

US EPA ARCHIVE DOCUMENT

SUMMARY OF ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT DATA FOR STEEL MILLS



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NOTE TO THE READER

The following report, a ***Summary of Environmental Compliance and Enforcement Data for Steel Mills***, was originally intended to be a definitive summary of violations of environmental law, the resulting enforcement responses; and through the analysis of this data, an explanation of why problems occur within the steel making industry of the United States. It became apparent after the review of many linear feet of Federal, State and local regulatory agency files, that the causes of many of the violations had not been determined or, if they had, not described. Currently there is no requirement for inspectors to include this information in the files.

Because of this lack of information on causes, statistically valid, definitive conclusions as to why certain steelmaking processes appear to frequently violate particular environmental requirements could not be drawn. The report, however, succinctly summarizes the compliance trends of 34 steel making facilities, approximately 30 percent of the industry with the U.S., between 1990 and 1995. The report also links specific steel making processes with violations and with the environmental parameters violated. When available, the causes of the problems have been noted.

The ***Summary of Environmental Compliance and Enforcement Data for Steel Mills*** will provide readers with information useful in understanding the industry and its associated processes, delineating problem areas and potentially, crafting innovative approaches to address recurrent problems.

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SUMMARY OF ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT DATA FOR STEEL MILLS

EXECUTIVE SUMMARY

I. Background

This document is the result of a study that was initiated in 1996 as part of the EPA Common Sense Initiative involving the iron and steel industry, and it was subsequently continued as part of an OECA study of noncompliance in that sector. The major purpose of the study was to document noncompliance trends among iron and steel mills and, if possible, identify the causes of noncompliance reflected in those trends. The study was conducted in five States and in two EPA Regions, and involved three environmental programs: air quality, water quality, and hazardous waste. In all, compliance and enforcement data was collected and analyzed for 14 integrated mills and 20 mini mills.

An initial report of findings was prepared in 1997, and a workshop was held in Chicago to review the findings with EPA Regional and State agency representatives in August 1997. Following the workshop, additional analyses were conducted to address comments raised at the workshop, and additional drafts of this report were subsequently prepared to include new areas of interest suggested by reviewers.

II. Methodology

The scope of the study was limited to two EPA Regions, five States and a selection of steel mills that would provide a representative picture of compliance trends within the industry. EPA Regions III and V were selected based on the large number of mills in those Regions. Likewise, Pennsylvania in Region III, and Illinois, Indiana, Michigan and Ohio in Region V, were selected based on the large number of mills in each of those States. Individual mills were selected primarily by identifying a district in each State with the most mills and including all the mills from that district.

Of the 34 mills that were finally selected, seven were selected for a longer term review. These were selected randomly ensuring that there would be at least one mill from each State, that no mills would be under common ownership, and that the selection would include at least four integrated mills and two mini mills. As shown in the following table, the selected mills provide a good representation of steelmaking processes for the study.

Major Steelmaking Processes Represented in the Study		
Major Process	Integrated Mills (14 Total)*	Mini Mills (20 Total)
Coke Ovens	8	--
Blast Furnaces	13	--
Sinter Plants	6	--
BOFs	13	--
EAfs	3	20
Hot Mills	9	4
Steel Finishing	13	19

* One integrated mill had shut down all operations except for its coke ovens.

The principal method of data collection was through an on-site file review in each agency with compliance oversight responsibility for the selected mills. Two EPA Regional Offices, five State central and regional offices, three local air quality control agencies, and five publicly owned treatment works in four States were included. The review covered a five year period (January 1, 1991 - December 31, 1995) for 4 integrated mills and 3 mini mills, and a one year review (January 1 - December 31, 1995) for the remaining 27 mills.

The files selected for review included all relevant permits, inspection reports, compliance reports, monitoring and test reports, malfunction and upset reports, spill reports, complaints, and the documentation of enforcement responses (including warnings, notices of violation, penalties, civil administrative actions, and civil judicial actions). Violations were categorized by type of violation, the related steelmaking process, and the cause of the violation (where indicated). In some cases inspection reports included a description of conditions that might be violations or that might lead to violations but were not actually indicated as violations by the inspector. These were recorded as compliance "concerns" in the study.

The file review identified over 1,800 documents that contained compliance and enforcement data that were used in this study. Within these documents there were 12,564 violations and concerns and 377 agency enforcement responses identified. A relational database was developed as a part of the study to contain the data obtained during the file review and to support the presentation and evaluation of compliance trends contained in this report.

The compliance and enforcement response data presented in this report are limited to information collected in the review of Federal, State and local agency files. The report does not provide definitive conclusions relating to the causes of noncompliance or other issues raised in the context of the file review. Supplementary interviews with inspectors were conducted to resolve some questions on the data, and to gather anecdotal information on the underlying causes of noncompliance.

III. Findings

The study shows that during the study period there were substantial levels of noncompliance among the air, water and RCRA programs in the iron and steel industry. Of the 34 mills that were reviewed, only one mill (a mini mill subject to a one year review) had no documented violations or compliance concerns in any of the three programs. Although most of the violations and concerns were documented in the air program (8,412), 7,384 of these violations are linked to one specific fuel related problem that occurred over a period of several months at a single mill. Except for these, most violations and concerns were recorded under the water program. Significantly fewer were recorded under the RCRA program. However, it is not possible to determine based on this study, that violations occur more or less frequently under any one program, since the methods of detection and their frequency vary significantly among the three programs.

Summary of Violations and Compliance Concerns Identified in the Study				
Type of Mill	Air Quality	Water Quality	RCRA	Total
Integrated Mills	8335*	3307	110	11,752*
Mini Mills	77	674	61	812
Total	8412*	3981	171	12,564*

* 7,384 of these violations relate to excess SO₂ emissions from boilers, heaters and other fuel combustion sources at one integrated mill as a result of the use of coke oven gas with a high sulfur content as the process fuel.

Most violations in all three programs involved integrated mills: 93% under the air program (excluding the 7,384 fuel burning violations at one mill), 83% under the water program, 64% under the RCRA program, and 84% among all programs combined.

! Types of Violation

By far the most common violations under the air and water programs involve pollutant emissions or discharges -- roughly 81% of the air program violations (without including the 7,384 fuel burning violations at one mill) and 97% of the water program violations. Violations under the RCRA program that involved actual or potential releases were roughly 35% of the total RCRA violations. The predominant areas of RCRA violation include labeling, manifesting, permitting and recordkeeping, reflecting the significant preventive focus of that program.

! Steelmaking Processes in Violation

When all three programs are considered together, coke ovens (and the coke oven by product recovery plants) account for the largest number of steelmaking process related violations. Blast furnace and basic oxygen furnace related violations are also predominant under both the air and water programs; electric arc furnace related violations are predominant under the air and RCRA programs; and steel finishing related violations are predominant under the water and RCRA programs. Other significant steelmaking process related violations under the water program involve hot forming mills and central treatment plants. Most violations under the RCRA program are not process related, but involve the numerous regulations designed to prevent hazardous releases through proper labeling, manifesting, recordkeeping and permitting.

Steel Making Processes with the Greatest Number of Violations and Compliance Concerns (in Order of Frequency)		
Air Quality	Water Quality	RCRA *
Coke Ovens Basic Oxygen Furnaces Electric Arc Furnaces Blast Furnaces	Blast Furnaces Coke Plants Finishing Processes Hot Forming Mills Basic Oxygen Furnaces Central Treatment Plants	Coke Plants Electric Arc Furnaces Finishing Processes

* The largest number of violations under RCRA were not related to specific steelmaking processes.

! Causes of Noncompliance

Compliance files contained incomplete information on the causes of water program violations, very little information on the causes of air program violations, and almost no information on the causes of RCRA violations. There was more information on the causes of water program violations, largely because most of the violations are documented in self-monitoring reports pursuant to regulations that require reporting the reason for the violation and the corrective action that was taken. In general, however, there are currently no statutory requirements that the regulatory agencies provide such information. Because of this lack of information on causes, statistically valid, definitive conclusions as to why industry frequently is not in compliance with certain environmental requirements could not be drawn. However, supplementary interviews with inspectors were conducted to gather anecdotal information on the underlying causes of noncompliance.

Where causes were documented, most involved operation and maintenance or work practice deficiencies (43% of all explained violations), with equipment failure

related to control or treatment systems (41%) next in frequency. Roughly 92% of the documented causes of violation are related to the water program, and almost all of the remaining 8% are related to the air program. It should be noted that underlying reasons, such as the absence of an effective overall environmental management system, or the inadequate commitment of resources to environmental controls, are rarely discussed in the compliance files. However, there were indications throughout the study that the success of environmental compliance measures at specific steel mills has in fact been related to their investment in effective control systems and programs and a commitment to effective environmental management practices.

! Enforcement Response

This study documented a significant enforcement response to steel mill violations among the agencies included in the study. Of the 34 mills included in the study, 25 were subject to an agency enforcement response at the NOV level or higher. This included all of the seven mills subject to a five year review, all but one of the 14 integrated mills, and 12 of the 20 mini mills. In all, 316 NOVs were issued, and 36 administrative enforcement orders or agreements and three civil judicial actions were completed during the study period.

Summary of Enforcement Responses				
Program	Type of Enforcement Response	Type of Mill		Total
		Integrated Mills	Mini Mills	
Air	Warnings	4	3	7
	NOVs	137	19	156
	Civil Admin	5	4	9
	Civil Judicial	--	--	--
	Total	146	26	172
Water	Warnings	4	1	5
	NOVs	106	25	131
	Civil Admin	5	6	11
	Civil Judicial	2	--	2
	Total	117	32	149
RCRA	Warnings	4	6	10
	NOVs	11	18	29
	Civil Admin	5	11	16
	Civil Judicial	1	--	1
	Total	21	35	56

All	Warnings	12	10	22
	NOVs	254	62	316
	Civil Admin	15	21	36
	Civil Judicial	3	--	3
	Total	284	93	377

Generally, the patterns of violations addressed in NOVs are comparable to the patterns identified in the compliance section of this study and encompass the complete range of violation categories and processes. Civil administrative and judicial actions also address most of the major processes for which violations were documented in the compliance analysis. A notable exception under the air program involves basic oxygen furnaces, for which no civil administrative or judicial actions were completed during the study timeframe.

Major steel mill processes addressed in civil administrative and judicial actions by all three of the programs include: coke ovens (7 in all), pickling operations (5 in all), and cold mill/annealing operations (5 in all). At least two programs addressed blast furnaces (air and water), basic oxygen furnaces (water and RCRA), electric arc furnaces (air and RCRA), and hot forming mills (water and RCRA). Multiple civil administrative and judicial actions during the study period also include three air program actions involving emissions from boilers, two water program actions involving non-process specific wastewater treatment plants, and six RCRA related actions involving violations related to landfills, waste piles and other storage or disposal conditions involving unspecified wastes.

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SUMMARY OF ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT DATA FOR STEEL MILLS

I. INTRODUCTION

A. Background

In 1996, as part of the Common Sense Initiative involving the iron and steel industry sector, EPA's Office of Enforcement and Compliance Assurance initiated a compliance and enforcement study of selected iron and steel mills in the U.S. This study evolved into a more comprehensive study to document environmental compliance and enforcement trends and, if possible, the specific causes of noncompliance in the iron and steel industry. Compliance and enforcement data included in the study were collected in 1996 and 1997 during an on-site file review in agencies that oversee compliance for this industry. The study covered three major pollution control programs: air, surface water and hazardous waste.

This report summarizes the data collected for 34 iron and steel mills. The file reviews were conducted in two EPA Regional Offices (Regions III and V); central and/or regional State agency offices in five States (Illinois, Indiana, Michigan and Ohio and Pennsylvania); local air pollution control offices in Detroit, Cleveland and Allegheny County, Pennsylvania; and five publicly owned treatment works in four of the five States. Mills were selected for review from an EPA list of the mills in each State. The district in each State with the largest number of mills was identified, and each mill in that district was selected for review. Additional mills were included from a second district to expand the coverage of mills in two States. In all, fourteen integrated mills and twenty mini mills were selected for review.

The file reviews cover either a one or a five year period. Seven mills were selected for a five year review -- three integrated mills and four mini mills. The other 27 mills were subject to a one year file review. The five year period extended from January 1, 1991 through December 31, 1995, and the one year period extended from January 1, 1995 through December 31, 1995. The five year review mills were selected randomly, but subject to the following conditions: there should be at least one mill from each State, no two mills should be under common ownership, and at least four integrated and two mini mills should be selected. Ultimately, the project budget allowed a five year review for seven mills.

For the most part, different plant locations for a mill are combined in this report -- for example, a mill making steel at one plant site and rolling it at another plant site is treated as a single mill. It should be noted that one integrated mill had shut down all but

its coking operations during the five year period, but is still being treated as an integrated mill in this analysis. Also, one integrated mill shut down completely after the one year review period, but is still included.

Data reviewed in the study include all inspection and self monitoring reports; all test and other compliance reports; all reported upsets, spills, complaints, and other incidents; and all enforcement cases (including warnings and cases under preparation). The data were collected and classified into standardized categories (developed during the study) of violations, processes, causes, and enforcement actions. Extensive review and quality assurance of the data were conducted. Finally, a series of tabulated summaries of the compliance and enforcement data for each of the media were generated. These tabulated summaries provide the statistical basis for this report. It should be noted that in the interest of maintaining the anonymity of specific mills and for impartial presentation of the compliance and enforcement data, no references to specific mills or agencies are included in this report.

B. Limitations of Study

While this report provides a representative picture of compliance problems experienced in the 34 mills, the following cautions should be noted. First, these data are not necessarily complete. Only those files made available by agencies could be reviewed. In some circumstances, files involved in on-going enforcement cases or current permit actions were not available for review. Second, except for the hazardous waste violation classifications involving actual and potential releases, the relative severity of the reported violations is not indicated and cannot be assumed based solely on the reported process and cause categories. Third, the tables in this report do not account for any increase in the incidence of violations that results from increased frequency of sampling and inspection, the increased stringency of regulations or enforcement order terms that apply to certain mills, or the more aggressive compliance monitoring and enforcement policies of certain agencies.

Comments on an earlier draft report proposed various approaches to normalizing the data. The suggestions included development of analyses weighted by the number of facilities, the stringency of regulations, the control systems in place, the number of inspections and/or samples involved, the magnitude of violations, the environmental harm or risk associated with violations, and the size, age and complexity of the mill. This report includes a facility weighted analysis, but no other approach was used to normalize the data. Comments also proposed that the five year and one year review mills be reported separately and then combined for a single year. This report combines five years of compliance and enforcement data for the five year review mills with one year of data for the one year review mills.

This report is limited to the presentation of information collected during the file review or during followup interviews with inspectors. It is not meant to include any evaluation or conclusion regarding the regulations or the compliance monitoring and enforcement policies of the agencies included in the study. Also, it does not provide statistically valid, definitive conclusions relating to the causes of compliance problems or related issues that were documented during the file review.

C. Organization of Report

This report separates the compliance and enforcement data tabulations. They are treated separately for several reasons. First, the compliance data provide the better representation of compliance problems that occur at the iron and steel mills, since the enforcement cases tend to be selective in addressing compliance issues, and different enforcement response policies may result in inconsistent enforcement from State to State and may therefore not provide as true a picture of violation trends.

Second, the violation and enforcement file data frequently could not be linked -- in part, because enforcement cases reviewed during the study often addressed violations that occurred prior to the review period and therefore were not considered in the compliance tabulation (also, compliance data collected at the end of the review period may have been included in an enforcement case finalized following the review period and not included for that reason). Moreover, the enforcement files usually did not include the case development backup, and violations cited in a case sometimes could not be linked to the specific violations in a compliance document. Also, violations were sometimes dropped from a case, but the reasons were usually not included in the files.

Both the compliance and enforcement sections of the report are organized primarily to present the data that were collected during the file review with a brief explanation of the data categories selected for the presentation. The compliance section focuses on the areas that are central to gaining an understanding of the potential causes of noncompliance under each of the media. This requires identifying the types of violations that are occurring, where in the mill they are occurring, and why they are occurring. As a result, the compliance section is developed around the types of violations, the types of processes, and those causes that were documented. Data for each category are broken out by integrated mills and mini mills to identify differences that may be related to mill type. For each of the media, a summary of the compliance problems is presented first, then followed by more detailed analyses. The compliance problem cause data include a more extensive explanation of the processes and pollution control systems that are involved.

A significant effort was made to standardize the data presentation among the media; however, there are some differences. Under the water program, the NPDES and the Pretreatment programs are broken out separately. Under RCRA, it was possible to provide a breakdown of the violations based on the potential or actual release of hazardous pollutants to the environment. Under the air and water programs, a release to the environment is implicit in the types of violations that were documented, and a similar breakdown was considered unnecessary. No attempt was made under any of the programs to characterize the magnitude or potential environmental impacts of the releases. The following is a brief description of each section of the report.

! Section II: Compliance Data Summary

Section II contains an overall summary of compliance data for each of the media programs. The number of mills evaluated for each program is presented in Table 1 followed by the total number of violations and concerns for all mills included in the study by mill type in Table 2 (Air), Table 3 (Water, with a separate breakout for NPDES and Pretreatment), and Table 4 (RCRA). The violations and concerns are categorized by the type of agency (Federal, State or Local) that recorded the problem.

! Section III: Types of Violations

Section III includes a narrative explanation of the approach used to identify and enumerate different types of violations and concerns. A table included in the narrative compares the violation categories among programs. The narrative concludes with definitions of the violation categories used in this report. Following the narrative, statistical information is summarized in tables by program area. For all three programs a table enumerates the type of violation by mill type: Table 5 (air), Table 6 (water), and Tables 7.1, 7.2 and 7.3 (RCRA).

Table 5 (air program) includes specific pollutants as part of the listed violation categories. Under the water program, because of the numerous regulated pollutants, an additional series of tables breaks out the type of pollutant for effluent and unauthorized discharge violations: Table 6.1 includes effluent violations with a breakout by mill type (Tables 6.1.1 and 6.1.2), a further breakout by NPDES and Pretreatment program (Tables 6.1.1.1, 6.1.1.2, 6.1.2.1 and 6.1.2.2), and a special breakout by metal pollutant (Tables 6.1.1.1a and 6.1.1.2a, etc.). Table 6.2 includes unauthorized discharges with breakouts similar to the effluent violation tables (but with no special breakout for metal pollutants). A process breakout is also provided in the water program pollutant tables. Section III (Types of Violations) was selected over Section IV (Types of Processes) for this presentation because it was in the context of the violation review that reviewers expressed interest in the breakout. For the RCRA program, specific pollutant information was generally not available, and the tables are limited to the type

of violation and whether an actual or potential release was involved: Tables 7.1 (integrated mills), 7.2 (mini mills) and 7.3 (integrated and mini mills combined).

! Section IV: Violations by Type of Process

Section IV presents a combined summary of the number of violations associated with the various processes by mill type for each program area, followed by the types of violations that are associated with each process for the same program. The section begins with an explanation of the approach used in making process designations and includes a table that compares the process categories among all three programs. Summary descriptions of each major process at an iron and steel mill include a discussion of the general types of compliance problems by program area for each process.

Note that major steelmaking processes at mills included in this study vary depending on the mill. The occurrence of major processes at mills included in this study is shown in the following table.

The Number of Mills at Which Major Steelmaking Processes Are Represented in this Study		
Major Process	Integrated Mills (14 Total)*	Mini Mills (20 Total)
Coke Ovens	8	--
Blast Furnaces	13	--
Sinter Plants	6	--
BOFs	13	--
EAfs	3	20
Hot Mills	9	4
Steel Finishing	13	19

* Note that one integrated mill had shut down all operations except for its coke ovens.

Specific process tables in Section IV include Table 8 (an overall summary of air program violations by mill type and process), followed by Table 9.1 (integrated mill air program violations by type of violation and type of process) and Table 9.2 (mini mill air program violations by type of violation and type of process). Tables 10, 11.1 and 11.2 are similar for the water program, with an additional breakout of the NPDES violations in Tables 11.1.1 and 11.2.1, and Pretreatment violations in Tables 11.1.2 and 11.2.2. Tables 12, 13.1 and 13.2 are similar for the RCRA program.

! Section V: Causes of Noncompliance

Section V provides a summary of the causes of violations based on the limited data documented in the files, and supplementary interviews with inspectors that were conducted to gather anecdotal information on the underlying causes of noncompliance.

The categories used to group causes are explained and the limitations of the cause analysis are stated in a brief introduction. The cause analysis includes detailed descriptions of the processes where most compliance problems were documented under each program. Not all processes are included in the analysis -- only those with the greatest number of violations. The process descriptions in this section provide more detailed information on waste streams and control measures and are included to help explain the general nature of the compliance problems and to provide further insight into the conditions where the violations occurred.

Tables summarizing the statistical cause information for each process are provided for the air and water programs after each process description. Cause information was generally not available for RCRA violations; therefore, no table is presented, and the narrative discussion focuses only on potential causes of violation. Because of this lack of documented information on causes, statistically valid, definitive conclusions as to why industry frequently is not in compliance with certain environmental requirements could not be drawn. The report includes the following processes selected for a violation cause analysis.

Processes for which Causes of Violations Are Presented in this Report		
Program	Process	Table(s)
Air Program	Coke Ovens	14A
	Blast Furnaces	14B
	Basic Oxygen Furnaces	14C
	Electric Arc Furnaces	14D
Water Program	Coke Plants	15A
	Blast Furnaces	15B
	Basic Oxygen Furnaces	15C
	Hot Forming/Hot Mills	15D
	Finishing Processes	
	-- Pickling	15E
	-- Cold Mill/Annealing	15F
	-- Coating	15G
Central Treatment Plant	15H	

RCRA	Non-Process Specific Violations	N/A
	Coke Plants	N/A
	Electric Arc Furnaces	N/A
	Finishing Processes	N/A

! Section VI: Enforcement Summary

Section VI provides a summary of the enforcement responses for each program area. Included are a description of the enforcement categories selected for tabulation and an overall summary of the enforcement responses broken out by type of mill, by agency initiating enforcement, and by type of enforcement response (Tables 16-18). More detailed summaries and tables are then provided by individual program. Each program is introduced by a brief narrative summary of the information included in the tables.

Air program tables include the number of mills subject to enforcement by type of mill (Table 19), the number of enforcement responses by agency type (Table 20), the number of enforcement responses by type of response (Table 21), the number of enforcement responses by type of violation (Table 22) and the number of enforcement responses by process type (Table 23). Similar summaries and tables are provided for the water program (Tables 24-28), including an NPDES/Pretreatment breakout for Table 25 (responses by agency type) and Table 26 (responses by action type); and similar summaries and tables are provided, as well, for the RCRA program (Tables 29-33).

! Appendix A: Glossary

A glossary is provided in Appendix A which explains frequently used terms for each program.

II. COMPLIANCE DATA SUMMARY

The following is an overall summary of the number of mills with compliance problems (Table 1), followed by summaries of the number of violations and compliance concerns that were identified for each program area (Table 2, Air; Table 3, Water with a separate breakout for NPDES and Pretreatment; and Table 4, RCRA).

The violations and concerns are broken out by the agency responsible for identifying the violation. The Federal-State column indicates that both agencies were involved (normally a combined inspection). The State/Local column indicates that either a State or Local agency identified the violation. For the water program, all pretreatment violations are related to the local agency, the POTW, and are identified separately. Violations that were self-reported are treated as State/Local agency

related unless the reporting was made pursuant to a Federal enforcement requirement and reported directly to EPA.

In general, an incident was considered to be a "violation" only if it was clearly indicated as such by an agency in an inspection report, test report, warning letter, notice of violation or other credible documentation, or if it was a self-reported violation and clearly indicated as a violation of the applicable regulation or permit. In this report, a "concern" is a compliance issue raised by the agency during an inspection or during the review of records or reports, and the compliance document does not clearly indicate that the problem is a violation. A detailed explanation of how "violations" and "concerns" are defined in this report is provided in Section III.

The following tables (Tables 1 through 4) provide an overall summary of compliance data for each of the major media programs.

TABLE 1
Summary of Mills Evaluated

Type Mill	Air		Water		RCRA		All Programs		Total Mills
	w/ Viola-tions or Concerns	w/o Viola-tions or Concerns	w/ Viola-tions or Concerns	w/o Viola-tions or Concerns	w/ Viola-tions or Concerns	w/o Viola-tions or Concerns	w/ Viola-tions or Concerns	w/o Viola-tions or Concerns	
Integrated Mills	14	--	14	--	13	1	14	--	14
Mini Mills	7	13	17	3	14	6	19	1	20
Total	21	13	31	3	27	7	33	1	34

TABLE 2

Summary of Compliance Problems: Air Quality Program

Type Mill	Violations				Concerns				Total Violations and Concerns			Combined Total	Number of Mills Represented
	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b		
Integrated Mills	509	8	7813 ^c	8330	5	--	--	5	514	8	7813	8335	14
Mini Mills	20	--	56	76	--	--	1	1	20	--	57	77	6
Total	529	8	7869 ^c	8406	5	--	1	6	534	8	7870	8412	20

Note: Fourteen integrated mills and twenty mini mills were included in the overall review.

- ^a Fed-State refers to compliance problems identified during joint Federal-State (or Federal-Local) inspections.
- ^b State/Local refers to compliance problems identified by the State or Local agency with primary enforcement authority over the mill.
- ^c 7,384 of these violations relate to excess SO₂ emissions from boilers, heaters and other fuel combustion sources throughout one integrated mill caused by the use of coke oven gas with a high sulfur content as process fuel.

TABLE 3

Summary of Compliance Problems: NPDES and Pretreatment Programs Combined

Type of Mill	Violations				Concerns				Total Violations and Concerns			Combined Total	Number of Mills Represented
	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b		
Integrated Mills	865 (62)	24	2088 (168)	2977 (230)	175	--	155	330	1040 (62)	24	2243 (168)	3307 (230)	14
Mini Mills	--	--	597 (115)	597 (115)	15	--	62	77	15	--	659 (115)	674 (115)	17
Total	865 (62)	24	2685 (283)	3574 (345)	190	--	217	407	1055 (62)	24	2902 (283)	3981 (345)	31

Note: Fourteen integrated mills and twenty mini mills were included in the overall review. All fourteen integrated mills have NPDES permits, three of which also have pretreatment permits. Thirteen of the mini mills have NPDES permits, one of which also has a pretreatment permit. An additional four mini mills have only pretreatment permits.

() = Represents the number of the violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report.

^a Fed-State refers to compliance problems identified during joint Federal-State (or Federal-Local) inspections.

^b State/Local refers to compliance problems identified by the State or Local agency with primary enforcement authority over the mill.

TABLE 3.1

Summary of Compliance Problems: NPDES Program

Type of Mill	Violations				Concerns				Total Violations and Concerns			Combined Total	Number of Mills Represented
	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b		
Integrated Mills	861 (60)	24	1291 (147)	2176 (207)	162	--	140	302	1023 (60)	24	1431 (147)	2478 (207)	14
Mini Mills	--	--	527 (99)	527 (99)	15	--	57	72	15	--	584 (99)	599 (99)	13
Total	861 (60)	24	1818 (246)	2703 (306)	177	--	197	374	1038 (60)	24	2015 (246)	3077 (306)	27

Note: Fourteen integrated mills and twenty mini mills were included in the overall review. All fourteen integrated mills have NPDES permits, three of which also have pretreatment permits. Thirteen of the mini mills have NPDES permits, one of which also has a pretreatment permit. An additional four mini mills have only pretreatment permits.

() = Represents the number of the violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report.

^a Fed-State refers to compliance problems identified during joint Federal-State (or Federal-Local) inspections.

^b State/Local refers to compliance problems identified by the State or Local agency with primary enforcement authority over the mill.

TABLE 3.2

Summary of Compliance Problems: Pretreatment Program

Type of Mill	Violations				Concerns				Total Violations and Concerns			Combined Total	Number of Mills Represented
	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b		
Integrated Mills	4 (2)	--	797 (21)	801 (23)	13	--	15	28	17 (2)	--	812 (21)	829 (23)	3
Mini Mills	--	--	70 (16)	70 (16)	--	--	5	5	--	--	75 (16)	75 (16)	5
Total	4 (2)	--	867 (37)	871 (39)	13	--	20	33	17 (2)	--	887 (37)	904 (39)	8

Note: Fourteen integrated mills and twenty mini mills were included in the overall review. All fourteen integrated mills have NPDES permits, three of which also have pretreatment permits. Thirteen of the mini mills have NPDES permits, one of which also has a pretreatment permit. An additional four mini mills have only pretreatment permits.

() = Represents the number of the violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report.

^a Fed-State refers to compliance problems identified during joint Federal-State (or Federal-Local) inspections.

^b State/Local refers to compliance problems identified by the State or Local agency with primary enforcement authority over the mill.

TABLE 4
Summary of Compliance Problems: RCRA Program

Type of Mill	Violations				Concerns				Total Violations and Concerns			Combined Total	Number of Mills Represented
	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b	Total	Fed	Fed-State ^a	State / Local ^b		
Integrated Mills	19	--	85	104	1	--	5	6	20	--	90	110	10
Mini Mills	10	--	51	61	--	--	--	--	10	--	51	61	5
Total	29	--	136	165	1	--	5	6	30	--	141	171	15

Note: Four integrated mills and three mini mills were included in the 5 year review; all were inspected during the five year period. Ten integrated mills and seventeen mini mills were included in the 1 year review. Of these, six integrated mills and four mini mills were inspected in 1995.

^a Fed-State refers to compliance problems identified during joint Federal-State (or Federal-Local) inspections.

^b State/Local refers to compliance problems identified by the State or Local agency with primary enforcement authority over the mill.

III. TYPES OF VIOLATIONS

Violation categories used in this report are listed in the table below and are described in further detail for each program in the text that follows the table. A compliance problem was listed as a violation only if clearly indicated as such in the file; otherwise, it was noted as a concern. Typically the requirement being violated was a State, Federal, or local regulation or permit condition. However, in some cases the violation was of a condition in an enforcement order.

Compliance concerns were derived almost always from information included in inspection reports. In a few instances they were derived from comments pertaining to the review of a compliance report. Generally, they include inspector observed conditions that are not currently violations but might lead to violations if uncorrected -- for example, air pollution control equipment is observed to be malfunctioning, or oil skimmers are not adequately removing surface oil from a pond that has overflowed in the past. They may also include minor infractions (e.g., minor recordkeeping inadequacies) that are noted in the inspection report but not cited as violations.

For the most part, the documentation identifying violations included inspection reports, self-monitoring reports, and enforcement records. No attempt was made to distinguish between State and Federally enforceable violations, since this information was generally not included in the file data that were reviewed (the vast majority of violations were identified in State and local files). Care was taken to avoid duplication (for example, where an inspection report cited a violation that was later repeated in an enforcement notice, or where a noncompliance incident was identified in separate documentation for different agencies). Also, an effort was made to remove contested violations that were ultimately withdrawn or overturned (there were several instances involving NPDES permit challenges where this occurred).

In almost all cases, a violation presented in this report represents the determination of noncompliance for a single day. However, several issues arose during the course of the study relating to the specific number of violations documented in agency files and how that number should be reflected in this report. The following is a summary of these issues and how they were resolved.

- ! Continuing Violations. If a mill failed to install a control or monitoring system by the required date, or failed to pass a compliance test, the underlying statutes usually treat each day of noncompliance as a separate violation. However, it was the consensus of agency staff to treat these events as single violations for the purpose of this report.
- ! Overlapping Regulations. On some occasions an incident may involve a violation of more than one regulation. For example, an air pollution incident might involve a violation of an emission limit, a related operation and maintenance requirement, and a reporting requirement. Failure to install a control system may trigger both

a compliance schedule violation as well as an emissions violation. In these situations all reported violations were included. However, it should be noted that multiple violations of this nature were not always identified in inspection or noncompliance reports, and no effort was made during this study to determine whether regulations in addition to those cited were also violated.

- ! Repeated Violations on a Single Day. Most (if not all) opacity limits have very short term averages, so that inspectors frequently observed and documented numerous violations from a specific emission point on a single day. In this report multiple violations of the same regulation at the same emission point on a single day have been treated as a single violation, except for two instances (footnoted in the tables) where the file documentation was unclear.
- ! Monthly Average Violations. Many of the water program violations were of monthly average effluent limits. This raised an issue as to whether these violations should be counted for each day of the month. It was the consensus of compliance staff from all five States and both EPA Regions that for the purpose of this report a monthly average violation should be counted as a single violation. Monthly average violations have been identified separately in the tables of this report.
- ! Fuel Related Violations. In one instance a mill used high sulfur coke oven gas as a fuel for other processes throughout the mill. When all the affected processes were taken into account, combustion of the recovered high sulfur gas resulted in 7,384 daily SO₂ violations. In contrast, if the gas had been flared at the coke plant (for which no SO₂ limit was applicable), no violations would have occurred. Consideration was given to treating this unusual situation as one violation at the mill for each day of violation, instead of one violation at each emission unit for each day of violation. In this case, the State preferred to show them all as separate violations.

It should be noted that violation counts among the three different programs are not readily comparable and do not indicate that compliance practices are generally better or worse for a specific program. Under the air program, for example, steel mill violations are identified primarily by inspectors who observe violations during site visits. Self-monitoring (with some exceptions) and routine compliance tests are infrequently used to determine compliance and to identify violations. As a result, with limited exceptions, the number of violations identified under the air program are most often related to the number of inspections that occur, and the frequency of inspections at a specific mill may vary based on the type of mill, its location and size, whether recent compliance problems have been documented, and the inspection policies of the overseeing agency.

In contrast to the air program, the majority of violations under the water program are identified through self-monitoring. Wastewater streams from a steel mill

are more readily collectible and conveyable to treatment systems and discharge points where they can be readily sampled and analyzed for regulated pollutants under the water program. As part of both the NPDES and Pretreatment programs, wastestreams are regularly sampled for permit limited pollutants at both internal monitoring points and discharge points. Monitoring for most pollutants occurs on a weekly or bi-weekly basis at most process wastewater outfalls. In some cases, daily monitoring of specific pollutants is required. Other regulatory mechanisms under the water program that contribute to self-reported incidents of noncompliance include spill reporting and self-inspection of outfalls or receiving waters to check for unauthorized discharges of color, foam or sheen. As a result, the water program is able to rely significantly on self-monitoring and self-reporting to identify violations, and comparatively fewer violations are identified during inspections, even though inspections may occur frequently at many of the mills.

Finally, most RCRA violations are identified during inspections that occur much less frequently for the RCRA program than for the air and water programs. The steel mills included in this study were inspected no more often than once per year and less frequently for most of the mills. Only 10 of the 27 one year review mills were inspected in 1995, and facilities subject to a five year review were typically inspected fewer than five times during the five year period. This infrequency results from the classification of mills as generators of hazardous waste rather than treatment, storage and disposal (TSD) facilities. TSDs require the more complex part B permits, are subject to more monitoring and reporting requirements, and are given a higher priority for inspections. As a result, RCRA violations in this report are likely to be a smaller number than might have been identified if the mills had been inspected as frequently under the RCRA program as under the air and water programs, or if there were self-monitoring and reporting requirements under the RCRA program comparable to those under the water program.

