section, any existing point source subject to this part may qualify for alternative effluent limitations to those specified in Part 420, Subparts A though L for a number of its processes representing the degree of effluent reduction attainable by the application of best practicable control technology currently available, best available technology economically achievable and best conventional technology. The alternative effluent limitations for each pollutant are determined for a combination of outfalls by totaling the mass limitations of each pollutant allowed under Subparts A though L and subtracting from each total an appropriate net reduction amount. The permit authority shall determine an appropriate net reduction amount for each pollutant traded based upon consideration of additional available control measures which would result in non-trival (substantial) effluent reductions and which can be achieved without requiring significant additional expenditures at any outfall(s) by which the discharges from any waste stream(s) in the combination for which the discharge is projected to be better than required by this regulation.

(b) In the case of Total Suspended Solids (TSS) and Oil and Grease (O&G), the minimum net reduction amount shall be approximately 15 percent of the amount(s) by which any waste stream(s) in the combination will exceed otherwise allowable effluent limitations. For all other traded pollutants, the minimum net reduction exceeds otherwise allowable effluent limitations. For all other traded pollutants, the minimum net reduction amount shall be approximately 10 percent of the amount(s) by which the discharges from any waste stream(s) in the combination will exceed otherwise allowable effluent limitations for each pollutant under this regulation.

(1) A discharger cannot qualify for alternative effluent limitations if the application of such alternative effluent limitations would result in violation of any applicable State water quality standard.

(2) Each outfall from which process wastewaters are discharged must have specific, fixed effluent limitations for each pollutant limited by the applicable Subparts A though L.

(3) Subcategory-Specific restrictions.

(i) There shall be no alternate effluent limitations for cokemaking process wastewaters.

(ii) There shall be no alternative effluent limitations for cold forming process wastewaters.

ENVIRONMENT REPORTER Current Developments

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Water Pollution

BUBBLE POLICY FOR IRON, STEEL SOURCES OPPOSED BY NRDC, SUPPORTED BY INDUSTRY

The Natural Resources Defense Council opposes use of the water bubble concept in the iron and steel industry, while the American Iron and Steel Institute supports its "unrestricted" use, according to comments submitted to the Environmental Protection Agency.

NRDC told the agency the bubble is impermissible under the Clean Water Act, but AISI supported the concept as being environmentally and economically sound.

In early January, EPA announced that it was evaluating the use of the bubble concept for iron and steel. Proposed effluent guidelines for the industry under the Act were published Jan. 7 (Current Developments, Jan. 9, p. 1393).

The agency invited public comments on the concept, which would allow facilities to relax expensive compliance controls at some outfalls, while tightening controls at outfalls where the measures cost less, as long as the plant's total discharge does not exceed pollution standards.

Two studies conducted for EPA concluded that the concept has only limited applicability for the iron and steel industry.

A study by Temple, Barker, and Sloane, Inc., of Lexington, Mass., at four steel mills concluded that use of the bubble concept could save between 3.3 and 6.2 percent in capital costs, and between 2.1 and 3.6 percent in annual best available technology (BAT) operating and maintenance costs.

Dollar savings were projected to range from $200,000 for capital costs at Republic Steel in Warren, Ohio, to $1.1 million for U.S. Steel at Gary, Ind., and from $10,000 in annual operating and maintenance costs at the Warren facility to $55,000 at the Gary plant. Other plants studied were Republic Steel in Cleveland, Ohio, and the Wheeling-Pittsburgh Steel Co., Steubenville, Ohio.

Limited Savings Foreseen

The study cautioned that "cost savings of this magnitude are probably not generally applicable to most steel facilities because steel plants often do not possess the multiple outfall and similar pollutant stream characteristics usually necessary to benefit from the water bubble policy."

In its public comments, NRDC maintained that the bubble policy is not permitted under the Act because it "requires that BPT [best practical technology] and BAT limitations are applied to each point source."

The environmental group stated, "If a discharger can remove 'cheap pounds' at any given point source, it should do so in order to make progress toward the elimination of discharge."

"The very fact that such cheap pounds are available may mean that (A) EPA has not properly established the appropriate effluent limitation, or (B) a *more* stringent 'fundamentally different factors' variance is warranted," the council said.

Bubble Approach Lauded

AISI said it is "heartened by the present consideration" of the water bubble which, the institute said, "permits a practical and reasonable approach" to controlling pollutant discharges that is "both economically and environmentally sound."

But the institute cautioned that the bubble "will serve a useful purpose" only if it is not subject to what AISI called the "unnecessary restrictions and conditions" that EPA suggested be applied to the concept if it is adopted.

These conditions, EPA said in the proposal, stipulate that dischargers must meet water quality standards. Trades could

involve only the same pollutant, and each outfall would be restricted to a specific discharge limit.

Also, dischargers would initiate, at their own expense, water bubble proposals during the normal permit re-issuance process. Non-complying dischargers would not be allowed to use the bubble concept, and all wastestreams would be required to meet applicable BPT requirements under the EPA proposals.

Finally, trading between some wastestreams from different subcategories of streams would be prohibited.

'Greatest" Use Urged

AISI said the water bubble "should be structured in such a manner to allow the greatest degree of application by industry so long as [its] use does not result in significant adverse environmental impacts affecting water quality or water use."

In its comment letter to EPA, the institute expressed reservations or opposition to each of the seven conditions suggested by the agency.

A "rigid imposition" of the condition that dischargers meet water quality standards, AISI said, "may limit the utility of the water bubble." The institute also argued that the bubble concept "should be sufficiently flexible to permit trades among pollutants which have similar characteristics."

Imposing specific discharge limits on each outfall, AISI said, "precludes opportunities to allocate effluent limitation loadings flexibly among outfalls in order to reduce costs and promote efficiency."

The institute stated that plants should be allowed to seek a bubble when applying for a new source or new discharger permit, for modification of an existing permit, "or at any time during permit review or negotiations." AISI also said it "sees no reason" to make non-compliance a bar to bubble eligibility

Requiring all wastestreams to meet applicable BPT requirements "would unnecessarily restrict the utility and economic benefit" of the bubble policy, AISI maintained.

The institute added that a wastestream trading ban would "greatly restrict and lessen the utility" of the water bubble.

AISI recommended that EPA allow water bubbles on a plant-wide basis, "unencumbered by the non-cost effective conditions" proposed by EPA.

Resource Increases Seen Necessary

NRDC predicted that a policy allowing bubbles would spawn "a significant increase in the demand for permitting and enforcement resources."

The council noted that EPA's budget and staff are being reduced and commented that "without additional manpower to review the permit application and monitor the operating facilities to assure minimal violations, the bubble policy will be a failure."

Regarding the seven conditions suggested by EPA, the council predicted that water quality standards would be jeopardized near outfalls where more pollutants were discharged than otherwise would be allowed.

The legislative history of the Act, NRDC argued, "clearly prohibits, for BAT, the types of economic tradeoffs that are necessary with a bubble policy."

Setting specific discharge limits for each outfall, the council continued, "is a legal and necessary requirement, with or without a bubble."

NRDC said if the bubble concept is approved, "a detailed survey of the wastewaters from all point sources must be required prior to the issuance of a permit so that tighter limitations can be applied to point sources that can remove the most tonnage of toxics."

The council said it supports banning water bubbles for dischargers in violation of their permits. It said limitations "more stringent than BPT" should be required "in cases where a specific BPT waste stream is known to be highly toxic."

NRDC also recommended that EPA prohibit waste stream "trading" between "any point sources that would discharge significantly more tonnage of toxic pollutants."

Study of General Concept

The second study, conducted for EPA by Putnam, Hayes, and Bartlett, Inc., of Cambridge, Mass., involved the use of the water bubble concept in industry generally and did not focus on iron and steel.

The study concluded that the water bubble saves money only if the concept is applicable to the facility, if tradeoffs between outfalls are feasible, and if current regulatory requirements do not already permit the facility to make these tradeoffs.

According to the study, most industrial facilities do not meet one or more of these conditions because:

- Many facilities have only a single process wastewater outfall "and hence no opportunities for trading across outfalls exists";
- Tradeoffs of control between outfalls may not be feasible for water quality reasons or may be "technologically infeasible," and
- Some facilities currently have permits that allow all feasible tradeoffs to be made, and thus "no cost savings will be realized by the application of the water bubble concept."

The Temple, Barker, and Sloane study found that no degradation of the water quality of the receiving waters at any of the four steel plants would occur if the water bubble policy were adopted.

BAT Seen Constraining Policy

The study said that the most important factor limiting "effectiveness" of the policy at steel facilities considered prime candidates for bubbles is "the stringency of the proposed BAT guidelines."

BAT limitations, the study noted, "typically result in 97 percent to 99 percent cleanup of total pollutant discharge relative to uncontrolled process wastewaters. This leaves a relatively small amount of pollutants that can be removed beyond BAT standards in order to generate pollutant credits for use of offsets under the water bubble policy," the study stated.

The small amounts of pollutant credits and the relatively significant differential between BPT and BAT levels of control "make it difficult to eliminate BAT equipment as part of the water bubble tradeoff process," the study said. It added, "Moreover, because BPT treatment typically removes substantial quantities of pollutant loadings, it is improbable that the relatively small amount of pollutant credits available for the tradeoff process would facilitate elimination of BPT equipment," the study said.

It noted that plants with single treatment facilities and single outfalls "usually cannot benefit" from bubbles.

"Because of the importance of each step in the treatment train to the quality of the entire effluent stream with central treatment, it becomes difficult to eliminate equipment as part of the bubble tradeoff process," the study concluded.

Richard Raines, chief of the Water Economics Branch in EPA's Office of Planning and Management, told BNA June 1 that the agency hopes to establish final effluent guidelines for the iron and steel industry by November.

A decision on whether to include a bubble policy in the guidelines will be made sometime before that time, he said.

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NEWS & ANALYSIS

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—The Editors

Steel Industry Effluent Limitations: Success At the Negotiating Table

by Alan S. Miller

In the midst of the chaos prevailing at the Environmental Protection Agency (EPA), one major environmental accomplishment received too little notice. On March 3, 1983, the Natural Resources Defense Council (NRDC), the American Iron and Steel Institute, and EPA filed a settlement agreement[1] with the U.S. Court of Appeals for the Third Circuit resolving all legal challenges to water pollution effluent guidelines for the steel industry. As a result, protracted, resource-intensive litigation was avoided, and Federal Water Pollution Control Act (FWPCA or the Act) permits for iron and steel dischargers will be written without the uncertainty created by pending judicial review. The settlement assures significant progress toward curtailing toxic discharges and improving water quality, but it is less clear whether the agreement furnishes hope for greater reliance on negotiation or represents an aberration from the usual tug of war between industry and environmentalists.

Background

The regulations modified by the settlement were issued by EPA on May 27, 1982. They provided requirements for the use of "best available technology economically achievable" (BAT) by direct dischargers and pretreatment standards for discharges into municipal treatment works. The steel industry was the first important industrial category for which BAT regulations were issued under the 1977 FWPCA amendments.

Mr. Miller, an attorney in the Natural Resources Defense Council's Washington, D.C. office, was the lead NRCD lawyer in the steel negotiation.

1. 13 ELR 20366.

The Settlement

The settlement is a major accomplishment for several reasons. First, industry's promise to comply with the requirements of the regulations without further challenges assures that significant reductions will be made in the discharge of toxic and other pollutants from iron and steel facilities. Iron and steel production is a very large source of water pollution; an average of 40,000 gallons of water is used in the production of a ton of steel, and the resultant effluent includes more than forty different toxic pollutants. The technology required by the regulations will remove more than 99 percent of the raw waste load discharged directly from steel plants into water bodies, more than 53,000 tons of pollution.

The industry argued that several portions of the original regulations were not supported by adequate data. EPA agreed to revisions for five categories in the interest of achieving a settlement and finality in permit terms. However, none of the changes will significantly increase the total amount of effluents being discharged.

The settlement also includes important changes in the so-called "bubble" policy. As promulgated last May, the regulations would have allowed dischargers to trade a reduction in the discharge permitted from one outfall for an increase in the limits on the same pollutant discharged from another outfall. For example, a discharger could increase the limits on discharging lead from a sintering operation by reducing discharges of lead from ironmaking or steelmaking by the same amount.

All three parties entered negotiations with strongly held views concerning the bubble policy. NRDC argued that the bubble is inconsistent with the Act because the economic savings that result are not considered when

EPA selects the best technologies that are economically achievable. Industry, on the other hand, very much wanted the bubble because the flexibility it provided made the prospect of compliance with significant effluent reduction requirements far more tolerable. Similarly, EPA viewed the bubble provision as an essential regulatory reform designed to reduce the costs of environmental regulation.

After several months of meetings, the parties agreed to a compromise which requires that all trades must include a net reduction if it can be achieved without significant additional expenditures. The settlement also requires a minimum net reduction of approximately 15 percent in the case of total suspended solids and oil and grease, and approximately 10 percent in the case of all other pollutants. The difference in these minimum requirements reflects the much larger quantities generally involved in discharges of conventional pollutants, and the correspondingly greater opportunity for further reductions. The compromise was accepted by all sides in order to obtain a settlement, and while EPA has not included a bubble policy in regulations for any other industry, the debate undoubtedly will recur if the policy surfaces again.

Settlements often leave the parties with a feeling of satisfaction and accomplishment, and this one was no exception. Protracted litigation is never anyone's first choice for resolving differences; efforts to promote negotiation always merit applause. In the afterglow, it is tempting to ask—as the Washington Post did in a March 7th editorial—"How did they do it?" and "Why must [such settlements] be so unusual?"

The answers to the questions asked by the Post are important and, unfortunately, sobering, for they suggest that negotiation can be successful only in special circumstances. The first requirement is arms length negotiation with all sides legally and technically well represented. In this case, each party had something to lose through lengthy court proceedings, and a compromise was possible that enabled each party to obtain much of what it most wanted.

More frequently, either the bargaining process is one-sided or one party has nothing to gain from negotiation. When former EPA Administrator Anne Burford negotiated modifications to lead standards for the benefit of an oil refinery, no environmentalists were involved and an adversarial response was assured. In the dance of environmental negotiation, it takes three to tango.

Equally important, there has to be something over which to negotiate. For the most part, EPA's steel regulations were basically sound and well supported; modifications were in order, not a major overhaul. Unfortunately, EPA actions under this Administration have too often been so one-sided that there is little room for compromise. For example, NRDC also sued EPA over BAT regulations for petroleum refineries. These rules require nothing beyond treatment systems already in place, despite the availability of better technology, already used by a third of the industry, that would remove up to a third of remaining toxic pollutants, and that can be utilized without causing any measurable economic impact. This kind of regulation leaves little room for negotiation.

Appendix D

GLOSSARY OF IRON AND STEEL INDUSTRY TERMINOLOGY

From:
Development Document for
Proposed Effluent Limitations Guidelines and Standards
for the Iron and Steel Manufacturing Point Source Category,
Draft, October 1979, Volume 1, Section XVI.

Acid Furnace. A furnace lined with acid brick as contrasted to one lined with basic brick. In this instance the terms acid and basic are in the same relationship as the acid anhydride and basic anhydride that are found in aqueous chemistry. The most common acid brick is silica brick or chrome brick.

Acid Steel. Steel made in a furnace or converter lined with siliceous (acid) refractory material. In the open hearth and electric furnaces employing the acid process, the hearth or bottom consists of fritted ("burned in") silica sand. The acid bessemer converter usually is lined with a kind of sandstone called "firestone". Raw materials for acid steel must be low in phosphorus and sulfur.

Additions. Materials which are added to the molten bath of steel or to the molten steel in the ladle to produce the chemical composition required for the specific steel order.

Air Cooled Slag. Slag which is cooled slowly in large pits in the ground. Light water sprays are generally used to accelerate the cooling over that which would occur in air alone. The finished slag is generally gray in color and looks like a sponge.

Alloy. A substance that has metallic properties and is composed of two or more chemical elements of which at least one is a metal.

Alloying Materials. Additives to steelmaking processes for improving the properties of the finished products. Chief alloying elements in medium alloy steels are: Nickel, chromium, manganese, molybdenum, vanadium, silicon, copper.

Alloy Scrap. Scrap steel which contains one or more alloying metals such as nickel, chromium, tungsten, molybdenum. Such scrap must be very carefully classified according to composition and kept separate from other kinds of scrap.

Alloy Steel. "Steel is classified as alloy when the maximum of the range given for the content of alloying elements exceeds one or more of the following: manganese, 1.65 pct; silicon, 0.60 pct; copper, 0.60 pct; or in which a definite range or a definite minimum quantity of any of the following elements is specified or required within the limits of the recognized field of constructional alloy steels: aluminum, boron, chromium up to 3.99 pct, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium, or any other alloying element added to obtain a desired alloying effect."

Aluminum. A metallic chemical element. (1) In either the bessemer, openhearth or electric furnace processes, it is used as a deoxidizer, by adding it to the molten steel either in the ladle or in the mold to remove oxygen and thereby control, or entirely eliminate, the escape

of gas (called "killing"). Aluminum may also be added for the contro of grain size, and occasionally as an alloying element. (2) A) weight metal. It weighs 28 pct as much as carbon steel.

Ammonia Liquor. Primarily water condensed from the coke oven gas, a aqueous solution of ammonium salts of which there are two kinds; free and fixed. The free salts are those which are decomposed on boilin to liberate ammonia. The fixed salts are those which require boilin with an alkali such as lime to liberate the ammonia.

Ammonia Still. The free ammonia still is simply a steam strippin operation where ammonia gas is removed from ammonia liquor. The fixe still is similar except lime is added to the liquor to force the combined ammonia out of its compounds so it can be steam stripped also.

Ammonia Still Waste. Treated effluent from an ammonia still.

Angle. A very common structural or bar shape with two legs of equal or unequal length intersecting at 90?.

Annealing. A process involving heating and cooling, usually applied to induce softening. The term also refers to treatment intended to alter mechanical or physical properties, produce a definite microstructure, or remove gases.