Compliance trends in this report are also affected by the different regulatory standards that apply, which vary from State to State for the air and water programs. In particular, water quality based limits (for the water program) and new source review limits (for the air program) have resulted in significantly stricter standards for certain mills and processes. Also, enforcement cases under both programs have resulted in additional requirements that are unique to specific mills.

Agency inspection programs are also often different, with some Federal and State agencies emphasizing more frequent inspections and conducting more enforcement (resulting in the documentation of more violations). Other factors that may affect compliance trends include targeting of specific companies for increased surveillance (for example, facilities of unique concern to the State), and the extent to which self monitoring for compliance is required (under the air program), or the required sampling frequency (under the water program).

An understanding of the compliance trends identified in this report would undoubtedly be improved by an analysis of these media and agency program related factors and are a recommended area of further analysis.

A Comparison of Violation Categories Used in this Report

Air Program	Water Program	RCRA Program
Mass Emissions Opacity* Fugitive Emissions* Open Burning	Effluent Discharges Unauthorized Discharges	--
O&M/Work Practice	O&M/Work Practice	Closure Improper Disposal Labeling Manifest Secondary Containment Self-inspections Spill Prevention Spill Response Storage Waste Determination
Monitoring	Monitoring	Monitoring
Recordkeeping Reporting	Recordkeeping Reporting	Recordkeeping Reporting
--	Certification/Training	Certification/Training
Permitting	Permitting	Permitting
--	Compliance Schedule	--
Miscellaneous Asbestos Related	--	--

* Often, fugitive emission violations at iron and steel mills are enforced through the application of opacity limits. This overlap and the manner in which the overlap is treated in this report are explained in the definition of "Fugitive emissions" and "Opacity" in Section A below.

A. Air Program Violations

Asbestos related. These non-steel mill process related violations involve the removal of asbestos insulation used commonly throughout many steel mills. Very few (6 out of 66) asbestos related violations involve removal procedures. Most relate to reporting or record-keeping deficiencies, removal plan requirements, and failure to meet notification deadlines.

Fugitive emissions. This category relates to visible emissions from: transfer\handling operations, processes (roof monitors, for example), 'fines' spilled from trucks or collection devices, dust on streets, and windborne particles. If a document asserts a fugitive emission violation of a numeric opacity limit, the report lists the incident as an opacity violation, not a fugitive emission violation.

Mass emissions. These are incidents identified as violations of a mass per volume, mass per heat input value, or process weight rate.

Miscellaneous. One violation did not easily fit other categories -- a mill was cited for restricting or preventing an inspector adequate or complete access to the plant.

Monitoring. These are incidents identified as violations for failure to perform monitoring, to have or operate required monitoring systems, to test or calibrate required monitoring systems, or for excessive monitoring system downtime.

O&M/Work Practice. This violation category relates to work practice, operation, or maintenance requirements. Incidents in this category include failure to perform required preventive or regular maintenance, failure to handle or store material properly, failure to install required control systems (this is a rare circumstance), operator error, negligence, or oversight, and failure to operate or maintain process or control systems. This category does not include failure to operate or maintain monitoring systems.

Opacity. This violation category includes visible emission readings that when compared with a numeric opacity standard for a point or area source (a roof monitor, or unpaved roads, for example), exceed the applicable opacity standard. If a document asserts a fugitive emission violation of a numeric opacity limit, the report lists the incident as an opacity violation, not a fugitive emission violation.

Open burning. This violation category involves a violation of the State's prohibition on open burning. There were only two incidents. In one, the contents of two metal containers were burned; in a separate incident, a wooden pallet was burned in an iron runner.

Permitting. These violations include operating air emission sources or control equipment without permits and, in one instance, operating with an expired permit.

Recordkeeping. There were only two incidents. In one, no CEM calibration records were kept; in the other, a mill failed to keep required records for a period of two years.

Reporting. These violations include failure to report excess emissions, failure to report malfunctions, failure to calculate and report emissions, and in one instance, failure to submit an affidavit of construction.

B. Water Program Violations

Certification/Training. These violations include failure to have a properly trained and certified wastewater treatment operator running a treatment facility.

Compliance Schedule Violation. These violations include failure to meet a compliance schedule deadline. In some cases, this might involve the failure to upgrade a treatment

facility within the required time, submit an approved remediation plan on time, or meet specified compliance schedule deadlines.

Effluent Violation. These are violations that relate to any exceedance of a permit limited pollutant. These limits may be concentration or load based and may represent Best Available Control Technology (BAT) limits, Water Quality Based limits (WQBL) or State or locally determined limits. These violations were almost always identified in Discharge Monitoring Reports (DMRs).

Monitoring Violation. These violations are related to failure to monitor flow or pollutants as required by a facility's NPDES permit. These violations may include failure to collect samples, failure to measure flow, failure to collect representative samples, and improper sampling.

O&M/Work Practice. These violations include violations associated with drum storage maintenance, preventive maintenance, and the failure to provide back up power to an ammonia still.

Permit Violation. These violations are related to expired permits or are related to the failure to obtain a permit.

Recordkeeping Violation. These violations are noted by inspectors as failures to have records available for inspection (e.g., DMRs, sampling logbooks, calibration records) or failure to properly maintain records (failure to update required plans or manuals, inadequate sample records, failure to have the appropriate number of years of DMRs on hand, etc).

Reporting Violation. These violations include failure to submit required reports or DMRs.

Unauthorized Discharge. These violations are due to the discharge of unpermitted pollutants, the bypass of treatment facilities, or the diversion of effluent from its appropriate sewer. Frequently, these violations were identified in spill reports.

C. RCRA Program Violations

Certification & Training Violations. These violations include the failure to provide the appropriate initial and/or annual training, failure to document annual refresher training, and failure to have certified engineers inspect and certify containment area or tank systems.

Closure Violations. These violations pertain to a failure to close a hazardous waste unit according to the approved closure plan or failure to include a unit to be closed in the plan.

Improper Disposal Violations. These violations pertain to the improper disposal of hazardous waste, either on-site or off-site.

Labeling Violations. These violations include the failure to label tanks and containers with the words "Hazardous Waste" and the absence of accumulation start dates on containers and drums.

Manifest Violations. These violations include the failure to complete manifests correctly, failure to use the appropriate waste codes or measuring units on a manifest, failure to receive the return-to-generator copy of a manifest within the required time, and the failure to initial corrections on a manifest.

Monitoring Violation. These violations pertain to ground water monitoring at a facility. If a facility is required to perform ground water monitoring, it must develop, follow and maintain a ground water sampling and analysis plan as well as maintain a network of ground water monitoring wells. This category of violation occurred outside of the review period for mills included in the study and is therefore not reported in the following tables.

Permitting Violation. These violations pertain to performing an operation that requires a permit without obtaining the required permit. The majority of the permit violations are related to storage of hazardous waste in excess of 90 days. In order to store waste over 90 days the facility must have a Part B RCRA permit. In addition, some of the permit violations relate to treating waste on-site without a Part B RCRA permit.

Recordkeeping Violations. These violations include the failure to maintain records for the appropriate length of time, failure to maintain the operating record or inspection log, failure to update records appropriately, failure to have inspection records, and failure to maintain emergency equipment logs.

Secondary Containment Violations. These violations include the failure to provide tanks with secondary containment, inadequate secondary containment, or secondary containment that is damaged or cracked.

Self-Inspection Violations. These violations include the failure to inspect the required areas/units as required. Often a failure to perform a required self-inspection will also lead to a records violation (a failure to complete the inspection log), a secondary containment violation (a proper inspection would have identified a cracked or damaged containment berm), and possibly a spill response violation (often if an inspection had been performed properly the spill would have been cleaned up in a timely manner).

Spill Prevention Violations. These violations include the failure to manage aboveground and underground tanks properly (e.g., failure to provide tanks with leak detection devices or spill/overflow controls, and incomplete or missing integrity assessments).

Spill Response Violations. These violations include the failure to operate in a manner to minimize the possibility of fire, explosion or unplanned release of waste, failure to take appropriate actions to prevent a release, failure to take leaking systems out of service, failure to note leaks in the inspection log, and failure to correct the cause of spillage/leakage.

Storage Violations. These violations primarily involve the management of containers or tanks. These violations include the failure to store containers closed at all times except when waste is being added and a failure to maintain adequate aisle space between containers.

Waste Determination Violations. These violations involve failure to perform the appropriate analysis on a waste to determine the proper method of disposal.

The following summary tables provide statistical information sorted by program area, type of violation and type of mill. Table 5 focuses on the air program. Tables 6 through 6.2 focus on the water program with separate charts for effluent violations and unauthorized discharges, and the NPDES Program and Pretreatment Program. Tables 7.1 through 7.3 focuses on the RCRA program.

TABLE 5 -- page 1

Summary of Violations and Concerns by Type of Violation: Air Quality Program

Type of Violation	Integrated Mills			Mini Mills			Total		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Asbestos Related	95	68	4	1	1	1	96	68	5
Fugitive Emissions	25	12	7	11	5	3	36	12	10
Mass Emissions -- CO	1	1	1	--	--	--	1	1	1
Mass Emissions -- H2S/SO2	5	5*	1	N/A	N/A	N/A	5	5*	1
Mass Emissions -- PM	54	48	2	4	3	2	58	48	4
Mass Emissions -- SO2	7385 _a	7384 _a	2	--	--	--	7385 ^a	7384 ^a	2
Monitoring	5	3*	2	6	6	1	11	6	3
O&M/Work Practice	44	22	6	9	6	2	53	22	8
Opacity	685 ^b	271	13	42	30	5	727 ^b	271	18
Open Burning	2	1*	2	--	--	--	2	1*	2
Permitting	7	7	1	3	3	1	10	7	2

* 1 year review mill

a 7,384 violations are related to the use of high sulfur coke oven gas as process fuel at boilers, heaters and other fuel combustion sources throughout one mill.

b It was not possible to determine from the available documentation whether 169 of these violations at one facility occurred on separate days.

TABLE 5 -- page 2

Summary of Violations and Concerns by Type of Violation: Air Quality Program

Type of Violation	Integrated Mills			Mini Mills			Total		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Recordkeeping	14	12	3	--	--	--	14	12	3
Reporting	7	2*	4	--	--	--	7	2*	4
Miscellaneous	1	1	1	--	--	--	1	1	1
Concerns	5	5	1	1	1	1	6	5	2
Total	8335	7724	14	77	41	6	8412	7724	20

* 1 year review mill

TABLE 6

Summary of Violations and Concerns by Type of Violation: NPDES and Pretreatment Programs

Type of Violations or Concerns	NPDES -- Integrated Mills			NPDES -- Mini Mills			POTW -- Integrated Mills			POTW -- Mini Mills			Totals		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Certification/Training	2	1	2	--	--	--	--	--	--	--	--	--	2	1	2
Compliance Schedule	13	5	3	--	--	--	--	--	--	--	--	--	13	5	3
Effluent Violation	1579 (207)	865 (70)	13	318 (99)	177 (36)	10	754 (23)	572 (14)	2	66 (16)	47 (16)	5	2717 (345)	865 (70)	27
Monitoring	50	20	5	--	--	--	1	1	1	1	1	1	52	21	6
Permitting	1	1*	1	--	--	--	--	--	--	--	--	--	1	1*	1
Recordkeeping	1	1*	1	--	--	--	--	--	--	--	--	--	1	1*	1
Reporting	17	8	3	--	--	--	1	1	1	--	--	--	18	8	3
Unauthorized Discharge	511	262	11	208	190	3	44	41	2	3	3	1	766	265	14
O&M/Work Practice	2	1	2	1	1*	1	1	1	1	--	--	--	4	2	3
Concerns	302	132	13	72	25	8	28	27	2	5	4	2	407	132	22
Total	2478 (207)	1079 (70)	14	599 (99)	393 (36)	13	829 (23)	642 (22)	3	75 (16)	55 (16)	5	3981 (345)	1079 (70)	31

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report.

TABLE 6.1.1.1 -- page 1a

Summary of Integrated Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	7 (1)	4 (1)	2	6 (1)	6 (1)	1	12 (1)	11 (1)	2	3	2	2	5	5	1
Coke Plant TS	--	--	--	1 (1)	1* (1*)	1	5	5*	1	15 (9)	15* (9*)	1	7 (3)	7* (3*)	1
Sinter Plant	84 (21)	84 (21)	1	--	--	--	2	2	1	--	--	--	--	--	--
Blast Furnace	682 (36)	662 (36)	4	13 (4)	8 (2)	3	9	6*	3	23 (13)	17 (10)	4	3 (1)	2 (1)	2
Blast Furnace RS	10 (4)	6 (3)	3	12	12	1	2	2	1	11 (3)	7 (1)	3	8 (1)	4*	3
Basic Oxygen Furnace	--	--	--	1	1	1	1	1	1	4	4	1	2	2	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	7 (3)	7 (3)	1	2	2	1
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	18 (2)	17 (1)	2	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	1	1	1	5 (3)	2*	3	23 (1)	14	5

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater
^a A separate breakout by metal is provided in Table 6.1.1.1.a, which follows this table.

TABLE 6.1.1.1 -- page 1b

Summary of Integrated Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	32 (28)	32 (28)	1	13	9	3
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	3	3	1	7	7	1
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	4	4*	1	1	1*	1	13	13*	1
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	14 (5)	14 (5)	1	4	4	1
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	6	6	1	3	3	1
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	2	2	1	20 (5)	14 (4)	2	14 (5)	12 (5)	2
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	2	1	2
Central Treatment Plant	3	3	1	--	--	--	--	--	--	48 (10)	28 (7)	4	55 (1)	44 (1)	4
Other Independent Treatment System	--	--	--	--	--	--	2	2*	1	2	2	1	1	1	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.1.1.a, which follows this table.

TABLE 6.1.1.1 -- page 1c

Summary of Integrated Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	24 (2)	15	2	--	--	--
General: WW/SW Conveyance	4	3*	2	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	1	1	1	1	1	1	6	4	2	16 (7)	15 (7)	2	1	1	1
General: Landfill	--	--	--	--	--	--	6 (2)	6* (2*)	1	--	--	--	7 (2)	7* (2*)	1
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	1 (1)	1* (1*)	1	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	4	4	1
Total	791 (62)	753 (60)	5	34 (6)	21 (2)	4	52 (3)	22 (1)	7	253 (91)	113 (43)	9	174 (14)	83 (7)	11

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.1.1.a, which follows this table.

TABLE 6.1.1.1 -- page 2a

Summary of Integrated Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	33 (3)	16 (2)	3
Coke Plant TS	9 (5)	9* (5*)	1	--	--	--	14	14*	1	--	--	--	51 (18)	51* (18*)	1
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	86 (21)	86 (21)	1
Blast Furnace	--	--	--	--	--	--	1	1*	1	--	--	--	731 (54)	663 (36)	8
Blast Furnace RS	7 (2)	5 (1)	2	--	--	--	--	--	--	--	--	--	50 (10)	22 (5)	5
Basic Oxygen Furnace	--	--	--	--	--	--	14	14	1	--	--	--	22	21	2
Basic Oxygen Furnace RS	3 (1)	3 (1)	1	--	--	--	--	--	--	--	--	--	12 (4)	12 (4)	1
Miscellaneous Steelmaking	1	1*	1	--	--	--	--	--	--	--	--	--	19 (2)	17 (1)	2
Miscellaneous Steelmaking RS/TS	2	2*	1	--	--	--	1	1*	1	--	--	--	3	3*	1
Hot Forming/Hot Mill	--	--	--	--	--	--	1	1	1	--	--	--	30 (4)	15 (1)	6

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1 -- page 2b

Summary of Integrated Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	6	4*	2	--	--	--	91	73	2	--	--	--	142 (28)	114 (28)	4
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	10	10	1
Finishing -- Cold Mill/Annealing TS	1 (1)	1* (1*)	1	--	--	--	--	--	--	--	--	--	19 (1)	19* (1*)	1
Finishing -- Cold Mill/Annealing/Pickling TS	8 (4)	8 (4)	1	16	16	1	3	3	1	--	--	--	45 (9)	45 (9)	1
Finishing -- Pickling	2	2	1	--	--	--	5	3*	2	--	--	--	16	11	3
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	3 (1)	3 (1)	1	--	--	--	5	5	1	--	--	--	44 (11)	31 (9)	2
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	2	1	2
Central Treatment Plant	23 (10)	9* (5*)	5	--	--	--	30	17*	4	--	--	--	159 (21)	91 (12)	9
Other Independent Treatment System	2	1	2	--	--	--	2	1	2	--	--	--	9	4	3

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1 -- page 2c

Summary of Integrated Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	16 (7)	13* (7*)	2	--	--	--	--	--	--	--	--	--	40 (9)	22* (9*)	3
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	4	3*	2
General: Buildings & Grounds	--	--	--	--	--	--	5	2	3	--	--	--	30 (7)	21 (7)	5
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	13 (4)	13* (4*)	1
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	1 (1)	1* (1*)	1
No Process Indicated	--	--	--	--	--	--	3	2	2	1	1	1	8	4	4
Total	83 (31)	22* (12*)	10	16	16	1	175	109	9	1	1	1	1579 (207)	865 (70)	13

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1a -- page 1a

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--
Coke Plant TS	--	--	--	--	--	--	--	--	--	6 (3)	6* (3*)	1	--	--	--
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	17 (10)	17 (10)	1	--	--	--
Blast Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	2 (2)	2 (2)	1	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1a -- page 1b

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	32 (28)	32 (28)	1	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	6 (1)	6 (1)	1	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	12 (1)	12 (1)	1	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1a -- page 1c

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
General: Intake	9 (2)	9* (2*)	1	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	15 (7)	15 (7)	1	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/ Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	9 (2)	9* (2*)	1	18 (2)	18 (2)	1	34 (30)	34 (30)	1	39 (20)	33 (17)	2	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1a -- page 2a

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1	3	2	2
Coke Plant TS	9 (6)	9* (6*)	1	--	--	--	--	--	--	--	--	--	--	--	--	15 (9)	15* (9*)	1
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	4 (2)	2* (2*)	2	2 (1)	1 (1)	2	23 (13)	17 (10)	4
Blast Furnace RS	--	--	--	--	--	--	--	--	--	3 (1)	2	2	8 (2)	5 (1)	3	11 (3)	7 (1)	3
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	--	--	--	4	4	1	4	4	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	7 (3)	7 (3)	1	7 (3)	7 (3)	1
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	1 (1)	1* (1*)	1	17 (1)	17 (1)	1	18 (2)	17 (1)	2
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	1	1*	1	2 (1)	1 (1)	2	5 (3)	2*	3

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1a -- page 2b

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32 (28)	32 (28)	1
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	1	1	1	2	2	1	3	3	1
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	1	1*	1	--	--	--	1	1*	1
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	14 (5)	14 (5)	1	14 (5)	14 (5)	1
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	6	6	1	6	6	1
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	14 (4)	14 (4)	1	20 (5)	14 (4)	2
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	1	1*	1	35 (9)	28 (7)	3	48 (10)	28 (7)	4
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1	2	2	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.1a -- page 2c

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	15	15	1	24 (2)	15	2
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	16 (7)	15 (7)	2
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	1 (1)	1* (1*)	1	1 (1)	1* (1*)	1
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	9 (6)	9* (6*)	1	--	--	--	--	--	--	12 (4)	4* (3*)	4	132 (27)	75 (12)	6	253 (91)	113 (43)	9

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2 -- page 1a

Summary of Integrated Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	16 (3)	12 (1)	2	478 (9)	337 (1)	2	--	--	--	2	2	1	25 (2)	17	2
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	11	11	1	--	--	--
Blast Furnace RS	2 (1)	2 (1)	1	11 (1)	11 (1)	1	--	--	--	6 (1)	6 (1)	1	--	--	--
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	144 (2)	144 (2)	1	--	--	--
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	2	2	1	--	--	--
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater
^a A separate breakout by metal is provided in Table 6.1.1.2.a, which follows this table.

TABLE 6.1.1.2 -- page 1b

Summary of Integrated Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	1 (1)	1 (1)	1	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	8 (1)	8 (1)	1	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater
^a A separate breakout by metal is provided in Table 6.1.1.2.a, which follows this table.

TABLE 6.1.1.2 -- page 1c

Summary of Integrated Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	3 (2)	3 (2)	1	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--
Total	18 (4)	12 (1)	2	490 (11)	349 (3)	2	--	--	--	177 (6)	166 (6)	2	25 (2)	17	2

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.1.2.a, which follows this table.

TABLE 6.1.1.2 -- page 2a

Summary of Integrated Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	--	--	--	--	--	--	1	1	1	--	--	--	522 (14)	351 (5)	2
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	11	11	1
Blast Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	19 (3)	19 (3)	1
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	--	--	--	144 (2)	144 (2)	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	29	29	1	--	--	--	31	31	1
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2 -- page 2b

Summary of Integrated Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	1 (1)	1 (1)	1
Finishing -- Pickling	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	3	3	1	--	--	--	11 (1)	11 (1)	1
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	7	7	1	--	--	--	7	7	1
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2 -- page 2c

Summary of Integrated Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	1	1	1	--	--	--	4 (2)	4 (2)	1
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	2	2	1	--	--	--	3	3	1
Total	--	--	--	--	--	--	44	43	2	--	--	--	754 (23)	572 (14)	2

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2a -- page 1a

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	11	11	1
Blast Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	--	--	--	24 (2)	24 (2)	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2a -- page 1b

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	2	2	1	3 (1)	3 (1)	1
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2a -- page 1c

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	2 (2)	2 (2)	1
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	2	2	1	44 (5)	33 (5)	2

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2a -- page 2a

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	2	2	1
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	11	1
Blast Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	3 (1)	3 (1)	1	6 (1)	6 (1)	1
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	120	120	1	--	--	--	144 (2)	144 (2)	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	2	2	1	--	--	--	2	2	1
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2a -- page 2b

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	1	1	1	2	2	1	8 (1)	8 (1)	1
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.1.2a -- page 2c

Summary of Integrated Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	3 (2)	3 (2)	1
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Total	--	--	--	--	--	--	--	--	--	126	126	1	5 (1)	5 (1)	1	177 (6)	166 (6)	2

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1 -- page 1a

Summary of Mini Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	34 (18)	31 (17)	2	4 (4)	4 (4)	1
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	4 (3)	4* (3*)	1	5	5*	1
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	7 (2)	7 (2)	1	4	4	1
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	8 (2)	6 (2)	2	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	1	1	1	39 (19)	38 (18)	2	2 (1)	2 (1)	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.2.1.a, which follows this table.

TABLE 6.1.2.1 -- page 1b

Summary of Mini Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	15 (8)	15 (8)	1	4 (1)	3 (1)	2
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	1 (1)	1 (1)	1
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
Other Independent Treatment System	--	--	--	--	--	--	16 (8)	15* (8*)	2	2 (2)	2* (2*)	1	2 (1)	1 (1)	2
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	2	2*	1
General: Landfill	--	--	--	--	--	--	--	--	--	3 (2)	3* (2*)	1	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	2 (1)	2 (1)	1	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.2.1.a, which follows this table.

TABLE 6.1.2.1 -- page 1c

Summary of Mini Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	3	3*	1
Total	--	--	--	--	--	--	17 (8)	15* (8*)	3	114 (57)	65 (29)	6	30 (8)	10 (2)	5

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.2.1.a, which follows this table.

TABLE 6.1.2.1 -- page 2a

Summary of Mini Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Miscellaneous Steelmaking RS/TS	5 (1)	4 (1)	2	--	--	--	--	--	--	--	--	--	43 (23)	39 (22)	2
Hot Forming/Hot Mill	1 (1)	1 (1)	1	--	--	--	6	6	1	--	--	--	16 (4)	7 (1)	3
Hot Forming/Hot Mill RS	20 (13)	20* (13*)	1	--	--	--	--	--	--	--	--	--	21 (13)	20* (13*)	2
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	23	23	1	--	--	--	34 (2)	34 (2)	1
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Finishing -- Pickling	9 (5)	9 (5)	1	--	--	--	15	14	2	--	--	--	32 (7)	16	2
Finishing -- Pickling TS	9 (3)	8 (3)	2	--	--	--	26	24	2	--	--	--	77 (23)	73 (22)	3

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1 -- page 2b

Summary of Mini Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	2 (1)	2 (1)	1	--	--	--	21	11	2	--	--	--	42 (10)	31 (10)	2
Unspecified Process Mills	--	--	--	--	--	--	5	5	1	--	--	--	6 (1)	5	2
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
Other Independent Treatment System	3 (1)	2*	2	--	--	--	2	2	1	--	--	--	25 (12)	15* (8*)	5
General: Intake	1	1	1	--	--	--	--	--	--	--	--	--	1	1	1
General: WW/SW Conveyance	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
General: Buildings & Grounds	2 (1)	2* (1*)	1	--	--	--	4	3	2	--	--	--	8 (1)	4* (1*)	3
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	3 (2)	3* (2*)	1
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	2 (1)	2 (1)	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1 -- page 2c

Summary of Mini Mill Effluent Violations by Pollutant and Process: NPDES Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	3	3*	1
Total	52 (26)	20* (13*)	6	--	--	--	105	88	2	--	--	--	318 (99)	177 (36)	10

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1a -- page 1a

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	20 (9)	20 (9)	1	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	3 (1)	3 (1)	1	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	6 (2)	6 (2)	1	--	--	--
Finishing -- Pickling TS	--	--	--	26 (13)	26 (13)	1	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1a -- page 1b

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	2 (1)	2 (1)	1	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1a -- page 1c

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/ Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	51 (24)	29 (14)	2	--	--	--	6 (2)	6 (2)	1	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1a -- page 2a

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	14 (9)	11 (8)	2	34 (18)	31 (17)	2
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	4 (3)	4* (3*)	1	4 (3)	4* (3*)	1
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	4 (1)	4 (1)	1	--	--	--	--	--	--	7 (2)	7 (2)	1
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1	8 (2)	6 (2)	2
Finishing -- Pickling TS	--	--	--	--	--	--	12 (5)	12 (5)	1	--	--	--	1 (1)	1 (1)	1	39 (19)	38 (18)	2

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1a -- page 2b

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	15 (8)	15 (8)	1	15 (8)	15 (8)	1
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	2 (2)	2* (2*)	1	2 (2)	2* (2*)	1
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	3 (2)	3* (2*)	1	--	--	--	--	--	--	--	--	--	3 (2)	3* (2*)	1
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2 (1)	2 (1)	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.1a -- page 2c

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: NPDES Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	3 (2)	3* (2*)	1	16 (6)	16 (6)	1	--	--	--	38 (23)	20 (9)	4	114 (57)	65 (29)	6

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2 -- page 1a

Summary of Mini Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	10	10*	1	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	39 (15)	39 (15)	1	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.2.2.a, which follows this table.

TABLE 6.1.2.2 -- page 1b

Summary of Mini Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	1	1*	1	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	2 (1)	1	2	--	--	--
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	7	6*	2	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

^a A separate breakout by metal is provided in Table 6.1.2.2.a, which follows this table.

TABLE 6.1.2.2 -- page 1c

Summary of Mini Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals ^a			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	59 (16)	40 (16)	5	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater
^a A separate breakout by metal is provided in Table 6.1.2.2.a, which follows this table.

TABLE 6.1.2.2 -- page 2a

Summary of Mini Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	10	10*	1
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	1	1	1	--	--	--	6	6	1	--	--	--	46 (15)	46 (15)	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2 -- page 2b

Summary of Mini Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	2 (1)	1	2
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	7	6*	2
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2 -- page 2c

Summary of Mini Mill Effluent Violations by Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Total Suspended Solids			Toxicity			pH			Not Indicated			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1	1	1	--	--	--	6	6	1	--	--	--	66 (16)	47 (16)	5

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2a -- page 1a

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	10	10*	1	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	12 (4)	12 (4)	1	1	1	1	1	1	1	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2a -- page 1b

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	1 (1)	1 (1)	1	--	--	--	--	--	--	--	--	--
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	1	1*	1	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2a -- page 1c

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants														
	Al			Cr			Cu			Fe			Hg		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	13 (5)	13 (5)	1	12	11*	2	1	1	1	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2a -- page 2a

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10	10*	1
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	25 (11)	25 (11)	1	--	--	--	--	--	--	39 (15)	39 (15)	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2a -- page 2b

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	1	1*	1	--	--	--	1	1*	1
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1	2 (1)	1	2
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	6	6*	1	7	6*	2
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.1.2.2a -- page 2c

Summary of Mini Mill Effluent Violations by Metal Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Mn			Mo			Ni			Pb			Zn			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	25 (11)	25 (11)	1	1	1*	1	7	6*	2	59 (16)	40 (16)	5

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.1 -- page 1a

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	4	3	2
Coke Plant TS	--	--	--	--	--	--	4	4*	1	1	1*	1	--	--	--	--	--	--
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Blast Furnace	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	9	5	3
Blast Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	1*	4
Basic Oxygen Furnace	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	2	2	1	--	--	--	123	117	5

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.1 -- page 1b

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10	8	2
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	3	2	2	--	--	--	21	13	2
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	1	1	1	1	1*	1	2	2	1
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8	7	2
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	2
Central Treatment Plant	1	1*	1	--	--	--	--	--	--	--	--	--	--	--	--	6	2*	4
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	16	12	3	--	--	--	1	1*	1

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.1 -- page 1c

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	1	1*	1	--	--	--	--	--	--
General: Buildings & Grounds	1	1	1	--	--	--	--	--	--	5	3	3	--	--	--	28	24	4
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	1	1*	1	--	--	--	12	9	3
Total	3	2	2	--	--	--	4	4*	1	34	14	7	1	1*	1	234	163	10

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.1 -- page 2a

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	2	1	2	--	--	--	4	4	1	1	1	1	--	--	--	1	1	1	13	8	3
Coke Plant TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1	6	6*	1
Sinter Plant	1	1	1	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Blast Furnace	17	14	4	3	3	1	1	1	1	8	7	2	--	--	--	2	1*	2	41	24	7
Blast Furnace RS	42	37	4	7	4	3	1	1	1	3	2	2	--	--	--	--	--	--	57	42	7
Basic Oxygen Furnace	10	4	3	1	1*	1	9	9	1	4	4	1	--	--	--	--	--	--	26	17	3
Basic Oxygen Furnace RS	15	15*	1	1	1*	1	--	--	--	--	--	--	--	--	--	--	--	--	18	16*	2
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--	1	1*	1	2	1*	2
Hot Forming/Hot Mill	18	6	5	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1	146	123	6

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.1 -- page 2b

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	2	1*	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12	8	4
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	4	4	1	--	--	--	2	1*	2	30	17	4
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	9*	1	9	9*	1
Finishing -- Pickling	1	1	1	--	--	--	--	--	--	5	2	3	2	2	1	--	--	--	12	8	3
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	12	6*	3	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	21	9	3
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	2
Central Treatment Plant	2	1	2	--	--	--	--	--	--	11	6*	3	--	--	--	3	2*	2	23	9*	6
Other Independent Treatment System	3	2	2	--	--	--	--	--	--	--	--	--	2	2*	1	--	--	--	22	12	5

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.1 -- page 2c

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	1	1	1	--	--	--	--	--	--	1	1	1	--	--	--	1	1*	1	4	1*	4
General: Buildings & Grounds	9	9	1	1	1	1	--	--	--	3	3	1	1	1	1	--	--	--	48	39	6
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1	1	1*	1
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13	9	4
Total	135	65	6	15	8	5	15	14	2	40	24	5	5	3	2	25	10*	8	511	262	11

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.2 -- page 1a

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--	1	1	1
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	2	2	1	--	--	--	--	--	--
Blast Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.2 -- page 1b

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.2 -- page 1c

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1	1	1	1	1	1	--	--	--	2	2	1	--	--	--	3	2	2

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.2 -- page 2a

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1	6	4	2
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
Blast Furnace RS	--	--	--	2	2	1	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1	2	2	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1	--	--	--	2	2	1
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.2 -- page 2b

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	12	12	1	1	1	1	--	--	--	--	--	--	1	1	1	14	14	1
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	2	2	1
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	2	2	1	1	1	1	--	--	--	1	1	1	3	3	1	2	2	1	9	9	1
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.1.2 -- page 2c

Summary of Integrated Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	2	2	1
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	4	3	2	15	15	1	1	1	1	1	1	1	7	7	1	9	9	1	44	41	2

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.1 -- page 1a

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	4	4	1	4	4	1	16	16	1
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28	28	1
Finishing -- Cold Mill/Annealing	5	5	1	--	--	--	--	--	--	1	1	1	--	--	--	22	19	2
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	2	2	1	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Finishing -- Pickling TS	5	5	1	--	--	--	--	--	--	2	2	1	--	--	--	4	4	1

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.1 -- page 1b

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18	15	2
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	4	1
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
General: Buildings & Grounds	3	3	1	--	--	--	--	--	--	5	4	2	--	--	--	11	11	1
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.1 -- page 1c

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Total	15	15	1	--	--	--	--	--	--	12	11	2	4	4	1	114	107	2

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.1 -- page 2a

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	1	1	1	3	3	1	1	1	1	--	--	--	29	29	1
Hot Forming/Hot Mill RS	1	1	1	--	--	--	--	--	--	2	2	1	--	--	--	--	--	--	31	31	1
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	3	3	1	2	2	1	1	1	1	34	31	2
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	1	1	1	--	--	--	1	1	1	1	1	1	5	3	2	--	--	--	13	10	2
Finishing -- Pickling TS	3	3	1	--	--	--	5	5	1	4	4	1	10	10	1	3	3	1	36	36	1

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

US EPA ARCHIVE DOCUMENT

TABLE 6.2.2.1 -- page 2b

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	2	2	1	--	--	--	--	--	--	1	1	1	21	18	2
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	4	1
Central Treatment Plant	--	--	--	7	7	1	--	--	--	--	--	--	--	--	--	--	--	--	7	7	1
Other Independent Treatment System	1	1	1	--	--	--	--	--	--	1	1	1	1	1	1	--	--	--	4	3	2
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	1	1	1	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--	4	4	1
General: Buildings & Grounds	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20	19	2
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

US EPA ARCHIVE DOCUMENT

TABLE 6.2.2.1 -- page 2c

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: NPDES Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Total	8	8	1	7	7	1	10	10	1	14	14	1	19	16	2	5	5	1	208	190	3

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.2 -- page 1a

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.2 -- page 1b

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																	
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.2 -- page 1c

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																		
	Acid/Acid Rinsewater			Ammonia			Cyanide			Miscellaneous			Miscellaneous Metals			Oil/Grease			
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.2 -- page 2a

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1	3	3	1

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.2 -- page 2b

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 6.2.2.2 -- page 2c

Summary of Mini Mill Unauthorized Discharges by Pollutant and Process: Pretreatment Program

Process	Pollutants																				
	Process Water			Undesignated Recycle Water			Total Suspended Solids			Turbidity/Color/Foam			pH			Not Identified			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1	3	3	1

* 1 year review mill TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 7.1

Summary of Integrated Mill Violations and Concerns by Type of Violation: RCRA Program

Type of Violation	No Release Potential			Release Potential			Actual Release			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Certification/Training	1	1*	1	--	--	--	--	--	--	1	1*	1
Closure	2	1*	2	--	--	--	--	--	--	2	1*	1
Improper Disposal	--	--	--	--	--	--	1	1*	1	1	1*	1
Labeling	17	6*	5	2	1	2	--	--	--	19	6*	6
Manifest	9	4	5	--	--	--	--	--	--	9	4	5
Permitting	6	3	2	--	--	--	--	--	--	6	3	2
Recordkeeping	16	5	6	--	--	--	--	--	--	16	5	6
Secondary Containment	1	1*	1	8	3*	4	--	--	--	9	3*	4
Self-Inspections	1	1	1	1	1*	1	--	--	--	2	1*	2
Spill Prevention	2	1	2	14	6	6	2	2	1	18	7	6
Spill Response	1	1*	1	1	1*	1	7	2*	5	9	3*	5
Storage	--	--	--	6	4	2	--	--	--	6	4	2
Waste Determination	6	4	3	--	--	--	--	--	--	6	4	3
Concerns	4	3*	2	2	1	2	--	--	--	6	1	2
Total	66	15	10	34	8	7	10	4	6	110	26	10

Type of Violation	No Release Potential			Release Potential			Actual Release			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills

Note: Four integrated mills were included in the 5 year review, all were inspected during the five year period. Ten integrated mills were included in the one year review. Six of the ten were inspected in 1995.

* 1 year review mill

TABLE 7.2

Summary of Mini Mill Violations and Concerns by Type of Violation: RCRA Program

Type of Violation	No Release Potential			Release Potential			Actual Release			Total		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Certification/Training	2	2	1	--	--	--	--	--	--	2	2	1
Closure	--	--	--	--	--	--	--	--	--	--	--	--
Improper Disposal	--	--	--	--	--	--	1	1	1	1	1	1
Labeling	6	4	3	--	--	--	--	--	--	6	4	3
Manifest	2	2	1	--	--	--	--	--	--	2	2	1
Permitting	5	4	2	--	--	--	1	1	1	6	5	2
Recordkeeping	20	10	4	--	--	--	--	--	--	20	10	4
Secondary Containment	--	--	--	2	1	2	--	--	--	2	1	2
Self-Inspections	4	2*	3	--	--	--	--	--	--	4	2*	3
Spill Prevention	--	--	--	4	2	3	--	--	--	4	2	3
Spill Response	--	--	--	--	--	--	3	2	2	3	2	2
Storage	6	4	2	1	1	1	3	2	2	10	6	3
Waste Determination	1	1	1	--	--	--	--	--	--	1	1	1
Concerns	--	--	--	--	--	--	--	--	--	--	--	--
Total	46	28	5	7	3	3	8	5	3	61	36	5

Type of Violation	No Release Potential			Release Potential			Actual Release			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills

Note: Three mini mills were included in the 5 year review, all were inspected during the five year period. Seventeen mini mills were included in the 1 year review. Four of the seventeen were inspected in 1995.

* 1 year review mill

TABLE 7.3

**Combined Summary of Integrated and Mini Mill
 Violations and Concerns by Type of Violation: RCRA Program**

Type of Violation	No Release Potential			Release Potential			Actual Release			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Certification/Training	3	2	2	--	--	--	--	--	--	3	2	2
Closure	2	1*	2	--	--	--	--	--	--	2	1*	1
Improper Disposal	--	--	--	--	--	--	2	1*	2	2	1*	2
Labeling	23	6*	8	2	1	2	--	--	--	25	6*	9
Manifest	11	4	6	--	--	--	--	--	--	11	4	6
Permitting	11	4	4	--	--	--	1	1	1	12	5	4
Recordkeeping	36	10	10	--	--	--	--	--	--	36	10	10
Secondary Containment	1	1*	1	10	3*	6	--	--	--	10	3*	6
Self-Inspections	5	2*	4	1	1*	1	--	--	--	6	2*	5
Spill Prevention	2	1	2	18	6	9	2	2	1	22	7	9
Spill Response	1	1*	1	1	1*	1	10	2*	7	12	3*	7
Storage	6	4	2	7	4	3	3	2	2	16	6	5
Waste Determination	7	4	4	--	--	--	--	--	--	7	4	4
Concerns	4	3*	2	2	1	2	--	--	--	6	3*	2
Total	112	28	15	41	8	10	18	5	9	171	36	15

Type of Violation	No Release Potential			Release Potential			Actual Release			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills

* 1 year review mill

IV. VIOLATIONS BY TYPE OF PROCESS

Tables breaking out violations and concerns by the type of process reflect process descriptions that are the most meaningful for each program area. For example, in most cases, air quality violations can be readily identified with specific steel mill processes. In contrast, surface water issues frequently involve a combination of steel mill processes, or are related to the entire plant, the stormwater sewer system, or other aspects of the site that do not involve a specific process. Most hazardous waste issues pertain to buildings, storage sites, closed disposal sites, etc., and usually involve waste tracking and other administrative requirements that are not related to specific steel mill processes. These differences are reflected in the process descriptions used to tabulate violations in this chapter of the report.

The following table summarizes and compares the steel mill process descriptions used in this report. It is followed by a description of each general process category.

A Comparison of Steel Mill Process Descriptions Used in this Report

General Category	Process Descriptions Used in this Report		
	Air Program	Water Program	RCRA Program
Coke Ovens	Coke Oven	Coke Plant	Coke Plant
Sinter Plant	Sinter Plant	Sinter Plant	--
Blast Furnace	Blast Furnace	Blast Furnace	Blast Furnace
Basic Oxygen Furnace (BOF)	BOF	BOF	BOF
Electric Arc Furnace (EAF)	EAF	EAF	EAF
Secondary Steelmaking	Secondary Steelmaking	--	--
Hot Forming/Hot Mill	Hot Forming/Hot Mill	Hot Forming/Hot Mill	Hot Forming/Hot Mill
Finishing	Cold Mill/Annealing Pickling Coating	Cold Mill/Annealing Pickling Coating	Cold Mill/Annealing Pickling Coating
General Mill/Buildings and Grounds	Buildings and Grounds Plant Roads/Yards Iron Dumping Asbestos Removal	Buildings and Grounds Wastewater/Stormwater Conveyance Landfill Underground Storage Tanks Intake Monitoring Program General Recordkeeping/ Reporting	Buildings and Grounds Laboratory
Non-Process Specific Wastewater Treatment Plants	--	Central Treatment Plant Other Independent Treatment Systems	Wastewater Treatment Plant
RCRA Waste Accumulation Areas	--	--	Landfill Waste Pile Surface Impoundment Satellite Accumulation Area HW Storage Area
General RCRA Processes	--	--	Monitoring Permitting Plans Recordkeeping Reporting Training Waste Analysis Closure Financial Assurance Inspections Labeling Manifest
Boilers/Heaters/Other Fuel Combustion Sources	Boilers/Heaters/Other Fuel Combustion	--	--
Miscellaneous	Miscellaneous	Miscellaneous	--

Coke Ovens/Coke Plant. Coke ovens are tall, narrow, refractory-lined chambers used to remove volatile constituents from coal to make coke, a material needed to produce iron in the blast furnace. Coke ovens are arranged in series (batteries) and may include more than 100 ovens. The coke ovens alternate with heating chambers where fuel is burned to heat the walls of the coking chambers. As volatile constituents evolve from the coal during heating, they are routed to distillate recovery operations (by-product recovery plants). Non-recovery coke oven batteries were not included in this study. Major steps in the process include charging individual ovens, heating (coking), pushing, and quenching hot coke. Air program noncompliance incidents may involve coke oven lids, doors, oftakes, collector mains, charging, flaring, pushing, travel (quench car), quenching, by-product recovery, combustion (or underfiring) stacks, or material handling. (In response to the request of a commenter on an earlier draft of this report, violations related to these specific coke oven processes are tabulated separately in the following air program tables.) Water program noncompliance incidents may involve quenching, by product recovery, cross-contamination of non-contact cooling waters with process waters, or wastewater physical/chemical treatment at the coke plant treatment system. RCRA related noncompliance issues at coke ovens are primarily associated with coke plant by-products and their treatment. The majority of RCRA violations and concerns tend to involve the mismanagement of coke by-products in containers and/or tanks and relate to spill prevention, storage, secondary containment, and labeling.

Sinter Plant. Sintering is a process for fusing iron-bearing fines into a hard clinker suitable for use in blast furnaces by passing iron-bearing fines through a traveling-grate hearth (sinter strand). It is capable of converting a wide variety of iron ore fines (iron-bearing blast furnace dusts and sludges, mill scales, and steelmaking dusts and iron-bearing dusts and sludges collected from air and water pollution control processes) into a high-quality blast furnace burden material. The sinter feed mix travels under an ignition hood, where it ignites, beginning the sintering process. As the sinter strand moves out of the ignition zone, air is drawn downward through the bed into windboxes under the traveling grate. As air is drawn through the sinter bed, the solid fuel in the mix burns at temperatures sufficient to fuse the raw materials into a hard clinker material. This category includes conveyors, transfer points, material handling, sinter strands, sinter strand controls, and crushing, screening, and cooling system controls. Air compliance problems, when they occur, may involve wet particulate scrubbing systems or fugitive emissions. Water program noncompliance incidents may involve the gas cleaning system or the subsequent treatment of the wastewater generated by gas cleaning at the blast furnace recycle system. There are no RCRA-listed wastes specific to sinter plant operations; however, hazardous wastes may be generated during machine maintenance activities at this process. There were no RCRA violations directly related to sinter plant operations at the mills included in this study.

Blast Furnace (BF). Flux, iron ore, and coke are charged into the refractory-lined blast furnace to produce molten iron. These materials combine and react in the furnace in the presence of a heated airstream introduced near the base of the furnace to form molten iron and slag. The blast furnace operates continuously and is tapped periodically. A hole

is drilled through the material sealing the taphole to allow the molten iron to spill into a trough and flow through a series of runners to a transfer station where it pours into cars for transfer to the steelmaking process. Slag, which is lighter than molten iron and contains impurities, begins to flow from the furnace toward the end of a cast. Slag is separated from the molten iron with skimmers and travels through a series of runners to pits where it may be quenched (cooled). The furnace rises above shelters designed to enclose the casting operation (casthouse). As a result, the blast furnace category includes iron runners, slag runners, skimmers, tilting spout or torpedo/pugh car station, kish and slag pot cooling/wetting stations, slag pot desulfurization, slag pits, the blast furnace, blast furnace stoves, and cast house roof monitors. Air program compliance problems at the blast furnace may involve high opacity related to fugitive emissions during drilling, tapping, casting, slag removal and slag quenching. Water program noncompliance incidents at this process and related slag quenching operations may involve overflows from cooling tower hot or cold wells, hydraulic imbalances, cross-contamination of blast furnace process water and non-contact cooling water, incomplete collection of contaminated water from blast furnace gas seals, loss of slag quench water, and the cleaning and cooling of exhaust gases. There are no RCRA listed wastes specific to blast furnace operations; however, hazardous wastes may be generated during machine maintenance activities at this process. In this study, there was one spill prevention violation associated with a blast furnace.

Basic Oxygen Furnace (BOF). This process utilizes refractory-lined vessels to convert molten iron and scrap into steel. Scrap and iron are charged to the vessel, flux is added, and oxygen is injected to drive the process. Alloys may be added to the molten steel in the vessel, or added later. Other processes in the BOF shop (ladle treatment, for example) are included in this category if agency documents describe a BOF shop incident without identifying the source; that is, BOF vessels may not be responsible for all BOF incidents in this report (especially opacity violations). These sources precede and follow the BOF process and are often located in the BOF shop. Air program compliance problems at the BOF typically involve fugitive emissions from roof vents in the BOF shop. Water program noncompliance incidents at this process may involve off-gas control systems, which may include wet gas BOF recycle systems (semi-wet, wet-open combustion, and wet-suppressed combustion), and non-contact cooling water. There are no RCRA listed hazardous wastes associated with BOF steelmaking; however, BOF related dusts may need to be evaluated at times to determine if they should be characterized as hazardous because of constituents such as lead and other heavy metals. Also, hazardous wastes may be generated during machine maintenance activities in the BOF building.

Electric Arc Furnace (EAF). EAFs are refractory lined vessels which melt and refine scrap using electric current and carbon electrodes which strike an arc in the furnace. A roof swings away and a crane drops cold or preheated scrap in the bottom of the furnace. Molten iron may also be charged to an EAF. The roof swings back into position, electrodes are positioned above the charge, and immense current is applied. Typically, at least three oxy-fuel burners are turned on during the first 5 to 10 minutes of the

heat in order to accelerate melting. Slag is poured from the bath and the furnace is tapped when established goals for temperature and composition are reached. Alloys are added directly to the furnace or to the tapping ladle, if needed. Though there are periods during a melt cycle that are characteristically more emissive than others, documents citing violations seldom establish dependence between violations and a particular period of the melt cycle. Air program compliance problems, again, most often involve fugitive emissions from roof panels in the EAF buildings. No water program noncompliance incidents have been identified at this process. Like violations occurring at the coke plant, the RCRA related violations associated with EAF operations involve the mismanagement of regulated wastes (EAF dust and sludge). The greatest number of RCRA violations at EAFs relate to spill prevention, labeling, spill response, and storage of the dust and sludge.

Secondary/Miscellaneous Steelmaking. Processes used to further refine steel in ladles or special vessels to remove carbon, oxygen, or other elements, or to obtain specific qualities or characteristics are a secondary step of the steelmaking process which typically follow initial refining (sulfur may be removed prior to initial refining). This category includes ladle metallurgy, argon stirring, argon-oxygen decarburization, desulfurization, and vacuum degassing. Air program violations typically involve high opacity from fugitive emissions related to these processes. Continuous casting is also included in this category. There are no RCRA-listed hazardous wastes directly associated with secondary steelmaking and no RCRA violations directly related to secondary steelmaking at the mills included in this study.

Hot Forming/Hot Mill. At hot forming mills, the temperature of the steel is raised to prepare it for hot working (shaping). Hot forming mills can be divided into four categories by the purpose that the mill serves in preparing the steel for finishing: primary rolling mills, section mills, flat-rolled mills (plate mills and hot strip mills) and pipe and tube mills. The hot forming primary mills include slabbing mills, blooming mills, and billet mills and perform the initial rolling step used in the production of a semi-finished product from solid hot steel ingots. Most section mills, plate mills, and hot strip mills use continuously cast billets or slabs to produce finished hot-rolled products, or to produce intermediate hot-rolled products for cold finishing and coating. Section mill types include bar mills, rail mills, rail-joint bars, and structural section mills. The basic operation of a plate mill is the reduction of a heated slab from a primary mill to the weight and dimensional limitations defining plates. The hot strip mill converts slabs that are reheated to rolling temperatures (2000EF-2400EF) in continuous reheat furnaces into "hot bands," or coils of strip steel. Typically, computers control many or most operations in modern strip/plate mills. Air program compliance problems at the hot mill are typically less significant than at the steelmaking processes, and would involve primarily emissions from fuel combustion sources. Water program noncompliance incidents at this process are more common and may involve scale removal, laminar cooling sprays at the runout table, or wastewater treatment and recycle. There are no RCRA-listed hazardous wastes directly associated with hot forming; however, hazardous wastes may be generated during machine maintenance activities at this process. RCRA

violations at the hot forming mill identified at mills included in this study relate to spill response and improper disposal.

Finishing. In this report, this category includes cold mill/annealing, pickling, and coating operations. Cold mill/annealing includes cold working unheated, previously hot-rolled bars, sheets, or strip steel through a set of rolls, often many times, and relieving stresses induced by cold working in annealing furnaces. Pickling is the process of chemically removing oxides and scale from the steel surface through the action of solutions of inorganic acids. Pickling lines remove oxides from hot-rolled steel. Coating operations apply zinc, or other protective or finish coatings to steel. Mill scale, rust, oil, grease, and soil must be removed prior to coating; solvents are used to dissolve or dilute these (pickling also removes scale and rust). These processes are among the least significant from an air compliance program perspectives. However, they are much more significant from the water and RCRA program perspective. Cold mill/annealing water program noncompliance incidents may involve the use of synthetic or animal-fat based rolling solutions, or the treatment and recirculation of such solutions. They may also involve treatment of cold rolling wastewaters, which includes chemical emulsion breaking, dissolved gas flotation for gross oil removal, and co-treatment with other finishing wastewaters.

Pickling water program noncompliance incidents may involve pickling, scale removal from certain grades of stainless steels in salt bath descaling, rinsing of the steel after processing, discharges from pickling line fume scrubbers, and co-treatment with other finishing wastewaters. Coating water program noncompliance incidents may involve product rinses, fume scrubbers, and co-treatment with other finishing wastewaters. Spent pickle liquor is a RCRA-listed hazardous waste because it contains residual heavy metals and acidity. The greatest number of RCRA related violations and concerns at finishing operations relate to the management of the spent pickle liquor. Violations identified at mills included in this study relate to spill prevention, labeling, secondary containment, and recordkeeping.

General Mill/Buildings and Grounds. Throughout a steel mill complex there are activities and areas not directly related to a specific steelmaking process that can cause or contribute to pollution conditions that are regulated under one or more of the programs included in this study. Examples include plant roads and yards (regulated for fugitive dust under the air program); asbestos insulation in buildings (regulated as a hazardous air pollutant when removed); water collection and conveyance systems throughout the plant (where leaks, infiltration, overflows, storm water surges, pump failures and similar incidents can result in unauthorized discharges and effluent violations); maintenance buildings (where oil, solvent and other chemical spills can occur); and the numerous enclosures where hazardous waste requirements under RCRA may be triggered. General mill related violations under the RCRA program include waste determination, spill prevention and spill response. Typically, these violations relate to the mismanagement of hazardous wastes generated during general maintenance of mill buildings, equipment and vehicles. General mill related violations under the water program include reporting,

recordkeeping, and other required activities unrelated to a specific process. Monitoring program violations under the water program are also plant-wide and unrelated to specific processes. Intake violations relate to requirements regulating the intake of water based on pollutant concentrations in the intake water.

Non-Process Specific Wastewater Treatment Plants. Unlike air pollution control systems that are, as a practical matter, usually limited in application to a specific process, wastewater streams from several processes are frequently combined for treatment at a central treatment facility. Violations at an outfall from such a facility are typically related to a failure at the treatment facility and not to the steelmaking processes that are involved. In some cases, violations at the central plant may have been caused by the failure of upstream equipment or an upstream pretreatment system at a specific process. To the extent possible in this report these violations are traced to the specific process causing the violation. There are no RCRA-listed hazardous wastes directly associated with non-process specific wastewater treatment plants, however, hazardous wastes may be generated during machine maintenance activities at this process. The sludge generated at the treatment plants is either dewatered and recycled on-site or sold for off-site reuse or disposal.

RCRA Waste Accumulation Areas. Several RCRA listed wastes are generated during steel mill operations. Violations associated with specific steelmaking processes and/or violations associated with the management of hazardous wastes generated at a specific steelmaking process were linked to that process in this tabulation. However, there are RCRA violations that either occurred at areas of the plant that were not involved in any specific process, or compliance documents did not identify the type of waste so that a violation to process relationship could be made. For example, a violation relating to the storage of a non-specified waste in a landfill, waste pile, surface impoundment, satellite accumulation area, and hazardous waste storage area could not be directly related to a specific steelmaking process. Therefore, the process category of "waste accumulation area" was created for the RCRA program. "Landfills" are areas of land or an excavation in which wastes are placed for permanent disposal. The majority of the landfills and surface impoundments at steel mills are inactive and undergoing RCRA closure activities, and therefore specific wastes in these landfills have accumulated over time and are generally unknown. "Waste piles" are used for the accumulation of solid, non-flowing waste, such as materials designated by the facility for reclamation on-site. "Satellite accumulation areas" are located throughout the mills in any areas where hazardous waste is generated. When necessary these wastes are transferred to the "hazardous waste storage area" where they are labeled and marked with an accumulation start date and stored for no more than 90 days. Generally, the RCRA violations at waste accumulation sites involve the mismanagement of wastes in these areas. Violations involve requirements relating to spill prevention, spill response, secondary containment, labeling, closure, and recordkeeping.

General RCRA Processes. Many of the RCRA violations at steel mills are not associated with a specific steelmaking process. Therefore, we have created process categories not specifically related to steelmaking to summarize the RCRA data. These categories include: monitoring, permitting, developing and maintaining plans, recordkeeping,

reporting, training, waste analysis, closure, financial assurance, inspections, labeling, and preparing and maintaining manifests.

Boilers/Heaters/Other Fuel Combustion Sources. This category includes power boilers, coke battery underfire stacks, blast furnace stoves, fuel used in sinter plants, plate and strip mill furnaces, and other fuel burning sources at mills involved in fuel combustion incidents. This special category of emission sources relates to firing fuel, fuel composition, or fuel characteristics. No water program noncompliance incidents are cited for this process. RCRA-listed hazardous wastes directly associated with boilers/heaters and other fuel combustion sources are likely to be generated during maintenance activities at these processes. However, RCRA violations that could be directly related to these sources were not identified in this study.

Miscellaneous. In a few instances it was not possible to associate violations with other general categories and these have been designated "miscellaneous" (e.g., refusing entry to an inspector under the air program; or a training and certification deficiency or a permitting deficiency under the water program).

The following summary tables (Tables 8 through 13) provide statistical information for violations and concerns by type of process and type of mill for each major media program.

TABLE 8 -- page 1

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process: Air Quality Program

Process	Integrated Mills			Mini Mills			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Oven -- Miscellaneous	4	2	3	--	--	--	4	2	3
Coke Oven -- By-Product Plant	10	8	2	--	--	--	10	8	2
Coke Oven -- Charging	67	28*	5	--	--	--	67	28*	5
Coke Oven -- Collector Main	1	1	1	--	--	--	1	1	1
Coke Oven -- Combustion/Underfiring Stack	25	11	4	--	--	--	25	11	4
Coke Oven -- Desulfurization Plant	6	6*	1	--	--	--	6	6*	1
Coke Oven -- Doors	86	67	4	--	--	--	86	67	4
Coke Oven -- Fines/Material Handling	4	4	1	--	--	--	4	4	1
Coke Oven -- Flaring	15	14	2	--	--	--	15	14	2
Coke Oven -- Lids	4	2*	2	--	--	--	4	2*	2
Coke Oven -- Offtakes	73	56	4	--	--	--	73	56	4
Coke Oven -- Pushing	60	37	5	--	--	--	60	37	5
Coke Oven -- Quenching	47	47	1	--	--	--	47	47	1
Coke Oven -- Travel	11	9	3	--	--	--	11	9	3

* 1 year review mill

TABLE 8 -- page 2

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process: Air Quality Program

Process	Integrated Mills			Mini Mills			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Sinter Plant	4	3	2	--	--	--	4	3	2
Blast furnace	46	14*	7	--	--	--	46	14*	7
Blast Furnace -- Control Device	3	2	2	--	--	--	3	2	2
BOF -- Miscellaneous	7	4	3	--	--	--	7	4	3
BOF -- Control Device	39	16	6	--	--	--	39	16	6
BOF -- Material Handling	2	2	1	--	--	--	2	2	1
BOF -- Roof Monitor	223	150*	8	--	--	--	223	150*	8
EAF -- Miscellaneous	--	--	--	8	6	2	8	6	2
EAF -- Control Device	--	--	--	18	12	3	18	12	3
EAF -- Roof Monitor/Panels	19	19*	1	14	5	4	33	19*	5
Secondary Steelmaking	30	17	7	4	4	1	34	17	8
Hot Forming/Hot Mill	19	12	3	1	1	1	20	12	4
Finishing -- Coating	6	6	1	---	--	--	6	6	1
Finishing -- Cold Mill/Annealing	--	--	--	5	5	1	5	5	1
Finishing -- Pickling	--	--	--	18	17	2	18	17	2
Buildings & Grounds (Asbestos)	95	68	4	1	1	1	96	68	5

Buildings & Grounds (Iron Dumping)	26	26	1	--	--	--	26	26	1
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* 1 year review mill

TABLE 8 -- page 3

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process: Air Quality Program

Process	Integrated Mills			Mini Mills			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Buildings & Grounds (Roads/Yards)	7	2	5	2	1	2	9	2	7
Boilers/Heaters/Fuel Combustion -- Material Handling	2	2	1	--	--	--	2	2	1
Boilers/Heaters/Fuel Combustion -- Opacity	4	2	2	2	2*	1	6	2	3
Boilers/Heaters/Fuel Combustion -- SO ²	7385	7384 ^a	2	--	--	--	7385	7384 ^a	2
Boilers/Heaters/Fuel Combustion -- Control Device	--	--	--	1	1	1	1	1	1
Miscellaneous	5	1*	5	3	2	2	8	2	7
Total	8335	7724 ^a	14	77	41	6	8412	7724 ^a	20

* 1 year review mill

^a 7,384 violations are related to the use of high sulfur coke over gas as process fuel at boilers and heaters throughout one mill.

Coke Oven -- Quenching	--	--	--	--	--	--	47	47	1	--	--	--
Coke Oven -- Travel	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill

TABLE 9.1 -- page 1b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	Asbestos Related			Fugitive Emissions			Mass Emissions			Monitoring		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Sinter Plant	--	--	--	1	1	1	2	2	1	--	--	--
Blast Furnace	--	--	--	3	2*	2	1	1	1	--	--	--
Blast Furnace -- Control Device	--	--	--	--	--	--	--	--	--	--	--	--
BOF -- Miscellaneous	--	--	--	1	1	1	--	--	--	2	2	1
BOF -- Control Device	--	--	--	7	6	2	2	2	1	--	--	--
BOF -- Material Handling	--	--	--	--	--	--	1	1	1	--	--	--
BOF -- Roof Monitor	--	--	--	--	--	--	--	--	--	--	--	--
EAF Roof Monitor/Panels	--	--	--	--	--	--	--	--	--	--	--	--
Secondary Steelmaking	--	--	--	1	1*	1	--	--	--	--	--	--

Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--
Buildings & Grounds (Asbestos)	95	68	4	--	--	--	--	--	--	--	--	--
Buildings & Grounds (Iron Dumping)	--	--	--	--	--	--	--	--	--	--	--	--
Buildings & Grounds (Roads/Yards)	--	--	--	5	2	3	--	--	--	--	--	--

* 1 year review mill

TABLE 9.1 -- page 1c

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	Asbestos Related			Fugitive Emissions			Mass Emissions			Monitoring		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Boilers/Heaters/Fuel Combustion -- Material Handling	--	--	--	2	2	1	--	--	--	--	--	--
Boilers/Heaters/Fuel Combustion -- Opacity	--	--	--	--	--	--	--	--	--	--	--	--
Boilers/Heaters/Fuel Combustion -- SO ₂	--	--	--	--	--	--	7385	7384 ^a	2	--	--	--
Miscellaneous	--	--	--	2	1*	2	1	1	1	--	--	--
Total	95	68	4	25	12	7	7445	7432 ^a	5	5	3*	2

* 1 year review mill

^a 7,384 violations are related to the use of high sulfur coke over gas as process fuel at boilers and heaters throughout one mill.

TABLE 9.1 -- page 2a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	O&M			Opacity			Open Burning			Permitting		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Coke Oven -- Miscellaneous	1	1	1	2	2	1	--	--	--	--	--	--
Coke Oven -- By-Product Plant	7	7	1	--	--	--	--	--	--	--	--	--
Coke Oven -- Charging	--	--	--	67	28*	5	--	--	--	--	--	--
Coke Oven -- Collector Main	--	--	--	1	1	1	--	--	--	--	--	--
Coke Oven -- Combustion/Underfiring Stack	--	--	--	22	11*	3	--	--	--	--	--	--
Coke Oven -- Desulfurization Plant	1	1*	1	--	--	--	--	--	--	--	--	--
Coke Oven -- Doors	--	--	--	86	67	4	--	--	--	--	--	--
Coke Oven -- Fines/Material Handling	--	--	--	1	1	1	--	--	--	--	--	--
Coke Oven -- Flaring	14	14*	1	--	--	--	--	--	--	1	1	1
Coke Oven -- Lids	--	--	--	4	2*	2	--	--	--	--	--	--
Coke Oven -- Offtakes	--	--	--	73	56	4	--	--	--	--	--	--
Coke Oven -- Pushing	--	--	--	59	37	4	--	--	--	--	--	--

Coke Oven -- Quenching	--	--	--	--	--	--	--	--	--	--	--	--
Coke Oven -- Travel	--	--	--	10	9*	2	--	--	--	--	--	--

* 1 year review mill

Buildings & Grounds (Iron Dumping)	--	--	--	26	26	1	--	--	--	--	--	--
Buildings & Grounds (Roads/Yards)	--	--	-	1	1	1	--	--	--	--	--	--

* 1 year review mill

^b It is unclear from the available documentation how many of these violations occurred on separate days.

TABLE 9.1 -- page 2c

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	O&M			Opacity			Open Burning			Permitting		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Boilers/Heaters -- Material Handling	--	--	--	--	--	--	--	--	--	--	--	--
Boilers/Heaters -- Opacity	--	--	--	4	2	2	--	--	--	--	--	--
Boilers/Heaters -- SO ₂ ^a	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous	--	--	--	--	--	--	2	1*	2	--	--	--
Total	44	22	6	685	271	13	2	1*	2	7	7	1

* 1 year review mill

TABLE 9.1 -- page 3a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Miscellaneous			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Oven -- Miscellaneous	--	--	--	1	1*	1	--	--	--	--	--	--	4	2	3
Coke Oven -- By-Product Plant	2	1*	2	--	--	--	--	--	--	--	--	--	10	8	2
Coke Oven -- Charging	--	--	--	--	--	--	--	--	--	--	--	--	67	28*	5
Coke Oven -- Collector Main	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Coke Oven -- Combustion/Underfiring Stack	--	--	--	--	--	--	--	--	--	--	--	--	25	11*	4
Coke Oven -- Desulfurization Plant	--	--	--	--	--	--	--	--	--	--	--	--	6	6*	1
Coke Oven -- Doors	--	--	--	--	--	--	--	--	--	--	--	--	86	67	4
Coke Oven -- Fines/Material Handling	--	--	--	--	--	--	--	--	--	--	--	--	4	4	1
Coke Oven -- Flaring	--	--	--	--	--	--	--	--	--	--	--	--	15	14*	2
Coke Oven -- Lids	--	--	--	--	--	--	--	--	--	--	--	--	4	2*	2
Coke Oven -- Offtakes	--	--	--	--	--	--	--	--	--	--	--	--	73	56	4
Coke Oven -- Pushing	--	--	--	--	--	--	--	--	--	1	1	1	60	37	5
Coke Oven -- Quenching	--	--	--	--	--	--	--	--	--	--	--	--	47	47	1

Coke Oven -- Travel	--	--	--	--	--	--	--	--	--	1	1	1	11	9*	3
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* 1 year review mill

TABLE 9.1 -- page 3b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Miscellaneous			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	4	3	2
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	46	14*	7
Blast Furnace -- Control Device	--	--	--	--	--	--	--	--	--	1	1	1	3	2	2
BOF -- Miscellaneous	--	--	--	--	--	--	--	--	--	1	1	1	7	4	3
BOF -- Control Device	--	--	--	3	2	2	--	--	--	--	--	--	39	16	6
BOF -- Material Handling	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
BOF -- Roof Monitor	--	--	--	--	--	--	--	--	--	--	--	--	223	150*	8
EAF Roof Monitor/Panels	--	--	--	--	--	--	--	--	--	--	--	--	19	19*	1
Secondary Steelmaking	--	--	--	2	2*	1	--	--	--	1	1	1	30	17	7
Hot Forming/Hot Mill	12	12	1	--	--	--	--	--	--	--	--	--	19	12	3
Finishing -- Coating	--	--	--	1	1	1	--	--	--	--	--	--	6	6	1
Buildings & Grounds (Asbestos)	--	--	--	--	--	--	--	--	--	--	--	--	95	68	4
Buildings & Grounds (Iron Dumping)	--	--	--	--	--	--	--	--	--	--	--	--	26	26	1
Buildings & Grounds (Roads/Yards)	--	--	--	--	--	--	1	1	1	--	--	--	7	2	5

* 1 year review mill

TABLE 9.1 -- page 3c

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Miscellaneous			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Boilers/Heaters -- Material Handling	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
Boilers/Heaters -- Opacity	--	--	--	--	--	--	--	--	--	--	--	--	4	2	2
Boilers/Heaters -- SO ₂	--	--	--	--	--	--	--	--	--	--	--	--	7385	7384 ^a	2
Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	5	1*	5
Total	14	12	3	7	2*	4	1	1	1	5	5	1	8335	7724 ^a	14

* 1 year review mill

^a 7,384 violations are related to the use of high sulfur coke over gas as process fuel at boilers and heaters throughout one mill.