Apron Rolls. Rolls used in the casting strand for keeping products aligned.

Bar, Hot Rolled. Produced from ingots, blooms or billets covering the following range: Rounds, 3/8 to 8-1/4 in. incl.; Squares, 3/8 to 5-1/2 in.; Round cornered squares, 3/8 to 8 in. incl.; Hexagons, 1/4 to 4-1/16 in. incl.; Flats, 13/64 (0.2031) in. and over in specified thicknesses and not over 6 in. specified width.

Standard and special shapes: Angles, channels, tees and zees, when their greatest cross-sectional dimension is under 3 in. Ovals, half ovals and half rounds. Special shapes.

Base Box. A unit of measure peculiar to the tin plate industry. It corresponds to an area equivalent to 112 sheets of tin plate, 14 x 20 in. each; or, 31,360 sq. in.; or, 217.78 sq. ft.

Basic Bottom and Lining. In a melting furnace, the inner lining and bottom are composed of either crushed burned dolomite, magnesite, mangnesite bricks or basic slag. These materials have a basic reaction in the melting process.

Basic Brick. A brick made of a material which is a basic anhydride such as MgO or mixed MgO plus CaO. See acid furnace.

Basic Furnace. A furnace in which the refractory material is compos of dolomite or magnesite.

Basic Material. A chemical expression meaning the opposite of acid. Basic and acid materials, when brought together so that they can react, neutralize each other, forming salts or slags. In such reactions, the base becomes the positive part of the salt and the acid the negative. Examples of basic materials; limestone (or lime, CaO), magnesite (MgO), dolomite (containing both CaO and MgO). Examples of acid materials; quartzite or silica (SiO_2) and the various clays, oxides of sulfur, etc. In metallurgy, the terms, "bases" and "acids," are applied to refractories, fluxes, and slags. Slags are said to be basic when the bases in them are greater than the acids; or to be acid when the acids in them are greater than the bases.

Basic Steel. Steel melted in a furnace that has a basic bottom and lining, and under a slag that is dominantly basic.

Basic Oxygen Steelmaking. The basic oxygen process is carried out in a basic lined furnace which is shaped like a pear. High pressure oxygen is blown vertically downward on the surface of the molten iron through a water cooled lance.

Battery. A group of coke ovens arranged side by side.

Beam. An important member of the structural steel family. There are three varieties; the standard H, I and the side flange used for weight supporting purposes.

Billet. A semi-finished piece of steel which has resulted from rolling in ingot or a bloom. It may be square, but is never more than twice as wide as thick. Its cross-sectional area is usually not more than 36 sq. in.

Blackplate. Cold reduced sheet over 12 in. wide to less than 32 in., in gases 29 and lighter, in cut length or coils and within the uniform Classification of Flat Rolled Carbon Steel Products.

Blast Furnace. A large, tall conical shaped furnace used to reduce iron ore to iron.

Bloom. A semi-finished piece of steel, resulting from the rolling or forging of an ingot. A bloom is square or not more than twice as wide as thick, and usually not less than 36 sq. in. in cross-sectional area.

Box Annealing. A process of annealing a ferrous alloy in a suitable closed metal container with or without packing material in order to minimize oxidation. The charge is usually heated slowly to a temperature below the transformation range, but sometimes above or within it, and is then cooled slowly. This process is also called "close annealing" or "pot annealing."

Bosh. The bottom section of a blast furnace. The section between the hearth and the stack.

Briquette. An agglomeration of steel plant waste material of sufficient strength to be a satisfactory blast furnace charge.

By-Product Coke Process. Process in which coal is carbonized in the absence of air to permit recovery of the volatile compounds and produce coke.

Burden. Solid feed stack to a blast furnace.

Carbon Steel. Steel which owes its properties chiefly to various percentages of carbon without substantial amounts of other alloying elements. Steel is classified as carbon steel when no minimum content of elements other than carbon is specified or required to obtain a desired alloying effect; when the specified minimum for copper does not exceed 0.40 pct; or the maximum content for the following does not exceed the percentage noted: Manganese, 1.65; silicon, 0.60; copper, 0.60

Cast Iron. The metallic product obtained by reducing iron ore with carbon at a temperature sufficiently high to render the metal fluid and casting it in a mold.

Casting. (1) A term applied to the act of pouring molten metal into a mold. (2) The metal object produced by such pouring.

Caustic Dip. Immersion in a metal in a solution of sodium hydroxide to clean the surface, or, when working with aluminum alloys, to reveal the macrostructure.

Channels. A common steel shape consisting of two parallel flanges at right angles to the web. It is produced both in bar sizes (less than 3 in.) and in structural sizes (3 in. and over).

Charge. The minimum combination of skip or bucket loads of material which together provide the balanced complement necessary to produce hot metal of the desired specification.

Checker. A regenerator brick chamber which is used to absorb heat and cool the waste gases to 650-750?C.

Cinder. Another name for slag.

Chromium. An alloying element added to alloy steel (in amounts up to around 1.50 pct) to increase hardenability. Chromium content of 4 pct or more confers special ability to resist corrosion, so that steel containing more than 4 pct chromium are called "Stainless Steel."

Clarification. The process of removing undissolved materials from a liquid, specifically either by settling or filtration.

Closed Hood. A system in which the hot gases from the basic oxygen furnace are not allowed to burn in the hood with outside air infiltration. These hoods cap the furnace mouth.

Coating. The process of covering steel with another material, primarily for corrosion resistance.

Cobble. (1) A jamming of the line of steel sheet while being rolled. (2) A piece of steel which for any reason has become so bent or twisted that it must be withdrawn from the rolling operation and scrapped. Some reasons for cobbling are: Steel too cold, a bad end which can not enter a pass, sticking to the roll and wrapping around it, etc.

Coke. The carbon residue left when the volatile matter is driven off of coal by high temperature distillation.

Coke Breeze. Small particles of coke; these are usually used in the coke plants as boiler feed or screened for domestic trade.

Coke Wharf. The place where coke is discharged from quench cars prior to screening.

Cold Metal Furnace. A furnace that is usually charged with two batches of solid material.

Cold Pig. Blast furnace metal which has been cast into solid pieces, usually weighing from 60 to 80 lb.

Cold Rolled Products. Flat-rolled products which have been finished by rolling the piece without heating (at approximately room temperature).

Conditioning. The removal of surface defects (seams, laps, pits, etc.) from steel. Conditioning is usually done when the steel is in the semi-finished condition (blooms, bilets, slabs). It may be accomplished, after an inspection, by chipping, scarfing, grinding, or machining. In special cases, the steel may be pickled first so as to reveal more of the defects.

Continuous Casting. A new process for solidifying liquid steel in place of pouring it into ingot molds. In this process the solidifed steel is in the form of cast blooms, billets, or slabs. This eliminates the need for soaking pits and primary rolling.

Continuous Mill. A mill composed of several strands of rolls arranged "in tandem", usually so close together that the steel being rolled is passing through several strands simultaneously. Examples: bar mills, strip mills, and some recently constructed plate mills.

Creosote. Distillate from tar.

Crop. The end or ends of an ingot or rolled product that contain the pipe or other defects to be cut off and discarded; also termed "crop end" and "discard."

Dephenolizer. A facility in which phenol is removed from the ammonia liquor and is recovered as sodium phenolate; this is usually accomplished by liquid extraction and vapor recirculation.

Deoxidize. In the limited sense used in metallurgy, the removing of oxygen from a batch of molten steel. Oxygen is present as iron oxide

(FeO), which is dissolved in the steel, and is removed by adding deoxidizing agent such as manganese, silicon, or aluminum.

Descaling. The process of removing scale from the surface of steel. Scale forms most readily when the steel is hot by union of oxygen with iron. Common methods of descaling are: (1) crack the scale by use of roughened rolls and remove by a forceful water spray, (2) throw salt or wet sand or wet burlap on the steel just previous to its passage through the rolls.

Double Slagging. Process in which the first oxidizing slag is removed and replaced with a white, lime finishing slag.

Drags. Flat bed railroad cars. A drag will generally consist of five-six coupled cars.

Duplexing. An operation in which a lower grade of steel is produced in the basic oxygen furnace or open hearth and is then alloyed in the electric furnace.

Dustcatcher. A part of the blast furnace through which the major portion of the dust is removed by mechanical separation.

Electric Furnace. A furnace in which scrap iron, scrap steel, and other solid ferrous materials are melted and converted to finished steel. Liquid iron is rarely used in an electric furnace.

Electrostatic Precipitator. A gas cleaning device using the principle of placing an electrical charge on a solid particle which is then attracted to an oppositely charged collector plate. The collector plates are intermittently rapped to discharge the collected dust to a hopper below.

Evaporation Chamber. A method used for cooling gases to the precipitators in which an exact heat balance is maintained between water required and gas cooling; no effluent is discharged in this case as all of the water is evaporated.

Extrusion. Shaping metal into a continuous form by forcing it through a die of appropriate shape.

Ferroalloy. A iron-bearing product, not within the range of those called steels, which contains a considerable amount of one or more alloying elements, such as manganese, silicon, phosphorus, vanadium, chromium. Some of the more common ones are ferrochromium, ferromanganese, ferrophosphorus, ferrosilicon, ferrovanadium. The chief use of these alloys is for making additions of their respective alloying elements to molten steel.

Ferrochrome. A finishing material which contains about 70 pct chromium. It is used when it is desired to add chromium to steel.

Ferromanganese. A product of the blast furnace, containing, besides iron, 78 to 82 pct of manganese and some silicon, phosphorus, sulphur

and carbon. It is used as a deoxidizer and for the introduction of manganese into steel.

Ferrophosphorus. A finishing material (see "finishing") which contains about 18 pct phosphorus. It is used when it is necessary to add phosphorus to steel.

Ferrosilicon. A product of the blast furnace which contains 8 to 15 pct silicon. It is used as a deoxidizer and for adding silicon to steel.

Ferrous Metallurgy. That section of general metallurgy which embraces the science and knowledge applying to iron and steel products, their preparation and adaptation to their numerous uses.

Ferrovanandium. A product which contains iron and about 38 pct vanadium. Used as a finisher for adding vanadium to steel.

Fettling. The period of time between tap and start.

Final Cooler. A hurdle packed tower that cools the coke oven gas by direct contact. The gas must be cooled to 30?C (86?F) for recovery of light oil.

Finish. In the steel industry, refers to the type of surface condition desired or existing in the finished product.

Finishing. The act of dissolving materials in molten, purified metal for the purpose of changing its composition to that which is called for in the steel order. Also, the shaping-up of the molt without additions.

Finishing Materials. Any material which may be added to purified molten steel in the latter stages of producing a heat of steel; i.e., for modifying its chemical composition.

Flat Sheet. Sheet rolled as pieces of convenient size and then flattened or leveled, usually by stretching. This operation may produce properties slightly different from those of coiled sheet.

Flats. Flat bars. They include all rectangular bars, except squares 13/64 in. and over in specified thickness, not over 6 in. in specified width.

Flattening. Standard commercial flatness is obtained by roller leveling. This consists in passing sheets singly or in packs through a machine having a series of small diameter rolls.

Flying Shear. A shear which severs steel as the piece continues to move. In continuous mills, the piece being rolled cannot be stopped for the shearing operation, so the shear knives must move with it until it is severed.

Flushing Liquor. Water recycled in the collecting main for the purpose of cooling the gas as it leaves the coke ovens.

Flux. Material added to a fusion process for the purpose of removing impurities from the hot metal.

Forging. (1) As a noun; a metal product which has been formed by hammering or pressing, (2) As a verb; forming hot metal into the desired shape by means of hammering or pressing.

Forming. To shape or fashion with the hand, tools or by a shape or mold.

Forming Properties. Those physical and mechanical properties that allow a steel to be formed without injury to the steel in the finished product.

Four-High Mill. A strand which has four rolls, one above the other. This kind of mill has two work rolls, each of which is stiffened by a larger back-roll. Four-high rolls are used only on mills which roll flat products: Slabs, plates, sheets and strips.

Fourth Hole. A fourth recovery lined hole in the roof of the electric furnace which serves as an exhaust port.

Free Leg. A portion of the ammonia still from which ammonia, hydrogen sulfide, carbon dioxide, and hydrogen cyanide are steam distilled and returned to the gas stream.

Fugitive Emissions. Emissions that are expelled to the atmosphere in an uncontrolled manner.

Gages. A measurement of thickness. There are various standard gases such as United States Standard Gage (USS), Galvanized Sheet Gage (GSG), Birmingham Wire Gage (BWG).

Galvanizing. The process of applying a coating of zinc to the finished cold-reduced sheet or to fabricated parts made from strip products. The coating is applied by hot dipping or electrolytic deposition.

Galvannealed. An extra tight coat of galvanizing metal (zinc) applied to a soft steel sheet, after which the sheet is passed through an oven at about 1200?F. The resulting coat is dull gray, without spangle, and especially suited for subsequent painting.

Grade. The term grade designates divisions within different types based on carbon content or mechanical properties.

Granulated Slag. A product made by dumping liquid blast furnace slag past a high pressure water jet and allowing it to fall into a pit of water. The material looks like light tan sand.

H-Steels. Alloy steels that can be used in applications requiring different degrees of hardenability.

Hammer Forging. A forging process in which the work is deformed by repeated blows. Compare with press forging.

Hammer Lap. A defect on the surface of steel, being a foldedover portion produced by bad practice in forging.

Hammer Welding. Welding effected by heating close to their melting point the two surfaces to be joined, and hammering them until a firm union is made.

Hammering. Beating metal sheet into a desired shape either over a form or on a high-speed mechanical hammer, in which the sheet is moved between a small curved hammer and a similar anvil to produce the required dishing or thinning.

Hard Drawn. A temper produced in wire, rod or tube by cold drawing.

Hardness. Defined in terms of the method of measurement. (1) Usually, the resistance to identation. (2) Stiffness or temper of wrought products. (3) Machinability characteristics.

Hearth. In a reverberatory furnace, the portion that holds the molten metal or bath.

Heat. (1) A form of energy which raises the temperature of bodies into which it is absorbed. (2) An individual bath of metal as it is treated in a furnace.

Hexagons. A product of hot rolled carbon steel bars hexagonal in cross section. Commercial size range of hexagons, 1/4 to 51/2 in. inclusive.

High Strength Steel. Low alloy steels forming a specific class in which enhanced mechanical properties and, in most cases, good resistance to atmospheric corrosion are obtained by the incorporation of moderate proportions of one or more alloying elements other than carbon. The preferred terminology is now "high-strength, low-alloy steels."

Holding Furnace. A small furnace for maintaining molten metal from a larger melting furnace, at the right casting temperature.

Hoop. Special quality flat rolled steel product developed to meet the requirements of the cooperage industry in the manufacture of barrels, pails and kegs. It is furnished in black or galvanized, in cut lengths or coils as specified.

Hot Bed. A large area containing closely spaced rolls or rails for holding hot, partially rolled metal.

Hot Blast. The heated air stream blown into the bottom of a blast furnace. Temperatures are in the range of 550?C to 1000?C, and pressures are in the range of 2 to 4.5 atmospheres.

Hot Forming. Working operations such as bending and drawing sheet and plate, forging, pressing, and heading, performed on metal heated to temperatures above room temperature.

Hot Metal. Melted, liquid iron or steel. Generally refers to th liquid metal discharge from blast furnaces.

Hot Metal Furnace. A furnace that is initially charged with solid materials followed by a second charge of melted liquid.

Hot Quenching. A process of quenching in a medium at a temperature substantially higher than ambient temperature.

Hot Rolled. Hot rolled products are those products that are rolled to finish at temperatures above the recrystallization temperature.

Hot Top. A reservoir insulated to retain heat and to hold excess molten metal on top of an ingot mold, in order to feed the shrinkage of the ingot. Also called "Shrink head," or "Feeder head".

Hot Working. Plastic deformation of metal at such a temperature and rate that strain hardening does not occur. The lower limit of temperature for this process is the recrystallization temperature.

Hydraulic Shear. A shear driven by water or oil pressure.

Immersion Coating. Coating a metal with a second metal by immersing the first in a solution containing ions of the second.

Impact Extrusion. A cold forming process in which the metal is force by impact to flow around the punch, forming a tube with a soli bottom.

In Tandem. An arrangement of stands in a rolling mill, one after another, so that the piece being rolled can travel in one direction through a number of stands.

Indirect Extruction (Inverted). An extrusion process in which the metal is forced back inside a hollow ram that pushes the die.

Induction Hardening. A process of hardening a ferrous alloy by heating it above the transformation range by means of electrical induction, and then cooling as required.

Induction Heating. A process of heating by electrical induction.

Ingot. A large block shaped steel casting. Ingots are intermediates from which other steel products are made. An ingot is usually the first solid form the steel takes after it is made in a furnace.

Ingot Iron. Steel so low in carbon, silicon, manganese, phosphorus, sulphur and other metalloid content that it is commonly called "pure iron". Ingot iron is sometimes used for making enameling sheets. Also, silicon is sometimes added to "pure iron" to make high grade electrical sheets.

Ingot Mold. A mold in which ingots are cast. Molds may be circular, square, or rectangular in shape, with walls of various thickness.

Some molds are of larger cross section at the bottom, other are larger at the top.

Iron. Primarily the name of a metallic element. In the steel industry, iron is the name of the product of a blast furnace containing 92 to 94 pct iron, the product made by the reduction of iron ore. Iron in the steel mill sense is impure and contains up to 4% dissolved carbon along with other impurities.

Iron Ore. The raw material from which iron is made. It is primarily iron oxide with impurities such as silica.

Iron Scrap. Blast furnace metal or other iron which may be salvaged by remelting in a blast furnace or in a steelmaking furnace.

Killed Steel. Steel deoxidized with a strong deoxidizing agent such as silicon or aluminum in order to reduce the oxygen content to a minimum so that no reaction occurs between carbon and oxygen during solidification.

KIP. A load of 1000 lb, or 453.59 kg.

Kish. A graphite formed on hot metal following tapping.