TABLE 9.2 -- page 1

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	Asbestos Related			Fugitive Emissions			Mass Emissions			Monitoring		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
EAF -- Miscellaneous	--	--	--	--	--	--	--	--	--	6	6	1
EAF -- Control Device	--	--	--	1	1	1	4	3	2	--	--	--
EAF -- Roof Monitor/Panels	--	--	--	7	5*	2	--	--	--	--	--	--
Secondary Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--
Buildings & Grounds (Asbestos)	1	1	1	--	--	--	--	--	--	--	--	--
Buildings & Grounds (Roads/Yards)	--	--	--	2	1	2	--	--	--	--	--	--
Boilers -- Control Device	--	--	--	--	--	--	--	--	--	--	--	--
Boilers -- Opacity	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous	--	--	--	1	1	1	--	--	--	--	--	--

TABLE 9.2 -- page 1

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	Asbestos Related			Fugitive Emissions			Mass Emissions			Monitoring		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Total	1	1	1	11	5	3	4	3	2	6	6	1

* 1 year review mill

TABLE 9.2 -- page 2

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	O&M			Opacity			Open Burning			Permitting		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
EAF -- Miscellaneous	--	--	--	2	2	1	--	--	--	--	--	--
EAF -- Control Device	7	4	2	6	5	2	--	--	--	--	--	--
EAF -- Roof Monitor/Panels	--	--	--	7	3	3	--	--	--	--	--	--
Secondary Steelmaking	--	--	--	4	4	1	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	1	1	1
Finishing Pickling	--	--	--	16	15	2	--	--	--	2	2	1
Finishing Cold Mill/Annealing	--	--	--	5	5	1	--	--	--	--	--	--
Buildings & Grounds (Asbestos)	--	--	--	--	--	--	--	--	--	--	--	--
Buildings & Grounds (Roads/Yards)	--	--	--	--	--	--	--	--	--	--	--	--
Boilers -- Control Device	1	1	1	--	--	--	--	--	--	--	--	--
Boilers -- Opacity	--	--	--	2	2*	1	--	--	--	--	--	--
Miscellaneous	1	1	1	--	--	--	--	--	--	--	--	--
Total	9	6	2	42	30	6	--	--	--	3	3	1

TABLE 9.2 -- page 2

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns											
	O&M			Opacity			Open Burning			Permitting		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills

* 1 year review mill

TABLE 9.2 -- page 3

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Miscellaneous			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
EAF -- Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	8	6	2
EAF -- Control Device	--	--	--	--	--	--	--	--	--	--	--	--	18	12	3
EAF -- Roof Monitor/Panels	--	--	--	--	--	--	--	--	--	--	--	--	14	5	4
Secondary Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	4	4	1
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Finishing Pickling	--	--	--	--	--	--	--	--	--	--	--	--	18	17	2
Finishing Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	5	5	1
Buildings & Grounds (Asbestos)	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Buildings & Grounds (Roads/Yards)	--	--	--	--	--	--	--	--	--	--	--	--	2	1	2
Boilers -- Control Device	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Boilers -- Opacity	--	--	--	--	--	--	--	--	--	--	--	--	2	2*	1
Miscellaneous	--	--	--	--	--	--	--	--	--	1	1	1	3	2	2
Total	--	--	--	--	--	--	--	--	--	1	1	1	77	41	6

TABLE 9.2 -- page 3

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Air Quality Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Miscellaneous			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills

* 1 year review mill

TABLE 10 -- page 1

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process: NPDES and Pretreatment Programs

Process	NPDES -- Integrated Mills			NPDES -- Mini Mills			POTW -- Integrated Mills			POTW -- Mini Mills			Totals		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	78 (3)	45 (1)	3	--	--	--	2	2	1	--	--	--	80 (3)	45 (1)	3
Coke Plant TS	58 (18)	58* (18*)	1	--	--	--	549 (14)	375 (13)	2	--	--	--	607 (32)	375 (13)	3
Sinter Plant	98 (21)	98 (21)	1	--	--	--	--	--	--	--	--	--	98 (21)	98 (21)	1
Blast Furnace	799 (54)	686 (36)	11	--	--	--	13	11	2	--	--	--	812 (54)	686 (36)	11
Blast Furnace RS	127 (10)	44	9	--	--	--	21 (3)	21 (3)	1	--	--	--	148 (13)	44	9
Basic Oxygen Furnace	65	28	5	--	--	--	146 (2)	146 (2)	1	--	--	--	211 (2)	150 (2)	5
Basic Oxygen Furnace RS	44 (4)	27 (4)	3	--	--	--	33	33	1	--	--	--	77 (4)	33	4
Miscellaneous Steelmaking	19 (2)	17 (1)	2	4	4	1	--	--	--	11	11*	1	34 (2)	17 (1)	4

Miscellaneous Steelmaking RS/TS	15	14*	2	43 (23)	39 (22)	2	--	--	--	--	--	--	58 (23)	39 (22)	4
Hot Forming/Hot Mill	210 (4)	154 (1)	7	46 (4)	36 (1)	3	1	1	1	--	--	--	257 (8)	154 (1)	10

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 10 -- page 2

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process: NPDES and Pretreatment Programs

Process	NPDES - Integrated Mills			NPDES - Mini Mills			POTW - Integrated Mills			POTW - Mini Mills			Totals		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	168 (28)	133 (28)	7	52 (13)	32	2	14	14	1	--	--	--	234 (41)	133 (28)	10
Finishing -- Cold Mill/Annealing	50	25	6	69 (2)	66 (2)	2	--	--	--	--	--	--	119 (2)	66 (2)	8
Finishing -- Cold Mill/Annealing TS	21 (1)	21* (1*)	1	1	1	1	--	--	--	--	--	--	22 (1)	21* (1*)	2
Finishing -- Cold Mill/Annealing/Pickling TS	54 (9)	45 (9)	2	1	1	1	1 (1)	1 (1)	1	--	--	--	56 (10)	45 (9)	4
Finishing -- Pickling	32	22	4	45 (7)	26	2	3	3	1	1	1	1	81 (7)	27	7

Finishing -- Pickling TS	--	--	--	116 (23)	112 (22)	3	--	--	--	52 (15)	52 (15)	1	168 (38)	164 (37)	3
Finishing -- Coating	82 (11)	53 (9)	3	65 (10)	51 (10)	2	11 (1)	11 (1)	1	--	--	--	158 (22)	53 (9)	6
Unspecified Process Mills	16	14	3	12 (1)	10	3	--	--	--	1	1*	1	29 (1)	14	7
Central Treatment Plant	220 (21)	95 (12)	9	9	9	1	18	18	1	--	--	--	247 (21)	95 (12)	11
Other Independent Treatment System	42	13	9	36 (12)	15* (8*)	9	--	--	--	2 (1)	1	2	80 (13)	15* (8*)	19

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 10 -- page 3

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process: NPDES and Pretreatment Programs

Process	NPDES - Integrated Mills			NPDES - Mini Mills			POTW - Integrated Mills			POTW - Mini Mills			Totals		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	46 (9)	22* (9*)	6	1	1	1	--	--	--	--	--	--	47 (9)	22* (9*)	7
General: WW/SW Conveyance	16	5	8	14	9	2	5 (2)	5 (2)	1	--	--	--	35 (2)	9	11
General: Buildings & Grounds	100 (7)	46	12	36 (1)	26	5	2	2	1	7	6*	2	145 (8)	46	19
General: Landfill	14 (4)	13* (4*)	2	3 (2)	3* (2*)	1	--	--	--	--	--	--	17 (6)	13* (4*)	3
General: Underground Storage Tank	3	2	2	--	--	--	1	1	1	--	--	--	4	3	2
General: Monitoring Program	44	10*	9	27 (1)	12	5	4	3	2	--	--	--	75 (1)	12	15
General: Recordkeeping/Reporting	9	5	3	8	6	3	--	--	--	1	1	1	18	6	6
General: Miscellaneous	22 (1)	7*	7	5	2	4	2	2	1	--	--	--	29 (1)	7*	11
No Process Indicated	26	16	8	6	3*	3	3	3	1	--	--	--	35	16	11

Total	2478 (207)	1079 (70)	14	599 (99)	393 (36)	13	829 (23)	642 (22)	3	75 (16)	55 (16)	5	3981 (345)	1079 (70)	31
-------	---------------	--------------	----	-------------	-------------	----	-------------	-------------	---	------------	------------	---	---------------	--------------	----

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.1 -- page 1a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	1	1	1	33 (3)	16 (2)	3	4	4	1	--	--	--	--	--	--
Coke Plant TS	--	--	--	--	--	--	51 (18)	51* (18*)	1	--	--	--	--	--	--	--	--	--
Sinter Plant	--	--	--	--	--	--	86 (21)	86 (21)	1	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	731 (54)	663 (36)	8	2	1	2	--	--	--	--	--	--
Blast Furnace RS	--	--	--	2	2	1	50 (10)	22 (5)	5	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace	--	--	--	1	1	1	22	21	2	4	3	2	--	--	--	--	--	--
Basic Oxygen Furnace RS	--	--	--	--	--	--	12 (4)	12 (4)	1	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	--	--	--	19 (2)	17 (1)	2	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	3	3*	1	--	--	--	--	--	--	--	--	--

Hot Forming/Hot Mill	--	--	--	--	--	--	30 (4)	15 (1)	6	3	2	2	--	--	--	--	--
----------------------	----	----	----	----	----	----	-----------	-----------	---	---	---	---	----	----	----	----	----

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.1 -- page 1b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permit Violation		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	142 (28)	114 (28)	4	9	9	1	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	10	10	1	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	19 (1)	19* (1*)	1	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	45 (9)	45 (9)	1	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	16	11	3	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	1	1	1	44 (11)	31 (9)	2	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	1	1	1	2	1	2	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	159 (21)	91 (12)	9	1	1	1	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	9	4	3	1	1	1	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.1 -- page 1c

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permit Violation		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	40 (9)	22* (9*)	3	1	1	1	1	1	1	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	4	3*	2	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	30 (7)	21 (7)	5	1	1	1	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	13 (4)	13* (4*)	1	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	22	9	5	--	--	--	--	--	--
General: Recordkeeping/ Reporting	--	--	--	5	5	1	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	2	1	2	2	2	1	1 (1)	1* (1*)	1	2	2	1	1	1*	1	1	1*	1
No Process Indicated	--	--	--	--	--	--	8	4	4	--	--	--	--	--	--	--	--	--
Total	2	1	2	13	5	3	1579 (207)	865 (70)	13	50	20	5	2	1	2	1	1*	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.1 -- page 2a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	13	8	3	27	24	2	78 (3)	45 (1)	3
Coke Plant TS	--	--	--	--	--	--	6	6*	1	1	1*	1	58 (18)	58* (18*)	1
Sinter Plant	--	--	--	--	--	--	3	3	1	9	9	1	98 (21)	98 (21)	1
Blast Furnace	--	--	--	2	2	1	41	24	7	23	16	5	799 (54)	686 (36)	11
Blast Furnace RS	--	--	--	2	2	1	57	42	7	16	7	7	127 (10)	44	9
Basic Oxygen Furnace	--	--	--	1	1	1	26	17	3	11	9	3	65	28	5
Basic Oxygen Furnace RS	--	--	--	--	--	--	18	16*	2	14	13	2	44 (4)	27 (4)	3
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	19 (2)	17 (1)	2
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	2	1	2	10	10*	1	15	14*	2
Hot Forming/Hot Mill	--	--	--	3	3	1	146	123	6	28	16	4	210 (4)	154 (1)	7

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.1 -- page 2b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns														
	Recordkeeping Violation			Reporting Violation			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	1	1	1	12	8	4	4	2*	3	168 (28)	133 (28)	7
Finishing -- Cold Mill/Annealing	--	--	--	5	3	2	30	17	4	5	3	2	50	25	6
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	2	2*	1	21 (1)	21* (1*)	1
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	9	9*	1	--	--	--	54 (9)	45 (9)	2
Finishing -- Pickling	--	--	--	--	--	--	12	8	3	4	3	2	32	22	4
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	1	1	1	21	9	3	15	12	3	82 (11)	53 (9)	3
Unspecified Process Mills	--	--	--	--	--	--	2	1	2	11	11	1	16	14	3
Central Treatment Plant	--	--	--	--	--	--	23	9*	6	37	20	7	220 (21)	95 (12)	9
Other Independent Treatment System	--	--	--	--	--	--	22	12	5	10	4	6	42	13	9

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.1 -- page 2c

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns														
	Recordkeeping Violation			Reporting Violation			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	4	2	3	46 (9)	22* (9*)	6
General: WW/SW Conveyance	--	--	--	1	1	1	4	1*	4	7	3	4	16	5	8
General: Buildings & Grounds	--	--	--	--	--	--	48	39	6	21	5	9	100 (7)	46	12
General: Landfill	--	--	--	--	--	--	--	--	--	1	1*	1	14 (4)	13* (4*)	2
General: Underground Storage Tank	--	--	--	--	--	--	2	2	1	1	1*	1	3	2	2
General: Monitoring Program	--	--	--	1	1	1	--	--	--	21	8	8	44	10*	9
General: Recordkeeping/Reporting	1	1*	1	--	--	--	--	--	--	3	2*	2	9	5	3
General: Miscellaneous	--	--	--	--	--	--	1	1*	1	12	4*	5	22 (1)	7*	7
No Process Indicated	--	--	--	--	--	--	13	9	4	5	3	3	26	16	8
Total	1	1*	1	17	8	3	511	262	11	302	132	13	2478 (207)	1079 (70)	14

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.2 -- page 1a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	--	--	--	--	--	--	522 (14)	351 (5)	2	--	--	--	1	1	1	--	--	--
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	11	11	1	--	--	--	--	--	--	--	--	--
Blast Furnace RS	--	--	--	--	--	--	19 (3)	19 (3)	1	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace	--	--	--	--	--	--	144 (2)	144 (2)	1	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace RS	--	--	--	--	--	--	31	31	1	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.2 -- page 1b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permit Violation		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	1 (1)	1 (1)	1	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	11 (1)	11 (1)	1	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	7	7	1	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.2 -- page 1c

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permit Violation		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	4 (2)	4 (2)	1	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--
General: Recordkeeping/ Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	3	3	1	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	754 (23)	572 (14)	2	1	1	1	1	1	1	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.2 -- page 2a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	2	2	1	2	2	1
Coke Plant TS	--	--	--	1	1	1	6	4	2	19	19	1	549 (14)	375 (13)	2
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	2	2	1	--	--	--	13	11	2
Blast Furnace RS	--	--	--	--	--	--	2	2	1	--	--	--	21 (3)	21 (3)	1
Basic Oxygen Furnace	--	--	--	--	--	--	2	2	1	--	--	--	146 (2)	146 (2)	1
Basic Oxygen Furnace RS	--	--	--	--	--	--	2	2	1	--	--	--	33	33	1
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.2 -- page 2b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns														
	Recordkeeping Violation			Reporting Violation			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	14	14	1	--	--	--	14	14	1
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	1 (1)	1 (1)	1
Finishing -- Pickling	--	--	--	--	--	--	2	2	1	--	--	--	3	3	1
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	11 (1)	11 (11)	1
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	9	9	1	2	2	1	18	18	1
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.1.2 -- page 2c

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns														
	Recordkeeping Violation			Reporting Violation			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	1	1	1	--	--	--	5 (2)	5 (2)	1
General: Buildings & Grounds	--	--	--	--	--	--	2	2	1	--	--	--	2	2	1
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
General: Monitoring Program	--	--	--	--	--	--	--	--	--	3	2	2	4	3	2
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Miscellaneous	--	--	--	--	--	--	--	--	--	2	2	1	2	2	1
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Total	--	--	--	1	1	1	44	41	2	28	27	2	829 (23)	642 (22)	3

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.1 -- page 1a

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	43 (23)	39 (22)	2	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	16 (4)	7 (1)	3	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	21 (13)	20* (13*)	2	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	34 (2)	34 (2)	1	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	32 (7)	16	2	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	77 (23)	73 (22)	3	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	42 (10)	31 (10)	2	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.1 -- page 1b

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns																		
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting			
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	
Unspecified Process Mills	--	--	--	--	--	--	6 (1)	5	2	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	2	2	1	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	25 (12)	15* (8*)	5	--	--	--	1	1*	1	--	--	--	--
General: Intake	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	8 (1)	4* (1*)	3	--	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	3 (2)	3* (2*)	1	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	2 (1)	2 (1)	1	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/ Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.1 -- page 1c

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	3	3*	1	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	318 (99)	177 (36)	10	--	--	--	1	1*	1	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.1 -- page 2a

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	3	3	1	--	--	--	4	4	1
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	43 (23)	39 (22)	2
Hot Forming/Hot Mill	--	--	--	--	--	--	29	29	1	1	1*	1	46 (4)	36 (1)	3
Hot Forming/Hot Mill RS	--	--	--	--	--	--	31	31	1	--	--	--	52 (13)	32	2
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	34	31	2	1	1	1	69 (2)	66 (2)	2
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Finishing -- Pickling	--	--	--	--	--	--	13	10	2	--	--	--	45 (7)	26	2
Finishing -- Pickling TS	--	--	--	--	--	--	36	36	1	3	3	1	116 (23)	112 (22)	3
Finishing -- Coating	--	--	--	--	--	--	21	18	2	2	2	1	65 (10)	51 (10)	2

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.1 -- page 2b

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Unspecified Process Mills	--	--	--	--	--	--	4	4	1	2	1	2	12 (1)	10	3
Central Treatment Plant	--	--	--	--	--	--	7	7	1	--	--	--	9	9	1
Other Independent Treatment System	--	--	--	--	--	--	4	3	2	6	2*	5	36 (12)	15* (8*)	9
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: WW/SW Conveyance	--	--	--	--	--	--	4	4	1	9	5	2	14	9	2
General: Buildings & Grounds	--	--	--	--	--	--	20	19	2	8	4	2	36 (1)	26	5
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	3 (2)	3* (2*)	1
General: Monitoring Program	--	--	--	--	--	--	--	--	--	25	12	5	27 (2)	12	5
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	8	6	3	8	6	3

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.1 -- page 2c

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: NPDES Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Miscellaneous	--	--	--	--	--	--	--	--	--	5	2	4	5	2	4
No Process Indicated	--	--	--	--	--	--	1	1	1	2	1	2	6	3*	3
Total	--	--	--	--	--	--	208	190	3	72	25	8	599 (99)	393 (36)	13

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.2 -- page 1a

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	10	10*	1	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling TS	--	--	--	--	--	--	46 (15)	46 (15)	1	1	1	1	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.2 -- page 1b

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
Unspecified Process Mills	--	--	--	--	--	--	1	1*	1	--	--	--	--	--	--	--	--	--
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	2 (1)	1	2	--	--	--	--	--	--	--	--	--
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	7	6*	2	--	--	--	--	--	--	--	--	--
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/ Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.2 -- page 1c

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns																	
	Certification/ Training			Compliance Schedule Violation			Effluent Violation			Monitoring Violation			O&M/Work Practice			Permitting		
	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills	No. of Viola- tions	Most at 1 Mill	No. of Mills
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	66 (16)	47 (16)	5	1	1	1	--	--	--	--	--	--

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.2 -- page 2a

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Miscellaneous Steelmaking	--	--	--	--	--	--	--	--	--	1	1*	1	11	11*	1
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	-	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Finishing -- Pickling TS	--	--	--	--	--	--	3	3	1	2	2	1	52 (15)	52 (15)	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.2 -- page 2b

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1
Central Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	2 (1)	1	2
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	7	6*	2
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-
General: Monitoring Program	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping/Reporting	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 11.2.2 -- page 2c

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: Pretreatment Program

Process	Violations and Concerns														
	Recordkeeping			Reporting			Unauthorized Discharge			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Miscellaneous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	3	3	1	5	4	2	75 (16)	55 (16)	5

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System RS = Recycle System WW/SW = Wastewater/Stormwater

TABLE 12 -- page 1

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process:
 RCRA Program

Process	Integrated Mills			Mini Mills			Total		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
Coke Plant	24	10	4	--	--	--	24	10	4
Blast Furnace	1	1	1	--	--	--	1	1	1
BOF	1	1*	1	--	--	--	1	1*	1
EAF	1	1	1	4	3	2	5	3	3
Hot Rolling Mill	1	1	1	--	--	--	1	1	1
Finishing - Cold Mill/Annealing	1	1*	1	--	--	--	1	1*	1
Finishing - Pickling	3	2*	1	8	5*	2	11	5*	3
Finishing/Coating	16	6*	4	--	--	--	16	6*	4
Hazardous Waste Storage Area (<90 days)	4	3*	2	8	6	2	12	6	4
Waste Water Treatment Plant	--	--	--	8	7	2	8	7	2
Waste Pile/Surface Impoundment/Landfill	3	3	1	1	1	1	4	3	2
Laboratory	5	3	2	--	--	--	5	3	2
Buildings & Grounds	17	5	5	5	2	3	22	5	8
Satellite Accumulation Area	--	--	--	2	2	1	2	2	1

Note: Four integrated mills and three mini mills were included in the 5 year review; all were inspected during the five year review period. Ten integrated mills and seventeen mini mills were included in the 1 year review. Of these 27 mills included in the 1 year review, six integrated mills and four mini mills were inspected in 1995.

*1 year review mill.

TABLE 12 -- page 2

Combined Summary of Integrated and Mini Mill Violations and Concerns by Type of Process:
 RCRA Program

Process	Integrated Mills			Mini Mills			Total		
	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills	No. of Viols/ Cons	Most at 1 Mill	No. of Mills
General/Closure	--	--	--	--	--	--	--	--	--
General/Financial Assurance	7	5	3	3	3	1	10	5	4
General/Inspecting	--	--	--	1	1	1	1	1	1
General/Labeling	2	2*	1	3	2	2	5	2	3
General/Manifest	8	4	5	2	2	1	10	4	6
General/Monitoring	1	1*	1	--	--	--	1	1*	1
General/Permitting	2	2*	1	2	2	1	4	2	1
General/Plan	1	1	1	6	3*	4	7	3*	5
General/Recordkeeping	6	2*	4	5	5	1	11	5	5
General/Reporting	1	1*	1	--	--	--	1	1*	1
General/Training	--	--	--	2	2	1	2	2	1
General/Waste Analysis	4	3	2	1	1	1	5	3	3
Not specified	1	1	1	--	--	--	1	1	1
Total	110	26	10	61	36	5	171	36	15

Note: Four integrated mills and three mini mills were included in the 5 year review; all were inspected during the five year review period. Ten integrated mills and seventeen mini mills were included in the 1 year review. Of these 27 mills included in the 1 year review, six integrated mills and four mini mills were inspected in 1995.

*1 year review mill.

TABLE 13.1 -- page 1a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns																	
	Closure			Improper Disposal			Labeling			Manifest			Monitoring			Permitting		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Coke Plant	1	1*	1	1	1*	1	2	1	2	1	1	1	--	--	--	2	2	1
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOF	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EAF	--	--	--	--	--	--	2	1	2	--	--	--	--	--	--	--	--	--
Hot Rolling Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/ Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	--	--	--	5	2*	3	--	--	--	--	--	--	--	--	--
Hazardous Waste Storage Area (<90 days)	--	--	--	--	--	--	2	2*	1	--	--	--	--	--	--	1	1*	1
Waste Water Treatment Plant	--	--	--	--	--	--	4	4	1	--	--	--	--	--	--	--	--	--
Waste Pile/Surface Impoundment/Landfill	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
Buildings & Grounds	1	1*	1	--	--	--	3	2	2	--	--	--	--	--	--	1	1	1

Note: Four integrated mills were included in the 5 year review, and all were inspected during the five year period. Ten integrated mills were included in the 1 year review. However, only six of the ten integrated mills were inspected in 1995.

* 1 year review mill

TABLE 13.1 -- page 1b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns																	
	Closure			Improper Disposal			Labeling			Manifest			Monitoring			Permitting		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Laboratory	--	--	--	--	--	--	3	2*	2	--	--	--	--	--	--	--	--	--
General: Closure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Financial Assurance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Inspecting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Labeling	--	--	--	--	--	--	2	2*	1	--	--	--	--	--	--	--	--	--
General: Manifest	--	--	--	--	--	--	--	--	--	8	4	5	--	--	--	--	--	--
General: Monitoring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Permitting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2*	1
General: Plan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Waste Analysis	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2	1*	2	1	1*	1	19	6*	6	9	4	5	--	--	--	6	3	2

Note: Four integrated mills were included in the 5 year review, and all were inspected during the five year period. Ten integrated mills were included in the 1 year review. However, only six of the ten integrated mills were inspected in 1995.

* 1 year review mill

TABLE 13.1 -- page 2a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns																	
	Recordkeeping			Secondary Containment			Self-Inspection			Spill Prevention			Spill Response			Storage		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	2	1	2	1	1*	1	7	4	3	1	1*	1	5	3	2
Blast Furnace	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--
BOF	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1	--	--	--
EAF	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Rolling Mill	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--
Finishing -- Cold Mill/ Annealing	--	--	--	1	1*	1	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	1	1*	1	--	--	--	1	1*	1	--	--	--	--	--	--
Finishing -- Coating	--	--	--	2	1*	2	1	1	1	3	2*	2	3	2*	2	--	--	--
Hazardous Waste Storage Area (<90 days)	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1	--	--	--
Waste Water Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Waste Pile/Surface Impoundment/Landfill	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Buildings & Grounds	1	1*	1	3	2*	2	--	--	--	4	2	3	2	2	1	--	--	--

Note: Four integrated mills were included in the 5 year review, and all were inspected during the five year period. Ten integrated mills were included in the 1 year review. However, only six of the ten integrated mills were inspected in 1995.

* 1 year review mill

TABLE 13.1 -- page 2b

Summary of Integrated Mill Violations and Concerns by Type of Process: RCRA Program

Process	Violations and Concerns																	
	Recordkeeping			Secondary Containment			Self-Inspection			Spill Prevention			Spill Response			Storage		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
Laboratory	--	--	--	--	--	--	--	--	--	2	2	1	--	--	--	--	--	--
General: Closure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Financial Assurance	7	5	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Inspecting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Labeling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Manifest	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Permitting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Plan	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping	6	2*	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Waste Analysis	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Total	16	5	6	9	3*	5	2	1*	2	18	7	6	9	3*	5	6	4	2

Note: Four integrated mills were included in the 5 year review, and all were inspected during the five year period. Ten integrated mills were included in the 1 year review. However, only six of the ten integrated mills were inspected in 1995.

* 1 year review mill

TABLE 13.1 -- page 3a

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns														
	Certification/Training			Miscellaneous			Waste Determination			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	1	1	1	--	--	--	24	10	4
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
BOF	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1
EAF	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Hot Rolling Mill	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Finishing -- Cold Mill/ Annealing	--	--	--	--	--	--	--	--	--	--	--	--	1	1*	1
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	3	2*	2
Finishing -- Coating	1	1*	1	--	--	--	1	1	1	--	--	--	16	6*	4
Hazardous Waste Storage Area (<90 days)	--	--	--	--	--	--	--	--	--	--	--	--	4	3*	2
Waste Water Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Waste Pile/Surface Impoundment/Landfill	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Laboratory	--	--	--	--	--	--	--	--	--	--	--	--	5	3	2
Buildings & Grounds	--	--	--	--	--	--	--	--	--	2	2*	1	17	5	5

Note: Four integrated mills were included in the 5 year review, and all were inspected during the five year period. Ten integrated mills were included in the 1 year review. However, only six of the ten integrated mills were inspected in 1995.

* 1 year review mill

TABLE 13.1 -- page 3b

Summary of Integrated Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns														
	Certification/Training			Miscellaneous			Waste Determination			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Closure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Financial Assurance	--	--	--	--	--	--	--	--	--	--	--	--	7	5	3
General: Inspecting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Labeling	--	--	--	--	--	--	--	--	--	--	--	--	2	2*	1
General: Manifest	--	--	--	--	--	--	--	--	--	--	--	--	8	4	5
General: Monitoring	--	--	--	--	--	--	--	--	--	1	1*	1	1	1*	1
General: Permitting	--	--	--	--	--	--	--	--	--	--	--	--	2	2*	1
General: Plan	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: Recordkeeping	--	--	--	--	--	--	--	--	--	--	--	--	6	2*	4
General: Reporting	--	--	--	--	--	--	--	--	--	1	1*	1	1	1*	1
General: Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Waste Analysis	--	--	--	--	--	--	4	3	2	--	--	--	4	3	2
Not Specified	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Total	1	1*	1	--	--	--	6	4	3	6	3*	4	110	26	10

Note: Four integrated mills were included in the 5 year review, and all were inspected during the five year period. Ten integrated mills were included in the 1 year review. However, only six of the ten integrated mills were inspected in 1995.

* 1 year review mill

TABLE 13.2 -- page 1a

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns																	
	Closure			Improper Disposal			Labeling			Manifest			Monitoring			Permitting		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
EAF	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/ Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
Hazardous Waste Storage Area (<90 days)	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
Waste Water Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
Waste Pile/Surface Impoundment/Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

General: Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Waste Analysis	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	1	1	1	6	4	3	2	2	1	--	--	--	6	5	2

Note: Three mini mills were included in the 5 year review. All were inspected during the five year period. Seventeen mini mills were included in the 1 year review. However, only four of the seventeen integrated mills were inspected in 1995.

* 1 year review mill.

TABLE 13.2 -- page 2a

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns																	
	Recordkeeping			Secondary Containment			Self-Inspection			Spill Prevention			Spill Response			Storage		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
EAF	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	2	2	1
Finishing -- Cold Mill/ Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	2	1	2	1	1*	1	1	1*	1	1	1	1	2	2*	1
Hazardous Waste Storage Area (<90 days)	1	1*	1	--	--	--	--	--	--	1	1	1	2	1	2	3	3	1
Waste Water Treatment Plant	4	4	1	--	--	--	1	1*	1	--	--	--	--	--	--	--	--	--
Waste Pile/Surface Impoundment/Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Buildings & Grounds	1	1*	1	--	--	--	--	--	--	2	2	1	--	--	--	2	2	1
Satellite Accumulation Area	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Financial Assurance	3	3	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Inspecting	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--
General: Labeling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Manifest	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Three mini mills were included in the 5 year review. All were inspected during the five year period. Seventeen mini mills were included in the 1 year review. However, only four of the seventeen mini mills were inspected in 1995.

* 1 year review mill

TABLE 13.2 -- page 2b

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns																	
	Recordkeeping			Secondary Containment			Self-Inspection			Spill Prevention			Spill Response			Storage		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills
General: Monitoring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Permitting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Plan	6	3*	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Recordkeeping	5	5	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Waste Analysis	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	20	10	4	2	1	2	4	2*	3	4	2	3	3	2	2	10	6	3

Note: Three mini mills were included in the 5 year review. All were inspected during the five year period. Seventeen mini mills were included in the 1 year review. However, only four of the seventeen mini mills were inspected in 1995.

* 1 year review mill

TABLE 13.2 -- page 3a

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns														
	Certification/Training			Miscellaneous			Waste Determination			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
EAF	--	--	--	--	--	--	--	--	--	--	--	--	4	3	2
Finishing -- Cold Mill/ Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	8	5*	2
Hazardous Waste Storage Area (<90 days)	--	--	--	--	--	--	--	--	--	--	--	--	8	6	2
Waste Water Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	8	7	2
Waste Pile/Surface Impoundment/Landfill	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Buildings & Grounds	--	--	--	--	--	--	--	--	--	--	--	--	5	2	3
Satellite Accumulation Area	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
General: Financial Assurance	--	--	--	--	--	--	--	--	--	--	--	--	3	3	1
General: Inspecting	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
General: Labeling	--	--	--	--	--	--	--	--	--	--	--	--	3	2	2
General: Manifest	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1

Note: Three mini mills were included in the 5 year review. All were inspected during the five year period. Seventeen mini mills were included in the 1 year review. However, only four of the seventeen mini mills were inspected in 1995.

* 1 year review mill

TABLE 13.2 -- page 3b

Summary of Mini Mill Violations and Concerns by Type of Process and Violation: RCRA Program

Process	Violations and Concerns														
	Certification/Training			Miscellaneous			Waste Determination			Concerns			Total		
	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Violations	Most at 1 Mill	No. of Mills	No. of Concerns	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
General: Monitoring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Permitting	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
General: Plan	--	--	--	--	--	--	--	--	--	--	--	--	6	3*	4
General: Recordkeeping	--	--	--	--	--	--	--	--	--	--	--	--	5	5	1
General: Reporting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Training	2	2	1	--	--	--	--	--	--	--	--	--	2	2	1
General: Waste Analysis	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2	2	1	--	--	--	1	1	1	--	--	--	61	36	5

Note: Three mini mills were included in the 5 year review. All were inspected during the five year period. Seventeen mini mills were included in the 1 year review. However, only four of the seventeen mini mills were inspected in 1995.

* 1 year review mill

V. CAUSES OF NONCOMPLIANCE

The following summary of causes related to compliance problems is based on whatever documentation was available in the files. In general, this information is incomplete and reflects the fact that documentation of the reasons for violations is not required for the agency to proceed with an enforcement response under the statutes and regulations included in this study. Cause information is almost always incomplete for hazardous waste violations and frequently incomplete for air program violations. Only the surface water program files contained substantial documentation of the reasons for violations, primarily because reporting regulations require that causes of violations be reported, and most surface water violations are self-reported. Because of this overall lack of information on causes, statistically valid, definitive conclusions as to why the iron and steel industry frequently is not in compliance with certain environmental requirements could not be drawn. However, supplementary interviews with inspectors were conducted to gather anecdotal information on the underlying causes of noncompliance.

To facilitate the presentation of cause explanations in a cohesive and readable format, categories were established based on the types of reasons and the level of detail provided in the files. A best effort was devoted to an objective categorization of these reasons based on the information provided. However, there is potential overlap in selected categories, and in a small number of cases, there may be some latitude for interpreting the cause explanations differently. These issues are discussed briefly in introductory sections to each program area.

In response to comments on a previous draft of this report, the categories used to identify causes of compliance problems have been simplified and standardized across all three media. The following categories are noted:

Equipment Failure. This category is used when a violation is caused by an equipment malfunction. The equipment may be pollution control or process related. The reasons for equipment failure may vary from unpredictable weather events to design inadequacies, or they may be unexplained. Further explanation of these failures, if available, usually is provided in the text of this report. If the reason for equipment failure is clearly attributable to faulty operation or maintenance, the cause is listed as O&M/Work Practice instead.

O&M/Work Practice. This category is used when a violation is clearly attributable to faulty operation, maintenance or work practices. In cases when the violated regulation is an O&M or Work Practice regulation, this is the assumed cause.

Permit/Regulation Interpretation. In some instances the violation is a result of an improper or disputed interpretation of permit or regulation conditions. These violations are included in the report even if they are being challenged by the

steel mill. On several occasions we were able to determine that a challenge had been successful, and the violations were removed.

Process Related. This category is used for a small number of violations where the cause was a natural outgrowth of processes at the steel mill and not related to poor O&M or equipment failures. Some examples of process-related causes might include opacity at the secondary steelmaking (ladle) due to carbon additions, excess opacity during normal slag flow conditions at a blast furnace, water quality problems in the blast furnace recycle system due to unusual flow of noncontact cooling water from the blast furnace, or inadequate treatment at a central treatment plant not resulting from any equipment malfunction or work practice inadequacy (central treatment plants are categorized as a water program related steel mill process for the purpose of this study).

Unknown/Not Indicated. Most inspection reports (for all three programs) did not indicate a cause for observed violations, and it is not known whether the inspector may have known or suspected the cause. Also, many self-monitoring and spill noncompliance reports (primarily occurring under the water program) indicated that the cause of a violation could not be determined. We have combined these two categories in this report.

Aside from these general cause categories, there are undoubtedly more basic, underlying causes that might be considered. For example, differences in regulation stringency, operating practices and even the types and age of equipment operating at different mills account for variation in the frequency of violations at the different mills. Specifically, underlying reasons for violations or concerns might include equipment failures that are unforeseeable and unavoidable despite the reasonable monitoring and control practices of industry staff (for example, as the result of a power loss caused by lightning), marginal or inadequate control technology, old manufacturing equipment needing repair or replacement, deficient O&M procedures, and resource constraints. Violation patterns are also influenced in some instances by the relative stringency of site specific regulations. Often these underlying causes are not documented in agency files for specific violations or concerns. However, they are generally recognized by experienced agency and industry staff.

A. Air Pollution Program

(1) Introduction

Documentation of causes existed for roughly 43% of the reported air program violations and concerns. In many cases, a determination of the actual cause was not required and frequently not possible. For example, roof monitor emissions during steelmaking operations are caused by a variety of events that occur continually as a normal part of the process, and documentation of these events is usually not required.

As a result, it is frequently not possible for agency staff to identify a specific event that caused a roof monitor opacity violation.

The following discussion of compliance problem causes focuses on the steelmaking processes experiencing the most air quality compliance problems: coke ovens, blast furnaces, basic oxygen furnaces, and electric arc furnaces. The discussion of each cause reflects additional information provided by agency inspectors. Where causes have been documented they are summarized in an accompanying table.

(2) Coke Ovens

A coke oven battery is a structural operating system comprised of doors, pushing machines, door machines, larry cars, coke cars, pushing emission control (PEC) systems and operators. Oven elements require routine, repeated, and, at times, nearly constant maintenance and adjustment if the battery is to perform properly. Operators must be familiar with equipment and work practice standards with respect to their area of responsibility if the battery is to operate in compliance with air quality opacity standards.

To permit the escape of volatile matter driven from the coal during coking, an opening is provided at the top of the oven at either one or both ends of the coking chamber. Each opening is fitted with an offtake pipe, which connects the oven with the gas-collecting main for the battery. The gas passing from the offtakes to the collecting main is shock-cooled with a flushing-liquor spray which causes tar to precipitate and cools the gas to the desired temperature. At mills with by-product coke oven batteries, specific compounds are recovered from the coke oven gas in a series of operations. At one mill, recovered coke oven gas with a high sulfur content was used as fuel for a large number of boilers, furnaces, and other fuel burning processes throughout the mill. This resulted in a very high number of SO₂ related violations for an extended period during the study.

Excessive leveling of the charged coal tends to pack the coal at the top of the charge, particularly under the charging holes, and may cause localized erosion of the oven wall. Coke oven walls must be gas-tight to prevent gases or fine particles from passing between the coking chambers and heating flues; fine particles may exit the coking chambers and the battery via the underfire stack if there are cracks -- in some cases, this may lead to opacity violations. To prevent escape of gases from the oven during charging in most plants, a steam-jet aspirator is used to draw gases from the space above the charged coal into the collecting main; this practice is called "charging on the main."

There are alternative systems for controlling pushing emissions: coke-side sheds, bench-mounted hoods (traveling hoods), enclosed quench cars with mobile scrubbing, and

wet spray pushing emission control systems. In contrast to bench-mounted hoods and water-spray systems, both enclosed cars and sheds have demonstrated effective capture of pushing emissions. Both enclosed cars and sheds are judged better for capture of pushing emissions than the other control systems.

Training and proper operation have a considerable effect on oven performance, coke quality, and emissions. A reference text explains that faulty heating, departing from optimal setpoints, affects not only the quality and quantity of the coke and coal chemicals produced, but also the ultimate life of the ovens. The text explains that the most serious damage to coke ovens is caused by fluxing or slagging of exposed brick surfaces due to local overheating beyond the critical temperature of the brick. Oven heating is operator dependent to a degree. Important operation and maintenance tasks include door and jamb cleaning prior to charging to insure proper seals during coking, luting (sealing) lids to ensure gas-tight seals after charging, and repair of damaged equipment, particularly doors and jambs.

Process-related constraints associated with coke oven batteries and cokemaking are often very difficult to overcome. The operating pressure in a battery is selected to be optimal, but this point may not correlate closely to the ideal pressure of individual ovens at different stages in the coking cycle since at many batteries the system allows operators to control pressure in the collector main but not the pressure in individual ovens. If the pressure in the main does not permit the pressure in an early-stage oven to decrease sufficiently, doors, lids and offtakes may leak.

All batteries operate at slightly positive pressure to prevent air from entering the ovens. This in itself means door, lid and offtake seals must be gas-tight or the ovens will leak. The seal and alignment between the larry car and the oven during charging is important. Drop sleeves must come in close contact with the oven to prevent visible emissions during charging and there is a limit to the speed at which coal can be delivered through the lids of the oven. If charged too quickly, the likelihood of visible emissions during charging increases.

During pushing, partially coked coal may lead to visible emissions. If the coal charge is unevenly distributed (i.e., if heating is uneven), if there is a problem with one or more heating flues, or if the coal touching either door is incompletely coked, then the uncoked coal or volatile compounds not completely driven from the coal may react visibly with air as the coke falls into the coke car. All PEC systems require maintenance with time to restore performance or to restore tolerances which will ensure proper operation of system components. Many systems operate nearly continuously in a physically extreme environment.

Cracks in the brickwork between the heating flues and the ovens provide a means for particles of coal to reach the heating flues, then travel with flue gases to the underfire stack where they exit as visible particles (opacity). The number of heating flues in a single battery may exceed 2,000. Carbon deposition inside ovens helps to seal

these cracks and mills leave a layer of beneficial carbon on the walls of ovens when cleaning the ovens.

Offtakes and lids must be inspected, cleaned and properly sealed to limit visible emissions. Water seals for offtakes provide a flexible seal and are an improvement in comparison with other methods for sealing offtakes. After an oven is charged, the lidman lutes lids to seal them during coking. At times, the lidman will have to reapply the luting material or the lids will leak.

Oven heights range from 3 meters to 6.5 meters. The difference is critical since door seals must be maintained over a greater length (perimeter) on taller doors. A relatively greater area must be cleaned and relatively longer edges adjusted to close tolerance on taller doors. Although it is reasonable to expect a 6.5 meter battery to have more problems, and perhaps more violations, one mill which operates a 6.5 meter battery has a program for repairing and closely monitoring door performance which has led to a dramatic improvement in performance. Personnel are assigned (dedicated) to this program and given responsibility for the performance and repair of doors; since responsibility is not divided among several departments, management or institutional-related obstacles have been reduced or eliminated. Several years ago, the worst performing doors were repaired, then returned to service and monitored. Overall performance improved quickly. An inspector related there was a time when as many as 30 doors would have visible emissions but that at present, perhaps only one door will have visible emissions during an inspection.

The following table (Table 14A) summarizes the causes of violations documented by the air program for coke ovens.

TABLE 14A

Air Quality Compliance Problem Cause Analysis: Coke Ovens

Process	Unknown/Not Indicated			Indicated Causes												Total		
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related					
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
By-product Plant	5	3	2	--	--	--	5	5	1	--	--	--	--	--	--	10	8	2
Charging	61	28*	5	3	3	1	--	--	--	--	--	--	3	3	1	67	28*	5
Collector Main	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Combustion/Underfiring Stack	24	11	4	--	--	--	--	--	--	--	--	--	1	1	1	25	11	4
Desulfurization Plant	5	5*	1	--	--	--	--	--	--	--	--	--	1	1*	1	6	6*	1
Doors	84	65	4	--	--	--	--	--	--	--	--	--	2	2	1	86	67	4
Fines/Material Handling	1	1	1	--	--	--	3	3	1	--	--	--	--	--	--	4	4	1
Flaring	1	1	1	5	5	1	--	--	--	--	--	--	9	9*	1	15	14	2
Lids	4	2*	2	--	--	--	--	--	--	--	--	--	--	--	--	4	2*	2
Offtakes	71	54	4	--	--	--	--	--	--	--	--	--	2	2	1	73	56	4
Pushing	54	37	4	3	3	1	--	--	--	--	--	--	3	3	1	60	37	5
Quenching	47	47	1	--	--	--	--	--	--	--	--	--	--	--	--	47	47	1
Travel	11	9	3	--	--	--	--	--	--	--	--	--	--	--	--	11	9	3

Miscellaneous	4	2	3	--	--	--	--	--	--	--	--	--	--	--	--	4	2	3
Total	373	228	6	11	6	2	8	8	1	--	--	--	21	10*	3	413	232	6

* 1 year review mill

(3) Blast Furnaces

Flux, iron ore and coke are charged into refractory-lined blast furnaces to produce molten iron. These materials combine and react in the furnace in the presence of a heated airstream introduced near the base of the furnace to form slag and molten iron. The blast furnace operates continuously and is tapped periodically. A hole is drilled through the material sealing the taphole to allow the molten iron to spill into a trough and flow through a series of runners to a transfer station where it is poured into cars for transfer to the refining process. Slag, which is lighter than the molten iron and contains impurities, begins to flow from the furnace toward the end of a cast. As the slag is skimmed from the iron, it travels through a series of runners to pits where it may be quenched. The blast furnace rises above shelters designed to enclose the casting operation (casthouse). As a consequence, the blast furnace process category also includes iron runners, slag runners, skimmers, a tilting spout or torpedo/pugh car station, kish and slag pot cooling/wetting stations, slag pot desulfurization, slag pits, and casthouse roof monitors, in addition to the blast furnace and blast furnace stoves.

Visible emissions occur primarily at times when hoods (if present) are withdrawn to allow the drill to tap a furnace and at the end of a cast when tight-fitting hoods are again withdrawn. Visible emissions may also occur from uncovered sections of iron or slag runners and at the iron spout. Open sections may be controlled by steam suppression or gas lances which prevent air from contacting the molten iron. If there is not a system to collect emissions which reach the roof of the cast house during tapping, visible emissions will leave through the roof monitors. Some mills employ roof evacuation systems, while others do not.

During drilling and at the beginning of a cast, opacity is somewhat dependent upon the length of time the hood is withdrawn. At the end of a cast, visible emissions depend upon the condition of the refractory at the face of the taphole; if this refractory is damaged, clays used to seal the taphole may adhere less readily to the uneven face. It may take longer to seal the taphole, and clay sealing material may drop to the runner and contact hot iron still in the runner; this may lead to visible emissions.

During casting at some mills, when the hood is in place, emissions are collected and directed to a control device; these systems generally perform well. A system of runner covers that suppress emissions by limiting the number of open sections on the iron and slag runners, help control emissions, but typically cannot perform as well as an active particulate collection and control system. Some mills employ systems for capturing and controlling iron and slag runner and tilting spout emissions during casting.

One mill that voluntarily constructed a system to collect emissions from the iron spouts at two blast furnaces and send them to a single baghouse had no violations during a five year period. In another instance, a mill that was required to install controls as part of an EPA Consent Decree was able to meet a 15% rolling 6-minute average casthouse opacity limit for 99.4% of 1169 rolling 6-minute average periods. The visible emission observations were performed on a random basis during three consecutive daylight casts each calendar month in 1995.

Most blast furnace air quality violations documented in the study are opacity violations (41 of 49), but documents often do not explain the reason violations occur. Faulty work practices

were listed as the cause for 7 violations; process related causes were responsible for 8 violations, and equipment failure was responsible for 3 violations. Examples of process related causes include: excess opacity during normal slag flow conditions; excess opacity related to unusual chemistry in the iron; and a failed cast due to "poor shutin." There were no reporting, recordkeeping, permit-related, or monitoring violations.

A series of opacity violations at one mill related to "beach iron dumping." This is the practice of pouring liquid iron on the ground when the iron is out of specification, cold, or there are production delays at other plant facilities. At this mill, an indoor beaching facility was placed in service. At first, the building was completely enclosed, but heat from the operation warped portions of the structure. The mill removed panels along a wall and placed louvers in the building roof which compromised the effectiveness of enclosing the process.

The following table (Table 14b) summarizes the causes of violations documented by the air program for blast furnaces.

TABLE 14B

Air Quality Compliance Problem Cause Analysis: Blast Furnaces

Process	Unknown/Not Indicated			Indicated Causes													Total		
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related						
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	
Blast Furnace	28	11	5	3	2	2	7	3*	4	--	--	--	8	4*	4	46	14*	7	
Blast Furnace Control Device	2	2	1	--	--	--	--	--	--	--	--	--	1	1	1	3	2	2	
Total	30	13	5	3	2	2	7	3*	4	--	--	--	9	4*	5	49	14*	8	

* 1 year review mill

(4) Basic Oxygen Furnaces

This process utilizes refractory-lined vessels to convert molten iron and scrap into steel. Scrap and molten iron are charged to the basic oxygen vessel, flux is added, and oxygen is injected to drive the steelmaking process. Alloys may be added to the molten steel in the vessel or added later. Other processes in the BOF shop (ladle treatment, for example) are included in this description if agency documents describe a BOF shop incident without identifying the source. As a result, BOF vessels may not be responsible for all BOF incidents in this report (especially opacity violations). These related sources may precede or follow the basic oxygen process and are often located in the BOF shop.

There are two principal sources of emissions in a BOF shop. The first is the basic oxygen vessel which evolves dense emissions at different times during a refining cycle which may last from 30 to 50 minutes. The second source comprises a variety of operations (reladling, ladle metallurgy, slag skimming, charging, tapping, and maintenance operations, for example) with their associated "secondary" emissions.

Typical BOF emissions include carbon monoxide and particles, or fumes, consisting of metallic oxides and particles of slag. These emissions may occur during the transfer of molten metal to and from the basic oxygen vessel or to other processes within the BOF shop enclosure. The emissions from these processes may lead to opacity violations at the roof monitor.

While opacity limits apply separately to many shop processes or to the controls for these processes, the majority of BOF violations are roof monitor opacity violations and are not linked to specific processes. Visible emissions occur primarily when the refining vessel (BOF) is tilted away from the primary collection hood during charging and at other times when the vessel is tilted. For example, if a mill processes scrap, the vessel is tilted to allow charging of cold scrap. Hot metal (iron from the blast furnace) is then poured over the scrap. Oil or other material in the scrap may flash off and escape when it comes in contact with the iron. During turndown for sampling and alloy addition, the vessel is again tilted and emissions may evade collection. Since the vessel is tilted upright during oxygen refining, a period when oxygen is injected at supersonic velocity, the primary control system located above the vessel is generally effective.

Although the causes of a majority of air quality violations are either unknown or not indicated, agency representatives agree that violations can be reduced substantially with the use of secondary control systems which capture and direct fugitive process emissions escaping primary controls to a secondary control device. This was also indicated in the compliance data at one mill with two BOF shops, one with secondary controls, and the other without. Although there were roof violations at both BOF shops, there were roughly four times the number of violations at the shop without secondary controls.

The design and construction of vessel hoods influence pollutant concentration, particle size, and gas temperature which, in turn, affect control selection and design. Closed hood vessels suppress full combustion (resulting in CO emissions) while open hood vessels allow air to mix with the process airstream and burn CO to CO₂. Wet scrubbers are typically used to control particulates from closed hoods since electrostatic precipitators (ESPs) present a risk of explosion if used with closed hoods. A wet scrubber or ESP is used for particulate control of open hood vessels. There are several advantages to closed hood systems, including increased control, thermal, and energy efficiencies which relate to the smaller, cooler volume air stream and larger particle size characteristic of closed hood vessel operation.

Furnace enclosures are an approach for controlling hot metal charging or other "secondary" furnace emissions and "total" enclosures are capable of controlling other furnace emissions, such as puffing, turndown, and skimming. Local hoods may be used to control sources scattered throughout the shop but present design problems relating to cross-drafts in the building and crane operations.

There are advantages and disadvantages to whole building evacuation systems for the control of secondary shop emissions. Agencies may recommend or require whole building evacuation if violations persist. If required to install such a system, a mill is required to underwrite the expense of such a system and to find a way to enclose the building while providing access to the shop and while meeting safety or operational limits relating to visibility, heat, and exposure inside the shop.

Whereas high-performance wet scrubber and ESPs have traditionally been used for primary furnace emissions, baghouses are typically used for secondary furnace emissions. Secondary emissions may also be collected through the primary gas cleaning system if total building enclosure is involved.

In this study, control equipment failure was the predominant cause of air quality violations (49), followed by poor O&M (15), then process related problems (9). Again, the underlying cause of the great majority of violations was either unknown or not indicated (198).

The following table (Table 14C) summarizes the causes of violations documented by the air program for basic oxygen furnaces.

TABLE 14C

Air Quality Compliance Problem Cause Analysis: Basic Oxygen Furnaces

Process	Unknown/Not Indicated			Indicated Causes												Total		
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related					
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Control Device	19	10*	5	9	4	4	11	8	3	--	--	--	--	--	--	39	16	6
Material Handling	2	2	1	--	--	--	--	--	--	--	--	--	--	--	--	2	2	1
Roof Monitor	174	115*	6	39	35*	4	3	2	2	--	--	--	7	4	3	223	150*	223
Miscellaneous	3	3	1	1	1	1	1	1	1	--	--	--	2	1	2	7	4	3
Total	198	115*	9	49	35*	5	15	10	4	--	--	--	9	4	4	271	150*	9

* 1 year review mill

(5) Electric Arc Furnaces

EAFs are refractory lined vessels which melt and refine scrap or direct reduced iron (DRI) using electric current and carbon electrodes which strike an arc in the furnace. A roof swings away and a crane drops cold or preheated scrap in the bottom of the furnace. Molten iron may also be charged to an EAF. The roof swings back into position, electrodes are positioned above the charge, and immense current is applied. Typically, at least three oxy-fuel burners are turned on during the first 5 to 10 minutes of the heat in order to accelerate melting. Oxygen lances are used to make the scrap collapse into the melt. Slag is poured from the bath and the furnace is tapped when established goals for temperature and composition are reached. Alloys are added directly to the furnace or to the tapping ladle, if needed. Although there are periods during a melt cycle that are characteristically more emissive than others, documents citing violations seldom establish a link between violations and a particular period of the melt cycle.

Emissions are heaviest during charging, melting, and tapping. The process of melting and refining scrap to produce liquid steel begins when the furnace roof swings open. A crane drops a cold metal charge into the furnace and large volumes of hot fume-laden air rise into the melt-shop roof trusses. The capacity of the EAF shop control system needs to be designed either to collect this volume or to spill the volume into an area scavenged by additional, smaller hoods. During melting, emissions consist of volatilized metals and iron oxide. EAF steelmaking processes add alloying elements to the ladle while tapping, which can increase emissions.

Air pollution control measures include direct evacuation of the furnace during melting (through a "fourth" hole in the furnace roof). Secondary emission control systems control charging and tapping emissions. Charging and tapping emissions are generally captured by canopy hoods in the melt-shop roof trusses. Tapping emissions are sometimes captured by low level tapping hoods if the ladle is not crane-held. Canopy hood shapes and hood exhaust flow rates are determined by experience and from plume rise formulas modified for obstructions such as cranes. Some EAFs are equipped with enclosures that have movable doors to permit scrap bucket access, tapping ladle access if necessary, access to the slag door, and access for maintenance. However, many carbon steel producing furnaces are now too fast for this emission capture concept to be practical. Most EAFs have fabric filters for fume cleaning and collection.

This is the only section of the air program noncompliance cause analysis that centers on compliance incidents at a process operating at integrated mills and at mini mills. While all mini mills operate EAFs, in a few instances integrated mills do also. EAF violations documented during the study include 19 at one integrated mill (all were roof monitor opacity violations with no cause identified), and 40 at six mini mills.

There were 34 opacity violations in all (27 occurred at two mills -- 19 at one integrated mill and 8 at one of the mini mills). In addition, there were 8 fugitive emission violations, 7 O&M violations, and 4 mass emission violations relating to EAFs (all at mini mills). There were also 6 monitoring violations. The underlying cause of these violations was indicated for only nine of the violations. These included 2 violations related to equipment failures, 5 violations caused by faulty work practices, and two process related violations.

The following table (Table 14D) summarizes the causes of violations documented by the air program for electric arc furnaces.

TABLE 14D

Air Quality Compliance Problem Cause Analysis: Electric Arc Furnaces

Process	Unknown/Not Indicated			Indicated Causes												Total		
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related					
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
Control Device	14	10	2	1	1*	1	2	1	2	--	--	--	1	1	1	18	12	3
Roof Monitor/Panels	29	19*	4	--	--	--	3	2	2	--	--	--	1	1	1	33	19*	5
Miscellaneous	7	6	2	1	1	1	--	--	--	--	--	--	--	--	--	8	6	2
Total	50	19*	4	2	1	2	5	3	3	--	--	--	2	2	1	59	26	5

* 1 year review mill

B. Surface Water Program

(1) Introduction

Under the NPDES program, causes are provided for most reportable effluent violations, spills, upsets and other reportable self-monitored events. On numerous occasions the cause cannot be determined, and this is also reported, usually with a statement of possible causes and/or a statement that the cause is being investigated. Situations where a facility routinely fails to respond to this requirement are rare. Aside from self-monitoring violations, however, there are numerous agency inspection reports, which frequently identify unacceptable outfall conditions but do not supply reasons. Many pretreatment violations reported to POTWs are also not explained. As a result, there are a substantial number of violations for which causes are not identified in agency files.

As in the case of air quality violations, the types of causes that are reported tend to relate to an immediate cause (e.g., equipment malfunctions, operator error). Underlying problems (e.g., the need to replace old treatment facilities with a more advanced control system) either are not addressed, or are not addressed in a way that links the problem to a specific violation as the reason -- more often, an underlying problem is discussed in terms of a potential solution to continued violations, and not as the definitive cause of a violation.

The cause categories reported in this analysis reflect a best effort to group the reported causes into standard categories based on the reasons for violations that were, for the most part, provided in reports submitted by the mills. Processes selected for this analysis include those with the most violations. They include coke plants, blast furnaces, basic oxygen furnaces, hot forming/hot mills, steel finishing (including cold mill/annealing, pickling and coating) and central treatment plants.

(2) Coke Plants

(a) Process Discussion

Virtually all blast furnace coke produced in the U.S. is manufactured in by-product coke plants comprising coke batteries (numerous, vertical slot-type ovens aligned side-by-side) and by-product coke oven gas cleaning and chemical recovery facilities. There is one, relatively small non-recovery coke plant operating in Virginia. A second non-recovery coke plant is being constructed at an integrated steel mill located in northwestern Indiana.

In the by-product process, coke is produced on a batch basis by distilling metallurgical coals in the slot type ovens at temperatures of 1,650 to 2,000EF in the absence of air. Blends of high, medium and low volatile coals are used to produce coke of sufficient strength for use in ironmaking blast furnaces. Coke batteries comprise numerous ovens constructed side-by-side equipped with ancillary coal charging, gas collecting mains, and coke pushing and coke quenching facilities. Coal is charged into the tops of the ovens with larry cars (there are no pipeline charged batteries in the U.S.). The coking process typically lasts 16 hours. After the coking process is complete, incandescent coke is pushed from the oven into a flat bed rail car and transported to a coke quench station where the coke is quenched with water to near ambient temperature.

Coke breeze, essentially fine coke particles, is recovered from the quench stations. Coke oven gas is the principal by-product of the coking process.

In the by-product coking process, distilled volatile components are collected as unpurified "foul" gas containing water vapor, tar, light oils, solid particulate matter of coal dust, heavy hydrocarbons, and complex carbon compounds. Condensable materials, such as tar, light oils, ammonia, and naphthalene are removed, recovered, and processed as gas and coal chemical by-products. Finally, sulfur is removed, leaving clean, desulfurized oven gas.

This cleaning involves a number of steps. First, the "foul" gas is sprayed with weak ammonia liquor, which condenses the tar and ammonia. The remaining gas is cooled as it passes through a condenser and then compressed by an exhauster. Any remaining tar is removed by a tar extractor, either by impingement against a metal surface or collection by an electrostatic precipitator.

At this stage, the gas still contains approximately 75% of the original ammonia and approximately 95% of the original light oils. The gas is passed through a saturator, where the ammonia reacts with sulfuric acid to form ammonium sulfate, which is crystallized and removed. The gas is further cooled to condense naphthalene. The light oils are removed in an absorption tower and subsequently refined or used as fuel in the coke heating process. The last cleaning step is removal of hydrogen sulfide in a scrubbing tower. The cleaned, desulfurized gas is then used as fuel for heating the coke ovens, as well as for other plant combustion processes, or sold to nearby facilities.

(b) Water Uses and Wastestreams

At the end of the coking period, the incandescent coke is pushed out of the furnace into a coke car and taken directly to a quenching area. There are two methods for quenching the hot coke: wet quenching and dry quenching. During wet quenching, water is sprayed onto the hot coke and most of the water is carried up a stack over the coke car as steam. Modern quenching stations are typically recirculating in nature. Excess quench water is collected in a settling basin where the coke fines settle out. The water is then reused for quenching (there is still one dirty quench process left in the U.S.).

The gas produced during the coking of the coal contains valuable chemicals which are recovered in the by-product recovery plant. The gas and vapors are shock-cooled by spraying with flushing liquor at various points along the collecting main. The cooling results from the evaporation of a portion of the water from the flushing liquor which removes some of the sensible heat from the gas and condenses some of the vapors, with the resultant condensation of heavy tar from the gas. The flushing liquor also provides a carrying medium for the condensable tars and other compounds formed in the operations.

The moisture and volatile components of the coal, typically 20 to 35% by weight, are collected and processed to recover by-products, which include crude coal tars, crude light oil (aromatics, paraffins, cycloparaffins and naphthalenes, sulfur compounds, nitrogen and oxygen compounds), anhydrous ammonia or ammonium sulfate, naphthalene, and sodium phenolate. During this by-product recovery process, wastewater is produced at the Ammonia Solution Spray, Tar Extractor, Condenser, and the Scrubbing Tower.

The typical volume of process wastewaters generated at a well-controlled by-product coke plant is approximately 100 gallons per ton (gpt) of coke produced. Waste ammonia liquor made up of moisture contained in the coal charge accounts for about 25 to 35 gpt. The remainder results from steam addition for distilling ammonia from the waste ammonia liquor, crude light oil recovery, and miscellaneous sources. Cokemaking wastewaters typically contain high levels of oil and grease, ammonia-N, cyanides, thiocyanates, phenolics, benzenes, toluene, xylene, other aromatic volatile components, and polynuclear aromatic hydrocarbons (PAHs).

(c) Typical Treatment and Potential Problem Areas

The conventional wastewater treatment approach consists of physical/chemical treatments, including oil separation, dissolved gas flotation, and ammonia distillation followed by biological treatment with nitrification. An innovative biological treatment approach without distillation pretreatment has been installed at one plant in the U.S.

Wastewater discharge problems associated with by-product coke plant wastewaters can include cross-contamination of non-contact cooling waters with process waters, loss of efficiency of ammonia stripping, and upsets of biological treatment systems from a number of causes including poor ammonia stripping, loss of alkalinity and shock loadings from the process.

(d) Compliance Problem Cause Analysis

The coke plant process evaluated in this study includes cokemaking, by-product recovery, and various treatment systems associated with the water-related wastestream from the coke plant. In general, identifying compliance issues associated with the coke plant is relatively straightforward compared to other steel mill processes, as the coke plant wastestreams are rarely, if ever, mixed with other process wastestreams.

There were 687 violations and concerns identified at coke plants. However, a single mill represents 399, or 58%, of all violations and concerns for this process. Two violation categories, effluent violations and unauthorized discharges, account for most violations and concerns (606 and 25, respectively). Of all violations and concerns, 551 or 80% are attributed to Pretreatment program requirements. The remaining 136 or 20% are related to NPDES requirements. A total of 270 or 39% of all violations and concerns include cause information, and 417 or 61% have no cause indicated.

! Pretreatment Program: Coke Plant Treatment System

Of the subcategories that comprise the coke plant process, the majority of violations and concerns, 549, are Pretreatment program violations and concerns associated with coke plant treatment systems. The cause associated with 168 of these violations and concerns involves permit and regulation interpretation issues. Most of these violations and concerns are related to stayed or contested permit limits. In some cases, the local authority has imposed a limit that is more stringent than the Federal categorical limit and the facility has applied for a variance staying their limit. There are also permit/regulation interpretation issues associated with removal credits. The second most significant cause for this category is equipment failure, with 14 violations

and one concern. Of these, 10 violations and one concern are related to problems with the ammonia still, and 2 violations are related to failed pump bearings. Process related causes are associated with 8 violations and one concern. Six violations are attributed to the air pollution controls installed at one mill in response to the benzene NESHAP regulations. The remaining process related incidents are attributed to an ammonia still, a sewer collapse (the only concern), and a fundamental inadequacy of the pretreatment system to remove cyanide from wastewater. There are 355 coke plant treatment system violations and two concerns with no cause indicated. All but 11 involve one mill, and all but one of the violations are effluent limit violations.

! Pretreatment Program: Coke Plant

Very few Pretreatment violations and concerns related to the coke plant are not also linked to the Coke Plant Treatment System. There are only two concerns in this category. Both involve potential unpermitted discharges. The cause for one is cited as equipment failure related to a failed pump indicator, and the cause for the other is cited as O&M/Work Practice related to operator error during maintenance.

! NPDES Program: Coke Plant Treatment System

There are 57 NPDES related violations and one concern involving the coke plant treatment system. Of these, 26 cite equipment failure as the cause. Of the 26 equipment failure causes, nine were valve or equipment leaks, eight were stormwater or other weather related equipment failures, and seven were attributed to a broken pH probe. O&M\Work Practice causes are noted for 15 violations, 12 involving problems with sediment basin operation. Process Related causes are associated with 11 violations, all of which are due to a fundamental inability of the treatment system to treat the wastestream adequately. There are six violations for which the cause is not indicated.

! NPDES Program: Coke Plant

There are 51 NPDES related violations and 27 concerns involving the coke plant. Of these, 17 cite equipment failure, six of which are equipment leaks or pipe failures. Other equipment failures include three level indicator malfunctions, a blown fuse, a pump failure, and a pipe blockage. There are six violations and concerns categorized as O&M/Work Practice. Three violations involve failure to conduct testing for the zebra mussel treatment program, and two concerns relate to potential unauthorized discharges during maintenance and repairs. There are 32 violations and 22 concerns with the cause not indicated.

The following table (Table 15A) summarizes the causes of violations documented by the water program for coke plants.

TABLE 15A

Water Quality Compliance Problem Cause Analysis: Coke Plant

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Coke Plant	54 (3)	35 (1)	3	17	8	3	6	3	3	--	--	--	1	1	1	78 (3)	45 (1)	3
Coke Plant TS	6	6*	1	26 (4)	26* (4)*	1	15 (6)	15* (6)*	1	--	--	--	11 (8)	11* (8)*	1	58 (18)	58* (18)*	1
TOTAL	60 (3)	35 (1)	4	43 (4)	26* (4)*	4	21 (6)	15* (6)*	4	--	--	--	12 (8)	11* (8)*	2	136 (21)	58* (18)*	4
Pretreatment																		
Coke Plant	--	--	--	1	1	1	1	1	1	--	--	--	--	--	--	2	2	1
Coke Plant TS	357 (5)	345 (5)	2	15 (1)	9	2	--	--	--	168 (8)	153 (8)	2	9	9	1	549 (14)	375 (13)	2
TOTAL	357 (5)	345 (5)	2	16 (1)	9	2	1	1	1	168 (8)	153 (8)	2	9	9	1	551 (14)	377 (13)	2
NPDES and Pretreatment Combined																		
Coke Plant	54 (3)	35 (1)	3	18	8	3	7	4	3	--	--	--	1	1	1	80 (3)	45 (1)	3
Coke Plant TS	363 (5)	345 (5)	3	41 (5)	26* (4)*	3	15 (6)	15* (6)*	1	168 (8)	153 (8)	2	20 (8)	11* (8)*	2	607 (32)	375 (13)	3
TOTAL	417 (8)	362 (7)	4	59 (5)	26* (4)*	4	22 (6)	15* (6)*	4	168 (8)	153 (8)	2	21 (8)	11* (8)*	3	687 (35)	399 (15)	4

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System

US EPA ARCHIVE DOCUMENT

(3) Blast Furnaces

(a) Process Discussion

Blast furnaces are large cylindrical structures in which molten iron is produced continuously by the reduction of iron bearing ores with coke and limestone. Reduction is promoted by blowing heated air (hot blast) into the lower part of the furnace from adjacent heating stoves. As the raw materials melt and decrease in volume, the volume of the furnace charge decreases. Additional raw materials are added (charged) at the top of the furnace to keep the raw material mass within the furnace at a constant level. Blast furnace gas leaving the top of the furnace has heating value and is cleaned and cooled prior to use for stove heating and boiler house and power house operations.

Iron oxides react with the hot carbon monoxide from the burning coke, and the limestone reacts with impurities in the iron bearing material and the coke to form molten slag. These reactions start at the top of the furnace and proceed to completion as the charge passes to the bottom of the furnace. Molten slag floats on top of the molten iron at the bottom of the furnace. Iron and slag are tapped separately from the bottom of the furnace on a batch basis.

(b) Water Uses and Wastestreams

Non-contact cooling is the largest application of water for blast furnace operations. For example, cooling water circulates constantly through the tuyeres, hearth staves, bosh, and in-wall cooling plates, cinder notch, and stove valves. Process water uses include blast furnace gas cleaning and cooling with direct contact water. Limited amounts of water are used for slag cooling or slag granulation.

Ironmaking process wastewaters are generated from gas cleaning and cooling the dirty exhaust (top) gases. The gas streams contain dust of raw materials and process reaction products. Principal pollutants include total suspended solids, ammonia-N, cyanides, phenolic compounds, and metals (Cu, Pb, and Zn).

(c) Typical Treatment and Potential Problem Areas

Standard treatment in the industry for the gas cleaning cooling waters includes sedimentation in thickeners or clarifiers, cooling with mechanical draft cooling towers, and high rate recycle. At present, all but one blast furnace plant (not included in the current study) in the U.S. are equipped with high rate recycle and treatment systems. Low-volume blowdowns from the recycle systems are either consumed in slag cooling at furnaces with adjacent slag pits, or treated in conventional metals precipitation systems. Alkaline chlorination is practiced at a few mills to treat for ammonia-N, cyanides, and phenolic compounds.

Wastewater problems from blast furnace operations can result from overflows from cooling tower hot or cold wells, hydraulic imbalances in the blast furnace recycle system or slag quench system, cross-contamination of blast furnace process water and non-contact cooling water, premature or excessively fast drainage of blast furnace gas seals, and failure or upsets of recycle treatment systems.

In this analysis causes of violations and concerns attributed to the blast furnace have been combined with those attributed to any related recycle system. A best effort was made to isolate the blast furnace from other mill processes. However, there are other violations that may be due to blast furnace wastestreams, but there was insufficient information in the file to make that determination.

(d) Summary of Causes

There are 960 violations and concerns under the blast furnace category, making this the process under the water program with the largest number of compliance problems. However, a single mill represents 722 or 75% of all violations and concerns for this process. There are two violation categories that account for the majority of problems: effluent violations (811) and unauthorized discharges (102). There are 926 violations and concerns (96%) attributed to NPDES related requirements. The remaining 34 (4%) involve Pretreatment program related requirements. Of the 960 violations and concerns, roughly two-thirds (610) cite cause information and no cause is indicated for the remaining 350.

! Pretreatment Program: Blast Furnace Recycle System

There were 21 violations for this subcategory. All were effluent violations. Of these, 16 cite pretreatment process related causes for noncompliance. As an example of one type of process inadequacy encountered, an investigation determined that the recycle system blowdown was high in carbonates and bicarbonates. This caused "overburden" on the pretreatment system and resulted in exceedances. Equipment failure is cited for two violations, one being a pump failure, and the other a check valve malfunction. O&M/Work Practice is also cited as the cause for two violations, both of which are due to an unusually high number of iron analyses requiring the use of mercuric chloride in the analysis, and that resulted in mercury exceedances. One violation has no cause indicated.

! Pretreatment Program: Blast Furnace

Only 13 violations are associated with this subcategory. O&M/Work Practice is cited as the cause for 10 violations, nine of which are caused by the use of coal with a higher than normal mercury content. No cause is indicated for three violations.

! NPDES Program: Blast Furnace Recycle System

There were 111 violations and 16 concerns for this subcategory. The most commonly cited cause is equipment failure (56). Of these, 23 are due to various pump failures, eight are due to weather related equipment failures, and the remainder are related to leaks, ruptures or parts failure. O&M/Work Practice is cited as the cause for 24 violations and three concerns. Process related causes are cited for 13 violations and one concern. Of these, eight are attributed to general operation of the recycle system and six are due to problems with system capacity. Permit/regulation interpretation issues are cited as the cause of two concerns, one for an unpermitted outfall, and one for unpermitted construction. There are 16 violations and five concerns with no cause indicated.