Ladle. A large vessel into which molten metal or molten slag is received and handled. Molten metal may be transported short distances by carrying it in a ladle.

Lap. A surface defect appearing as a seam caused from folding over, during hot rolling, fins or sharp corners and then rolling or forging, but not welding them into the surface.

Lap Weld. A term applied to a weld formed by lapping two pieces of metal and then pressing or hammering, and applied particularly to the longitudinal joint produced by a welding process for tubes or pipe, in which the edges of the skelp are beveled or scarfed so that when they are over-lapped they can be welded together.

Light Oil. A clear yellow-brown oil with a specific gravity of about 0.889. It contains varying amounts of coal-gas products with boiling points from about 40?C to 200?C and from which benzene, toluene, xylene and solvent napthas are recovered.

Lime Boil. The fixed leg of the ammonia still to which milk of lime is added to decompose ammonium salts, the liberated ammonia is steam distilled and returned to the gas stream.

Liming. Application of lime to pickled rod produced in the wire industry for protection against corrosion and as a lubricant for cold drawing.

Machining. In general, the cutting away of the surface of a metal by means of power driven machinery. Specifically, a method of conditioning steel by machining away from the surface.

Malleability. The property that determines the ease of deforming metal when the metal is subjected to rolling or hammering. The m malleable metals can be hammered or rolled into thin sheet more easi- than others.

Mandrel. (1) A rod used to relation the cavity in hollow metal products during working. (2) A metal bar around which other metal may be cast, bent, formed or shaped.

Manganese-Nickel-Copper. An obsolete high-strength low alloy steel, intended primarily for weight reduction by means of high strength, greater toughness and improved welding characteristics in applications requiring cold forming and moderately severe impacts in low temperature service.

Meltdown. The melting of the scrap and other solid metallic elements of the charge.

Mill Edge. Normal rounded edge produced in hot rolling. Does not conform to any standard radius. This replaces the old term, band edge.

Mill Finish. A surface finish produced on sheet and plate, characteristic of the ground finish on the rolls used in fabrication.

Mill Length. Those lengths which can be most economically handled in the mill. Upper and lower limits are set by equipment limitations the mill.

Mill Scale. The iron oxide scale which breaks off of heated steel as it passes through a rolling mill. The outside of the piece of steel is generally completely coated with scale as a result of being heated in an oxidizing atmosphere.

Mold. A form or cavity into which molten metal is poured to produce a desired shape.

Molten Metal Period. The period of time during the electric furnace steelmaking cycle when fluxes are added to furnace molten bath for the purpose of slag formation.

Molybdenum. A special alloying element commonly used to increase hardenability of steel. Molybdenum is sometimes added to Stainless Steel to enhance its corrosion resistance to certain chemicals. Molybdenum is commonly called "moly".

Molybdenum Oxide. A commercial compound of molybdenum (MoO_3) which is used as a finishing agent in making molybdenum steels.

Nickel. A metallic element used in some metals.

Non-Standard Steel. A steel is classed as non-standard when th chemical composition or mechanical properties specified do no coincide with or encompass the ranges or limits of a standard steel

(AISI or ASTM), or when restricted ranges or limits are outside the ranges or limits of a standard steel.

Normalize. The normalizing process which is commonly applied to steel articles of heavy section consists of: heating to a temperature about 100?F above the critical range and cooling in still air.

Off Size. Rolled steel, too light or too heavy to meet requirements.

Oiled. Application of a suitable oil to final product to retard rusting. Where surface is a consideration, it is also desirable in reducing friction scratches that may develop in transit. The oil coating is not intended to serve as a lubricant for subsequent fabrication.

Open Hearth Furnace. A furnace for melting metal, in which the bath is heated by the convection of hot gases over the surface of the metal and by radiation from the roof.

Open Plate Panel Hood. A 4.5 meter to 6 meter square, rectangular or circular cross sectional shaped conduit, open at both ends, which is used in the BOF steelmaking process for the combustion and conveyance of hot gases, fume, etc., generated in the basic oxygen furnace, to the waste gas collection system.

Ore. A mineral from which the metal can be extracted profitably.

Ore Boil. The generation of carbon monoxide by the oxidation of carbon.

Ovals. A hot rolled carbon steel bar product which is oval in cross section.

Overfill. A defect in a rolled bar or other section which is an overfullness on some part of the surface. Among the causes are worn rolls and extrusion into the clearance of the rolls. 1t+1 Oxide. Usually refers in the steel industry to the oxides of iron, of which there are three principal ones: FeO, Fe_3O_4, Fe_2O_3. In addition, there are many mixtures of these oxides which form on the surface of steel at different temperatures and give the steel different colors, such as yellow, brown, purple, blue and red. Oxides must be thoroughly removed from the surface of steel objects which are to be coated with tin, zinc, or other metals.

Oxidize. A chemical treatment which increases the positive valences of a substance. In a limited sense, adding oxygen to a substance, as in oxidizing C to CO, CO to CO_2, Si to SiO_2, Mn to MnO.

Oxidizing Agent. A substance added to a mixture for the purpose of oxidizing some constituents. For example, iron ore (Fe_4O_3) is used in an open hearth furnace to furnish oxygen for the removal of Si, Mn, P and C, by converting them to SiO_2, MnO, P_2O_5 and CO.

Oxidizing Slags. Fluxing agents that are used to remove certain oxides such as silicon dioxide, manganese oxide, phosphorus pentoxide and iron oxide from the hot metal.

Pass. (1) Movement of a piece of steel through a stand of rolls. (2) The open space between grooved rolls through which is rolled the steel which is being processed.

Patenting. In wire making, a heat treatment applied to mediumcarbon or high-carbon steel before the drawing of wire or between drafts. This process consists of heating the product in air or in a bath of molten lead or salt maintained at a temperature appropriate to the carbon content of the steel and to the properties required of the finished product.

Pelletizing. The processing of dust from the steel furnaces into a pellet of uniform size and weight for recycle.

Pickle. Chemical or electrochemical removal of surface oxides.

Pig. An ingot of virgin or secondary metal to be remelted for use.

Pig Iron. Inpure iron cast into the form of small blocks that weigh about 30 kg. each. The blocks are called pigs.

Piling. A form of rolled structural shape of two types: sheet piling, and bearing piling. The three forms of sheet pile - straight, arch type and zee - are used for such types of construction as docks, breakwaters, coffer dams, etc. Bearing piles, which range from 14 in. to 8 in. in depth, are heavy, wide flange sections for foundation work, etc.

Pinch Pass. A pass of sheet through rolls that are set to give a very light reduction.

Pinch Rolls. Rolls used to regulate the speed of discharge of cast product from the molds.

Pitch. Distillate from tar.

Plain Carbon Scrap. Scrap steel with less than: 1.65 pct manganese, 0.60 pct silicon, 0.60 pct copper, or any other alloying element added for a special alloying effect.

Plate. Carbon steel plates comprise that group of flat rolled finished steel products within the following size limitation:

0.180 in. or thicker, over 48 in. wide;
0.230 in. or thicker, over 6 in. wide;
7.53 lb/sq ft or heavier, over 48 in. wide;
9.62 lb/sq ft or heavier, over 6 in. wide

Pouring. The transfer of molten metal from the ladle into ingot molds or other types of molds; for example, in castings.

Preheating. (1) A general term used to describe heating applied as a preliminary to some further thermal or mechanical treatment. (2) A term applied specifically to steel to describe a process in which the steel is heated slowly and uniformly to a temperature below the hardening temperature and is then transferred to a furnace in which the temperature is substantially above the preheating temperature.

Press Forging. The forging process in which metal stock is formed between dies, usually by hydraulic pressure. Press forging is an operation that employs a single, slow stroke. Compare with hammer forging.

Primary Scale. Oxide of iron (Fe_3O_4) which is formed while the steel is being heated.

Primes. Metal products such as sheet and plate, of the highest quality and free from visible surface defects.

Process Annealing. In the sheet and wire industries, a process by which ferrous alloy is heated to a temperature close to, but below, the lower limit of the transformation range and is subsequently cooled. This process is applied in order to soften the alloy for further cold working.

Quality. Refers to the suitability of the steel for the purpose or purposes for which it is intended.

Quench Hardening. A process of hardening a ferrous alloy of suitable composition by heating within or above the transformation range and cooling at a rate sufficient to increase the hardness substantially. The process usually involves the formation of martensite.

Quench Tower. The station at which the incandescent coke in the coke car is sprayed with water to prevent combustion. Quenching of coke requires about 500 gallons of water per ton of coke.

Quenching. A process of rapid cooling from an elevated temperature by contact with liquids, gases or solids.

Quenching Crack. A fracture resulting from thermal stresses induced during rapid cooling or quenching. Frequently encountered in alloys that have been overheated and liquated and are thus "hot short."

Recuperator. A piece of equipment for recovering heat from hot, spent gases and using it for the preheating of incoming fuel or air. This is a continuous operation, in which the incoming materials pass through pipes surrounded by a chamber through which the outgoing gases pass.

Reducing Slag. Used in the electric furnace following the slagging off of an oxidizing slag to minimize the loss of alloys by oxidation.

Refining. Oxidation cycle for transforming hot metal (iron) and other metallics into steel by removing elements present, such as silicon, phosphorus, manganese and carbon.

Refractory. Ideally, any substance which is infusible at the highes temperature it may be required to withstand in service. A perfect refractory, which does not exist at present, would be one which: (1) would not fuse or soften, (2) would not crumble or crack, (3) its contraction and expansion would be the minimum, (4) would not conduct heat, (5) would be impermeable to high temperature gases and liquids, (6) would resist mechanical abrasion, and (7) it would not react chemically with substances in contact with it.

Rod Mill. (1) A mill for fine grinding, somewhat similar to the ball mill, but employing long steel rods instead of balls as the grinding medium. (2) A mill for rolling metal rod.

Roll Forming. (1) An operation used in forming sheet. Strips of sheet are passed between rolls of definite settings that bend the sheet progressively into structural members of varioius contours, sometimes called "molded sections." (2) A process of coiling sheet into open cylinders.

Roll Scale. Oxide of iron which forms on the surface of steel while it is being heated and rolled. Much of the scale is cracked and loosened during the rolling operation and may fall off the piece naturally or be blown off by high-pressure water sprays or by other means.

Roll Table. A conveyor-type table surface that contains a series oi small rolls over which metal products pass during processing.

Roughing Stand. The rolls used for breaking down the ingot or billet in the preliminary rolling of metal products.

Round Cornered Squares. A bar product square in cross sections with rounded corners with size ranges 3/8 in. to 8 in., inclusive.

Runner. A channel through which molten metal or slag is passed from one receptacle to another; in a casting mold, the portion of the gate assembly that connects the downgate or sprue with the casting.

Runout. Escape of molten metal from a furnace, mold or melting crucible.

Scale. An oxide of iron which forms on the surface of hot steel. Sometimes it forms in large sheets which fall off when the steel is rolled.

Scarfing. Cutting surface areas of metal objects, ordinarily by using a gas torch. The operation permits surface defects to be cut from ingots, billets, or the edges of plate that are to be beveled for butt welding.

Scrap. Iron or steel discard, or cuttings, or junk metal, which can be reprocessed.

Secondary Scale. Oxide of iron which is formed on hot steel while it is being rolled or forged.

Self-Hardening Steel. A steel containing sufficient carbon or alloying element or both, to form martensite either through air hardening or, as in welding and induction hardening, through rapid removal of heat from a locally heated portion by conduction into the surrounding cold metal.

Semi-Finished Steel. Steel in the form of ingots, blooms, billets, or slabs for forging or rolling into a finished product.

Semi-Killed Steel. Steel incompletely deoxidized, to permit evolution of sufficient carbon monoxide to offset solidification shrinkage.

Shake-Out. The operation of removing castings from their molds.

Shear. In a steel mill, a machine for cutting steel products. There are many kinds of shears, but the general principle is the same as that used for shearing cloth or paper; the work is held upon a lower blade and an upper blade is thrust down, severing the piece. Steel shears may be classified: as to kind of drive - hydraulic and electric; as to the work done - cropping, squaring, slab, bloom, billelt, bar shears; as to type of mechanism - rotary, rocking, gate, guillotine, alligator shears; as to movement of work while shearing - flying shears.

Silico Manganese. An alloy containing silicon and manganese. In the open hearth process, it is used as a deoxidizer in the furnace and for the introduction of manganese and silicon into steel.

Sinter. In blast furnace usage, lumpy material which has been prepared from flue dust. The dust is agglomerated by heating it to a high temperature. Sinter contains valuable amounts of combined iron.

Skelp. A plate of steel or wrought iron from which pipe or tubing is made by rolling the skelp into shape longitudinally and welding or riveting the edges together.

Skin. A thin surface layer that is different from the main mass of a metal object, in composition, structure or other characteristics.

Slab. A semifinished block of steel cut from a rolled ingot, with its width at least twice its thickness. It differs from a bloom which is square or nearly so. Slabs are the product of a slabbing mill, or a blooming mill.

Slab Shear. A shear for cutting a rolled ingot into slab lengths. This shear also cuts off the discard or crop.

Slabbing Mill. A mill which rolls ingots into slab shapes.

Slag. A product resulting from the action of a flux on the nonmetallic constituents of a processed ore, or on the oxidized metallic constituents that are undesirable. Usually slags consist of combinations of acid oxides with basic oxides, and neutral oxides are added to aid fusibility.

Slag Top. A variation of the Hot Top.

Soak. To hold an ingot, slab, bloom, billet or other piece of steel in a hot chamber or pit to secure uniform temperature throughout. Freshly stripped ingots are hottest in the interior, whereas a cold object which is being heated is hottest at the surface. The term is used in connection with heating of steel whether for forging or rolling or for heat treatment.

Soaking Pit. A furnace or pit for the heating of ingots of steel to make their temperature uniform throughout.

Spark Box. A solids and water collection zone in a basic oxygen furnace hood.

Spiegeleisen (Also Spiegel). A pig iron containing 15 to 30 pct Mn and 4.5 to 6.5 pct C.

Sponge Iron. The material produced by the reduction of iron oxide with carbon, without melting.

Stainless. (1) A trade name given to alloy steel that is corrosion and heat resistant. The chief alloying elements are chromium, nickel and silicon in various combinations with a possible small percentage of titanium, vanadium, etc. (2) by AISI definition, a steel is call "Stainless" when it contains 4 pct or more chromium.

Stainless Steel. Any steel containing four or more pct chromium is classified as stainless. However, there are many grades for specific purposes. These grades may contain nickel or molybdenum or both, but always chromium.

Steel. Refined iron. Typical blast furnace iron has the following composition: Carbon, 3 to 4.5%, Silicon, 1 to 3%; Sulfur, 0.04 to 0.2%; Phosphorus, 0.1 to 1.0%; Manganese, 0.2 to 2.0%. The refining pocess (steelmaking) reduces the concentration of these elements in the metal. A common steel 1020 has the following composition: Carbon, 0.18 to 0.23%; Manganese, 0.3 to 0.6%; Phosphorus, less than 0.04%; Sulfur, less than 0.05%.

Steel Ladle. A vessel for receiving and handling liquid steel. It is made with a steel shell, lined with refractories.

Stools. Flat cast iron plates upon which the ingot molds are seated.

Stoves. Large refractory filled vessels in which the air to be blown into the bottom of a blast furnace is preheated.

Strand. A term applied to each continuous casting mold and its associated mechanical equipment.

Stretcher Flattening. A process for removing bow and warpage from sheet by applying a uniform tension at the ends so that the piece is elongated to a definite amount of permanent set.

Strip, Hot Rolled Carbon Steel. Flat hot rolled carbon steel produced in coils or in cut lengths is classified as hot rolled carbon steel strip when the product is within the following size limitations:

Width	Thickness
up to 3-1/2 in. incl.	.0255 to.2030 in. incl.
over 3-1/2 to 6 in. incl.	.0344 to .2030 in. incl.
over 6 to 12 in. incl.	.0568 to .2299 in. incl.

Support Rolls. Rolls used in the casting strand for keeping cast products aligned.

Tandem Mill. A mill with a number of stands in succession.

Tap Hole. A hole approximately fifteen (15) centimeters in diameter located in the hearth brickwork of the furnace that permits flow of the molten steel to the ladle.

Tap to Tap. Period of time after a heat is poured and the other necessary cycles are performed to produce another heat for pouring.

Tapping. Transfer of hot metal from a furnace to a steel ladle.

Tar. The organic matter separating by condensation from the gas in the collector mains. It is a black, viscous liquid, a little heavier than water. From it the following general classes of compounds may be recovered: pyrites, tar acids, naphthalene, creosote oil and pitch.

Teeming. Casting of steel into ingots.

Temper. A condition produced in a metal or alloy by mechanical or thermal treatment, and having characteristic structure and mechanical properties. A given alloy may be in the fully softened or annealed temper, or it may be cold worked to the hard temper, or further to spring temper. Intermediate tempers produced by cold working (rolling or drawing) are called "quarter-hard", "half-hard" and "three-quarters hard", and are determined by the amount of cold reduction and the resulting tensile properties. In addition to the annealed temper, conditions produced by thermal treatment are the solution heat treated temper and the heat treated and artificially aged temper. Other tempers involve a combination of mechanical and thermal treatments and include that temper produced by cold working after heat treating, and that produced by artificial aging of alloys that are as-cast, as-extruded, as-forged and heat treated, and worked.

Tempering. A process of reheating quench-hardened or normalized steel to a temperature below the transformation range, and then cooling at any rate desired.

Tensile Strength. The value obtained by dividing the maximum load observed during tensile straining until breakage occurs by the specimen cross-sectional area before straining. Also called "ultimate strength."

Terneplate. Steel sheet, hot dip coated with terne metal (10-15 tin; 85-90 pct lead).

Three-High Mill. A stand which has three rolls, one above the other. The steel which is being rolled passes one way between the bottom and middle rolls, and the other way between the middle and top mills.

Tinplate. A mild steel of low carbon content bearing a coating of commercially pure tin. Two manufacturing processes are in use at the present time, hot dipped and electrolytic tinning lines.