! NPDES Program: Blast Furnaces

The majority of blast furnace violations and concerns, 775 violations and 24 concerns, are associated with this process subcategory. Of these, 334 violations and six concerns cite O&M/Work Practice as the cause of noncompliance. There are 252 violations related to slag quench water management, and 51 violations related to sewer cross-connections. Other violations or concerns relate to general operation and maintenance, operating condition variations (high flows, sewer repairs, hydraulic imbalances), or operator error. Equipment Failure is the second most frequently cited cause (129 violations and five concerns). Of these, 92 are due to line and pipe leaks, and 13 are weather-related equipment failures. Other equipment failures include power failures, stuck and failed valves, level controller problems and pump malfunctions. There are 309 violations and 11 concerns in this category with no cause indicated.

The following table (Table 15B) summarizes the causes of violations documented by the water program for blast furnaces.

TABLE 15B

Water Quality Compliance Problem Cause Analysis: Blast Furnaces

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Blast Furnace	318 (37)	258 (20)	8	134 (5)	112 (5)	4	340 (12)	316 (11)	6	--	--	--	7	6*	2	799 (54)	686 (36)	11
Blast Furnace RS	28 (6)	15 (5)	4	56 (4)	24	7	27	16	6	2	1	2	14	4*	5	127 (10)	44	9
TOTAL	346 (43)	269 (21)	8	190 (9)	135 (9)	7	367 (12)	318 (11)	9	2	1	2	21	7*	5	926 (64)	722 (41)	11
Pretreatment																		
Blast Furnace	3	2	2	--	--	--	10	9	2	--	--	--	--	--	--	13	11	2
Blast Furnace RS	1	1	1	2	2	1	2	2	1	--	--	--	16 (3)	16 (3)	1	21 (3)	21 (3)	1
TOTAL	4	2	2	2	2	1	12	9	2	--	--	--	16 (3)	16 (3)	1	34 (3)	23 (3)	2
NPDES and Pretreatment Combined																		
Blast Furnace	321 (37)	258 (20)	8	134 (5)	112 (5)	4	350 (12)	316 (11)	7	--	--	--	7	6*	2	812 (54)	686 (36)	11
Blast Furnace RS	29 (6)	15 (5)	5	58 (4)	24	7	29	16	7	2	1	2	30 (3)	16 (3)	6	148 (13)	44	9
TOTAL	350 (43)	269 (21)	8	192 (9)	135 (9)	7	379 (12)	318 (11)	10	2	1	2	37 (3)	16 (3)	6	960 (67)	722 (41)	11

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section I I I relating to how daily and monthly averages are treated in this report. RS = Recycle System

(4) Basic Oxygen Furnaces

(a) Process Discussion

The principal purpose of BOF steelmaking is to refine a metallic charge consisting of approximately two-thirds to three-quarters molten iron and one third to one-quarter steel scrap by oxidizing silicon, carbon, manganese, phosphorus and a portion of the iron. Oxygen is injected into the molten bath either through the top of the furnace (top blown), bottom of the furnace (bottom blown), or both (combination blown). Residual sulfur is controlled by managing furnace slag processes.

(b) Water Uses and Wastestreams

Off-gases from furnaces in the U.S. are controlled by one of three methods: semi-wet, wet-open combustion, and wet-suppressed combustion. In the semi-wet method, furnace off-gases are conditioned with moisture prior to processing in electrostatic precipitators or bag houses. In wet-open combustion, excess air is admitted to the off-gas collection system allowing carbon monoxide to combust prior to high-energy wet scrubbing for air pollution control. In wet-suppressed combustion, excess air is not admitted to the off-gas collection system prior to high-energy wet scrubbing for air pollution control. In addition to process water usage, large quantities of non-contact cooling water are also used in BOF steelmaking operations.

The particulate matter carried by the gas stream is the principal source of pollutants which contaminate the process wastewaters. The raw wastewaters from the semi-wet and wet gas cleaning systems of each steelmaking subdivision are similar in waste characterization in that toxic metals, fluoride, and significant quantities of suspended solids are present. Pollutants include Zn, Cu, Pb, Hg, Cr, Ni, Ag, Cd, As, Se, Tl. The levels of the various pollutants, however, vary between systems. Untreated wastewaters are highly alkaline, particularly during the period of the furnace "blow."

(c) Typical Treatment and Potential Problem Areas

Standard treatment for wet gas cleaning systems consists of sedimentation in clarifiers or thickeners and recycle of 90% or more of the applied water. Blowdown treatment consists of metals precipitation. Operating problems can result in the recycle systems from introduction of excess lime fines from furnace operations which can cause fouling and scaling, loss of alkalinity control, and hydraulic imbalances within the blowdown treatment systems.

Although the effluent limitations guidelines at 40 CFR Part 420 specify zero discharge as the effluent limitation for BOF semi-wet air cleaning systems, most, if not all of these systems are operated with wastewater discharges. These discharges result from use of water to flush deposits of dusts and sludges from the gas collection and

cleaning systems beyond that amount which can be evaporated. Discharges from BOF semi-wet air cleaning systems are usually co-treated with wastewaters from other processes in centralized wastewater treatment systems.

(d) Summary of Causes

For the purpose of this study, causes of violations and concerns associated with the BOF include those attributed to the BOF, as well as those attributed to any related recycle systems. A best effort was made to isolate the BOF part of the steelmaking process from other processes. However, in some cases, there are other processes where violations may be due to BOF wastestreams, but there was insufficient information available to make that determination. The most common case is when BOF wastestreams are directed to a central treatment plant and combined with wastestreams from continuous casting and the ladle metallurgical facility. Therefore, the count of violations and concerns for the BOF category in this summary should not be assumed to represent all violations and concerns related to the BOF process.

There are 328 documented violations and concerns related to BOFs, ranking BOFs fifth among the process categories selected for this study in the number of documented compliance problems. A single mill represents 183 or 64% of all violations and concerns. Two violation categories account for the majority of problems: effluent violations (209) and unauthorized discharges (48). Of the 288 violations and concerns, 179 or 62% are related to the Pretreatment program, and the remaining 109 or 38% are related to the NPDES program. A total of 184 (64%) of all violations and concerns for the BOF have cause information, and 104 (36%) have no cause indicated.

! Pretreatment Program: BOF Recycle System

The least number of violations and concerns are related to this subcategory. There are 33 violations, of which 19 cite equipment failure, all related to an antiquated pH adjustment system. O&M/Work Practice is cited for four violations involving incorrect calibrations and operator error. There are 10 violations with no cause indicated.

! Pretreatment Program: BOF

The majority of BOF related violations and concerns, 146 (all violations), are associated with this subcategory. Of these, 91 violations are associated with O&M/Work Practice problems, including 80 incidents related to the contamination of cooling water from scrap. Other O&M/Work Practice problems include seven surcharge conditions, two bypasses during maintenance, and two problems with acid meter calibration. The remaining 55 violations have no cause indicated.

! NPDES Program: BOF Recycle System

The BOF Recycle System accounts for 30 NPDES related violations and 14 concerns. Of these, 19 violations and four concerns are due to equipment failure. Of the 19 violations, 16 are weather related, including 10 pumping capacity related exceedances due to stormwater flows. There are three effluent violations and seven concerns involving potential unauthorized discharges with no cause indicated.

! NPDES Program: BOFs

Discharges in this subcategory account for 54 violations and 11 concerns. Of these, 28 violations and three concerns are due to equipment failure, 17 of which are weather related, and 15 of which involve stormwater infiltration into sewers. The remaining equipment failures are primarily ruptures of pipes and pump failures. O&M/Work Practice is cited as the cause for three violations and two concerns. There are 23 violations and six concerns with no cause indicated.

The following summary table (Table 15C) provides information on the causes of violations documented by the water program for basic oxygen furnaces.

TABLE 15C

Water Quality Compliance Problem Cause Analysis: Basic Oxygen Furnaces

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Basic Oxygen Furnace	29	20	3	31	22	5	5	5	1	--	--	--	--	--	--	65	28	5
Basic Oxygen Furnace RS	10 (1)	10 (1)	1	23 (1)	15*	2	9 (1)	7 (1)	3	--	--	--	2 (1)	2 (1)	1	44 (4)	27 (4)	3
TOTAL	39 (1)	30 (1)	3	54 (1)	22	5	14 (1)	12 (1)	3	--	--	--	2 (1)	2 (1)	1	109 (4)	55 (4)	5
Pretreatment																		
Basic Oxygen Furnace	55 (2)	55 (2)	1	--	--	--	91	91	1	--	--	--	--	--	--	146 (2)	146 (2)	1
Basic Oxygen Furnace RS	10	10	1	19	19	1	4	4	1	--	--	--	--	--	--	33	33	1
TOTAL	65 (2)	65 (2)	1	19	19	1	95	95	1	--	--	--	--	--	--	179 (2)	179 (2)	1
NPDES and Pretreatment Combined																		
Basic Oxygen Furnace	84 (2)	58 (2)	3	31	22	5	96	91	2	--	--	--	--	--	--	211 (2)	150 (2)	5
Basic Oxygen Furnace RS	20 (1)	10	2	42 (1)	19	3	13 (1)	7 (1)	4	--	--	--	2 (1)	2 (1)	1	77 (4)	33	4
TOTAL	104 (3)	68 (2)	3	73 (1)	22	5	109 (1)	95	4	--	--	--	2 (1)	2 (1)	1	288 (6)	183 (2)	5

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. RS = Recycle System

(5) Hot Forming/Hot Mills

(a) Process Discussion

Hot forming mills can be divided into four categories by the purpose that the mill serves in preparing the steel for finishing: primary rolling mills, section mills, flat-rolled mills (plate mills and hot strip mills) and pipe and tube mills. Primary mills include slabbing mills, blooming mills, and billet mills and perform the initial rolling step used in the production of a semi-finished product from solid hot steel ingots. Primary mills produce either blooms, slabs, or billets. Prior to hot rolling in primary mills, steel ingots are heated to rolling temperature (2,000EF- 2,400EF) in soaking pit furnaces. In a primary rolling mill, the hot ingot is passed between the mill rolls and reduced in cross-section in either a reversing mill or a tandem mill. After the ingot is rolled to the desired size, the end of the bloom, slab, or billet is cut off or "cropped." Also at the primary rolling mill, the semi-finished steel is conditioned to remove defects, such as rolled seams, light scabs, and checks, by hand chipping, machine chipping, scarfing, grinding, milling, and hot steel scarfing. With the current high utilization of continuous casters at steel mills in the United States, there are relatively few primary mills operating today. They are most often used to produce slabs for selected grades of plate products where ingot casting is desirable.

Most section mills, plate mills, and hot strip mills use continuously cast billets or slabs to produce finished hot-rolled products, or to produce intermediate hot-rolled products for cold finishing and coating. Continuous casting machines offer significant yield and energy savings over the combination of ingot casting and primary hot rolling.

The section rolling mill takes the semi-finished product from the casting machine, usually in the form of a rectangular cross-section billet or a round, and produces either an intermediate finished product to be further reduced in other section mills or rolls the billet directly to a finished product. Reheating is necessary for section operations whenever the temperature of the metal being worked falls below the temperature required to maintain plasticity. Automatic hot scarfing is used at some section mills to remove defects, such as rolled seams, light scabs, and checks. Section mill types include billet mills, bar mills, rail mills, rail-joint bars, and structural section mills.

The basic operation of a plate mill is the reduction of a heated slab from a primary mill to the weight and dimensional limitations defining plates. Plates are generally considered to be those flat, hot-rolled finished products that are more than 8 inches wide and generally 0.23 inches or more thick, or over 48 inches wide and at least 0.18 inches thick. The reduction of the plate is accomplished by heating slabs, descaling and rolling them to plate dimensions, leveling, cooling and shearing the plate to the desired size. Most plate mills use continuous heating furnaces. Descaling in modern

plate mills is accomplished by hydraulic sprays impinging on both top and bottom surfaces of the plate at pressures up to 1,500 lbs/in².

The hot strip mill converts slabs that are reheated to rolling temperatures (2000EF-2400EF) in continuous reheat furnaces into "hot bands," or coils of strip steel. Slabs are provided either from a storage yard, or are delivered hot (or warm) directly from slab casting machines. The hot strip mill rolling train consists of a roughing scale breaker stand, several roughing mill stands, a finishing scale breaker stand, several finishing mill stands, a run-out table, and coilers. Motor driven roll stands convey the hot slabs along the strip mill from mill stand to mill stand. High pressure water sprays used to remove scale from the hot slabs are located after the scale breaker and roughing stands. Roll stand spray cooling water is provided for cooling of each roll in the stands.

(b) Water Uses and Wastestreams

In hot rolling mills, water in the form of high-pressure jets is used to remove scale from the hot steel before rolling and to keep the surface clean between certain passes. The scale removed from the hot steel by the high-pressure jets falls into a flume or sluice beneath the mill, where a running stream of water carries the scale to a scale pit. Hot-strip mills also use laminar cooling sprays at the runout table to cool the strip in a controlled manner prior to coiling.

Water use and discharge rates from hot forming operations vary greatly depending upon the type of hot forming mill and the shapes produced. Applied process water rates typically range from 1,500 gpt for specialty plate mills to more than 6,000 gpt for hot strip mills. Discharge rates range from the applied water rates for hot forming mills operated with once-through process water systems to near zero discharge for mills equipped with high-rate recycle systems. At present, most hot forming mills in the U.S. are equipped with recycle process water treatment systems.

The principal pollutants in wastestreams from hot mills are total suspended solids (TSS) and oil and grease (O&G). Low levels of metals are also found in particulate form.

(c) Typical Treatment and Potential Problem Areas

Wastewater treatment includes: processing in scale pits located adjacent to the hot forming mill to recover mill scale and remove gross amounts of tramp oils; recycling of a portion of the scale pit effluent for flume flushing; sedimentation in clarifiers for TSS and O&G removal; filtration in mixed- or single-media filters; and discharge or recycle. High rate recycle systems (e.g., >95%) have been installed at many hot forming mills in the United States.

Upsets and operating problems for hot forming process water treatment and recycle systems are less common than for more complex steel mill process water treatment and recycle systems involving pH control and chemical precipitation. The most common operating problem in these systems is fouling of filter with oil resulting from inadequate removal in upstream treatment units (scale pits, clarifiers).

(d) Summary of Causes

The steel mill processes in the hot forming/hot mill category include: heating/soaking pits, primary slabbing or hot forming mills, and hot rolling mills. It was possible to break this into two subcategories, hot forming/hot mill and the hot forming/hot mill recycle system (when the available process information allowed).

There are 491 violations and concerns for the hot forming/hot mill process. One facility is responsible for 156 or 32% of all violations and concerns. As is the case for most processes, effluent violations and unauthorized discharges account for most violations (209 and 233, respectively). Of all violations and concerns for this process, 476 or 97% are attributed to NPDES requirements. The remaining 15 or 3% relate to Pretreatment program requirements. A total of 267 or 54% of all violations and concerns have cause information, and 224 or 46% have no cause indicated.

! Pretreatment Program: Hot Forming/Hot Mill Recycle System

There are 14 violations, all at one mill, under this subcategory. The primary cause is equipment failure, accounting for nine violations, eight of which are pump related, seven resulting in overflows at the clearwell. The remaining equipment failure violation is weather related. The second most common cause cited is O&M/Work Practice (two violations). The only other cause cited is weather related (a single violation involving an overflow caused by a frozen float). There are three violations with no cause indicated.

! Pretreatment Program: Hot Forming/Hot Mill

This subcategory accounts for one violation. There is no cause indicated for this one violation.

! NPDES Program: Hot Forming/Hot Mill Recycle System

The hot forming/hot mill recycle system accounts for 216 NPDES violations and four concerns. Of these, equipment failure is the primary cause (96 violations). The specific cause for 72 of the 96 violations is the percolation of groundwater at one mill through a high calcium slag soil where it becomes excessively alkaline, enters a cracked sewer line, and discharges. The next most significant cause cited is O&M/Work Practice (37 violations and two concerns). Of these, 30 work practice related incidents are operation related, 12 of which are attributed to the direct contact of clean water with mill scale at one mill, which occurred frequently over a one year period. Another eight work practice causes are maintenance related, and a single violation is related to

startup. Process related causes are cited for five violations and concerns. There are 75 violations with no cause indicated.

! NPDES Program: Hot Forming/Hot Mill

The majority of violations, 227, and concerns, 29, are associated with this subcategory. There are 47 violations and 11 concerns which cite equipment failure as the cause. Of the 58 equipment failures, 21 are leaks, eight are weather related, six involve pump failures and the remainder include a variety of equipment failures. There are 45 violations and seven concerns which cite O&M/Work Practice as the cause. Of these, 24 are operation related, 13 are maintenance related, and 5 are repair related. A permit/regulation interpretation issue relating to unpermitted flow was cited as a cause for one concern. There are 136 violations and nine concerns with no cause indicated.

The following summary tables provide information on the causes of violations documented by the water program for hot forming/hot mills.

TABLE 15D

Water Quality Compliance Problem Cause Analysis: Hot Forming/Hot Mills

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Hot Forming/Hot Mill	145 (5)	91	9	58	35	7	52 (3)	28 (1)	9	1	1	1	--	--	--	256 (8)	154 (1)	10
Hot Forming/Hot Mill RS	75 (17)	39 (16)	7	101 (2)	78	6	39 (20)	14 (12)	6	--	--	--	5 (2)	3* (2)*	2	220 (41)	133 (28)	9
TOTAL	220 (22)	91	12	159 (2)	80	9	91 (23)	28 (1)	11	1	1	1	5 (2)	3* (2)*	2	476 (49)	156 (1)	13
Pretreatment																		
Hot Forming/Hot Mill	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Hot Forming/Hot Mill RS	3	3	1	9	9	1	2	2	1	--	--	--	--	--	--	14	14	1
TOTAL	4	4	1	9	9	1	2	2	1	--	--	--	--	--	--	15	15	1
NPDES and Pretreatment Combined																		
Hot Forming/Hot Mill	146 (5)	91	9	58	35	7	52 (3)	28 (1)	9	1	1	1	--	--	--	257 (8)	154 (1)	10
Hot Forming/Hot Mill RS	78 (17)	39 (16)	8	110 (2)	78	7	41 (20)	14 (12)	7	--	--	--	5 (2)	3* (2)*	2	234 (41)	133 (28)	10
TOTAL	224 (22)	91 (18)	12	168 (2)	80	9	93 (23)	28 (1)	11	1	1	1	5 (2)	3* (2)*	2	491 (49)	156 (1)	13

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. RS = Recycle System

(6) Steel Finishing

Steel finishing categories selected for this analysis include acid pickling, cold forming and annealing, and coating. These processes, their related wastestreams and treatment issues, are discussed in two sections below: (a) Pickling, and (b) Cold Forming and Coating. The discussion of violation causes for three selected finishing processes appears below in (c) Summary of Causes. Separate summary tables for all three of the finishing processes are grouped together following the narrative discussion of causes.

(a) Pickling

1. Process Discussion

The most common acid pickling processes are hydrochloric, sulfuric, and combination (nitric and hydrofluoric) acid pickling operations used to remove oxide scale from the surfaces of semi-finished products prior to further processing by cold rolling, cold drawing, and subsequent cleaning and coating operations. Acid pickling operations may be either batch or continuous. For continuous pickling processes, flat rolled coils are welded end-to-end at the start of the line, and are cut by torch at the end of the line. Virtually all pickling operations in the steel industry involve immersion of the steel in acid baths and subsequent rinse tanks. Continuous hydrochloric acid pickling is predominant for flat-rolled carbon steels. Batch sulfuric acid pickling is often used for bar products.

A related process used to remove scale from certain grades of stainless steels is salt bath descaling whereby the steel is immersed in an oxidizing (Kolene®) or reducing (Hydride®) molten salt bath. Wastewaters result from rinsing the steel after processing and from fume scrubbers.

2. Water Uses and Wastestreams

Process wastewaters include spent pickling acids, rinse waters, and discharges from pickling line fume scrubbers. Process water and wastewater flows vary greatly depending upon the product and process. Waste pickle liquor flows typically range between 10 and 20 GPT for certain flat-rolled products.

The principal pollutants include total suspended solids (TSS), dissolved iron, and metals. For carbon steel operations, the principal metals are lead and zinc, and for specialty and stainless steel, chromium and nickel. Hexavalent chromium may be formed in salt bath descaling processes, in addition to chromium and nickel dissolved from the steel.

3. Typical Treatment and Potential Problem Areas

In-process controls for acid pickling include: countercurrent rinsing; use of indirect heating versus direct stream sparging for temperature control of acid solutions; and recycle and reuse of fume scrubber blowdowns. Spent hydrochloric and sulfuric acid solutions are rarely treated in conventional treatment systems on site; instead, they are generally sold as treatment aids for municipal and centralized wastewater treatment systems; injected into deep wells; or neutralized off site. Some steel mills are equipped with acid recovery or regeneration systems for spent sulfuric and hydrochloric acids, respectively. Waste nitric and hydrofluoric acids from combination acid pickling of specialty steels are often neutralized separately on-site and further treated with pickling and scale removal rinse waters and fume scrubber blowdowns.

At carbon steel mills, hydrochloric acid and sulfuric acid pickling rinse waters are usually co-treated with wastewaters from cold rolling, alkaline cleaning, hot coating, and electroplating operations, when present.

Operating problems for acid pickling and steel finishing wastewater treatment systems can result from loss of pH control; hydraulic and waste loading imbalances caused by spills and losses from the pickling lines; and, excessive loss of pickling acids to rinse waters caused by inadequate maintenance or failure of wringer rolls at the exit end of the pickling tanks.

(b) Cold Forming and Coating

1. Process Discussion

After acid pickling, the remaining Steel Finishing operations can be broken into four subcategories by the purpose that each serves in the finishing process: cold forming, alkaline cleaning, hot coating, and electroplating.

Cold forming operations transform steel of various configurations (*i.e.*, bar, slab, sheet) to the final configuration desired. As the name implies, cold forming is done at ambient temperature. The cold forming category maybe separated into two divisions: cold rolling and cold working of pipe and tube. Cold rolling is the operation which passes unheated metal through a pair or rolls for the purpose of reducing its thickness, producing a smooth, dense surface and developing controlled mechanical properties in the metal. The thickness reduction attained may be as much as ten per cent in some tandem cold rolling applications to virtually nil in some temper rolling and skin pass mills. An oil-water emulsion lubricant is sprayed on the material prior to its entering the rolls of a tandem cold rolling mill, and the material is usually coated with oil prior to recoiling. This oil prevents rust while the material is in transit or in storage. The oil must be removed before the material can be further processed or formed. For temper and skin pass mills, rolling solutions may or may not be used. In pipe and tube operations (cold worked)

unheated flat-rolled steel strip is formed into tubes, welded and cold rolled to desired dimensions.

Alkaline cleaning baths are used to remove mineral and animal fats and oils from cold rolled steel. Batch or continuous alkaline cleaning occurs after cold forming and prior to hot coating or electroplating to provide a surface suitable to accept the coating. The cleaning baths are solutions of carbonates, alkaline silicates, and phosphates in water. Electrolytic cleaning may be used for high-production operations. Alkaline cleaning may be conducted in separate cleaning lines or as integral parts of hot coating or electroplating operations.

Hot dip coating processes involve the immersion of clean steel into baths of molten metal for the purpose of depositing a thin layer of metal onto the steel surface. Various fluxes are used in certain applications. Hot coating processes can be carried out on either a continuous or batch basis. The physical configuration of the product being coated usually determines the method of coating to be used. The hot coating category maybe divided into three subcategories based on the type of coating used: galvanizing, terne coating, and other metal coatings. Galvanizing is basically a zinc coating operation. Terne coating consists of a lead and tin application. Other metal coatings can include aluminum, cadmium, hot dipped tin, or mixtures of metals.

Historically, electroplating at steel mills was limited to tin and chromium electroplating for the food and beverage markets and relatively low tonnage production of zinc-electroplated (electro-galvanized) steel for the automotive markets. During the past ten to fifteen years, electro-galvanized steel production has increased substantially in response to automobile manufacturers' demand. New coatings consisting of combinations of iron, nickel, and other metals have been developed.

2. Water Uses and Wastestreams

In the cold forming subcategory, process wastewater results from using synthetic or animal-fat based rolling solutions, many of which are proprietary. The solutions may be treated and recycled at the mill, used on a once-through basis, or a combination of the two. At mills with recirculated oil systems, batch dumps of spent solutions occur when contaminants, particularly iron, reach undesirable levels. Process wastewater discharge rates may range from less than 10 gpt for mills with recirculated rolling solutions to more than 400 gpt for mills with direct application of rolling solutions.

In the alkaline cleaning subcategory, nearly all of the alkaline cleaning rinse operations in the steel industry involve immersion in rinse tanks. Applied process water flow rates may range from 250 gpt to 350 gpt.

Wastewaters from hot coating result principally from product rinses and fume scrubbers. Applied process water rates may range from 600 gpt for flat rolled products to 2,400 gpt for wire products.

Wastewater flows from electroplating are generated from precleaning operations, electroplating, rinsing, and fume scrubbers. Wastewater flows at large continuous strip electroplating lines are typically about 500 gpt.

Principal pollutants of cold forming operations are total suspended solids (TSS) and oil and grease (O&G) (emulsified), and metals (lead and zinc for carbon steels, and chromium and nickel for specialty and stainless steels). Chromium may also be a contaminant from cold rolling of carbon steels resulting from wear on chromium-plated work rolls. Toxic organic pollutants including naphthalene, other polynuclear aromatic compounds, and chlorinated solvents have been found in cold rolling wastewaters. Because alkaline cleaning baths are not aggressive chemical solutions, the principal pollutants generated are oils and greases removed from the steel, and low levels of toxic organic pollutants found in cold rolling solutions. Principal pollutants of hot coating operations are usually those associated with the coating metal or metal combinations and hexavalent chromium for lines with chromium brightening or passivation operations. Principal pollutants of electroplating operations are TSS and O&G and the metals plated.

3. Typical Treatment and Potential Problem Areas

Conventional treatment of cold rolling wastewaters includes chemical emulsion breaking, dissolved gas flotation for gross oil removal, and co-treatment with other steel finishing wastewaters for removal of toxic metals. Alkaline cleaning wastewaters are usually co-treated with wastewaters from other steel finishing operations. In-process controls of wastewater in hot dip coating include countercurrent rinses for lines with multiple rinses and recycle of fume scrubber water. Wastewaters from hot coating lines located at integrated steel mills or at stand-alone steel finishing plants are almost universally co-treated with wastewaters from other steel finishing operations in metals precipitation systems. Conventional wastewater treatment in electroplating includes metals precipitation. At some finishing mills, wastewaters from electroplating lines are pretreated or treated separately to minimize the volume of listed hazardous waste sludge generated due to heavy metal concentrations.

As noted for acid pickling, the primary operating problems for steel finishing wastewater treatment systems are those associated with loss of pH control for metals precipitation; hydraulic and waste loading imbalances caused by spills and losses from the finishing lines; and inadequate performance of cold rolling oil removal systems.

(c) Summary of Causes

The Steel Finishing general category is subdivided into five subcategories based upon the level of information provided in the documents that were reviewed. As much as possible, different steel finishing processes were separated. Processes that have been identified include: Cold Mill/Annealing and Cold Mill/Annealing Treatment Systems, Pickling and Pickling Treatment Systems, and Finishing/Coating. For the Cold Mill/Annealing Treatment System subcategory it should be noted that in a small number of cases, pickling wastewater may be involved. However, the documentation was not specific enough to allow attribution to Pickling. As noted in the process description, a central treatment plant may be used to combine and treat steel finishing wastewaters. However, violations and concerns were only attributed to the central treatment plant category if it was not possible to trace the compliance problem back to a specific process, or if the violations and concerns were specifically linked to the central treatment plant.

There are 604 documented violations and concerns for the Steel Finishing category. A single mill represents 310 or 51% of all violations and concerns. Of the 604 violations and concerns, 379 are effluent violations, and 182 are unauthorized discharges. The great majority (536 or 89%) of all violations and concerns are NPDES related. The remaining 68 or 11% are Pretreatment program related. A total of 332 or 55% of all violations and concerns for the Steel Finishing category have cause information, and 272 or 45% have no cause indicated.

1. Pickling and Pickling Treatment Systems

The subcategory of steel finishing with the greatest number of violations and concerns (249) is pickling and pickling treatment systems. Of these, there are 172 effluent violations, and 66 unauthorized discharges. Of all violations and concerns, 193 or 78% are NPDES related. The remaining 56 or 22% are Pretreatment program related. A total of 148 or 59% of all violations and concerns have cause information cited, and the remaining 101 or 41% do not have cause information.

! Pretreatment Program: Pickling Treatment Systems

This pickling subcategory accounts for 50 violations and two concerns. Thirteen violations and one concern are due to O&M/Work Practice problems. Of these, five violations are due to discharges during the repair of a waste acid storage tank, two are due to operational problems with pH control resulting in reduced metals removal efficiency, two are related to the startup of a new mill and the startup of a new wastewater treatment plant, and another two are related to maintenance oversights. Of the three equipment failure related incidents, problems with the chemical feed system are cited in one instance, failure of a pH meter is cited in another, and the third is a concern regarding frozen tubing in a composite sampler. There are 35 violations with no cause indicated.

! Pretreatment Program: Pickling

This pickling subcategory accounts for three violations and one concern. There are two violations related to O&M/Work Practice problems, and there is a single concern related to an equipment failure. One O&M/Work Practice violation is due to improper maintenance, the other is due to a slug discharge of acid. The equipment failure concern involves a flow meter reading falsely elevated values. There is one violation with no cause indicated.

! NPDES Program: Pickling Treatment Systems

This pickling treatment system subcategory is cited the most frequently (113 violations and three concerns). A majority are accounted for by 44 equipment failures and 37 O&M/Work Practice problems. Of the 44 equipment failures, 13 are due to malfunctions of the lime feed system, eight are due to problems with a clarifier, and six are due to pump malfunctions. Of the 37 O&M/Work Practice causes, 17 are attributed to poor pH adjustment or capacity related exceedances, nine violations are related to operator error associated with the pH adjustment system, and six violations are related to improper maintenance. There are 33 violations and two concerns with no cause indicated.

! NPDES Program: Pickling

This subcategory accounts for 73 violations and four concerns. O&M Work Practice and equipment failure account for the majority (28 and 19, respectively). O&M/Work Practice causes include 10 violations related to an acidic condition causing a clarifier upset, four violations citing general operation, and three violations related to maintenance problems. Equipment failures are due to leaking pipes, hoses or flanges in 12 instances. There are 28 violations and two concerns with no cause indicated.

2. Cold Mill/Annealing and Cold Mill/Annealing Treatment System

The cold mill/annealing and cold mill/annealing treatment system steel finishing subcategory is ranked third in the number of steel finishing violations and concerns (197). Of these, 196 are NPDES related, and one violation is Pretreatment program related. Effluent violations account for 110 violations, and unauthorized discharges account for 74 violations. There are 87 (44%) violations and concerns that have cause information. The remaining 110 (56%), have no cause information.

! Pretreatment Program: Cold Mill/Annealing/Pickling Treatment System

The one violation for this subcategory had no cause indicated.

! Pretreatment Program: Cold Mill/Annealing

There are no violations or concerns for this subcategory.

! NPDES Program: Cold Mill/Annealing/Pickling Treatment System

There are 75 violations and two concerns for the cold mill/annealing treatment system steel finishing subcategory. Of these, 32 violations and one concern are related to equipment failures. Of the 32 violations, nine are freezing weather related, eight are due to stormwater (with no additional information), three are due to a lime slurry feed problem, and two are due to a pH meter probe clog. Ten violations are attributed to O&M/Work Practice causes. Of these, six are due to a slug of FeCl₂ solution released from the pickle line, and one is due to a slug of Zn released when a cell was left open at startup. One other O&M/Work Practice violation involved a general operation issue. Only one process related cause was cited, and it was related to a treatment system interruption. There are 33 violations with no cause indicated.

! NPDES Program: Cold Mill/Annealing

There are 113 violations and six concerns for the cold mill/annealing steel finishing subcategory. Of these, 22 violations and five concerns are related to equipment failures, 15 violations are related to O&M/Work Practice problems, and one violation is related to process related causes. Of the 27 equipment failures, nine are due to various leaks of pipes, trenches, flanges and lines, eight are due to a leak at a heat exchanger, and five are due to pump failures or blockages. Of the 15 O&M/Work Practice violations, 11 are due to operator error, failure to take necessary preventive or corrective action involving spills and overflows, and similar deficiencies, three are due to maintenance or repair work, and one is due to personnel absence during a holiday shutdown. There are 76 violations with no cause information.

3. Finishing/Coating

This subcategory has the second largest number of the steel finishing violations and concerns (158). Of these, 97 are effluent violations, and 42 are unauthorized discharges. Unlike other process categories, there is no treatment system exclusively noted for finishing/coating. Of the total violations and concerns, 147 are NPDES related, and 11 are Pretreatment program related. Cause information is cited for 97 (61%) of these violations and concerns and there is no cause information for 61 (39%).

! Pretreatment Program: Finishing/Coating

There are 11 violations associated with this steel finishing subcategory. There are only two cause explanations, and both cite O&M/Work Practice problems related to retention basin overflows.

! NPDES Program: Finishing/Coating

NPDES related violations and concerns occur most often in this steel finishing subcategory (130 violations and 17 concerns). Of these, 43 violations and 11 concerns are related to equipment failures. Various leaks associated with oil lines, process lines and sewers account for 21 violations. Failed pipes and valves account for 13 violations. Most of the concerns (nine) involve inadequate outfalls -- in eight instances the outfall and sampling point is subject to submersion. Five violations involve stormwater flows that exceeded the capacity of pumping stations or sumps. There are 32 O&M/Work Practice related violations and five concerns. Of the 32 violations, 12 are related to overfilling a zinc tank, eight are related to maintenance and repair work, and 11 are related to miscellaneous operating problems. In addition, there are four process related violations and concerns, all of which were attributed to suspended materials being discharged from clarifiers. There are 51 violations and one concern with no cause information.

The following summary tables (Tables 15E through 15G) provide information on the causes of noncompliance documented by the water program for pickling and finishing operations.