Titanium. A metal which is commonly added to chrome nickel stainless steel to improve its welding properties. So used, it is called a "stabilizer" or is said to prevent "carbide precipitation." The amount of titanium commonly used for this purpose is 5 to 7 times the carbon content.

Train of Stands. In rolling mill construction, those stands of rolls which are placed side by side, i.e., so that the rolls of the different stands come end to end so that one engine or motor can drive them. Contrast this with strands in tandem.

Tundish. A preheated covered steel refractory lined rectangular container with several nozzles in the bottom which is used to regulate the flow of hot steel from the teeming ladles.

Tungsten. A metal which is sometimes added to steel to make tool steel.

Two-High Mill. A stand having only two rolls. Some two-high mills are reversing with screw-downs to adjust the rolls; other are one way only and may or may not have screw-downs for roll adjustment and may or may not be a part of a continuous mill.

Universal Plate Mill. A mill for rolling steel plates, which has vertical as well as horizontal rolls, so that its product has rolled edges.

Upsetting. (1) A metal working operation similar to forging. (2) The process of axial flow under axial compression of metal, as in forming heads on rivets by flattening the end of wire.

Vacuum Degassing. A process for removing dissolved gases from liquid steel by subjecting it to a vacuum.

Venturi Scrubber. A wet type collector that uses the throat for intermixing of the dust and water particles. The intermixing is accomplished by rapid contraction and expansion of the air stream and a high degree of turbulence.

Wash Oil. A petroleum solvent used as an extractant in the co plant.

Waste Heat Boiler. Boiler system which utilizes the hot gases from the checkers as a source of heat.

Water Tube Hood. Consists of steel tubes, four (4) centimeters to five (5) centimeters, laid parallel to each other and joined together by means of steel ribs continuously welded. This type of hood is used in the basic oxygen steelmaking process for the combustion and conveyance of hot gases to the waste gas collection system.

Wet Scrubbers. Venturi or orifice plate units used to bring water into intimate contact with dirty gas for the purpose of its removal from the gas stream.

Wire Rod. A semifinished product from which wire is made. It is generally of circular cross section approximately 1/4 in. in diameter.

Work Rolls. Nongrooved rolls which come into contact with the piece of steel (slab, plates, strip or sheet) being rolled. In four-high mills, the rolls which stiffen or strengthen the work rolls are called back-up rolls. The drive spindles are connected with with the work rolls.

Appendix E

PLANT BY PLANT SUMMARIES OF THE USE AND IMPACT OF INTRA-PLANT TRADING

ARMCO STEEL, MIDDLETOWN, OH

The NPDES permit issued to Armco Steel's Middletown Ohio Works effective March 31, 1987 contained a trade involving five outfalls: 613, 614, 631, 641, and 005. This trade is also included in the facility's December 1, 1992 permit, with slightly different limits, and is still in effect. The use of the outfalls involved in the trade at the time the permit was issued is described below.[1]

Descriptions of Outfalls Involved in Trading

Outfall 613

This internal outfall conveys treated effluent from the blast furnace and sinter plant. This treated effluent mixes with other wastewaters, including those from outfall 614, prior to discharge. The permit specifies limits for the combined effluent from outfalls 613 and 614.

Outfall 614

This internal outfall conveys treated effluent from the cold mill coating and acid pickling lines, and boiler house/water softener operations. The treated effluent mixes with other wastewaters, including those from outfall 613, prior to discharge. The permit specifies limits for the combined effluent from outfalls 613 and 614.

Outfall 631

This internal outfall conveys treated effluent from the basic oxygen furnace.

Outfall 641

This internal outfall conveys treated effluent from cold mill and pickling operations.

Outfall 005

This outfall conveys treated wastewater from the hot forming operations, continuous caster, vacuum degasser (at the basic oxygen shop), and blowdown water from the non-contact cooling water recycle system associated with slab reheat furnaces. This effluent combines with cooling and storm waters prior to discharge.

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[1] These descriptions are based on descriptions in the 1992 permit. The relevant portions of the 1992 permit are reproduced in Attachment 1 to this report.

The Trade

The use of trading at this facility involves the five outfalls described above, and four parameters: total suspended solids (TSS), oil and grease, lead, and zinc. As indicated in the descriptions above, several of the outfalls contain wastewater either from cold forming operations (which are not eligible for trading) or from operations whose effluent is governed by effluent guidelines other than the iron and steel guidelines (i.e., metal finishing). The trade involves only that portion of the effluent eligible for trading. The details of the trade are presented in Exhibit E-1.[2] Appendix G walks the reader through a sample trading calculation.

Effluent Limits Differences

In the permit, total suspended solids (TSS) and oil and grease limits for outfall 005 are more stringent than required by the effluent limitation guidelines (ELGs). A portion of the reduction below the ELG limits is applied to allow effluent from outfalls 613/614, 631, and 641 to exceed the ELG limits for these parameters. In addition, lead and zinc limits for outfalls 641 and 005 are more stringent than required by the ELG limits. A portion of the reduction below the ELG limits is applied to allow effluent from outfalls 613/614 and 631 to exceed the ELG limits for these parameters.

For example, the draft permit calculations show combined monthly average TSS limits for these five outfalls of 7,213 pounds per day, 379 pounds below ELG limits of 7,593 pounds per day (6,821 pounds from iron and steel wastewater and 772 pounds from non-steel wastewater).[3] This reduction is achieved because the limit at outfall 005 is below the ELG limit by a greater amount than the amount by which the combined effluent limit for outfalls 613/614, 631, and 641 exceeds ELG limits. As the exhibit shows, the sum of the limits in the draft 1992 permit for these five outfalls are also below the maximum allowed under the ELG for oil and grease, lead, and zinc.

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits at all the outfalls. According to a plant official, Armco Steel would most likely have installed sand filters at outfall 631 and either outfall 613 or 614 (probably outfall 613) to control TSS and lead.[4] The official estimated the capital cost of these filters at $1 million each, a total capital cost of $2 million (1993 dollars).[5]

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[2] The information presented here is based on calculations prepared for the 1992 permit. These calculations are the only readily available information on the trade. The limits they arrive at differ slightly from the limits in the final permits. In addition, the 1987 and 1992 permit limits are slightly different from each other. Nonetheless, the trade as described here appears to be the basis for the current permit limits.

[3] The final 1992 permit shows combined limits 951 kilograms below ELG limits.

[4] This assumes that controlling suspended lead would allow the effluent to meet the ELG limits (i.e., dissolved lead is below ELG limit).

[5] Donald R. Perander, Senior Staff Engineer, Environmental Affairs.

Control of zinc at outfall 631 would have been achieved by the sand filters discussed above. The final permit limits for zinc at outfalls 613/614 reflect the resolution of issues in addition to trading, such as waste load assimilation and water quality standards. Because these other issues had priority over trading, Armco officials were not able to estimate the additional capital costs that would have been associated with zinc control at these outfalls had trading not been available. Readily available information on plant operations at the time of the permit is insufficient to allow an engineering estimate to be made.[6]

Thus, had trading not been allowed, at least $2 million (1993 dollars) in additional pollution control capital costs would have been incurred. The annual operation and maintenance costs that would have been associated with this additional treatment capital were estimated at five to ten percent of installed capital costs, or $100,000 to $200,000 (1993 dollars). The trade was in place under a draft permit from 1983, prior to final permit approval in 1987. Thus, estimated compliance cost differences are calculated from 1983 onward.

Under the assumptions outlined in Appendix F, the present value through the end of 1993 of the estimated capital cost of additional treatment that would have been required in the absence of trading is $3.9 million (1993 dollars). In addition, the present value of the operation and maintenance expenses associated with this additional treatment is estimated at $2.4 million (1993 dollars). Thus, the present value of the additional costs that Armco Steel, Middletown, would have incurred without the trade is estimated at $6.3 million (1993 dollars).

[6] Mr. Perander did not feel that additional treatment equipment would have made a substantial reduction in effluent loadings at outfall 641.

Exhibit E-1

EFFLUENT LIMITS (lbs/day)
ARMCO STEEL COMPANY
MIDDLETOWN OHIO

Total Suspended Solids	ELG Limits Less Cold Forming and Non-Steel Wastewaters	ELG Limits For Cold Forming and Non-Steel Wastewaters	Modified Effluent Limitations (1992 Draft)	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfalls 613/614	1,303	293	3,007	1,411			
Outfall 631	198		752	554			
Outfall 641	804	478	1,237	154			
Outfall 005	4,716		2,216			2,500	
Total	6 821	772	7,213	2,121	2,439	2,500	379
Daily Maximum							
Outfalls 613/614	3,380	584	7,515	3,552			
Outfall 631	566		2,255	1,689			
Outfall 641	1,407	959	2 734	368			
Outfall 005	12,710		6,122			6,587	
Total	18 062	1,543	18,627	5,589	6,427	6,587	998

Oil and Grease	ELG Limits Less Cold Forming and Non-Steel Wastewaters	ELG Limits For Cold Forming and Non-Steel Wastewaters	Modified Effluent Limitations (1992 Draft)	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfall 641	201	161	414	53			
Outfall 005	1,257		1,195			82	
Total	1,457	161	1 609	53	61	82	9
Daily Maximum							
Outfall 641	992	399	1,180	159			
Outfall 005	3,375		3,188			187	
Total	3,977	399	4,347	159	183	187	29

Total Lead	ELG Limits Less Cold Forming and Non-Steel Wastewaters	ELG Limits For Cold Forming and Non-Steel Wastewaters	Modified Effluent Limitations (1992 Draft)	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfalls 613/614	6.37	1 57	11 07	3 13			
Outfall 631	1 17		1 98	0 82			
Outfall 641	3 00	2 40	2 40			3 00	
Outfall 005	1 90		0 51			1 39	
Total	12 43	3.97	15 98	3 95	4 34	4 39	0 44
Daily Maximum							
Outfalls 613/614	17 35	5.25	32.10	9 50			
Outfall 631	3 53		5 93	2.40			
Outfall 641	9 09	7 19	7 21			9 04	
Outfall 005	5.89		1 50			4 19	
Total	35 85	12.43	46 74	11.90	13 10	13 23	1 32

Total Zinc	ELG Limits Less Cold Forming and Non-Steel Wastewaters	ELG Limits For Cold Forming and Non-Steel Wastewaters	Modified Effluent Limitations (1992 Draft)	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfalls 613/614	8 07	3 88	16 20	4 25			
Outfall 631	1 76		2.60	0 84			
Outfall 641	4 03	1 59	1 59			4 03	
Outfall 005	2.62		0 99			1 63	
Total	16 48	5 47	21 38	5 09	5 60	5 67	0 57
Daily Maximum							
Outfalls 613/614	24.21	8.02	42.61	10 39			
Outfall 631	5.29		8 58	3 29			
Outfall 641	12.08	4 78	8 64			10 23	
Outfall 005	7 88		2.91			4 98	
Total	49 47	12.81	66 74	13 67	15 04	15 21	1 54

Exhibit E-2

EFFLUENT LIMITS (lbs/day)
BABCOCK AND WILCOX
BEAVER FALLS, PENNSYLVANIA

Total Suspended Solids	ELG Limits Less Non-Steel Wastewaters	ELG Limits for Non-Steel Wastewaters	Modified Effluent Limits	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfall 113	15 97	4 46	68 43	48 00			
Outfall 115	606 00		552.00			56 00	
Total	623 97	4 46	620 43	48 00	55 20	56 00	8 00
Daily Maximum							
Outfall 113	37 28	8 64	73 90	28 00			
Outfall 115	1,615 00		1 562 00			53 00	
Total	1,652.28	8 64	1 635 90	28 00	32 20	53 00	25 00

Oil and Grease	ELG Limits Less Non-Steel Wastewaters	ELG Limits for Non-Steel Wastewaters	Modified Effluent Limits	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfall 113	9 32	3 74	11 76	2 70			
Outfall 115	193 00		189 00			4 00	
Total	198 32	3 74	200 76	2.70	3 10	4 00	1 30
Daily Maximum							
Outfall 113	15 97	7 49	41 46	18 00			
Outfall 115	387 62		366 62			21 00	
Total	403 59	7 49	408 08	18 00	20 70	21 00	3 00

Total Lead	ELG Limits Less Non-Steel Wastewaters	ELG Limits for Non-Steel Wastewaters	Modified Effluent Limits	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfall 113	0 0797	0 0819	0 1616	0 0400			
Outfall 115	0.2570		0 2070			0 0500	
Total	0 3367	0.0819	0 3686	0 0400	0 0440	0 0500	0 0100
Daily Maximum							
Outfall 113	0.2389	0 0983	0 7382	0 4000			
Outfall 115	0.7680		0 3280			0 4400	
Total	1 0069	0 0983	1 0662	0 4000	0 4400	0 4400	0 0400

Total Zinc	ELG Limits Less Non-Steel Wastewaters	ELG Limits for Non-Steel Wastewaters	Modified Effluent Limits	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfall 113	NA		NA				
Outfall 115	NA		NA				
Total	NA		NA				
Daily Maximum							
Outfall 113	0 3167	0 3757	0.9244	0 2300			
Outfall 115	1 1130		0 8530			0 2600	
Total	1 4317	0.3757	1 7774	0 2300	0 2530	0 2600	0 0300

BABCOCK AND WILCOX, BEAVER FALLS, PA

The NPDES permit issued to Babcock and Wilcox's Beaver Falls Works effective November 18, 1983 contains a trade involving two outfalls: 113 and 115. The company was reorganized in the mid-1980s, and portions of the facility, including these two outfalls, came under different ownership. The trade was discontinued in 1986 when the plant associated with outfall 115 was closed. The use of these outfalls at the time the permit was issued is described below.[7]

Descriptions of Outfalls Involved in Trading

Outfall 113

This outfall conveyed treated wastewater associated with Babcock and Wilcox's Special Metals Works, which produces stainless steel with a very high chromium and nickel content. As noted below, a portion of the effluent from this outfall was classified as "non-steel wastewater," and thus not governed by the iron and steel effluent limitation guidelines.

Outfall 115

This outfall conveyed treated effluent from the Koppel Steel Mill, located near the Special Metals Works. This was primarily cooling water and water from scaling pits.

The Trade

In the 1983 permit, limits for total suspended solids (TSS), oil and grease, lead, and zinc at outfall 115 are more stringent than required by the effluent limitation guidelines (ELGs). A portion of the reduction below the ELG limits is applied to outfall 113, allowing its effluent to exceed the ELG limits for these same parameters. A portion of the effluent from outfall 113 is from non-steel sources, and thus not eligible for trading. The trade involves only that portion of the effluent regulated by the iron and steel ELGs. The details of the trade are presented in Exhibit E-2.[8] Appendix G walks the reader through a sample trading calculation.

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[7] These descriptions are based on information from the 1983 permit and from conversations with Len Zacarchuk and Victor Catania, both of whom worked for Babcock and Wilcox during the time the trade was in effect. The relevant portions of the permit are reproduced in Attachment 1 to this report.

[8] Because of the reorganization of Babcock and Wilcox in the mid-1980s, complete information on the trade is difficult to obtain. The information presented here is drawn primarily from the fact sheet for the November 18, 1983 permit and the associated calculations. As noted below, the limits in the permit itself differ somewhat from the limits laid out in the fact sheet. Neither the Pennsylvania Department of Environmental Resources nor the former employees of Babcock and Wilcox who provided information on the trade could explain this difference.

Effluent Limits Differences

In the permit, monthly average TSS loadings for outfall 115 are 56 pounds per day below ELG limits (552 pounds vs. 608 pounds). At the same time, the corresponding TSS limit for outfall 113 is 48 pounds above the ELG limit of 20.43 pounds per day (15.97 pounds from iron and steel wastewater, and 4.46 pounds from non-steel wastewater). The combined monthly average TSS loading limit for these two outfalls is thus 8 pounds below ELG limits. Similar limit reductions are shown for the daily maximum loading limit for TSS, and for monthly average and daily maximum limits for oil and grease, lead, and zinc.[9]

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits at outfall 113. No official currently associated with the facilities that once made up Babcock and Wilcox's Beaver Falls Works was able to provide detailed information on the additional treatment that would have been required in the absence of trading to assure that effluent from outfall 113 met ELG limits. A former Babcock and Wilcox official, who was in charge of environmental affairs at the time of the trade, explained two factors that made the trade attractive to Babcock and Wilcox.[10]

- The existing treatment plant associated with outfall 113 would have required expansion in order to treat the effluent to ELG limits. This was not possible on the land available — a new plant would have been required.

- The Special Metals Plant (the source of wastewater for outfall 113) was dedicated to production of tubing for use in nuclear reactors for U.S. Navy ships on a "cost plus" basis. Babcock and Wilcox was concerned that a new treatment plant would not meet the Navy's cost standard.

This individual was not able to estimate the increase in treatment costs that might have been associated with controlling effluent at this outfall had trading not been possible. Readily available information on plant operations at the time of permit issuance is insufficient to allow an engineering estimate to be made.

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[9] Note that in the final 1983 permit the limits for TSS and oil and grease for outfall 115 do not appear to have been decreased as the calculations indicate they should have been. No explanation for this discrepancy has been provided, but it may be a clerical error corrected in a subsequent permit modification. Officials of the State of Pennsylvania noted that any documents modifying this permit would have been sent to the state archives, and therefore are not readily retrievable. Regional EPA officials discard or archive all documents over five years old. Babcock and Wilcox has also archived all documents relating to this permit.

[10] Telephone conversation with Allan Dahlgren, manager of environmental affairs at Babcock and Wilcox at the time of the trade. 24 January 1994.

BETHLEHEM STEEL, SPARROWS POINT, MD

The NPDES permit issued to Bethlehem Steel's Sparrows Point Division effective October 10, 1985 contains a trade involving two points: outfall 014 and monitor point 101. The permit containing this trade is still in administrative effect. The operations associated with these points at the time the permit was issued are described below.[11]

Descriptions of Points Involved in Trading

Outfall 014

This outfall conveys effluent from a large central treatment plant that manages wastewater from a basic oxygen furnace, hot and cold forming operations, and finishing operations. Some of the wastewaters associated with this outfall are not eligible for trading, as they originate from cold forming operations (excluded from trading) or operations regulated under metal finishing guidelines.

Monitor Point 101

This internal monitor point conveys treated wastewater from blast furnace and sintering operations.

The Trade

The use of trading at this facility is relatively complicated. As indicated in the description above, outfall 014 contains wastewater from cold forming operations (which are not eligible for trading) and from operations whose effluent is governed by effluent guidelines other than the iron and steel guidelines (i.e., metal finishing). The trade involves only that portion of the effluent from outfall 014 that is eligible for trading under the iron and steel ELGs.

In the 1985 permit, limits for zinc at outfall 014 are more stringent than required by the effluent limitation guidelines. A portion of the reduction below the ELG limits is applied to monitor point 101, allowing its effluent limits for zinc to be set above the ELG limits. The details of the trade are shown in Exhibit E-3.[12] Appendix G walks the reader through a sample trading calculation.

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[11] These descriptions are based on correspondence and telephone conversations with Barbara E. Bachman, Senior Environmental Engineer, Bethlehem Steel Corporation. The relevant portions of documents related to trading at this facility are reproduced in Appendix 1 to this report.

[12] This exhibit is based on correspondence and documentation provided by Barbara E. Bachman, Senior Environmental Engineer. Relevant documents are reproduced in Attachment 1 to this report.

Effluent Limits Differences

As the exhibit shows, for monitor point 101, the permit allows monthly average zinc loadings 12.6 pounds per day above ELG limits (21.8 pounds vs. 9.2 pounds). At the same time, the monthly average zinc limit for outfall 014 is 73.1 pounds per day, 14.0 pounds below ELG limits of 87.1 pounds per day (14.0 pounds from wastewater eligible for trading and 73.1 pounds not eligible for trading). Thus, the combined monthly average loading limit for zinc from these two points is 1.4 pounds (94.9 pounds vs. 96.3 [87.1 plus 9.2] pounds) below ELG limits. Similarly, the trade results in daily maximum zinc loading limits from these two points 4.0 pounds below ELG limits.

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits for zinc at monitoring point 101. According to a Senior Engineer in Bethlehem Steel's Environmental Regulatory Affairs Department, in the absence of the trade Bethlehem Steel would have controlled zinc by adding filtration to the existing treatment train prior to monitoring at point 101.[13]

In 1983, Bethlehem estimated the capital cost of meeting "strict BAT" limits to be $2.1 million (1983 dollars) greater than the capital cost of meeting limits arrived at using the trading provision, as well as other limit modifications not related to trading. The portion of the difference in capital cost expenditures attributable to trading is not readily discernible. However, Bethlehem's engineer stated that it was reasonable to assume it accounted for more than half and perhaps as much as three-fourths of the cost difference. Thus, $1.05 million (1983 dollars) provides a conservative estimate of the treatment capital costs that would have been incurred had trading not been allowed.

No definitive estimate of associated operation and maintenance costs is available. However, the company's engineer stated that as a rule of thumb, Bethlehem estimates that annual operation and maintenance costs are fifteen percent of installed capital costs. This implies a conservative estimate of additional annual operation and maintenance costs of $157,500 (1983 dollars) had trading not been possible.

Under the assumptions outlined in the Appendix F, the present value through the end of 1993 of capital costs that would have been incurred in the absence of trading is $2.36 million (1993 dollars). In addition, the present value through 1993 of associated operation and maintenance expenses is estimated at $2.47 million (1993 dollars). Thus, the present value of the costs that Bethlehem Steel would have incurred without the trade is estimated at $4.83 million (1993 dollars).

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[13] Barbara E. Bachman, telephone conversations and correspondence, December 1993 through February 1994.

Exhibit E-3

EFFLUENT LIMITS (lbs/day)
BETHLEHEM STEEL
SPARROWS POINT, MARYLAND

Zinc	ELG Limits Less Cold Forming and Non-Steel Wastewaters	ELG Limits For Cold Forming and Non-Steel Wastewaters	Modified Effluent Limitations	Actual Increase in Limit	Minumum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average							
Outfall 101	9 2		21 8	12 6			
Outfall 014	14.0	73 1	73.1			14 0	
Total	23.2	73.1	94 9	12 6	13 9	14 0	1 4
Daily Maximum							
Outfall 101	27 7		63 7	36 0			
Outfall 014	40 0	171 4	171 4			40 0	
Total	67.7	171 4	235 1	36 0	39 6	40 0	4 0

Exhibit E-4

EFFLUENT LIMITS (lbs/day)
INLAND STEEL COMPANY
EAST CHICAGO, INDIANA

Lead	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 601	0.11	0 20	0 09			
Outfall 614	1.13	2 89	1 76			
Outfall 618	4.20	2 16			2.04	
Total	5.44	5 25	1.85	2.04	2.04	0 19
Daily Maximum						
Outfall 601	0.34	0.60	0.26			
Outfall 614	3.38	8.62	5.24			
Outfall 618	12.59	6.48			6.11	
Total	16.31	15 70	5.50	6.05	6 11	0 61

Zinc	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 601	0.17	0.20	0.03			
Outfall 614	1.69	2.89	1.20			
Outfall 618	6.32	4.95			1.37	
Total	8.18	8.04	1.23	1.35	1.37	0 14
Daily Maximum						
Outfall 601	0.51	0.60	0.09			
Outfall 614	5.08	8.62	3.54			
Outfall 618	18.91	14.88			4.03	
Total	24.50	24.10	3.63	3.99	4.03	0 40

INLAND STEEL, EAST CHICAGO, IN

The NPDES permit issued to Inland Steel's East Chicago Works effective March 6, 1984 contains a trade involving three outfalls: 601, 614, and 618. The permit is still in administrative effect. The use of these outfalls at the time the permit was issued is described below.[14]

Descriptions of Outfalls Involved in Trading

Outfall 601

This internal outfall conveys treated effluent from the billet caster. After this point the effluent mixes with other treated wastewater and non-contact cooling water, and discharges through outfall 001.

Outfall 614

This internal outfall conveys treated effluent from the facility's number two basic oxygen furnace. This effluent is discharged through outfall 014 along with treated wastewaters from other production operations.

Outfall 618

This internal outfall conveys filtered blowdown from the wastewater recycle systems associated with the facility's number four basic oxygen furnace and number one slab caster. Effluent from this monitoring point is mixed with a large quantity of noncontact cooling water prior to discharge through outfall 018.

The Trade

The trade involves two pollutants, lead and zinc, and three outfalls, 601, 614, and 618. The 1984 permit sets monthly average and daily maximum lead and zinc limits for outfall 618 more stringently than required by the ELGs. The maximum allowable portion of the difference between this limit and the ELG limits is applied to the corresponding limits for outfalls 601 and 614, allowing them to be set above the ELG limits. The details of the trade are shown in Exhibit E-4.[15] Appendix G walks the reader through a sample trading calculation.

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[14] These descriptions are based on the 1984 permit fact sheet. The relevant portions of the fact sheet are contained in Attachment 1 to this report.

[15] This exhibit is based on 1984 permit fact sheet.

Effluent Limits Differences

For outfalls 601 and 614, the permit allows monthly average lead loadings above ELG limits (0.20 pounds vs. 0.11 pounds, and 2.89 pounds vs. 1.13 pounds, respectively). The corresponding limit for outfall 618 is 2.04 pounds per day below ELG limits (2.16 pounds vs. 4.20 pounds). Thus, the trade results in a net reduction of 0.19 pounds per day (5.25 pounds vs. 5.44 pounds) in the monthly average loading limit for lead. As the exhibit shows, the trade results in similar decreases in the daily maximum loading limit for lead, the monthly average loading limit for zinc, and the daily maximum loading limit for zinc.

Compliance Cost Differences

According to an official at Inland Steel's East Chicago Works, if the opportunity to trade had not been available, Inland Steel would have installed a small filtration plant at outfall 614.[16] The official estimated the cost of such a system as between $750,000 and $1.5 million (1993 dollars). Inland Steel estimates annual operation and maintenance costs as approximately 7.5 percent of capital costs, or $56,250 to $112,500 (1993 dollars). The treatment capital would have been installed in 1984, the year the permit was issued. Inland officials note that the increased limit trading allowed at outfall 601 did not prevent an increase in treatment cost, but simply provided a buffer for error.

Under the assumptions outlined in Appendix F, the present value through the end of 1993 of the additional treatment capital that might have been required at Inland Steel's Indiana Harbor Works in the absence of trading is $2.07 million (1993 dollars). In addition, the present value of the associated increase in operation and maintenance expenses through 1993 is estimated at $1.17 million (1993 dollars). Thus, the present value of all costs that Inland Steel would have incurred without the trade is estimated at $3.2 million (1993 dollars).

[16] Robert Johnston, Staff Engineer, Environmental, Health, and Safety.

LTV STEEL, INDIANA HARBOR, IN

The NPDES permit issued to LTV Steel's Indiana Harbor Works effective October 1, 1986 contains trades involving four outfalls: 101, 011, 111, and 211. This permit is still in administrative effect. The use of these outfalls at the time the permit was issued is described below.[17]

Descriptions of Outfalls Involved in Trading

Outfall 101

This internal outfall conveys treated effluent from cold rolling, pickling, hot-dip galvanizing, alkaline cleaning, tinning, and chromium electroplating operations. These wastewaters originate from two tin mills and one cold sheet mill.

Outfall 011

This outfall conveys treated effluent from the basic oxygen furnace (BOF), a blooming mill, a seamless mill, continuous casting operations, sintering and blast furnaces, miscellaneous shop and water treatment plant backwash, non-contact cooling water from the BOF, and stormwater.

Outfall 111

This internal outfall conveys effluent from the filtration plant associated with a hot strip mill.

Outfall 211

This internal outfall conveys effluent from the oily waste treatment plant associated with a cold sheet reduction mill.

The Trade

The use of trading at this facility is relatively complicated. As indicated in the descriptions above, several of the outfalls contain wastewater from either cold forming operations (which are not eligible for trading) or from operations whose effluent is governed by effluent guidelines other than the iron and steel guidelines (i.e., metal finishing). The trade involves only that portion of the effluent from each outfall that is eligible for trading under the iron and steel ELGs. Trading involves oil and grease at outfalls 101, 011, and 111, as well as lead and zinc at outfalls 101, 011, and 211. The details of the trade are shown in Exhibit E-5.[18] Appendix G walks the reader through a sample trading calculation.

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[17] These descriptions are based on information contained in the fact sheet prepared for the 1986 permit. A copy of the permit itself was not readily available. The relevant portions of the permit fact sheet are reproduced in Attachment 1 to this report.

[18] The exhibit is based on information in the fact sheet for the 1986 permit.

Effluent Limits Differences

As shown in the exhibit, daily maximum oil and grease limits for outfalls 101 and 011 are more stringent than required by the ELGs. A portion of the effluent reduction below the ELG limits is applied to allow effluent from outfall 111 to exceed the ELG limits for this parameter. In addition, monthly average and daily maximum lead and zinc limits for outfalls 101 and 211 are more stringent than required by the ELG limits. A portion of the reduction below the ELG limits is applied to allow effluent from outfall 011 to exceed the ELG limits for these parameters.

For example, the draft permit calculations show that daily maximum oil and grease limits for outfalls 101, 011, and 111 total 8,093 pounds per day, 237.9 pounds below total ELG limits of 8,330.9 pounds per day (7,081.9 pounds from wastewater eligible for trading and 1,249 pounds from ineligible wastewater). This trade is achieved because the combined effluent limits at outfalls 101 and 011 are below ELG limits by a greater amount than effluent limits at outfall 111 exceed ELG limits. As the exhibit shows, the combined 1986 permit limits for lead and zinc are also below the maximum allowed under the ELGs.

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits at all the outfalls. According to a company official, without the trade, LTV would need to install additional treatment facilities.[19] LTV was not able to provide an estimate of the capital and operation and maintenance costs that would have been associated with such facilities, and readily available information on plant operations at the time of permit issuance are insufficient to allow an engineering estimate to be made.

[19] John Etchison, Manager, Water, Corporate Environmental Control.

Exhibit E-5

EFFLUENT LIMITS (lbs/day)
LTV STEEL
INDIANA HARBOR WORKS, INDIANA

Oil and Grease		ELG Limits Less Non-Steel Wastewaters	ELG Limits for Non-Steel Wastewaters	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average								
	Outfall 101	NA		NA				
	Outfall 011	NA		NA				
	Outfall 111	NA		NA				
Total		NA		NA				
Daily Maximum								
	Outfall 101	993 1	1,248 0	1,248 0			993 1	
	Outfall 011	2,088 8		1,500 0			588 8	
	Outfall 111	3,999 0		5 344 0	1 345 0			
Total		7 081 9	1 248 0	6 093 0	1 345 0	1 546 7	1 582 9	237 9

Total Lead		ELG Limits Less Non-Steel Wastewaters	ELG Limits for Non-Steel Wastewaters	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average								
	Outfall 101	4 91	10 32	10 32			4 91	
	Outfall 011	5 28		10 19	4 91			
	Outfall 211	4 22		3 73			0 49	
Total		14 41	10 32	24 24	4 91	5 40	5 40	0 49
Daily Maximum								
	Outfall 101	14 70	16 57	16 57			14 70	
	Outfall 011	15 83		30 58	14 75			
	Outfall 211	12 67		11 19			1 48	
Total		43 20	16 57	58 34	14 75	16 23	16 18	1 43

Total Zinc		ELG Limits Less Non-Steel Wastewaters	ELG Limits for Non-Steel Wastewaters	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average								
	Outfall 101	4.89	35 55	35 55			4 89	
	Outfall 011	7 90		12 79	4 89			
	Outfall 211	4 70		4 21			0 49	
Total		17 49	35 55	52 55	4 89	5 38	5 38	0 49
Daily Maximum								
	Outfall 101	14 70	62.69	62.69			14 70	
	Outfall 011	23 75		38 45	14 70			
	Outfall 211	14 08		12.60			1 48	
Total		52.53	62.69	113 74	14 70	16 17	16 18	1 48

Exhibit E-6

EFFLUENT LIMITS (lbs/day)
REPUBLIC STEEL COMPANY
MASSILLON, OHIO

Total Suspended Solids	ELG Limits	Limits in 1983 Permit	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 004	1,036	1,318	282			
Outfall 603	604	280			324	
Total	1,640	1,598	282	324	324	42
Daily Maximum						
Outfall 004	2,760	3,462	702			
Outfall 603	1,372	550			822	
Total	4,132	4,012	702	807	822	120

Oil and Grease	ELG Limits	Limits in 1983 Permit	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 004	NA	NA				
Outfall 603	NA	NA				
Total	NA	NA				
Daily Maximum						
Outfall 004	691	882	191			
Outfall 603	580	213			367	
Total	1,271	1,095	191	219	367	176

REPUBLIC STEEL, MASSILLON, OH

The NPDES permit issued to Republic Steel's Massillon Ohio Works on August 22, 1983 contains a trade involving two outfalls: 004 and 603. This permit expired in 1988, and the follow-on permit did not contain the trade, apparently because the company had been reorganized and portions of the plant, including these two outfalls, had come under different ownership. The use of these outfalls at the time the permit was issued is described below.[20]

Descriptions of Outfalls Involved in Trading

Outfall 004

This outfall conveyed treated effluent from billet and bar mills, and a quenching unit. Discharge also included non-contact cooling water, surface water runoff, and ground water.

Outfall 603

This internal outfall conveyed treated effluent from several operations, including stainless steel cold rolling and pickling operations.

The Trade

The trade involved two pollutants, total suspended solids (TSS) and oil and grease, and two outfalls, 004 and 603. In the 1983 permit, monthly average and daily maximum TSS limits and daily maximum oil and grease limits for outfall 603 were more stringent than required by the effluent limitation guidelines (ELGs). A portion of the effluent reduction below the ELG limits was applied to outfall 004, allowing its effluent to exceed the ELG limits for these same parameters. Details of the trade are shown in Exhibit E-6.[21] Appendix G walks the reader through a sample trading calculation.

Effluent Limits Differences

As the exhibit shows, for outfall 004, the permit allowed monthly average TSS loadings 282 pounds per day above ELG limits (1,318 pounds vs. 1,036 pounds). At the same time, the TSS limit for outfall 603 was 324 pounds per day below ELG limits (280 pounds vs. 604 pounds). Thus the trade resulted in a net reduction of 42 pounds (1,598 pounds vs. 1,640 pounds) in the monthly average loading limit for TSS. The trade also resulted in a daily maximum loading limit for TSS 120 pounds below ELG limits, and a 176 pound decrease in the oil and grease maximum daily loading limit.

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[20] These descriptions are based on information in the August 22, 1983 permit. The relevant portion of the permit is reproduced in Attachment 1 to this report.

[21] Details of the trade are based on a letter prepared in 1982 laying out proposed final limits, in combination with the actual limits in the August 1983 permit. The relevant portion of these documents are reproduced in Attachment 1 to this report.

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits at outfall 004. According to a wastewater management engineer formerly with Republic Steel Corporation, in the absence of the trade the plant would have required a recycle system with deep bed filters for the hot mill operations.[22] He estimated the capital cost of such a system as between $3 million and $6 million dollars (1983 dollars). This official was not able to provide an estimate of operation and maintenance costs.

Under the assumptions outlined in Appendix F, the present value through the end of 1993 of the estimated capital cost for additional treatment that might have been required in the absence of trading is $10.3 million (1993 dollars). In addition, operation and maintenance expenses associated with this additional treatment would have been required for the years 1983 through 1988, when the permit allowing the trade was made void due to corporate reorganization. If operation and maintenance costs are estimated at 7.5 percent of capital costs, the present value of these increased operation and maintenance costs is $3.9 million (1993 dollars). Thus, the present value of the costs that Republic Steel would have incurred without the trade is estimated at $14.2 million (1993 dollars).