TABLE 15E

Water Quality Compliance Problem Cause Analysis: Finishing -- Pickling

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Finishing-Pickling	30 (7)	15 (7)	5	19	11	4	28	11	5	--	--	--	--	--	--	77 (7)	26 (7)	6
Finishing-Pickling TS	35 (7)	35 (7)	1	44 (8)	43 (8)	2	37 (8)	34 (7)	3	--	--	--	--	--	--	116 (23)	112 (22)	3
TOTAL	65 (14)	42 (7)	5	63 (8)	54 (8)	5	65 (8)	42 (7)	6	--	--	--	--	--	--	193 (30)	138 (22)	7
Pretreatment																		
Finishing-Pickling	1	1	1	1	1	1	2	2	1	--	--	--	--	--	--	4	3	2
Finishing-Pickling TS	35 (14)	35 (14)	1	3	3	1	14 (1)	14 (1)	1	--	--	--	--	--	--	52 (15)	52 (15)	1
TOTAL	36 (14)	35 (14)	2	4	4	1	16 (1)	14 (1)	2	--	--	--	--	--	--	56 (15)	53 (15)	2
NPDES and Pretreatment Combined																		
Finishing-Pickling	31 (7)	15 (7)	6	20	12	4	30	11	6	--	--	--	--	--	--	81 (7)	27	7
Finishing-Pickling TS	70 (21)	70 (21)	1	47 (8)	46 (8)	2	51 (9)	48 (8)	3	--	--	--	--	--	--	168 (38)	164 (37)	3
TOTAL	101 (28)	77 (21)	6	67 (8)	58 (8)	5	81 (9)	56 (8)	7	--	--	--	--	--	--	249 (45)	191 (37)	8

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System

TABLE 15F

Water Quality Compliance Problem Cause Analysis: Finishing -- Cold Mill/Annealing

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Finishing-Cold Mill/Annealing	76 (2)	44 (2)	5	27	14	5	15	8	5	--	--	--	1	1	1	119 (2)	66 (2)	8
Finishing-Cold Mill/Annealing/ Pickling TS ^a	33 (1)	19	3	33 (7)	18 (7)	4	10 (2)	7 (2)	2	--	--	--	1	1	1	77 (10)	45 (9)	4
TOTAL	109 (3)	45 (2)	6	60 (7)	19 (7)	7	25 (2)	9 (2)	6	--	--	--	2	1	2	196 (12)	68 (2)	9
Pretreatment																		
Finishing-Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing-Cold Mill/Annealing/ Pickling TS	1 (1)	1 (1)	1	--	--	--	--	--	--	--	--	--	--	--	--	1 (1)	1 (1)	1
TOTAL	1 (1)	1 (1)	1	--	--	--	--	--	--	--	--	--	--	--	--	1 (1)	1 (1)	1
NPDES and Pretreatment Combined																		
Finishing-Cold Mill/Annealing	76 (2)	44 (2)	5	27	14	5	15	8	5	--	--	--	1	1	1	119 (2)	66 (2)	8
Finishing-Cold Mill/Annealing/ Pickling TS	34 (2)	19	4	33 (7)	18 (7)	4	4 (1)	7 (2)	7	--	--	--	1	1	1	78 (11)	45 (9)	5
TOTAL	110 (4)	45 (2)	6	60 (7)	19 (7)	7	7 (1)	9 (2)	9	--	--	--	2	1	2	197 (13)	68 (2)	9

* 1 year review mill ^a In a small number of cases, some pickling wastewater may be involved. However, it is not possible to attribute these violations or concerns specifically to pickling. () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report. TS = Treatment System

TABLE 15G
Water Quality Compliance Problem Cause Analysis: Finishing -- Coating

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Finishing/Coating	52 (8)	29 (5)	5	54 (6)	25 (2)	5	37 (6)	18 (4)	4	--	--	--	4 (1)	4 (1)	1	147 (21)	53 (9)	5
Pretreatment																		
Finishing/Coating	9 (1)	9 (1)	1	--	--	--	2	2	1	--	--	--	--	--	--	11 (1)	11 (1)	1
NPDES and Pretreatment Combined																		
TOTAL	61 (9)	29 (5)	6 (3)	54 (6)	25 (2)	5 (2)	39 (6)	18 (4)	5 (3)	--	--	--	4 (1)	4 (1)	1	158 (22)	53 (9)	6

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report.

(7) Central Treatment of Steel Industry Process Wastewater

(a) Process Discussion

Centralized wastewater treatment is the mixing of process wastewaters from two or more distinct process operations prior to or as part of an end-of-pipe wastewater treatment system. Use of centralized wastewater treatment is common in the U.S. iron and steel industry today. Such systems are generally configured as follows:

- ! treatment and recycle of process waters on a process-specific basis, followed by mixing and co-treatment of low-volume blowdown streams from each process;
- ! cascading of low-volume blowdowns from process-specific recycle systems to other process water treatment and recycle systems;
- ! combinations of blowdowns from process-specific recycle systems with once-through flows from other processes where recycling is not feasible because of product quality considerations;
- ! mill-wide recycle systems whereby major process water flows are discharged from the processes on a once-through basis and then combined, treated and subsequently recycled for selected process applications; and,
- ! terminal, or end-of-pipe, wastewater treatment systems where compatible wastewaters from steel finishing operations are combined and treated and then discharged on a once-through basis.

Those processes where high-rate recycle of process waters (*i.e.*, greater than 90 to 95 percent) is feasible include sintering, ironmaking in blast furnaces, steelmaking in open-combustion and suppressed-combustion basic oxygen furnaces, vacuum degassing, continuous casting, and hot forming. Much of the reduction in mass discharges of conventional and toxic pollutants from these processes is attributable to high rate recycling. For certain steel finishing operations (*e.g.*, acid pickling, alkaline cleaning, hot coating and electroplating), cascade rinsing and other techniques may be used for wastewater flow reduction; however, in many instances high rate recycling as defined above is not practical because of product quality considerations. In these cases, most of the conventional and toxic pollutant discharge reduction is attributable to end-of-pipe wastewater treatment systems.

Mixing of incompatible wastewaters prior to wastewater treatment is an issue that EPA considered when it promulgated 40 CFR Part 420 in 1982 and 1984. Incompatible wastewaters were defined as those wastewaters that contained toxic pollutants that were not present in wastewaters from other processes that were mixed prior to treatment (*e.g.*, mixing of ironmaking wastewaters containing ammonia-N,

cyanide and phenolic compounds with wastewaters from steelmaking operations that do not contain those pollutants). EPA's principal concern was that when mixing incompatible wastewaters, certain toxic pollutants would not be treated effectively, but would be diluted and discharged at higher quantities than would occur if the wastewaters were treated separately. Consequently, EPA structured the effluent limitations guidelines in Part 420 to foster co-treatment of compatible wastewaters from the following processes: Group 1: cokemaking; Group 2: sintering, ironmaking; Group 3: steelmaking, vacuum degassing, continuous casting, acid pickling (H_2SO_4 , HCl), cold rolling, alkaline cleaning, hot coatings; and Group 4: specialty steel finishing operations, combination acid pickling, salt bath descaling, and cold rolling. EPA also stated that co-treatment of hot forming wastewaters with wastewaters from processes in Groups 2 and 3 above would be appropriate where the hot forming wastewaters were recycled to a high degree and a low-volume blowdown was discharged to the central treatment system (see 47 Fed. Reg. 23265-66, May 27, 1982).

For integrated steel mills, cokemaking wastewaters are almost universally treated on a process-specific basis. The most common types of centralized wastewater treatment systems include the following combinations: sintering and ironmaking; steelmaking, vacuum degassing, and continuous casting; hot forming from multiple hot forming mills; carbon steel finishing -- acid pickling, cold rolling, alkaline cleaning, hot coating, and electroplating; and specialty steel finishing -- combination acid pickling, salt bath descaling, and cold rolling.

For mini mills, centralized wastewater treatment most often involves co-treatment of process waters from continuous casting and hot forming mills. Stand-alone steel finishing mills typically have centralized wastewater treatment systems for the steel finishing mills listed above.

(b) Potential Problem Areas

Wastewater treatment systems require a balance of flows through the plant and chemical loadings within design limits to ensure effective treatment. Physical or chemical shock loadings to the treatment system can reduce or destroy treatment efficiencies. As a result, maintaining an appropriate hydraulic balance through the system is critical for treatment performance. Stormwater flows, sudden hydraulic increases or drops may adversely affect treatment and in some cases require bypass of treatment altogether. Likewise, chemical loadings can fluctuate within a range, but excessive loadings of chemical waste can lead to a number of different treatment upsets including, disruption of pH balance, reduction in metals removal, or flocculating problems. In treatment systems using biological methods, shock chemical loadings can destroy microbial populations resulting in severe treatment deficiencies. Proper maintenance of treatment systems ensure that treatment components are working and performing at expected levels. Slug discharges of oil or sediment can cause a number of

maintenance problems that can affect adequate treatment including clogged filters or rapid filling of settling basins or clarifiers.

(c) Summary of Causes

For the purpose of this study the central treatment plant process category includes all violations and concerns that occur at the central treatment facility and that are caused by a problem at the plant. It may also include violations and concerns caused by an upstream process if the upstream process is not identified. When possible, central treatment plant violations and concerns have been traced back and assigned to the iron and steelmaking process responsible for the problem.

There are 247 documented violations and concerns for the central treatment plant process. A single mill is responsible for 95 or 38% of all violations and concerns. Approximately 84% of the violations and concerns involve pollutant discharges: effluent exceedances account for 168 violations, and unauthorized discharges account for 39 violations. Of the 247 total violations and concerns, 229 or 93% are NPDES related, and 18 or 7% are Pretreatment program related. Cause information was available for 102 (41%) of the violations and concerns and not available for 145 (59%).

! Pretreatment Program: Central Treatment Plant

The Pretreatment program accounts for 18 violations. Of these, 13 cite equipment failure, six of which relate to pH probe failures. The additional equipment failures include: two plugged bubbler tubes, two valve failures, a motor failure, a pipe flange rupture, and a blown fuse. Process related causes are cited for three violations, all of which relate to problems with the gravimetric neutralization system. There are two violations where no cause is indicated.

! NPDES Program: Central Treatment Plant

The majority of central treatment plant violations and concerns are associated with the NPDES program. Of the 192 violations and 37 concerns in this category, the principal cause of noncompliance is related to O&M/Work Practices (34 violations and nine concerns). Of these, nine violations relate to tank or clarifier overflows, four violations relate to operator error, two violations relate to startups, and 24 violations and concerns involve discharges resulting from miscellaneous maintenance activities at or affecting the central treatment plant (e.g., clarifier upset resulting from acid cleaning of a wastewater transfer line, pH slug resulting from lime neutralization of an acid tank during maintenance, accidental power interruption during pump maintenance, accidental activation of pump during maintenance, etc.).

The second most common central treatment plant related cause is equipment failure with 26 violations and six concerns, comprised of eight line/pipe/valve leaks or

failures, five freezing weather related failures, five incidents of broken grit chamber equipment or scrapers, three power failures, and three pump failures. There are also various incidents of control circuit failures, level controller failures, lime feed system problems, or tank leaks. There are also nine concerns and one violation citing process inadequacies (eight involved defective oil separators at one mill). There is one violation citing a permit/regulation interpretation issue regarding an unpermitted discharge pipe. There are 132 violations and 11 concerns with no cause indicated.

The following summary table (Table 15H) provides information on the causes of noncompliance documented by the water program for central treatment plants.

TABLE 15H

Water Quality Compliance Problem Cause Analysis: Central Treatment Plants

Process	Unknown/Not Indicated			Indicated Causes														
				Equipment Failure			O&M/Work Practice			Permit/Regulation Interpretation			Process Related			Total		
	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills	No. of Viols/Cons	Most at 1 Mill	No. of Mills
NPDES																		
Central Treatment Plant	143 (21)	76 (12)	9	32	8	9	43	14	8	1	1*	1	10	8	3	229 (21)	95 (12)	10
Pretreatment																		
Central Treatment Plant	2	2	1	13	13	1	--	--	--	--	--	1	3	3	1	18	18	1
NPDES and Pretreatment Combined																		
TOTAL	145 (21)	76 (12)	10	45	13	10	43	14	8	1	1*	1	13	8	4	247 (21)	95 (12)	11

* 1 year review mill () = Represents the number of violations which are monthly average violations. See discussion in Section III relating to how daily and monthly averages are treated in this report.

C. Hazardous Waste Program

(1) Introduction

The Resource Conservation and Recovery Act (RCRA) establishes standards and procedures for the handling, storage, treatment, and disposal of hazardous waste. Generators of hazardous waste are subject to waste accumulation, manifesting, and recordkeeping standards in order to achieve "cradle-to-grave" management of hazardous waste. Facilities that treat, store, or dispose of hazardous waste (TSD facilities) must obtain a RCRA Part B permit. The permit contains general facility standards such as contingency plans, emergency procedures, recordkeeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions for conducting corrective actions that govern the cleanup of releases of hazardous waste or constituents from solid waste management units (SWMUs) at RCRA-regulated facilities. Typically, the contamination addressed by RCRA corrective action can be attributed to historical work practices and the historical mismanagement of wastes, rather than present day operations.

Several RCRA listed wastes are generated during steel mill operations. The majority of these wastes are related to coke production, steel manufacturing at an electric arc furnace (EAF), and pickling/finishing. At the coke plant, tar residues (K087, K141, and K142), oil (K143 and K144), naphthalene residues (K145), lime sludge (K060), wastewater sump residues containing benzene and polynuclear aromatic hydrocarbons (K144), and coke oven gas condensate from transfer and distribution lines are generated. EAF emission control dust and sludge (K061) are generated during the steelmaking operation at mini mills. Finishing/Pickling operations at steel mills generate wastewater sludge from cooling, descaling, and rinsing (D006, D007, D008, D009, D010, and D011) and spent pickle liquor (K062). In addition, smaller amounts of waste solvents, used oil and waste paint are also generated.

Generally, RCRA violations are determined during a State/Local or Federal inspection of the facility. During an inspection, the inspector examines the areas of the facility where hazardous wastes are generated and stored to determine compliance with the applicable storage, labeling, and handling requirements. In addition, the inspector will review the required records, including: manifests, Land Disposal Restriction (LDR) forms, appropriate plans and reports, training and certification records, and other relevant documentation. The record review provides the inspector with insight into the hazardous waste handling practices over the past few years, or since the last RCRA inspection. Record deficiencies are frequently identified during this review and cited in violation notices.

Most of the RCRA violations at steel mills are not related to a specific steelmaking process. When steelmaking processes are involved, the violations occur most frequently in relation to coke plants, electric arc furnaces, and steel finishing

operations (cold rolling, pickling and coating). There is very little information available in the RCRA compliance files regarding the specific causes of violations. Generally, this is because documentation of a specific reason for a violation is not required to support an enforcement response, and agencies have not found that documentation of this information is needed or useful for other purposes in their compliance programs.

The tables included in this report contain data from the same mills over the same time period as the water and air programs. Included in the five year review are four integrated mills and three mini mills, all of which were inspected during the five year period. Ten integrated mills and seventeen mini mills were included in the one year review. Of these, six integrated mills and four mini mills were inspected in 1995. Because only 17 (or one-half) of the steel mills included in the study were actually inspected during the stated timeframe, the RCRA file review was expanded to cover five years for every mill. During this period, every mill was inspected at least once. The following violation cause analysis is based on documented violations over a five year period at all mills and therefore provides a more comprehensive representation of compliance problems and their relative frequency than represented in the preceding tables.

(2) Non-Process Specific Violations

By reviewing incidents of noncompliance and enforcement in State and EPA Regional files it was a goal of this project to relate specific violations back to individual steelmaking operations. Although this could be done for some of the RCRA violations, it could not be done for most of them. These non-process specific related violations are summarized in this section. Violations that could be linked to a specific steelmaking process are discussed below in the context of the specific process. For the purpose of this study, RCRA violations were grouped into thirteen subcategories. These include: closure, financial assurance, self-inspection, labeling, manifest, monitoring, notification, permit, corrective action or contingency plan, recordkeeping, reporting, training, and waste analysis.

The greatest number of these violations relate to recordkeeping, manifesting, required plans, and financial assurance. For the most part, recordkeeping violations include: failure to maintain records for the appropriate amount of time, failure to maintain the operating record or inspection log, failure to update the appropriate training records, failure to have inspection records, and failure to maintain emergency equipment logs. Manifesting violations generally include: failure to complete manifests correctly, failure to use appropriate waste codes or measuring units on a manifest, failure to receive the return-to-generator copy of manifest within the required time, and failure to initial corrections on a manifest. Examples of violations pertaining to required plans include: failure to update or amend required plans, failure to distribute appropriate plans to emergency agencies, and failure to revise a waste analysis plan when required to do so. The financial assurance related violations include: failure to update

closure cost estimates, failure to use proper inflation rates, and failure to use the correct financial worksheet/form.

Non-process specific "RCRA related concerns" identified in this report are generally conditions documented by an inspector at the time of the inspection, that appear to be violations, but are not cited as such by the inspector, or they appear to be a condition that may lead to a violation in the future if not addressed by the facility. Examples include: failure to report a change in operating status, deviations from the facility's Ground Water Sampling and Analysis Plan, and debris interfering with the ability to conduct a secondary containment inspection.

The causes of these violations, if known, were rarely included in the documentation reviewed. In most cases, the obvious cause is likely to be related to some type of oversight. Discussions with State and Federal inspectors indicate, in their opinion, that an underlying cause may often be attributed to limited and overextended environmental staffs. However, these conditions were not mentioned in the compliance files. It should be noted that very few of the non-process specific violations identified in this study actually caused a release to the environment (e.g., mislabeled hazardous waste resulted in improper disposal).

Of the violations and concerns discussed above, the majority of them were associated with integrated mills. The large number of non-process specific violations at integrated mills may be attributed to more frequent inspections of the integrated mills and the fact that integrated mills are usually larger (more employees, more processes, greater facility area, etc.) than mini mills. In addition, integrated mills are generally older and have a more complicated physical layout with recycling, storage and disposal areas and procedures that have changed and evolved over time.

(3) Coke Plant Violations

The violations associated with the coke plant relate to coke plant operations and coke plant generated wastes. The greatest number of coke plant violations relate to spill prevention, storage, secondary containment, and labeling. In addition, there were violations relating to permitting, self-inspection, spill response, closure, improper disposal, monitoring, and waste determination. Since coking operations are performed at integrated mills, all of the violations listed above are associated with the integrated mills included in this study. Also, most violations at the coke plant tend to involve the mismanagement of coke by-products in containers or tanks -- over half of the coke plant violations have had the potential to cause a release to the environment; and the number of violations that have actually resulted in a release to the environment is greater at the coke plant than at other steel mill processes.

The spill prevention violations at the coke plant primarily involve the management of aboveground and underground storage tanks -- for example, tanks that are not

provided with leak detection devices, tanks not provided with spill/overfill prevention controls, incomplete or nonexistent integrity assessments and tank certifications.

The storage violations primarily involve the management of containers or tanks. These violations include containers that are not stored closed at all times except when waste is being added. When this issue was discussed with inspectors, they indicated their belief that the problem may often be related to understaffing -- the size of the integrated mills, some covering thousands of acres, and the number of employees, in the thousands, make it difficult for an understaffed environmental team to manage adequately all aspects of the RCRA program.

The secondary containment violations include tanks that do not have secondary containment or tanks with inadequate or damaged secondary containment. The facility's self-inspection program should include the aboveground tanks. Problems with secondary containment should be noted during these inspections, and, subsequently, the proper maintenance should be performed. The labeling violations involve the failure to label containers and tanks with the words "Hazardous Waste" and the absence of accumulation start dates on containers and drums.

The hazardous wastes produced at the coke plant are primarily associated with cokemaking by-products and their treatment. In the by-product coking process, distilled volatile components are collected as unpurified "foul" gas containing water vapor, tar, light oils, solid particulate matter of coal dust, heavy hydrocarbons, and complex carbon compounds. Condensable materials, such as tar, light oils, ammonia, and naphthalene are removed, recovered, and processed as gas and coal chemical by-products. Finally, sulfur is removed, leaving clean, desulfurized oven gas.

This cleaning involves a number of steps. First, the "foul" gas is sprayed with weak ammonia liquor, which condenses the tar and ammonia. The remaining gas is cooled as it passes through a condenser and then compressed by an exhauster. Any remaining tar is removed by a tar extractor, either by impingement against a metal surface or collection by an electrostatic precipitator.

At this stage, the gas still contains 75% of the original ammonia and 95% of the original light oils. The gas is passed through a saturator, where the ammonia reacts with sulfuric acid to form ammonium sulfate, which is crystallized and removed. The gas is further cooled to condense naphthalene. The light oils are removed in an absorption tower and subsequently refined or used as fuel in the coke heating process. The last cleaning step is removal of hydrogen sulfide in a scrubbing tower. The cleaned, desulfurized gas is then used as fuel for heating the coke ovens, as well as other plant combustion processes, or sold to nearby facilities.

There are seven listed hazardous wastes associated with cokemaking under RCRA: K060, K087, K141, K142, K143, K144, and K145. Process residues from coal tar

recovery (K141) are generated when the uncondensed gas enters the primary cooler. Condensate from the primary cooler flows into the tar collecting sump and is discharged to the flushing liquor decanter. The tars at the bottom of a tar collecting sump are discharged to the flushing liquor decanter. Tar collection sump residue (sludge) accumulates at the bottom of the collecting sump and must be recycled periodically. The tar residue is recycled either as an individual stream, by recycling it through the flushing liquor decanter, or by recycling it back to the coke oven.

Tar storage tank residues (K142) are produced when residuals settle out of the crude coal tar collected as a coking by-product. The residues are periodically removed from the storage tanks and are recycled to the coke oven or are landfilled.

Residues from light oil processing units (K143) collect in a light-oil scrubber and light oil stripping still. Resin is a related waste that accumulates from cleaning wash oil used in the light-oil recovery process. Wash-oil muck, residue from either a wash-oil purifier or a wash oil decanter is periodically removed and recycled to the coke oven, reclaimed off-site, or used as blast furnace or boiler fuel.

Wastewater sump residues (K144) accumulate in the bottom of a sump used to provide sufficient quiescent residence time for oil and water to separate during light oil recovery. The settled solids are removed periodically and either recycled to the coke oven or landfilled off-site.

Residues from naphthalene collection and recovery (K145) accumulate at the bottom of a skimmer sump where naphthalene is mechanically skimmed off the surface. Residues also accumulate in the hot and cold sumps used as collection or surge vessels, and on cooling tower surfaces. K145 is recycled to the decanter or sometimes to the oven.

EPA has excluded a number of the hazardous wastes generated at the coke plant from substantive regulation under RCRA. Coke by-product residues (K087, K141, K142, and K147), considered hazardous because they exhibit the Toxicity Characteristic (TC) specified in 40 CFR § 261.24, have been excluded from the definition of solid waste if they are recycled either by returning the residues to the coke ovens as feedstock to produce coke or to the recovery process as feedstock to produce coal tar, or by mixing the residues with coal tar prior to coal tar refining or sale. This exclusion is conditioned on there being no land disposal of the wastes from the point they are generated to the point they are recycled to coke ovens or to tar recovery or to refining processes, or to the point they are mixed with coal tar.

EPA concluded that the exclusion for coke by-product residues rests on three factors. First, the recycling of the material in coke ovens causes no statistically discernable increase in concentration of toxic constituents in the coke ultimately produced. Second, if by-product residues are generated from the coking process and

are inserted on-site back into the process, this can be viewed as continuing activity (a continuous process), rather than waste management activity. Third, by conditioning the exclusion on no land disposal, the traditional RCRA objectives of avoiding land placement of material and the general safe-handling and management of the material will be assured. The exclusion is intended to encourage waste minimization, while maintaining RCRA control over the wastes prior to the recycling step. The EPA noted that an abandoned spill of these materials (a spill not cleaned-up expeditiously and used beneficially) would constitute land disposal of a hazardous waste.

Inspectors indicate that these exclusions create a "grey area" with respect to what is considered a recyclable material and what is hazardous waste when enforcing the storage and handling requirements of these materials. A facility may recycle coke by-products to their coke ovens or sinter plant; however, the storage of these materials prior to recycling is often inadequate. For example, although the material must not be stored in waste piles or in a similar manner that qualifies as land disposal prior to recycling, inspectors noted that facilities have done so, arguing that the recycling exclusion applies. This improper storage has resulted in findings of violation and subsequent enforcement.

(4) Electric Arc Furnace Violations

The violations and concerns associated with the EAF relate to EAF operations and the management of EAF dust and sludge. The greatest number of EAF related violations relate to spill prevention, labeling, spill response, closure, and storage. In addition, there were violations relating to recordkeeping, secondary containment, self-inspections, and training and certifications. Like violations occurring at the coke plant, violations associated with EAF operations, when they occur, involve primarily the mismanagement of hazardous waste (EAF dust). As a result, a large number (approximately one-third) have the potential to cause a release to the environment, although few of the EAF violations that were identified actually resulted in a release.

The spill prevention and spill response violations at the EAF involve the management of storage tanks, waste piles and containers. For example, EAF dust containers (roll-offs) that have not been provided with sufficient containment to prevent wind dispersal or contact with stormwater runoff would be considered a spill prevention violation, and if the spill is not cleaned-up properly, it would also be considered a spill response violation. The closure violations relate to closure activities associated with EAF dust landfills and former EAF storage areas. In addition, infractions involving the aisle space between storage containers requirements are included in the storage violation category. The labeling violations involve the labeling of containers and tanks with the words "Hazardous Waste," the absence of "No Smoking" signs, and the absence of accumulation start dates on containers and drums. The violation relating to secondary containment involved the containment of EAF sludge stored in a roll-off trailer.

The majority of violations relating to EAFs are associated with mini mills. The larger number of violations at mini mills are likely because there are only two integrated mills in this study with EAFs, and all the mini mills had one or more EAFs.

EAF dust is particulate matter produced during the EAF process and subsequently conveyed into a gas cleaning system. The particulate matter that is removed from emissions in a dry system is called EAF dust, and the particulate matter removed from a wet system is EAF sludge. The dust (or sludge) has been designated by EPA as a listed hazardous waste, K061. The primary hazardous constituents of EAF emissions control dust/sludge are lead, cadmium, and chromium. EAF dust/sludge may vary greatly in composition depending on the composition of the scrap charge and on the furnace additives used.

Mini mills typically transport K061 off-site for disposal or reclamation. However, some facilities are treating the dust or sludge in a high temperature metals recovery (HTMR) unit to recover valuable metals. The treatment of EAF dust in the HTMR is considered reclamation. The EAF dust is pumped pneumatically from the baghouse at the EAF to the HTMR. Therefore, prior to being fed into the HTMR the EAF dust and sludge are considered hazardous waste and must be handled and stored according to RCRA requirements. The HTMR reduces the zinc and lead concentrations to acceptable levels for land disposal of the dust, and the resulting slag is sampled and analyzed. If it is found to be below exclusion limits it is sold offsite to integrated mills for introduction into their blast furnaces. If the slag is analyzed and found to be above exclusion limits, it is shipped off-site as special waste. The files reviewed indicate that only one of the facilities included in the study is equipped with a HTMR.

Inspectors indicate that the management of EAF dust is difficult because of its physical properties. The dust is very fine, much like talc, and reddish-brown in color. Any small hole in a baghouse bag or storage bin cover results in a very noticeable, and often times significant release. The dust is easily spread via wind and water dispersion because it is fine and light. Inspectors add that the management of the dust requires constant attention, but adequate management of the material is possible.

(5) Cold Rolling/Pickling/Finishing (Steel Finishing) Violations

The greatest number of violations and concerns associated with steel finishing operations (cold rolling, pickling and finishing) relate to spill prevention, labeling, secondary containment, and records. In addition, there were spill response violations, self-inspection violations, permit violations, storage violations, training and certification violations, waste determination violations, and an improper disposal violation.

The spill prevention violations at the steel finishing processes primarily involve the management of aboveground storage tanks, for example, tanks that are not provided with leak detection devices, tanks not provided with spill/overflow prevention controls,

and incomplete or nonexistent integrity assessments and tank certifications. The labeling violations involve the labeling of containers and tanks with the words "Hazardous Waste," the absence of "No Smoking" signs, and the absence of accumulation start dates on containers and drums. The record violations relate to inspection logs not being completed properly, records not maintained for the appropriate length of time, and operating logs not being maintained.

The secondary containment violations include tanks that have not been provided with secondary containment or tanks with inadequate or damaged secondary containment. The number of secondary containment violations for the steel finishing operations is likely to be high because of the large number of aboveground tanks typically used for the storage of spent pickle liquor. Since many violations associated with the finishing operations involve secondary containment and spill prevention, they tend to have a greater potential to cause a release to the environment. Also, the large volume of acids and other finishing solutions are caustic and tend to degrade containers, tank systems and other containment systems, thereby increasing the potential for release. However, the actual releases at steel finishing operations identified in this study were not significantly greater as a percentage of the total violations identified.

In contrast to the coke plant and EAF related violations, which are linked primarily to one specific mill type (integrated mills in the case of coke ovens, and mini mills in the case of EAFs), steel finishing violations would be expected to occur at both types of mills. In this study, however, the majority were associated with integrated mills. This may be attributed to the fact that integrated mills are inspected more often and that they are usually larger with more extensive finishing operations. The overall operations are also more extensive at integrated mills, requiring a significantly larger commitment of environmental staff.

Inspectors indicate that iron and steel facilities handle the spent pickle liquor in three ways. They either sell it to a company that will resell it as a chemical additive to neutralize pH in waste water, sell it to a firm for the production of iron oxides, or dispose of it by deep well injection. There are instances where a mill has sold the spent pickle liquor to a firm as hazardous waste, and then bought the same material back as product to be used in the waste water treatment plant to facilitate the precipitation of metals from the waste water by neutralizing pH.

The mills have requested that EPA exclude spent pickle liquor from RCRA regulation if it is used as a product in their waste water treatment plants on-site. However, EPA has denied such requests because of its concern that the mills would use amounts of spent pickle liquor in excess of what is necessary to neutralize pH in their waste water as a way to dispose of the excess spent pickle liquor. The mills argue that the use of excess amounts of spent pickle liquor in their waste water treatment plant would result in pH exceedances in violation of their NPDES permits.

VI. ENFORCEMENT SUMMARY

The following is a summary of the enforcement response against the iron and steel mills that were included in the study. The same study period used for the compliance review was used in the enforcement review -- enforcement documents were reviewed over a five year period (January 1, 1991 - December 31, 1995) for four integrated mills and three mini mills, and over a one year period (January 1, 1995 - December 31, 1995) for ten integrated mills and 17 mini mills. Consistent with the approach taken in the compliance section of this report, all 34 mills are grouped together without distinguishing between mills with different review periods.

Only enforcement responses that were completed during the applicable study period are included in this analysis. Because civil administrative and judicial actions often involve lengthy negotiations, the number of these cases actually completed during the study period and included in this report does not fully represent the level of ongoing enforcement that occurred during the period. Also, in several instances major enforcement cases that were completed prior to the study period (and therefore are not reflected in this summary) resulted in compliance plans and guidelines that governed plant activities during the review period, reducing the number of violations and, as a result, the number of warnings and notices of violations that were issued.

It should be noted that the enforcement summaries cannot be linked directly with the compliance summaries in this report, even though they cover the same timeframe. Enforcement responses that occurred early in the review period may have pertained to violations that were identified by the agency before the January 1, 1991 or January 1, 1995 file review starting point. Likewise, violations that were identified towards the end of the review period may have been subject to enforcement initiated (or not completed until) after the December 31, 1995 file review end point.

The enforcement responses reported below are classified as a Warning (a potential violation is cited, but no actual determination of a violation is made; or an actual violation is cited, but the agency has chosen not to issue an official Notice of Violation); a Notice of Violation (NOV) (a formal, written notice of a violation is given, representing an agency's determination that a violation exists -- the terminology may vary from one agency to another); Civil Administrative Action (an administrative enforcement action which results in an administrative order or agreement); and Civil Judicial Action (a judicial action in a State or Federal court resulting in a final judgment, court order, or consent decree).

If a document indicated that a civil penalty was issued, this is also indicated in the report. In some cases it was clear that a penalty was not issued. However, in other cases whether a penalty was issued could not be determined. To avoid any

misinterpretation, all three options are tabulated. In most cases the civil penalty was imposed as part of a civil administrative or judicial action. However, in a small number of cases, a State or local agency imposed the penalty in conjunction with the issuance of an NOV, and the tables below reflect this.

A. Overall Summary for All Media

Twenty-five of the 34 mills included in this study were subject to an enforcement response finalized during the study period. Roughly half of the mills subject to enforcement were integrated mills and half, mini mills. However, all but one of the integrated mills included in the study were subject to some type of enforcement response, while only 60% of the mini mills were.

During the study period, 172 enforcement responses were completed under the air program, 149 under the water program, and 56 under the RCRA program. State or local agencies accounted for the great majority of the NOVs and warnings (over 98%). However, EPA accounted for a larger share (over 25%) of the civil administrative and judicial enforcement actions.

! Types of Enforcement Responses

As would be expected, the vast majority of enforcement responses were NOVs. The number of NOVs issued under the air and water programs (156 and 131 respectively) greatly exceeded the number of NOVs issued under the RCRA program (29). This difference among programs mirrors both the relative inspection frequencies of the programs, as well as the manner in which violations are typically identified within each program. It should further be noted that, for all three media programs, a predominance of the NOVs involving mini mills were associated with a single mill.

In contrast to NOVs, the number of civil administrative enforcement actions completed under each program were roughly equivalent. The air, water, and RCRA programs each accounted for five civil administrative actions involving integrated mills. For mini mills, the air program accounted for four civil administrative actions, the water program for six, and the RCRA program for ten (all ten of these actions addressed a single mill).

Of the three documented civil judicial enforcement actions, the water program accounted for two and the RCRA program accounted for one. All involved integrated mills. While the air program did not account for any completed civil judicial actions, there was one action pending at the close of the study period. This pending action also involved an integrated mill. No criminal actions were identified during the study.

! Violation Categories

Pollutant emissions/discharges constituted the most frequently cited category of violations in both the air and water program enforcement responses. While O&M/Work Practice violations were cited frequently in both the air and RCRA program enforcement responses, no O&M violation was cited in a water program response. Manifest, labeling and recordkeeping were, in the aggregate, the most frequently cited RCRA violations.

! Process Categories

The major steelmaking processes cited most frequently among all three programs were coke ovens and steel finishing operations. In the air program, the most frequently cited processes were (in order of frequency) basic oxygen furnaces, coke ovens, blast furnaces, steel finishing operations, and electric arc furnaces. Most frequently cited in the water program were (in order of frequency) steel finishing operations, blast furnaces, central treatment plants, hot forming mills, and coke ovens. Finally, most frequently cited steelmaking processes under RCRA (in order of frequency) were coke ovens, steel finishing operations, waste treatment plants and electric arc furnaces. However, most RCRA enforcement responses addressed violations that were not limited to specific processes.

Processes addressed in civil administrative and judicial actions by all three of the programs include: coke ovens (7 in all), pickling operations (5 in all), and cold mill/annealing operations (5 in all). At least two programs addressed blast furnaces (air and water), basic oxygen furnaces (water and RCRA), electric arc furnaces (air and RCRA), and hot forming mills (water and RCRA). Multiple civil administrative and judicial actions during the study period also include three air program actions involving emissions from boilers, two water program actions involving non-process specific wastewater treatment plants, and six RCRA related actions involving violations related to landfills, waste piles and other storage or disposal conditions involving unspecified wastes.

The following summary tables (Tables 16-18) sort enforcement responses by type of mill; the agency initiating the enforcement action; and the type of enforcement response.