[22] Leonard Wisniewski, formerly of Republic Steel. Telephone conversation 3 December 1993.

ROUGE STEEL COMPANY, DEARBORN, MI

The NPDES permit issued to the Rouge Steel Company effective July 19, 1984 contained a trade involving two outfalls: 04B1 and 001. The trade is still in effect, and is included in the most recent permit, issued January 1, 1994. The use of these outfalls at the time the permit was issued is described below.[23]

Descriptions of Outfalls Involved in Trading

Outfall 04B1

This outfall conveys treated wastewater from Rouge Steel's blast furnace operations.

Outfall 001

This outfall conveys treated wastewater from hot mill, cold mill, and slab mill operations.

The Trade

The trade involves three pollutants, total suspended solids (TSS), lead, and zinc, and two outfalls, 04B1 and 001. In the 1994 permit, limits for TSS, lead, and zinc for outfall 001 are more stringent than required by the effluent limitation guidelines. A portion of the effluent reduction below the ELGs is applied to outfall 04B1, allowing limits for these three parameters to exceed the ELG limits. The details of the trade are shown in Exhibit E-7.[24] Appendix G walks the reader through a sample trading calculation.

Effluent Limits Differences

As the exhibit shows, for outfall 04B1, the permit allows monthly average TSS loadings 367 pounds per day above ELG limits (700 pounds vs. 333 pounds). At the same time, the corresponding TSS limit for outfall 001 is 422 pounds per day below ELG limits (5,419 pounds vs. 5,841 pounds). Thus, the combined monthly average limit for TSS at the two outfalls is 55 pounds (6,119 pounds vs. 6,174 pounds) below ELG limits. Similarly, the combined daily maximum limit for TSS at these outfalls is 60 pounds below ELG limits. In addition, combined monthly average and daily maximum loading limits for lead and for zinc for these two outfalls are below the ELG limits.

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[23] These descriptions are based on conversations with Lowell Potvin of Rouge Steel's Environmental Engineering Department, and on documents related to the trade provided by his office.

[24] This information is based on information contained in the January 1, 1994 permit and fact sheet. The relevant portions of these documents are included in Attachment 1 to this report.

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits at outfall 04B1. According to an official of Rouge Steel's Engineering and Environment Department, in the absence of the trade, Rouge Steel would most likely have added additional clarification and filtration to the existing treatment train associated with outfall 04B1.[25]

This official estimated the capital costs associated with such a system at $2 to $4 million (1993 dollars), and annual operation and maintenance costs for such a system at 7.5 percent of installed capital costs, or $150,000 to $300,000 (1993 dollars).

Under the assumptions outlined in Appendix F, the present value through the end of 1993 of the estimated cost of treatment capital that would have been required in the absence of trading is $5.5 million (1993 dollars). In addition, the present value of the operation and maintenance expenses through 1993 is estimated at $3.1 million (1993 dollars). Thus, the present value of the costs that Rouge Steel would have incurred without the trade is estimated at $8.6 million (1993 dollars).

[25] Lowell Potvin, Rouge Steel, Environmental Engineering Department.

Exhibit E-7

EFFLUENT LIMITS (lbs/day)
ROUGE STEEL
DEARBORN, MICHIGAN

Total Suspended Solids	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 04B1	333	700	367			
Outfall 001	5,841	5,419			422	
Total	6,174	6,119	367	422	422	55
Daily Maximum						
Outfall 04B1	1,001	1,400	399			
Outfall 001	15,301	14,842			459	
Total	16,302	16,242	399	459	459	60

Lead	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 04B1	1 12	2 40	1 28			
Outfall 001	7 61	6 20			1 41	
Total	8.73	8 60	1 28	1 41	1 41	0 13
Daily Maximum						
Outfall 04B1	3 37	7 20	3 83			
Outfall 001	22.87	18 66			4 22	
Total	26.24	25 86	3 83	4 22	4 22	0 38

Zinc	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (110 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 04B1	1.68	3 60	1 92			
Outfall 001	10.76	8 64			2.12	
Total	12.43	12 24	1 92	2.12	2 12	0 19
Daily Maximum						
Outfall 04B1	5.04	7 20	2 16			
Outfall 001	32.23	29 86			2.37	
Total	37 27	37.06	2.16	2.37	2.37	0.22

Exhibit E-8

EFFLUENT LIMITS (lbs/day)
US STEEL COMPANY
CLAIRTON, PENNSYLVANIA

Total Suspended Solids	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfall 102	352	600	248			
Outfall 120	6,245	1,876			4,369	
Total	6,597	2,476	248	285	4,369	4,121
Daily Maximum						
Outfall 102	938	1,100	162			
Outfall 120	12,061	5,628			6,433	
Total	12,999	6,728	162	186	6,433	6,271

UNITED STATES STEEL, CLAIRTON, PA

The NPDES permit issued to U.S. Steel's Clairton Works effective March 9, 1984 contained a trade involving two outfalls: 102 and 120. The trade was not included in the follow-on September 29, 1989 permit because one of the outfalls (outfall 102) was no longer in use. The use of these outfalls at the time the permit was issued is described below.[26]

Descriptions of Outfalls Involved in Trading

Outfall 102

This internal outfall conveyed treated wastewater from rolling mills.

Outfall 120

This internal outfall conveyed treated wastewater from coking operations, and other miscellaneous wastes.[27]

The Trade

The trade involved one pollutant, total suspended solids (TSS), and two outfalls, 102 and 120. In the 1984 permit, limits for TSS at outfall 120 were more stringent than required by the effluent limitation guidelines (ELGs). A portion of the effluent reduction below the ELG limits was applied to outfall 102, allowing its effluent to exceed the ELG limits for TSS. The details of the trade are shown in Exhibit E-8.[28] Appendix G walks the reader through a sample trading calculation.

Effluent Limits Differences

As the exhibit shows, for outfall 102 the permit allowed monthly average TSS loadings 248 pounds per day above ELG limits (600 pounds vs. 352 pounds). At the same time, the TSS limit for outfall 120 was 4,369 pounds per day below ELG limits (1,876 pounds vs. 6,245 pounds). Thus the combined monthly average TSS loading limit for the two outfalls was 4,121 pounds (2,476 pounds vs. 6,597 pounds) below ELG limits. Similarly, the combined daily maximum loading limit for TSS at these two outfalls was 6,271 pounds below the maximum allowed under the ELG.

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[26] These descriptions are based on information from the 1984 permit and fact sheet, and from calculations provided with the fact sheet. The relevant portions of the permit and fact sheet are contained in Attachment 1 to this report.

[27] Note that this outfall is included in the trade despite the explicit exclusion from trading of outfalls associated with coking operations. No explanation is provided in available documentation.

[28] This exhibit is based on information from the fact sheet and calculations associated with the 1984 permit.

Compliance Cost Differences

If the option to trade had not been available, the Clairton plant would have had to meet ELG limits at outfall 102. According to an official of U.S. Steel's Environmental Affairs Department, in the absence of the trade U.S. Steel would have had to expand the existing treatment for the rolling mill wastewaters associated with outfall 102.[29] This would have included additional cooling, clarification, and recycle facilities, as well as chemical treatment, clarification, and filtration on the recycle system blowdown stream. In 1981, the capital cost of such a system was estimated at $3.5 million (1981 dollars). No definitive estimate of operation and maintenance costs is available. However, the official noted that U.S. Steel generally estimates operation and maintenance costs at fifteen percent of installed capital costs, or $525,000 (1981 dollars).

Under the assumptions outlined in the Appendix F, the present value through the end of 1993 of the additional treatment capital that would have been required at U.S. Steel's Clairton Works in the absence of trading is $8.9 million (1993 dollars). In addition, increased operation and maintenance expenses would have been required for the years 1984 through 1989, when the permit allowing the trade expired. The present value of these operation and maintenance costs is $6.8 million (1993 dollars). Thus, the present value of all costs that U.S. Steel would have incurred without the trade is estimated at $15.7 million (1993 dollars).

[29] Gary Cason, U.S. Steel, Environmental Affairs Department.

UNITED STATES STEEL, GARY, IN

The NPDES permit issued to U.S. Steel's Gary Works effective June 1, 1983 contains a trade involving three outfalls: 028, 030, and 605. This permit is still in administrative effect. The use of these outfalls at the time the permit was issued is described below.[30]

Descriptions of Outfalls Involved in Trading

Outfalls 028 and 030

These outfalls convey the effluent from three terminal lagoons to the Grand Calumet River. At the time of permit issuance, roughly 36 percent of the treated lagoon wastewater discharged from outfall 028; the remainder discharged from outfall 030. The influent to the lagoons is contact cooling water from hot forming mills, treated gas cleaning process wastewater from two basic oxygen process shops, and non-contact cooling water from foundry open hearth furnaces. In addition, the lagoons were scheduled to receive treated slab cooling water from a continuous caster recycle system once the permit took effect. The terminal lagoons allow settling of these wastewaters prior to discharge from outfalls 028 and 030. The permit specifies limits for the combined effluent from these two outfalls. Shortly after the permit was issued, the flow from outfalls 028 and 030 was substantially reduced due to the permanent closure of many of the hot forming mills and the foundry.

Outfall 605

This internal outfall conveys treated wastewater associated with the coolant water recycle system for an 84-inch hot strip mill.

The Trade

The trade involves two pollutants, total suspended solids (TSS) and oil and grease, and three outfalls, 028 and 030 (combined) and 605. In the permit, monthly average TSS limits and daily maximum oil and grease limits for outfall 605 are more stringent than required by the effluent limitation guidelines (ELGs). A portion of the effluent reduction below the ELG limits is applied to the corresponding limits for outfalls 028 and 030, allowing their combined effluent to exceed the ELG limits for these parameters. The calculations of effluent limits for the outfalls involved in the trade are shown in Exhibit E-9.[31] Appendix G walks the reader through a sample trading calculation.

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[30] These descriptions are based on the fact sheet for the 1983 permit. The relevant portions of the fact sheet are reproduced in Attachment 1 to this report.

[31] Details of the trade are based on the fact sheet for the 1983 permit. The relevant portions are reproduced in Attachment 1 to this report.

Effluent Limits Differences

As the exhibit shows, for the combined effluent from outfalls 028 and 030, the permit allows monthly average TSS loadings 1,766 pounds per day above ELG limits (10,842 pounds vs. 9,076 pounds). At the same time, the daily maximum TSS limit for outfall 605 is 4,341 pounds per day below ELG limits (725 pounds vs. 5,066 pounds). Thus, there is a net reduction of 2,575 pounds (11,567 pounds vs. 14,142 pounds) in the monthly average limit for total suspended solids. As the exhibit shows, trading also enables an 823 pound decrease in the oil and grease maximum daily limit.[32]

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits at outfalls 028 and 030. In the absence of the trade, U.S. Steel would most likely have installed a process water recycle system, and a treatment system for the blowdown water from that system.[33] In 1982, the cost of this equipment was estimated by U.S. Steel as approximately $22 million (1982 dollars). In addition, annual operation and maintenance costs associated with such a treatment system were estimated by U.S. Steel as five to ten percent of capital costs, or $1.1 to $2.2 million (1982 dollars).

Under the assumptions outlined in Appendix F, the present value through the end of 1993 of the additional treatment capital that would have been required at U.S. Steel's Gary Works in the absence of trading is $57.7 million (1993 dollars). In addition, associated operation and maintenance expenses would also have been required. As indicated previously, many of the facilities associated with these outfalls shut down over the period 1983-1985. Therefore, operation and maintenance costs associated with the treatment system would have been incurred only for those three years, 1983 through 1985. The present value of this expense is estimated at $12.1 million (1993 dollars). Thus, the present value of the costs that U.S. Steel would have incurred without the trade allowed in the 1983 permit is estimated at $69.8 million (1993 dollars).

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[32] The daily maximum TSS limits were reduced below ELGs for all three outfalls. Thus these reductions are not considered attributable to trading.

[33] Victor Nordlund, U.S. Steel Gary Works.

Exhibit E-9

EFFLUENT LIMITS (lbs/day)
US STEEL COMPANY
GARY, INDIANA

Total Suspended Solids	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfalls 028,030	9,076	10,842	1,766			
Outfall 605	5,066	725			4,341	
Total	14,142	11,567	1,766	2,031	4,341	2,575
Daily Maximum						
Outfalls 028,030	24,655	22,800			1,855	
Outfall 605	13,520	2,175			11,345	
Total	38,175	24,975	0	0	13,200	13,200

Oil and Grease	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfalls 028,030	NA	NA				
Outfall 605	NA	NA				
Total	NA	NA				
Daily Maximum						
Outfalls 028,030	5,345	6,460	1,115			
Outfall 605	3,388	1,450			1,938	
Total	8,733	7,910	1,115	1,282	1,938	823

Exhibit E-10

EFFLUENT LIMITS (lbs/day)
US STEEL COMPANY
HOMESTEAD, PENNSYLVANIA

Total Suspended Solids	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfalls 088(+115)	5,747	200			5,547	
Outfall 010	1,800	4,210	2,410			
Total	7,547	4,410	2,410	2,772	5,547	3,137
Daily Maximum						
Outfalls 088(+115)	11,703	500			11,203	
Outfall 010	4,795	7,450	2,655			
Total	16,498	7,950	2,655	3,053	11,203	8,548

Oil and Grease	ELG Limits	Modified Effluent Limitations	Actual Increase in Limit	Minimum Required Reduction in Limit (115 percent)	Actual Limit Reduction	Reduction in Permitted Discharge
30-Day Average						
Outfalls 088(+115)	NA	NA				
Outfall 010	NA	NA				
Total	NA	NA				
Daily Maximum						
Outfalls 088(+115)	4,386	75			4,311	
Outfall 010	1,200	2,060	860			
Total	5,586	2,135	860	989	4,311	3,451

UNITED STATES STEEL, HOMESTEAD, PA

The NPDES permit issued to U.S. Steel's Homestead Works effective March 9, 1984 contained a trade involving three outfalls: 008, 010, and 115. The trade was in place until the facility closed in the mid-1980s. The use of these outfalls at the time the permit was issued is described below.[34]

Descriptions of Outfalls Involved in Trading

Outfall 008

This outfall conveyed treated wastewater from slab and plate mills, and a plate heat treatment line. In the permit, limits are set for the combined effluent from outfall 008 and outfall 115.

Outfall 010

This outfall conveyed treated wastewater from structural and slab mills.

Outfall 115

This internal outfall conveyed treated wastewater from a plate heat treatment line. In the permit, limits are set for the combined effluent from outfall 008 and outfall 115.

The Trade

The trade involved two pollutants, total suspended solids (TSS) and oil and grease, and three outfalls, 008 and 115 (combined) and 010. In the 1984 permit, the limits for TSS and oil and grease set for the combined effluent from outfalls 008 and 115 were more stringent than required by the effluent limitation guidelines (ELGs). A portion of the effluent reduction below the ELGs was applied to outfall 010, allowing its effluent to exceed the ELG limits for TSS and oil and grease. The details of the trade are shown in Exhibit 10.[35] Appendix G walks the reader through a sample trading calculation.

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[34] These descriptions are based on information from the 1984 permit and fact sheet, and from calculations provided with the fact sheet. The relevant portions of the permit and fact sheet are contained in Attachment 1 to this report.

[35] The exhibit is based on information from the 1984 permit, fact sheet, and calculations.

Effluent Limits Differences

As the exhibit shows, for outfall 010, the permit allows monthly average TSS loadings 2,410 pounds per day above ELG limits (4,210 pounds vs. 1,800 pounds). At the same time, the monthly average TSS limit for the combined effluent from outfalls 008 and 115 is 5,547 pounds per day below ELG limits (200 pounds vs. 5,747 pounds). Thus, the 30-day average loading limit for total suspended solids is 3,137 pounds (4,410 pounds vs. 7,547 pounds) below ELG limits. In addition, the daily maximum loading limit for total suspended solids is 8,548 pounds below the maximum allowed under the ELG, and the daily maximum loading limit for oil and grease is 3,451 pounds below the ELG maximum.

Compliance Cost Differences

If the option to trade had not been available, the plant would have had to meet ELG limits at outfall 010. According to officials in U.S. Steel's Environmental Affairs Department, in the absence of the trade, U.S. Steel would most likely have expanded the existing treatment system in a manner similar to that envisioned at U.S. Steel's Clairton Works.[36] This would have included additional cooling, clarification, and recycle facilities. Due to the unavailability of documentation related to this long-closed facility, officials were not able to provide an estimate of the capital and operation and maintenance costs that would have been associated with such a system. Readily available information on plant operations at the time of permit issuance is insufficient to allow an engineering estimate to be made.

[36] Gary Cason, U.S. Steel, Environmental Affairs Department.

Appendix F

CALCULATION OF REDUCED TREATMENT COSTS DUE TO INTRA-PLANT TRADING

INTRODUCTION

As noted in the main body of the report, the present value of the reduction in treatment costs associated with intra-plant trading is estimated at $122.7 million for the seven facilities for which cost information was obtained. Permits incorporating trading are still in place at five of these facilities.[1] This appendix presents an explanation of how these costs are calculated.

IDENTIFICATION OF TREATMENT TECHNOLOGY USED IN ABSENCE OF INTRA-PLANT TRADING

The treatment technology that would have been used in the absence of trading was identified by interviewing facility environmental managers or other officials associated with the plants at the time permits containing trades were issued. These officials were also asked to provide estimates of the capital costs and operation and maintenance costs associated with the treatment technology. As described in the detailed writeups in Appendix E, treatment technologies were identified for most of the facilities, and cost estimates were provided for seven facilities. Three of the seven cost estimates were based on analysis carried out at the time of the trade (Bethlehem Sparrows Point, U.S. Steel Clairton and U.S. Steel Gary). The remaining costs were estimated by managers based on their knowledge of plant operations and understanding of treatment costs. Some of the cost estimates were provided as ranges of costs. Operation and maintenance (O&M) costs were estimated as a percentage (or percentage range) of capital costs. Exhibit F-1 presents the capital and O&M cost estimates provided by the plant officials, as well as the base year for these cost estimates.[2]

To provide a single point estimate of cost for each facility, the midpoint of each capital cost range was employed. Similarly, the midpoint of each O&M percent range was applied to estimate annual O&M costs. These values are used in the calculation of present value, presented in Exhibit F-2. The other calculations in this table are discussed below.

UPDATING COSTS TO 1993

The *Engineering News-Record* Construction Cost Index (ENR CCI) was used to update treatment capital costs to 1993 dollars.[3] This standard construction index is available for twenty cities. The calculations employ the index for the city nearest each facility; these cities are identified in Exhibit F-2. For all cost estimates given in pre-1993 dollars, the index for December of the base year was used. For 1993, the March index was used (the most recent available). Annual O&M costs were derived using 1993 treatment capital costs as the base.

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[1] For the other three plants that have had trades, one of which is still in effect, no cost information was obtained.

[2] The base year of the cost estimate does not necessarily correspond to the year in which the trade first took effect. The base year simply indicates whether the initial cost estimate is expressed in 1993 dollars or in values for some prior year. If the latter is the case, the initial cost estimate must be adjusted to account for inflation. This adjustment is described below.

[3] *Engineering News-Record*, March 29, 1993, pp. 34-39.

CALCULATING PRESENT VALUE THROUGH 1993

To calculate the present value of cost reductions through the end of 1993, the following assumptions were made:

- treatment capital is assigned no salvage value; and
- a seven percent real discount rate is used to calculate present values.[4]

The present value of capital costs is calculated from the year trading was implemented.[5] The present value of O&M costs is calculated by adding together the present value of each year's O&M expenditures.[6] These two figures are added together to arrive at the present value of total averted expenditures through the end of 1993.

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[4] This is consistent with guidance from the U.S. Office of Management and Budget. See: U.S. Office of Management and Budget, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs," Circular A-94, October 29, 1992.

[5] This method – as opposed to calculating present values from the date each permit was issued – is a simplification that reflects the uncertain timing of any additional investment in treatment capital that would have been needed in the absence of trading. If it would have been necessary to make such an investment prior to the year in which the trade first took effect, this assumption will understate the present value of reductions in treatment costs due to trading. Conversely, if such an investment would have been delayed until a subsequent year, this assumption will overstate the present value of reductions in treatment costs. In light of these considerable uncertainties, a more precise characterization of each trade's "start date" is unwarranted.

[6] An entire year of O&M costs is assessed for each year the trade was in effect, as detailed at the bottom of Exhibit F-2. This approach is consistent with the treatment of capital costs explained above.

Exhibit F-1

ESTIMATES OF REDUCTION IN TREATMENT COSTS DUE TO TRADING

Plant	Reduced Capital Expenditures	Base Year for Cost Estimate	Annual O&M Expenditure
Armco Steel Middletown, OH	$2,000,000	1993	5 to 10 percent of capital cost
Babcock and Wilcox Beaver Falls, PA	NA	NA	NA
Bethlehem Steel Sparrows Point, MD	more than ½ but less than ¾ of $2.1 million	1983	15 percent of capital cost
Inland Steel East Chicago, IN	$750,000 to $1.5 million	1993	5 to 10 percent of capital cost
LTV Steel Indiana Harbor, IN	NA	NA	NA
Republic Steel Massillon, OH	$3 million to $6 million	1983	7½ percent of capital cost
Rouge Steel Dearborn, MI	$2 million to $4 million	1984	7½ percent of capital cost
U.S. Steel Clairton, PA	$3.5 million	1981	15 percent of capital cost
U.S. Steel Gary, IN	$22 million	1982	5 to 10 percent of capital cost
U.S. Steel Homestead, PA	NA	NA	NA

Exhibit F-2

CALCULATION OF PRESENT VALUE OF REDUCTION IN TREATMENT COSTS DUE TO INTRA-PLANT TRADING

Plant Name	Plant Location	Capital Expenditure Reduction Due to Trade	First Year of Trade	Base Year for Dollars	City for ENR CCI	ENR CCI Base Year	ENR CCI 1993	Capital Expenditure Reduction in 1993$	Present Value of Reduced Capital Expenditures Through 1993	Annual O&M Expenditure Reduction in 1993$	Present Value of Annual O&M Expenditures Reduction Through 1993	Present Value of Total Expenditure Reduction Through 1993	Notes
Armco Steel	Middletown, OH	$2,000,000	1983	1993	Cincinnati	5,277	5,277	$2,000,000	$3,934,303	$150,000	$2,367,540	$6,301,843	
Babcock and Wilcox	Beaver Falls, PA	NA										NA	Trade ended 1988
Bethlehem Steel	Sparrows Point, MD	$1,050,000	1985	1993	Baltimore	3,107	4,088	$1,374,676	$2,361,949	$208,201	$2,469,878	$4,831,827	
Inland Steel	East Chicago, IN	$1,125,000	1984	1993	Chicago	5,644	5,644	$1,125,000	$2,056,257	$84,375	$1,165,763	$3,234 029	
LTV Steel	Indiana Harbor, IN	NA										NA	
Republic Steel	Massillon, OH	$4,500,000	1983	1993	Cleveland	4,847	5,843	$5,236,534	$10,304,690	$392,890	$3,941,811	$14,246,501	Trade ended 8/19/88
Rouge Steel	Dearborn, MI	$3,000,000	1984	1993	Detroit	5,441	5,441	$3,000,000	$5,515,376	$225,000	$3,108,701	$8,624,078	
U S Steel	Clairton, PA	$3,500,000	1984	1991	Pittsburgh	3,663	5,044	$4,832,007	$8,583,446	$724,801	$8,766,101	$15 679,549	Trade ended by 6/28/89
U S Steel	Gary, IN	$22,000,000	1983	1982	Chicago	4,236	5,644	$29,313,285	$57,663,666	$2,166,499	$12,144,047	$69,807,715	Trade ended 1985 Permit still in effect
U S Steel	Homestead, PA	NA										NA	Plant closed in mid 1980s
Totals									$90,732,002		$31,983,841	$122,725,843	

	Armco Steel Middletown	Bethlehem Sparrows Pt	Inland Steel Ind Harbor	Republic Massillon	Rouge Steel Dearborn	U S Steel Clairton, PA	U S Steel Gary, IN
	O&M	O&M	O&M	O&M	O&M	O&M	O&M
1993	$295,073	$0	$0	$772,874	$0	$0	$4,324,775
1994	$275,769	$0	$155,120	$722,312	$413,653	$1,332,517	$4,041,848
1995	$257,728	$364,292	$144,972	$675,056	$386,592	$1,245,343	$3,777,428
1996	$240,867	$331,114	$135,485	$630,896	$361,301	$1,163,872	$0
1997	$225,110	$309,453	$126,624	$589,622	$337,664	$1,087,731	$0
1998	$210,383	$289,208	$118,340	$551,048	$315,574	$1,016,571	$0
1999	$196,619	$270,286	$110,595	$0	$294,929	$950,066	$0
2000	$183,756	$252,608	$103,365	$0	$275,635	$0	$0
2001	$171,735	$236,060	$96,601	$0	$257,603	$0	$0
2002	$160,500	$220,635	$90,281	$0	$240,750	$0	$0
2003	$150,000	$206,201	$84,375	$0	$225,000	$0	$0

Appendix G

CALCULATION OF PERMIT LIMITS IN INTRA-PLANT TRADING

Intra-plant trading requires that the net discharge of traded pollutants be less than the discharge allowed without the trade. For trades involving total suspended solids or oil and grease, the reduction in net discharge must be approximately 15 percent; for trades involving any other pollutants, the reduction must be approximately 10 percent. This appendix walks the reader through the calculation of such a reduction.

As a simple example, assume a plant has two outfalls, outfall A and outfall B. Furthermore, assume that the effluent limitation guidelines (ELG) daily maximum limit for total suspended solids (TSS) on outfall A is 1,000 pounds, and the corresponding limit on outfall B is 2,000 pounds. Using intra-plant trading, the discharger might propose to increase the limit on Outfall A to 1,100 pounds, exceeding the ELG limit by 100 pounds. In order to do so, the discharger must reduce TSS at outfall B by 15 percent more than the limit at outfall A is increased, or by 115 pounds. Thus, the new limit at outfall B would be 1,885 pounds (2,000 pounds - 115 pounds). Without trading, the maximum TSS loading permitted from these two outfalls would have been 3,000 pounds. Using trading, the maximum loading would be 2,985 pounds (1,100 pounds + 1,885 pounds), a net limit reduction of 15 pounds (3,000 pounds - 2,985 pounds). This is illustrated in Exhibit G-1.

Exhibit G-1

SAMPLE CALCULATION OF PERMIT LIMITS USING INTRA-PLANT TRADING INVOLVING TWO OUTFALLS
(Pounds per Day)

Outfall	ELG Limits	Limits Using Intra-Plant Trading	Actual Increase in Limit	Minimum Required Reduction in Limit	Actual Reduction in Limit	Reduction in Permitted Discharge
Outfall A	1,000	1,100	100			
Outfall B	2,000	1,885			115	
Total	3,000	2,985	100	115	115	15

A more complicated trade, involving five outfalls, is illustrated in Exhibit G-2. This trade is more typical of the actual trades described in Appendix E. In this example, the limits at three of the outfalls (C, D, and G) are increased above the ELG limits by a total of 1,000 pounds. In order to meet the net reduction requirement, the minimum reduction in other limits must total 15 percent more than this, or 1,150 pounds (1,000 * 1.15=1,150). Limits at outfalls E and F are reduced below ELG limits by a total of 2,000 pounds, more than the minimum 1,150 required. The final column in the exhibit records the total reduction in permitted discharge from these outfalls – 1,000 pounds (19,000 - 18,000). The exhibits in Appendix E follow this general format, although some are complicated by the removal of wastewaters not eligible for trading.

Exhibit G-2

SAMPLE CALCULATION OF PERMIT LIMITS USING INTRA-PLANT TRADING INVOLVING FIVE OUTFALLS
(Pounds per Day)

Outfall	ELG Limits	Limits Using Intra-Plant Trading	Actual Increase in Limit	Minimum Required Reduction in Limit	Actual Reduction in Limit	Reduction in Permitted Discharge
Outfall C	5,000	5,300	300			
Outfall D	3,000	3,400	400			
Outfall E	2,000	1,500			500	
Outfall F	8,000	6,500			1,500	
Outfall G	1,000	1,300	300			
Total	19,000	18,000	1,000	1,150	2,000	1,000

Appendix H

FEDERAL REGISTER NOTICE ANNOUNCING EPA'S EFFLUENT GUIDELINES PLAN

ENVIRONMENTAL PROTECTION AGENCY

[FRL-4196-6]

RIN 2040-AA90

Effluent Guidelines Plan

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of effluent guidelines plan.

SUMMARY: This notice announces the Agency's plan for developing new and revised effluent guidelines, which regulate industrial discharges to surface waters and publicly owned treatment works (POTWs). Section 304(m) of the Clean Water Act requires EPA to publish a biennial Effluent Guidelines Plan.

EFFECTIVE DATE: October 8, 1992.

ADDRESSES: The public record for this notice is available for review in EPA's Headquarters Library, room M2404, 401 M Street SW., Washington, DC. The EPA public information regulation (40 CFR part 2) provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Eric Strassler, Engineering and Analysis Division (WH-552), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, telephone 202-260-7150.

SUPPLEMENTARY INFORMATION:

I. Legal Authority

This notice is published under the authority of section 304(m) of the Clean Water Act, 33 U.S.C. 1314(m).

II. Introduction

A. Purpose of Today's Notice

Today's notice announces the Agency's second biennial Effluent Guidelines Plan for developing new and revised effluent guidelines pursuant to section 304(m) of the Clean Water Act (CWA).

EPA proposed this plan on May 7, 1992 (57 FR 19748)("Proposed Plan"). The Agency invited comment on the notice until June 8, 1992. Today's notice summarizes and addresses the major comments the Agency received.

B. Overview of Today's Notice

The Agency intends to develop effluent limitation guidelines and standards ("effluent guidelines") as follows:

1. Continue development of the nine ongoing rules: Pulp, Paper and Paperboard; Pesticide Chemicals (Manufacturing); Pesticide Chemicals (Formulating and Packaging); Offshore Oil and Gas Extraction; Coastal Oil and Gas Extraction; Organic Chemicals, Plastics and Synthetic Fibers (Remand); Waste Treatment; Pharmaceutical Manufacturing; and Metal Products and Machinery, Phase 1.

2. Develop effluent guidelines for each of the following point source categories: Waste Treatment, Phase 2; Industrial Laundries; Transportation Equipment Cleaning; and Metal Products and Machinery, Phase 2.

3. Begin approximately two preliminary studies of particular point source categories each year. Each preliminary study will generally take approximately two years to complete.

4. Start development of additional guidelines (either new or revised). Point source categories will be identified in future biennial Effluent Guidelines Plans. Eight rules would be begun on a staggered basis during the years 1996 to 1999 with final action between 2000 and 2003.

These actions are identical to those described in the Proposed Plan.

III. 1992 Proposed Effluent Guidelines Plan

In the Proposed Plan, EPA described its intent to continue development of 9 ongoing rulemakings, develop 12 new rules over an 11 year period, and conduct 11 preliminary studies over a 6 year period. The Proposed Plan set forth EPA's rationale for the selection of particular new or revised effluent guidelines. The Proposed Plan also described the relevant statutory framework, the components and process for development of an effluent guidelines regulation, and other background information. The principal elements of the Proposed Plan were designed to implement sec. 304(m) and a consent decree in *Natural Resources Defense Council et al.* v. *Reilly* (D.D.C. 89-2980, January 31, 1992)(the "Consent Decree"). See 57 FR 19750-19755.

IV. 1992 Effluent Guidelines Plan

EPA's 1992 Effluent Guidelines Plan is set forth below. Today's Plan is substantively identical to the Proposed Plan. As noted above, the basis for selection of the industries identified in today's Plan is described in the Proposed Plan. This plan is based on funding levels proposed by the President's Budget for fiscal year 1993. If these levels cannot be achieved EPA will have to evaluate the impact on t' Plan's schedules.

A. Regulations

1. Ongoing Rulemakings

EPA is currently in the process of developing new or revised effluent guidelines for nine categories. These rulemakings will proceed as previously described in the Proposed Plan. The current schedules for these rules are set forth in Table 1.

TABLE 1.—EFFLUENT GUIDELINES CURRENTLY UNDER DEVELOPMENT

Category	Proposal	Final action
Offshore Oil and Gas Extraction [1]	11/28/90 & 3/13/91	1/93
Organic Chemicals, Plastics and Synthetic Fibers (Remand issues)	12/6/91	5/93
Pesticide Chemicals (Manufacturing)	4/10/92	7/93
Pulp, Paper and Paperboard [2]	10/93	8/95
Pesticide Chemicals (Formulating and Packaging)	1/94	8/95
Waste Treatment (Phase 1)	4/94	1/95
Pharmaceutical Manufacturing	8/94	2/95
Metal Products and Machinery (Phase 1)	11/94	8
Coastal Oil and Gas Extraction	1/95	7/

[1] The Offshore Oil and Gas Extraction rulemaking is not covered under the January 31, 1992 C Decree. The deadline is required by a Consent Decree in *NRDC v. Reilly* (D.D.C. No. 79-3442).

[2] The Pulp, Paper and paperboard rulemaking is not covered under the January 31, 1 C Decree. Deadlines are required by a Consent Decree in *Environmental Defense Fund et al. v. T* (D.D.C. No. 85-0973).

federal register

Tuesday
September 8, 1992

Part V

Environmental Protection Agency

Effluent Guidelines Plan; Notice

2. New Rulemakings

EPA intends to develop 12 new effluent guidelines over an 11 year period. Four of the rules are specified; the remaining eight rules will be specified in future Effluent Guidelines Plans. This schedule for developing the guidelines is set forth in Table 2, and is identical to the schedule in the Proposed Plan.

TABLE 2.—NEW CATEGORIES TO BE REGULATED

Category	Proposal	Final action
Waste Treatment, Phase 2	1996	1997
Industrial Laundries	1998	1998
Transportation Equipment Cleaning	1998	1998
Metal Products and Machinery, Phase 2	1997	1999
Eight additional categories	1998–2001	2000–2003

EPA will include any updates to these schedules in the semi-annual Regulatory Agenda published in the Federal Register.

B. Preliminary Studies

In the Proposed Plan EPA announced that it intended to conduct 11 preliminary studies, which will assist the Agency in selecting industries for the eight remaining rules discussed in Section IV.A.2 above (see 57 FR 19752, 19755).

The Agency is proceeding as proposed with studies for the Metal Finishing Category (40 CFR part 433) and the Petroleum Refining Category (40 CFR part 419). These studies are underway and are scheduled to be completed by the end of 1993. The findings will be published in Preliminary Data Summaries, and will be considered in preparation of the 1994 Effluent Guidelines Plan.

EPA intends to conduct nine additional studies. Six industries (all of which are currently subject to effluent guidelines) were tentatively identified in the Proposed Plan as the subject of future studies, with two studies to begin in each of 1993, 1994 and 1995. These are Iron and Steel Manufacturing (40 CFR part 420), Inorganic Chemicals (40 CFR part 415), Leather Tanning and Finishing (40 CFR part 425), Coal Mining (40 CFR part 434), Onshore/Stripper Oil and Gas Extraction (40 CFR part 435), and Textile Mills (40 CFR part 410). The Agency intends to study three additional categories, not yet identified, beginning in 1997. Other industries, identified through review of new information made available to the Agency, may be studied. Each Preliminary Study would take approximately two years to complete. Updated information on industry studies will be included in the next biennial Effluent Guidelines Plan.

C. Summary of Changes from Proposed Plan

Today's Effluent Guidelines Plan is substantively identical to the Proposed Plan. However, some clarifications are provided below in response to several comments the Agency received on the proposal.

V. Public Comments

The public comment period for the Proposed Plan closed on June 8, 1992. The Agency received comments that covered approximately 12 topics from 10 commenters, including industries, local governments (POTWs), and an environmental group. EPA also considered seven comment letters received after publication of the January 2, 1990 Effluent Guidelines Plan (55 FR 80). The summary is in this section highlights the more significant comments submitted. The administrative record for today's notice includes a complete text of the comments and the Agency's responses.

A. Metal Products and Machinery Category

Two POTWs expressed reservations about the feasibility of regulating the Metal Products and Machinery (MP&M) Category. They were concerned that implementing categorical standards for a large number of MP&M facilities in a local pretreatment program would be overly burdensome to POTWs and hinder their ability to effectively run their programs. While they did not disagree with EPA's assertions that the overall MP&M category is a significant source of toxic and nonconventional pollutants, they believed that attention should be focused on the larger facilities in the category.

EPA's Proposed Plan included a brief working description of the MP&M category. This working description is subject to change, pending collection and analysis of additional data, prior to promulgation of an effluent guideline for this category. The description in the Proposed Plan included an estimate of 970,000 facilities in the category nationwide. This figure was derived from mailing lists that EPA purchased for the purpose of sending survey questionnaires to a statistical sample of the industry.

The Agency has administered questionnaires focused primarily on MP&M Phase 1 facilities and is now analyzing the surveys along with other information it is gathering on the industry. Preliminary assessments of the Phase 1 survey information indicate that the overall size of the MP&M category is significantly smaller than the initial estimate of 970,000 facilities. The Phase 1 survey responses indicate that the information sources used to compile the Agency's mailing list included sites without manufacturing activities such as sales offices, warehouses, and company headquarters. EPA currently projects that there are 80,000 active Phase 1 sites rather than the initial estimate of 195,000. If similar trends are observed in the planned Phase 2 survey, then the number of Phase 2 sites would be projected to be about 318,000 instead of the initial estimate of 775,000.

The Notices of Proposed Rulemaking and accompanying Development Documents will provide a fuller description of the category. EPA believes that when the MP&M rules (Phases 1 and 2) are proposed, there will be a clearer and smaller estimate of the category size, and an acceptable balance between addressing serious pollutant discharges and maintaining a manageable compliance and enforcement workload at POTWs.

B. Basis for Conducting Preliminary Studies

Four industry associations questioned the need for conducting preliminary studies of existing effluent guidelines affecting their industries—Coal Mining, Iron and Steel Manufacturing, and Leather Tanning and Finishing. In the case of the Coal Mining Category, the commenter argued that in general the industry does not discharge toxic or nonconventional pollutants and that current pollutant discharges are at low concentrations (which are too small to be effectively reduced by additional treatment technology). Regarding the Iron and Steel and Leather Tanning and Finishing Categories, the commenters stated that the existing regulations were adequately protective of human health and the environment.

EPA conducted a brief review of documents supporting the existing Coal Mining effluent guidelines and estimated that high loadings of metal pollutants continue to be discharged by the category, after application of BAT-level (best available technology) limitations. These pollutants are predominantly inorganic: Antimony, arsenic, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc; as well as phenol. While the Agency agrees with the commenter that these pollutants tend to be found in low concentrations in mine discharges, the nationwide pollutant

estimates are large because of the large number of mines (estimated in the thousands).

The Agency estimated that the other two categories also continue to discharge high levels of pollutants on a nationwide basis, after application of BAT-level limitations. The Iron and Steel Manufacturing Category discharges include antimony, arsenic, copper, selenium, benzene, phenol, sulfide, and fluoride. The Leather Tanning and Finishing Category discharges lead, zinc, and toxic organic pollutants.

EPA's studies of the existing regulations will likely include a review of existing wastewater characteristics and technologies (including source reduction, recycling and treatment techniques). A decision to study an industry does not mean that EPA has decided to proceed with a rulemaking for that industry.

C. Overall Effluent Guidelines Plan

One commenter recommended that any further work on effluent guidelines be postponed and that EPA's water quality efforts should be directed primarily at nonpoint source pollution. The commenter cited reports that nonpoint sources are responsible for 55 percent of the water quality problems in the nation's streams, and that directing additional work toward point sources would be a waste of resources.

The Agency agrees that nonpoint source pollution is a major cause of water quality problems nationwide. However, industrial point sources continue to cause water quality impairment in some areas, and the Agency is mandated by the Clean Water Act and the Consent Decree to develop new or revised effluent guidelines.

D. EPA Discretion Not to Regulate Following a Preliminary Study

The Natural Resources Defense Council (NRDC) objected to several phrases in the Proposed Plan relating to EPA's discretion to elect not to issue effluent guidelines for a particular industry following study of that industry. NRDC disputes whether EPA necessarily has such discretion.

EPA acknowledges that NRDC and EPA have different views concerning the Agency's discretion to decide not to proceed with an effluent guideline. At NRDC's suggestion, EPA is including as Appendix A to today's plan a copy of paragraph 6 of the Consent Decree, which states EPA's position concerning its discretion not to proceed with guidelines and establishes a procedure by which NRDC may challenge any attempt by EPA to exercise such discretion.

E. Clean Water Act Requirements Regarding Toxic and Nonconventional Pollutants

NRDC also objected to the statement in the Proposed Plan that effluent guidelines "may include limitations on any toxic or nonconventional pollutants in addition to the 126 priority pollutants" (57 FR 19751). In NRDC's view, the Clean Water Act requires, rather than allows, effluent limitations for all toxic and nonconventional pollutants present in more than trivial amounts.

EPA does not share NRDC's view on this issue. In addition, EPA believes the quoted statement, which appeared in a parenthetical explaining the Agency's methodology in calculating "toxic pound-equivalent factors", is accurate even under NRDC's view of the law.

F. Relationship of Clean Water Act and Pollution Prevention Act

NRDC recommended that the Effluent Guidelines Plan should focus explicitly on the Pollution Prevention Act of 1990 (Pub. L. 101-508) (PPA) and explain the Agency's efforts to identify source reduction opportunities in connection with the development of effluent guidelines.

The PPA declares that pollution should be prevented or reduced whenever feasible; pollution that cannot be prevented should be recycled or reused in an environmentally safe manner wherever feasible; pollution that cannot be recycled should be treated; and disposal or release into the environment should be chosen only as a last resort. Source reduction, as defined by the PPA, means any practice which reduces the amount of any hazardous substance, pollutant or contaminant entering any waste stream or otherwise released into the environment prior to recycling, treatment or disposal, and reduces the hazards to public health and the environment associated with the release of such substances. The term includes equipment or technology modification, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. The term "source reduction" does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a substance, pollutant, or contaminant through a process or activity which itself is not integral to and necessary for the production of a product or the providing of a service.

In developing effluent guidelines for a point source category, EPA identifies the "best available technology economically achievable" (BAT) under CWA sections 301(b) and 304(b)(2)(B) and "best available demonstrated control technology" (used for setting New Source Performance Standards) under CWA section 306. In so doing, the Agency is required to consider (among other things) process changes, non-water quality environmental impacts, energy requirements and the cost of achieving effluent reductions. Pursuant to the foregoing, the Agency routinely considers source reduction opportunities in developing effluent guidelines.

To identify source reduction opportunities in effluent guidelines, the Agency's Source Reduction Review Project (SRRP) will coordinate multi-media reviews of several industries included in the Effluent Guidelines Plan. These categories were chosen based on one or more of the following criteria:

- Environmental releases to more than one medium (air, water, solid waste);
- Potential for pollution reductio
- Known opportunity for source reduction;
- Forthcoming regulatory requirements under multiple statutes.

The effluent guidelines to be reviewed under SRRP are:

- Pesticide Formulating and Packaging;
- Pulp, Paper and Paperboard;
- Pharmaceutical Manufacturing; and
- Metal Products and Machinery.

To further explore opportunities for source reduction in effluent guidelines, the Agency created the Industrial Pollution Prevention Project (IP3) Focus Group, a subcommittee of the National Advisory Council for Environmental Policy and Technology (NACEPT). The IP3 Focus Group is comprised of representatives from industry, citizen groups, state and local governments, consultants and academics, and is exploring ways of instituting additional pollution prevention measures in effluent guidelines. The Focus Group has held several public meetings and is beginning to formulate recommendations to the Agency.

Service industries are distinct from manufacturing industries in that their discharges of toxic and nonconvent pollutants may be a direct result of handling wastes or contaminated materials and equipment received from their customers. Industrial laundries, for example, receive soiled shop towels and work uniforms which may be contaminated with solvents or other pollutants. The A y's technology

assessments for effluent guidelines have traditionally focused on manufacturing processes. As a result, source reduction strategies for service industries have not been fully explored. Such strategies, if adopted, would meet the requirements for "best available technology economically achievable" or "best available demonstrated control technology." In the case of the industrial laundries example, EPA may evaluate the appropriateness of source reduction methods such as substitute cleaners and changing of materials handling practices. In addition to the Industrial Laundries Category, two other categories in today's Effluent Guidelines Plan are service industries: Waste Treatment and Transportation Equipment Cleaning.

G. Relative Utility of POTW Local Limits Compared to National Categorical Pretreatment Standards

One POTW contended that local pretreatment limits established by a POTW are a more effective way of controlling specific industrial discharges to that POTW than national categorical pretreatment standards. This POTW argued that, due to the wide level of discharge variability in some of the categories listed in EPA's Proposed Plan, development of national standards would be difficult and control by means of local limits would be more effective. . This is especially true for certain categories such as Waste Treatment, Industrial Laundries, and Metal Products and Machinery, according to the commenter.

EPA required POTWs to develop local limits as part of their pretreatment programs pursuant to the General Pretreatment Regulations (40 CFR part 403) and has provided assistance to POTWs in developing local limits. However, the Agency considers local limits to be complementary to, rather than a replacement for, categorical standards, as part of an overall pretreatment program. Many POTWs have informed EPA that they need categorical standards because they lack the resources and/or technical expertise to develop local limits for some pollutants, particularly toxic organics. The Agency's National Pretreatment Program Report to Congress (July 1991) listed enhancement of national categorical pretreatment standards as its first recommendation. (Improvement of local pretreatment standards was the second recommendation.) While EPA may indeed encounter more difficulty in setting national standards for some categories such as those mentioned by the commenter, other POTWs have in fact urged EPA to develop standards for these categories.

VI. Future Effluent Guidelines Plans

EPA will continue to publish Effluent Guidelines Plans biennially. In future notices, the Agency will provide updated information on these rulemakings and preliminary studies, and will notice other information received, if any, that may be considered in the designation of additional industries to be regulated by new or revised effluent guidelines. Industries listed in today's notice for further study may be designated for rulemaking in the future 304(m) notices. In those notices, the Agency may also schedule rulemaking actions for other industries not listed in today's notice, based on public comments received and new data made available to the Agency.

The public is invited to submit information on industrial dischargers that may be useful to EPA in planning for future effluent guidelines development. Such information might include descriptions of specific industrial effluent, water quality effects of industrial discharges, impacts on POTWs (interference, pass-through, etc.), and developments in wastewater technology (including source reduction, recycling and treatment techniques). In particular, the Agency is interested in data that would facilitate category-wide comparisons of industries with regard to discharge characteristics, treatment practices and effects on water quality. EPA will include any information submitted in the record for the 1994 plan.

Comments on proposed guidelines for specific categories of dischargers will be accepted, as usual, according to the time periods specified in notices published as part of rulemaking proceedings to establish effluent guidelines for the categories.

VII. Economic Impact Assessment; OMB Review

This notice contains a plan for the review and revision of existing effluent guidelines and for the selection of priority industries for new regulations. This notice is not a rulemaking; therefore, no economic impact assessment has been prepared. EPA will provide economic impact analyses or regulatory impact analyses, as appropriate, for all of the future effluent guideline rulemakings developed by the Agency.

Today's notice has been reviewed by the Office of Management and Budget under Executive Order 12291.

Dated: August 28, 1992.

F. Henry Habicht II,

Acting Administrator

Appendix A—Paragraph 6 of Consent Decree in NRDC et al. v. Reilly

(D.D.C. 89-2980, January 31, 1992)

6.(a) The parties disagree with respect to what discretion, if any EPA has under applicable law to decide not to proceed with an effluent guideline. Accordingly, the Court has determined that the following provisions shall govern in the event that EPA decides not to proceed with an effluent guideline for a particular point source category. For such purposes, "decide not to proceed with an effluent guideline" shall mean to make a final, affirmative decision prior to proposal that an effluent guideline is not appropriate for the point source category under consideration, and shall not include making a decision to defer development of such guideline.

(1) Notwithstanding the provision of Paragraphs 4 and 5, EPA reserves the discretion to decide not to proceed with any one or more effluent guidelines where the Administrator determines, pursuant to any discretion the Administrator has under the Clean Water Act, 33 U.S.C. 1251–1387, or any other legal authority, that an effluent guideline is not appropriate for the point source category under consideration. In EPA's view, such discretion includes the discretion not to proceed with an effluent guideline where the Administrator determines (taking into account the range of environmental issues confronting the Agency) that promulgating the guideline would not have the potential to significantly reduce risk to human health or the environment, or that another approach would accomplish a comparable reduction in risk. In EPA's view, such discretion also includes the discretion not to proceed with an effluent guideline on the basis of cost considerations.

(2) Plaintiffs do not necessarily agree that EPA has the discretion, under the Clean Water Act or any other legal authority, to decide not to proceed with an effluent guideline as described in Paragraph 6(a)(1), and thus reserve the right to contest any determination made pursuant to such paragraph.

(3) In the event EPA decides not to proceed with an effluent guideline with respect to any point source category described in Paragraphs 4(a) or 5(a), EPA shall notify plaintiffs within thirty (30) days of the date such discretion is exercised. Plaintiffs shall have sixty (60) days from receipt of such notice to provide EPA with a written statement of plaintiffs' intent to challenge such decision, and one hundred eighty (180) days from receipt of such notice to file any and all motions contesting such decision with the Court.

(4) In the event EPA decides not to proceed with an effluent guideline with respect to any point source category described in Paragraphs 4(a) or 5(a), and either (i) plaintiffs do not challenge such decision pursuant to the procedures and within the t fr described in Paragraph 6(a)(3)

above, or (ii) the Court holds that, in making such decision, EPA properly exercised its discretion under applicable law, then such decision shall satisfy any and all obligations of EPA under this Decree with respect to such point source category.

(b) Any decision by the Administrator not to proceed with an effluent guideline pursuant to Paragraph 6(a)(1) above shall be included in the first 304(m) Plan proposed following such determination.

(c) (1) Notwithstanding the provisions of Paragraph 6(a), EPA will take final action with respect to twelve (12) effluent guidelines (in addition to those listed in Paragraph 2) before December 31, 2003 unless, after analysis of the eleven (11) studies undertaken pursuant to Paragraph 3 and the seven (7) studies already completed, the Administrator determines, pursuant to any discretion the Administrator has under the Clean Water Act, 33 U.S.C. 1251–1387, or any other legal authority, that fewer than twelve (12) of the eighteen (18) total point source categories studied merit proposal of effluent guidelines pursuant to the standards set forth in Paragraph 6(a)(1). In such case, EPA will undertake studies of additional categories of point sources to determine whether the promulgation of additional effluent guidelines is appropriate. EPA will state its intention to conduct any such additional studies in 304(m) Plans.

(2) EPA will notify plaintiffs within thirty (30) days after any decision pursuant to Paragraph 6(c)(1) not to take final action with respect to twelve (12) effluent guidelines (in addition to those effluent guidelines listed in Paragraph 2) before December 31, 2003. Plaintiffs may challenge such decision by following the procedures set forth in Paragraph 6(a)(3) above. In the event the Court holds that EPA lacks the authority to make such a decision, the Court will establish a new schedule for taking final action on the remaining effluent guidelines.

Appendix B—Effluent Guidelines Currently Under Development, New Categories to be Regulated, and Preliminary Studies

Effluent Guidelines Currently Under Development

Category	40 CFR Part	Proposal	Final action
Offshore Oil and Gas Extraction	435	3/13/92	1/93
Organic Chemicals, Plastics and Synthetic Fibers (Remand)	414	12/6/91	5/93
Pesticides Manufacturing	455	4/10/92	7/93
Pulp, Paper and Paperboard	430	10/93	9/95
Pesticides Formulating and Packaging	455	1/94	8/95
Waste Treatment, Phase 1	437	4/94	1/96
Pharmaceutical Manufacturing	439	8/94	2/96
Metal Products and Machinery, Phase 1	438	11/94	5/96
Coastal Oil and Gas Extraction	435	1/96	7/96

New Categories To Be Regulated

Category	40 CFR Part	Proposal	Final action
Waste Treatment, Phase 2	437	1995	1997
Industrial Laundries	441	1998	1
Transportation Equipment Cleaning	442	1998	1998
Metal Products and Machinery, Phase 2	438	1997	1999
Eight additional categories		1998–2001	2000–03

Preliminary Studies

Category	40 CFR Part	Start	Complete
Petroleum Refining	419	1992	1993
Metal Finishing	433	1992	1993
Iron and Steel Manufacturing	420	1993	1994
Inorganic Chemicals	415	1993	1994
Leather Tanning and Finishing	425	1994	1995
Coal Mining	434	1994	1
Onshore/Stripper Oil and Gas Extraction	435	1995	1996
Textile Mills	410	1995	1996
Three additional categories		1996	1997

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For a copy of this attachment, please contact
Richard Kashmanian at the address below

THE USE AND IMPACT OF IRON AND STEEL INDUSTRY INTRA-PLANT TRADES

ATTACHMENT 1

DOCUMENTS RELATED TO PERMITS INCORPORATING INTRA-PLANT TRADING

Prepared for:

Richard Kashmanian
Office of Policy, Planning and Evaluation
U.S. Environmental Protection Agency
401 M Street
Washington, DC 20460

Prepared by:

Industrial Economics, Incorporated
2067 Massachusetts Avenue
Cambridge, MA 02140

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