TABLE 16

Summary of Iron and Steel Mills Subject to Enforcement Response*

Type of Mill	Air Program		Water Program		RCRA Program		Combined Total	
	Enforce- ment Response	No Enforce- ment Response	Enforce- ment Response	No Enforce- ment Response	Enforce- ment Response	No Enforce- ment Response	Enforce- ment Response	No Enforce- ment Response
Integrated Mills	12	2	8	6	9	5	13	1
Mini Mills	5	15	8	12	4	16	12	8
Total	17	17	16	18	13	21	25	9

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 17

Summary of Enforcement Responses* by Agency Type

Type of Mill	Air Program		Water Program		RCRA Program		Combined Total	
	Federal	State/ Local	Federal	State/ Local	Federal	State/ Local	Federal	State/ Local
Integrated Mills	7	139	5	112	1	20	13	271
Mini Mills	--	26	1	31	1	34	2	91
Total	7	165	6	143	2	54	15	362

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 18

Summary of Enforcement Responses by Type of Response

Type of Mill	Air Program				Water Program				RCRA Program				Combined Total*			
	Warn-ings	NOVs	Civil Admin.	Civil Judicial	Warn-ings	NOVs	Civil Admin.	Civil Judicial	Warn-ings	NOVs	Civil Admin.	Civil Judicial	Warn-ings	NOVs	Civil Admin.	Civil Judicial
Integrated Mills	4	137	5	--	4	106	5	2	4	11	5	1	12	254	15	3
Mini Mills	3	19	4	--	1	25	6	--	6	18	11	--	10	62	21	--
Total	7	156	9	--	5	131	11	2	10	29	16	1	22	316	36	3

* Includes Warnings

B. Air Program Enforcement

(1) Overview

During the study period, air program enforcement focused most heavily on integrated mills. There were enforcement responses against 12 of the 14 integrated mills included in the study, and five of the 20 mini mills. Most (95%) of the enforcement responses involving integrated mills and all of the enforcement responses involving mini mills were State or local responses. All seven of the Federal enforcement responses involving integrated mills addressed coke oven violations, four of which occurred at a single facility. Roughly 75% of the State or local responses involving integrated mills occurred at one mill, as did slightly more than 75% of the enforcement responses involving mini mills.

(2) Types of Actions

There were 156 NOVs issued for air program violations. Of these, 137 were issued to integrated mills, and the great majority (roughly 75 %) were issued to one facility, primarily for either BOF or coke oven-related violations. The same facility was also subject to three civil administrative actions during the study period, all of which cited coke oven-related violations.

One of the NOVs issued to integrated mills included a stipulated penalty assessment, and three were followed by penalty settlement offers. Also, ten of the NOVs issued to mini mills were accompanied by penalty settlement offers. Of the four NOVs with penalties issued to integrated mills, three addressed coke oven violations at a single facility, and of the ten NOVs with penalties issued to mini mills, all addressed electric arc furnace (EAF) and pickling emission control violations at a single mini mill with operations at several sites.

Nine civil administrative actions were completed during the study period. Five involved integrated mills, and four involved mini mills. In addition, three civil administrative actions were pending at the end of the study period. All three pending actions involved a single integrated mill and were initiated by a State agency. Four of the five civil administrative actions involving integrated mills cited coke oven-related violations, and three occurred at a single mill. Eight of the nine civil administrative actions included penalty assessments.

No civil judicial actions against either integrated or mini mills were completed during the study period. There were, however, civil judicial actions completed prior to the study period at several of the mills, and one Federal civil judicial action against an integrated mill was pending at the end of the study period.

(3) Types of Violations

Of the 146 enforcement responses taken against integrated mills, the vast majority cited violations of either opacity or fugitive emission limits. (See Section III for an explanation of how the overlap between these two types of limits has been addressed in this report.) Roughly 75% of the NOVs addressing opacity violations were issued to a single facility, as were slightly less than 75% of the NOVs addressing fugitive emission violations. Of the 26 enforcement responses taken against mini mills, most addressed opacity violations at a single integrated mill. Operation and maintenance (O&M) violations were also addressed in a significant number of enforcement responses (roughly 20% of the total enforcement responses). More than half of the NOVs citing O&M deficiencies were also issued to a single facility.

(4) Types of Processes

More than half of the NOVs issued to mini mills addressed pickling emission control violations (all of which involved one mini mill with finishing operation occurring at several sites), and roughly a quarter addressed EAF related violations (all of which involved a single site at the same mini mill).

Civil administrative enforcement actions focused primarily on coke oven violations at the integrated mills. This was the case in four of the five civil administrative actions, three of which involved a single facility. Basic oxygen furnace (BOF) related violations were addressed in over a third (35%), and coke oven related violations in slightly less than a third (29%), of all enforcement responses involving integrated mills. The majority of enforcement responses citing BOF related violations involved a single facility. Similarly, the majority of enforcement responses citing coke oven related violations involved the same facility. Blast furnaces and secondary steelmaking operations/controls are the only other processes that were frequently cited in the enforcement responses taken against integrated mills. Again, the majority of enforcement responses citing these processes involved a single facility.

The following summary tables (Tables 19-23) sort air-related enforcement responses by type of mill; the agency initiating the enforcement action; the type of enforcement response; the type of violation; and the type of process.

TABLE 19

Summary of Iron and Steel Mills Subject to Air Program Enforcement Responses*

Type of Mill	Enforcement Response	No Enforcement Response	Total
Integrated Mills	12	2	14
Mini Mills	5	15	20
Total	17	17	34

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 20

Summary of Air Program Enforcement Responses* by Agency Type

Type of Mill	Federal			State/Local			Total		
	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills
Integrated Mills	7	4	3	139	103	12	146	107	12
Mini Mills	--	--	--	26	20	5	26	20	5
Total	7	4	3	165	103	17	172	107	17

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 21 -- page 1a

Summary of Air Program Enforcement Responses by Type of Response

Type of Mill	NOVs												Civil Administrative Actions								
	Warnings			w/ Penalty*			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty			Penalty Unknown		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills
Inte-grated	4	2	3	4	3	3	115	103	6	18	17	2	4	2	3	1	1	1	--	--	--
Mini Mills	3	2	2	10	10	1	6	5	2	3	3	1	4	2	3	--	--	--	--	--	--
Total	7	2	5	14	10	4	121	103	8	21	17	3	8	2	6	1	1	1	--	--	--

* Includes penalties imposed by State or local agencies concurrently with the NOV.

TABLE 21 -- page 1b

Summary of Air Program Enforcement Responses by Type of Response

Type of Mill	Civil Judicial Actions									Combined Total									Total		
	w/ Penalty			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty*			Penalty Unknown					
	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Inte-grated	--	--	--	--	--	--	--	--	--	8	4	4	120	104	6	18	17	2	146	107	12
Mini Mills	--	--	--	--	--	--	--	--	--	14	12	3	9	5	2	3	3	1	26	20	5
Total	--	--	--	--	--	--	--	--	--	22	12	7	129	104	8	21	17	3	172	107	17

* Includes warnings

TABLE 22 -- page 1a

Summary of Air Program Enforcement Responses by Violation Type*

Type of Violations	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No of Mills	No. of NOV's	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Mass Emissions	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Opacity	1	1	1	99	73	7	2	2	1	--	--	--	102	75	8
Fugitive Emissions	2	1	2	18	13	3	1	1	1	--	--	--	21	13	6
O&M	2	1	2	22	17	4	2	2	1	--	--	--	26	19	5
Monitoring	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Open Burning	1	1	1	--	--	--	--	--	--	--	--	--	1	1	1
Recordkeeping	--	--	--	2	1	2	1	1	1	--	--	--	3	2	2
Reporting	--	--	--	3	2	2	--	--	--	--	--	--	3	2	2
Permitting	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 22 -- page 1b

Summary of Air Program Enforcement Responses by Violation Type*

Type of Violations	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Mass Emissions	1	1	1	--	--	--	--	--	--	--	--	--	1	1	1
Opacity	--	--	--	14	14	1	2	2	1	--	--	--	16	16	1
Fugitive Emissions	3	2	2	1	1	1	2	1	2	--	--	--	6	2	4
O&M	1	1	1	3	2	2	2	1	2	--	--	--	6	3	3
Monitoring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Open Burning	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Recordkeeping	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Reporting	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Permitting	--	--	--	1	1	1	2	1	2	--	--	--	3	2	2

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 22 -- page 1c

Summary of Air Program Enforcement Responses by Violation Type*

Type of Violations	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Mass Emissions	1	1	1	1	1	1	--	--	--	--	--	--	2	1	2
Opacity	1	1	1	113	73	8	4	2	2	--	--	--	118	75	9
Fugitive Emissions	5	2	4	19	13	4	3	1	3	--	--	--	27	13	10
O&M	3	1	3	25	17	6	4	2	3	--	--	--	32	19	8
Monitoring	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Open Burning	1	1	1	--	--	--	--	--	--	--	--	--	1	1	1
Recordkeeping	--	--	--	2	1	2	1	1	1	--	--	--	3	2	2
Reporting	--	--	--	4	2	3	--	--	--	--	--	--	4	2	3
Permitting	--	--	--	2	1	2	2	1	2	--	--	--	4	2	3

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 23 -- page 1a

Summary of Air Program Enforcement Responses by Process Type*

Type of Violations	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills
Coke Oven	--	--	--	39	29	4	4	3	2	--	--	--	43	32	4
Blast Furnace	--	--	--	16	8	5	1	1	1	--	--	--	17	9	5
Sinter Plant	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
BOF	1	1	1	50	36	4	--	--	--	--	--	--	51	36	5
Electric Arc Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Secondary Steelmaking	1	1	1	15	14	2	1	1	1	--	--	--	17	14	4
Hot Forming/Hot Mill	--	--	--	6	6	1	--	--	--	--	--	--	6	6	1
Finishing -- Pickling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 23 -- page 1b

Summary of Air Program Enforcement Responses by Process Type*

Type of Violations	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	6	6	1	--	--	--	--	--	--	6	6	1
Boiler	--	--	--	4	4	1	1	1	1	--	--	--	5	4	2
Buildings & Grounds (roads/yards)	1	1	1	1	1	1	--	--	--	--	--	--	2	1	2
Buildings & Grounds (asbestos)	--	--	--	2	1	2	--	--	--	--	--	--	2	1	2
Miscellaneous	1	1	1	2	1	2	1	1	1	--	--	--	4	2	3

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 23 -- page 2a

Summary of Air Program Enforcement Responses by Process Type*

Type of Violations	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills
Coke Oven	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOF	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electric Arc Furnace	3	2	2	5	5	1	1	1	1	--	--	--	9	5	4
Secondary Steelmaking	--	--	--	2	1	2	1	1	1	--	--	--	3	2	2
Hot Forming/Hot Mill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	11	11	1	2	2	1	--	--	--	13	13	1
Finishing -- Cold Mill/Annealing	--	--	--	2	2	1	2	1	2	--	--	--	4	3	2

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 23 -- page 2b

Summary of Air Program Enforcement Responses by Process Type*

Type of Violations	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boiler	--	--	--	1	1	1	2	1	2	--	--	--	3	2	2
Buildings & Grounds (roads/yards)	2	1	2	--	--	--	--	--	--	--	--	--	2	1	2
Buildings & Grounds (asbestos)	--	--	--	1	1	1	1	1	1	--	--	--	2	2	1
Miscellaneous	1	1	1	1	1	1	--	--	--	--	--	--	2	1	2

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 23 -- page 3a

Summary of Air Program Enforcement Responses by Process Type*

Type of Violations	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Res-p-ones	Most at 1 Mill	No. of Mills
Coke Oven	--	--	--	39	29	4	4	3	2	--	--	--	43	32	4
Blast Furnace	--	--	--	16	8	5	1	1	1	--	--	--	17	9	5
Sinter Plant	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
BOF	1	1	1	50	36	4	--	--	--	--	--	--	51	36	5
Electric Arc Furnace	3	2	2	5	5	1	1	1	1	--	--	--	9	5	4
Secondary Steelmaking	1	1	1	17	14	4	2	1	2	--	--	--	20	14	6
Hot Forming/Hot Mill	--	--	--	6	6	1	--	--	--	--	--	--	6	6	1
Finishing -- Pickling	--	--	--	11	11	1	2	2	1	--	--	--	13	13	1
Finishing -- Cold Mill/Annealing	--	--	--	2	2	1	2	1	2	--	--	--	4	3	2

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 23 -- page 3b

Summary of Air Program Enforcement Responses by Process Type*

Type of Violations	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills
Finishing -- Coating	--	--	--	6	6	1	--	--	--	--	--	--	6	6	1
Boiler	--	--	--	5	4	2	3	1	3	--	--	--	8	4	4
Buildings & Grounds (roads/yards)	3	1	3	1	1	1	--	--	--	--	--	--	4	1	4
Buildings & Grounds (asbestos)	--	--	--	3	1	3	1	1	1	--	--	--	4	2	3
Miscellaneous	2	1	2	3	1	3	1	1	1	--	--	--	6	2	5

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

C. Surface Water Program Enforcement

(1) Overview

Less than one-half of the 34 mills included in this study were subject to water program enforcement during the study period. Enforcement responses were documented for eight of the 14 integrated mills, and eight of the 20 mini mills. The great majority of the NOV's were issued to integrated mills, compared to mini mills, and most NOV's in both cases were issued by State or local agencies. In contrast, a nearly equal number of civil administrative and judicial actions were brought against integrated mills (seven) and mini mills (six), and there was a nearly equal number brought by EPA (six) and State agencies (seven).

NOV's were fairly evenly distributed between the NPDES program (68) and the Pretreatment program (63). However, all of the civil administrative and judicial actions were NPDES related.

(2) Types of Actions

Of the 131 NOV's documented during the study period, 52% were associated with NPDES permits and the remaining 48% with Pretreatment permits. Roughly three-quarters of the NOV's associated with NPDES permits were issued to a single integrated mill. Similarly, about two-thirds of the NOV's associated with Pretreatment permits were issued to a single integrated mill. One NOV had a penalty associated with it (a \$700 penalty was imposed by a POTW on a mini mill).

There were 11 civil administrative actions documented during the study period. All were NPDES-related and were fairly evenly distributed between integrated and mini mills. Nine included civil penalties (three were taken against a single mini mill). The penalties associated with civil administrative actions often involved stipulated penalty payments for subsequent violations or for failure to meet the terms of an order. The highest penalty documented was approximately 50,000 dollars.

There were only two civil judicial actions during the study period. Both actions were brought by State agencies and involved integrated mills and NPDES permits. The penalty in one case was less than 200,000 dollars, and the violations included unauthorized discharges associated with the miscellaneous steelmaking and finishing processes at one mill. This action required extensive corrective action at the mill.

The other civil judicial case had a penalty approximately 8 times higher than the other civil judicial action, and addressed effluent violations, unauthorized discharges, and reporting and permitting violations. These violations involved the blast furnace recycle system, the central treatment plant, and miscellaneous steelmaking processes.

This action, occurring at the end of the study period, also required extensive corrective action by the facility.

Several mills were operating under civil consent decrees during the study period. In one case (involving an integrated mill) the consent decree resulted from a multi-media enforcement case involving all three programs. This consent decree was finalized in 1993, before the review period for that mill.

(3) Types of Violations

Effluent violations were the most frequently cited type of violation in enforcement responses for all mills. This is consistent with violation patterns in the compliance section of this study. Over a third (37%) of the NOVs citing effluent violations involved a single integrated mill. Unauthorized discharges were the second most frequently cited violation category for all mills. As with effluent violations, over a third (36%) of the enforcement responses citing unauthorized discharges involved a single integrated mill.

The fact that most NOVs cite effluent violations is consistent with the use of monthly discharge monitoring reports (DMRs) (a major mechanism for monitoring compliance under the water program). In most cases DMR exceedances are effluent violations, and most are cited in NOVs by the responsible enforcement agency. Similarly, unauthorized discharges are most frequently identified through spill reports, which typically result in NOVs, depending on the nature of the spill and applicable permit requirements.

Civil administrative and judicial actions documented in this study also focus largely on effluent violations and unauthorized discharges (NOVs have usually already been issued for these violations). However, these less frequent actions usually include any other violations that may have occurred, and because the summary tables in this report reflect the number of actions and not the number of violations, the predominance of effluent violations and unauthorized discharges does not stand out as strongly.

(4) Types of Processes

The central treatment plant and the blast furnace related processes stand out as the most frequently cited process categories in the water program NOVs. However, over 80% of the NOVs citing blast furnace related violations involved a single integrated mill, and over 70% of the NOVs citing central treatment plant related violations involved another integrated mill.

The hot forming processes are the next most frequently cited category for NOVs, followed by coke plant processes and finishing processes. Roughly 75% of the NOVs addressing hot forming/hot mill related violations involved a single integrated mill.

Over 80% of the NOVs citing coke plant related violations and all of the NOVs citing coke plant treatment system related violations involved another integrated mill. Also, all of the NOVs citing pickling treatment system related violations involved a single mini mill.

At integrated mills, the processes most commonly cited (in order of frequency) are blast furnace related processes, the central treatment plant, hot mill processes, and coke plant processes. In all cases, a single mill was responsible for the majority of the NOVs. Among mini mills, the processes most frequently cited (in order of frequency) are the finishing processes and miscellaneous steelmaking processes (e.g., ladle metallurgy, desulfurization, or casting). Eighty percent of the enforcement responses in which miscellaneous steelmaking was cited involved a single mill.

Civil administrative actions cited the same processes, with a more significant focus on finishing processes (pickling and coating) but with no other major focal point. The two civil judicial actions (involving two integrated mills) focused on blast furnace recycling systems, miscellaneous steelmaking processes, and central treatment plants.

The following summary tables (Tables 24-28) sort water-related enforcement responses by type of mill; the agency initiating the enforcement action, the type of enforcement response; the type of violation; and the type of process.

TABLE 24

Summary of Iron and Steel Mills Subject to Water Program Enforcement Response *

Type of Mill	Enforcement Response	No Enforcement Response	Total
Integrated Mills	8	6	14
Mini Mills	8	12	20
Total	16	18	34

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 25

Summary of Water Program Enforcement Responses* by Agency Type

Type of Mill	NPDES								
	Federal			State/Local			Total		
	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills
Integrated Mills	5	2	3	61	41	7	66	43	7
Mini Mills	1	1	1	17	14	4	18	14	4
Total	6	2	4	78	41	11	84	43	11
	Pretreatment								
Integrated Mills	--	--	--	51	39	2	51	39	2
Mini Mills	--	--	--	14	7	5	14	7	5
Total	--	--	--	65	39	7	65	39	7
	NPDES and Pretreatment Combined								
Integrated Mills	5	2	3	112	41	8	117	43	8
Mini Mills	1	1	1	31	18	8	32	18	8
Total	6	2	4	143	41	16	149	43	16

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 26 -- page 1a

Summary of Water Program Enforcement Responses by Type of Response

Type of Mill	NPDES																				
	Warnings			NOVs									Civil Administrative Actions								
				w/ Penalty*			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty			Penalty Unknown		
	No. of Warnings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills
Inte-grated Mills	3	1	3	--	--	--	56	41	5	--	--	--	3	1	3	2	1	2	--	--	--
Mini Mills	--	--	--	--	--	--	12	11	2	--	--	--	6	3	3	--	--	--	--	--	--
Total	3	1	3	--	--	--	68	41	7	--	--	--	9	3	6	2	1	2	--	--	--

* Includes penalties imposed by State or local agencies concurrently with the NOV.

TABLE 26 -- page 1b

Summary of Water Program Enforcement Responses by Type of Response

Type of Mill	NPDES																				
	Civil Judicial Actions									Combined Total									Total		
	w/ Penalty			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty*			Penalty Unknown					
	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Integrate d	2	1	2	--	--	--	--	--	--	5	2	4	61	42	6	--	--	--	66	43	7
Mini Mills	--	--	--	--	--	--	--	--	--	6	3	3	12	11	2	--	--	--	18	14	4
Total	2	1	2	--	--	--	--	--	--	11	3	7	73	42	8	--	--	--	84	43	11

* Includes warnings

TABLE 26 -- page 2a

Summary of Water Program Enforcement Responses by Type of Response

Type of Mill	Pretreatment																				
	Warnings			NOVs									Civil Administrative Actions								
				w/ Penalty*			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty			Penalty Unknown		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills
Inte-grated	1	1	1	--	--	--	50	39	2	--	--	--	--	--	--	--	--	--	--	--	--
Mini Mills	1	1	1	1	1	1	12	7	3	--	--	--	--	--	--	--	--	--	--	--	--
Total	2	1	2	1	1	1	62	39	5	--	--	--	--	--	--	--	--	--	--	--	--

* Includes penalties imposed by State or local agencies concurrently with the NOV.

TABLE 26 -- page 2b

Summary of Water Program Enforcement Responses by Type of Response

Type of Mill	Pretreatment																				
	Civil Judicial Actions									Combined Total									Total		
	w/ Penalty			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty*			Penalty Unknown					
	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills
Integrate d	--	--	--	--	--	--	--	--	--	--	--	--	51	39	2	--	--	--	51	39	2
Mini Mills	--	--	--	--	--	--	--	--	--	1	1	1	13	7	4	--	--	--	14	7	5
Total	--	--	--	--	--	--	--	--	--	1	1	1	64	39	6	--	--	--	65	39	7

* Includes warnings

TABLE 26 -- page 3a

Summary of Water Program Enforcement Responses by Type of Response

Type of Mill	NPDES and Pretreatment Combined																				
	Warnings			NOVs									Civil Administrative Actions								
				w/ Penalty*			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty			Penalty Unknown		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOV's	Most at 1 Mill	No. of Mills	No. of NOV's	Most at 1 Mill	No. of Mills	No. of NOV's	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills
Inte-grated	4	1	4	--	--	--	106	41	6	--	--	--	3	1	3	2	1	2	--	--	--
Mini Mills	1	1	1	1	1	1	24	15	4	--	--	--	6	3	3	--	--	--	--	--	--
Total	5	1	5	1	1	1	130	41	10	--	--	--	9	3	6	2	1	2	--	--	--

* Includes penalties imposed by State or local agencies concurrently with the NOV.

TABLE 26 -- page 3b

Summary of Water Program Enforcement Responses by Type of Response

Type of Mill	NPDES and Pretreatment Combined																				
	Civil Judicial Actions									Combined Total									Total		
	w/ Penalty			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty*			Penalty Unknown					
	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills	No. of Res-ponses	Most at 1 Mill	No. of Mills
Integrate d	2	1	2	--	--	--	--	--	--	5	2	4	112	42	7	--	--	--	117	43	8
Mini Mill	--	--	--	--	--	--	--	--	--	7	3	4	25	15	5	--	--	--	32	18	8
Total	2	1	2	--	--	--	--	--	--	12	3	8	137	42	12	--	--	--	149	43	16

* Includes warnings

TABLE 27 -- page 1

Summary of Water Program Enforcement Responses by Violation Type*

Type of Violation	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOV's	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Certification/Training	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Compliance Schedule	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Effluent	1	1	1	89	40	5	2	1	2	1	1	1	93	41	7
Monitoring	2	1	2	1	1	1	1	1	1	--	--	--	4	1	4
Permitting	1	1	1	--	--	--	--	--	--	1	1	1	2	1	2
Recordkeeping	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Reporting	--	--	--	5	2	3	3	1	3	1	1	1	9	3	5
Unauthorized Discharge	1	1	1	18	10	5	4	2	3	2	1	2	25	12	6
O&M/Work Practice	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 27 -- page 2

Summary of Water Program Enforcement Responses by Violation Type*

Type of Violation	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Certification/Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Compliance Schedule	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Effluent	1	1	1	18	9	4	4	2	3	--	--	--	23	10	7
Monitoring	1	1	1	2	2	1	--	--	--	--	--	--	3	2	2
Permitting	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Recordkeeping	1	1	1	--	--	--	--	--	--	--	--	--	1	1	1
Reporting	1	1	1	9	8	2	--	--	--	--	--	--	10	8	3
Unauthorized Discharge	--	--	--	10	10	1	1	1	1	--	--	--	11	11	1
O&M/Work Practice	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 27 -- page 3

Summary of Water Program Enforcement Responses by Violation Type*

Type of Violation	Combined Total														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Certification/Training	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Compliance Schedule	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Effluent	2	1	2	107	40	9	6	2	5	1	1	1	116	41	14
Monitoring	3	1	3	3	2	2	1	1	1	--	--	--	7	2	6
Permitting	1	1	1	--	--	--	1	1	1	1	1	1	3	1	3
Recordkeeping	1	1	1	1	1	1	--	--	--	--	--	--	2	1	2
Reporting	1	1	1	14	8	5	3	1	3	1	1	1	19	8	8
Unauthorized Discharge	1	1	1	28	10	6	5	2	4	2	1	2	36	12	7
O&M/Work Practice	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 28 -- page 1a

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	20	17	3	1	1	1	--	--	--	21	17	4
Coke Plant TS	--	--	--	10	10	1	--	--	--	--	--	--	10	10	1
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	29	25	3	1	1	1	--	--	--	30	25	4
Blast Furnace RS	1	1	1	7	4	4	--	--	--	1	1	1	9	4	5
Basic Oxygen Furnace	--	--	--	20	10	3	2	1	2	--	--	--	22	10	4
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	2	2	1	--	--	--	--	--	--	2	2	1
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	31	25	3	2	1	2	--	--	--	33	26	3

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 1b

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Finishing -- Cold Mill/Annealing	--	--	--	14	12	2	1	1	1	--	--	--	15	13	2
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/ Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	13	8	3	1	1	1	--	--	--	14	9	3
Finishing -- Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Coating	--	--	--	2	2	1	--	--	--	--	--	--	2	2	1
Unspecified Process Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Central Treatment Plant	1	1	1	34	26	4	1	1	1	1	1	1	37	27	6
Other Independent Treatment System	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 1c

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	1	1	1	2	1	2	--	--	--	3	2	2
General: Buildings & Grounds	--	--	--	7	3	4	--	--	--	--	--	--	7	3	4
General: Landfill	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1
General: Monitoring Program	2	1	2	1	1	1	1	1	1	--	--	--	4	1	4
General: Recordkeeping/ Reporting	--	--	--	3	1	3	2	1	2	1	1	1	6	2	5
General: Miscellaneous	1	1	1	1	1	1	--	--	--	1	1	1	3	1	3
No Process Indicated	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 2a

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coke Plant TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	8	8	1	2	2	1	--	--	--	10	8	2
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	1	1	1	1	1	1	--	--	--	2	1	2

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 2b

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	6	6	1	1	1	1	--	--	--	7	6	2
Finishing -- Cold Mill/Annealing TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing/Cold Mill/Annealing/ Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	4	4	1	2	2	1	--	--	--	6	4	2
Finishing -- Pickling TS	--	--	--	9	9	1	1	1	1	--	--	--	10	10	1
Finishing --Coating	--	--	--	2	2	1	2	2	1	--	--	--	4	2	2
Unspecified Process Mills	--	--	--	7	7	1	--	--	--	--	--	--	7	7	1
Central Treatment Plant	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Other Independent Treatment System	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 2c

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Buildings & Grounds	--	--	--	2	2	1	--	--	--	--	--	--	2	2	1
General: Landfill	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Monitoring Program	1	1	1	1	1	1	--	--	--	--	--	--	2	1	2
General: Recordkeeping/ Reporting	--	--	--	6	5	2	--	--	--	--	--	--	6	5	2
General: Miscellaneous	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
No Process Indicated	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 3a

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	20	17	3	1	1	1	--	--	--	21	17	4
Coke Plant TS	--	--	--	10	10	1	--	--	--	--	--	--	10	10	1
Sinter Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	29	25	3	1	1	1	--	--	--	30	25	4
Blast Furnace RS	1	1	1	7	4	4	--	--	--	1	1	1	9	4	5
Basic Oxygen Furnace	--	--	--	20	10	3	2	1	2	--	--	--	22	10	4
Basic Oxygen Furnace RS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous Steelmaking	--	--	--	10	8	2	2	2	1	--	--	--	12	8	2
Miscellaneous Steelmaking RS/TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hot Forming/Hot Mill	--	--	--	32	25	4	3	1	3	--	--	--	35	26	5

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 3b

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Hot Forming/Hot Mill RS	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Finishing -- Cold Mill/Annealing	--	--	--	20	12	3	2	1	2	--	--	--	22	13	4
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing/ Pickling TS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	17	8	4	3	2	2	--	--	--	20	9	5
Finishing -- Pickling TS	--	--	--	9	9	1	1	1	1	--	--	--	10	10	1
Finishing -- Coating	--	--	--	4	2	2	2	2	1	--	--	--	6	2	3
Unspecified Process Mills	--	--	--	7	7	1	--	--	--	--	--	--	7	7	1
Central Treatment Plant	1	1	1	35	26	5	1	1	1	1	1	1	38	27	7
Other Independent Treatment System	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 28 -- page 3c

Summary of Water Program Enforcement Responses by Process Type*

Type of Process	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOV's	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
General: Intake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: WW/SW Conveyance	--	--	--	1	1	1	2	1	2	--	--	--	3	2	2
General: Buildings & Grounds	--	--	--	9	3	5	--	--	--	--	--	--	9	3	5
General: Landfill	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
General: Underground Storage Tank	--	--	--	--	--	--	--	--	--	1	1	1	1	1	1
General: Monitoring Program	3	1	3	2	1	2	1	1	1	--	--	--	6	1	6
General: Recordkeeping/Reporting	--	--	--	9	5	5	2	1	2	1	1	1	12	5	7
General: Miscellaneous	1	1	1	1	1	1	1	1	1	1	1	1	4	1	4
No Process Indicated	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

D. RCRA Program Enforcement

(1) Overview

Less than one-half (13) of the 34 mills included in this study were subject to RCRA enforcement during the study period. This is primarily related to the fact that only 17 of the mills were inspected during the applicable review period (all seven of the five year review mills, but only ten of the 27 one year review mills). An enforcement response was documented for nine (64%) of the 14 integrated mills, and four (20%) of the 20 mini mills. This includes three of the four integrated mills included in the five year review and all three of the mini mills included in the five year review. Also, an enforcement response was documented at six of the ten integrated mills included in the one year review, but at only one of the 16 mini mills included in the one-year review.

The greater number of integrated mills subject to an enforcement response may partially be attributed to more frequent inspections of the integrated mills (ten of the 14 integrated mills were inspected during the review period). Although there were more integrated mills than mini mills subject to an enforcement response, 35 (62%) of the 56 responses involved mini mills. This is greatly influenced by one mill that was subject to 24 enforcement responses during the five year period. The large number of enforcement responses attributed to this one facility may be due in part to the fact that the facility is comprised of four non-contiguous sites, and each site was inspected and cited independently.

All but two of the RCRA enforcement responses were initiated by a State agency. This is probably due to the fact that all the States included in the study have been delegated RCRA authority, and, therefore, the vast majority of inspections are conducted by State officials.

(2) Types of Actions

Of the 56 enforcement responses documented under the RCRA program, ten (18%) were warnings, 29 (52%) were NOVs, 16 (29%) were civil administrative enforcement actions, and one was a civil judicial enforcement action. In addition, two State civil administrative actions and one Federal civil judicial action were pending at the end of the study period. Civil penalties resulted in 15 of the 16 civil administrative actions as well as in the one civil judicial action. Six of the 16 administrative actions with penalties involved integrated mills and ten involved mini mills. All ten of the latter actions involved a single mini mill.

The one civil enforcement action finalized within the study period involved an integrated mill and the failure to perform corrective action plan requirements regarding the disposal of waste ammonia liquor (and possibly other wastes) in violation of both the Safe Drinking Water Act and RCRA. It concluded in a stipulated penalty settlement of \$3,375,000.

(3) Types of Violations

Manifest, labeling, and recordkeeping were, in the aggregate, the most frequently cited types of violation in enforcement actions for all mills. This is

consistent with the compliance analysis included in this report. More than half (55%) of the 22 enforcement responses citing manifest violations were associated with a single mini mill, as were more than a third (36%) of the 14 responses citing recordkeeping violations.

The next most frequently cited violations were permitting violations (42% of which involved a single mini mill), followed by spill prevention and storage violations. This finding is also consistent with the compliance analysis portion of this report.

(4) Types of Processes

Steelmaking processes most frequently cited in enforcement responses under RCRA include (in order of frequency) coke plants, steel finishing operations and electric arc furnaces. However, the majority of the RCRA enforcement response violations could not be linked to a specific steelmaking process. Most of these violations involved general program deficiencies that would be applicable to the handling of any regulated waste at a steel mill. However, in some cases cited violations pertain to waste piles, landfills, underground storage and similar site related conditions, where specific steelmaking process wastes have been combined and often can't be identified because they involve historical land disposal practices for which there are no records. There are 14 enforcement responses in this combined category (five waste pile and landfill related, and nine general buildings and grounds related).

The following summary tables (Tables 29-33) sort RCRA-related enforcement responses by type of mill; the agency initiating the enforcement action; the type of enforcement response; the type of violation; and the type of process.

TABLE 29

Summary of Iron and Steel Mills Subject to RCRA Program Enforcement Responses*

Type of Mill	Enforcement Response	No Enforcement Response	Total
Integrated Mills	9	5	14
Mini Mills	4	16	20
Total	13	21	34

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 30

Summary of RCRA Program Enforcement Responses* by Agency Type

Type of Mill	Federal			State/Local			Total		
	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills
Integrated Mills	1	1	1	20	5	9	21	5	9
Mini Mills	1	1	1	34	24	4	35	24	4
Total	2	1	2	54	24	13	56	24	13

* Includes Warnings, NOVs, Civil Administrative Actions and Civil Judicial Actions

TABLE 31 -- page 1a

Summary of RCRA Program Enforcement Responses by Type of Response

Type of Mill	Warnings						NOVs						Civil Administrative Actions								
				w/ Penalty*			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty			Penalty Unknown		
	No. of Warnings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills
Inte-grated Mills	4	2	3	--	--	--	11	3	6	--	--	--	5	2	4	--	--	--	--	--	--
Mini Mills	6	6	1	--	--	--	18	14	3	--	--	--	10	10	1	1	1	1	--	--	--
Total	10	6	4	--	--	--	29	14	9	--	--	--	15	10	5	1	1	1	--	--	--

* Includes penalties imposed by State or local agencies concurrently with the NOV.

TABLE 31 -- page 1b

Summary of RCRA Program Enforcement Responses by Type of Response

Type of Mill	Civil Judicial Actions									Combined Total									Total		
	w/ Penalty			w/o Penalty			Penalty Unknown			w/ Penalty			w/o Penalty			Penalty Unknown					
	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills
Integrated Mills	1	1	1	--	--	--	--	--	--	6	2	4	15	3	8	--	--	--	21	5	9
Mini Mills	--	--	--	--	--	--	--	--	--	10	10	1	25	14	4	--	--	--	35	24	4
Total	1	1	1	--	--	--	--	--	--	16	10	5	40	14	12	--	--	--	56	24	13

TABLE 32 -- page 1a

Summary of RCRA Program Enforcement Responses by Violation Type*

Type of Violation	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Certification/Training	--	--	--	1	1	1	1	1	1	--	--	--	2	1	2
Closure	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Improper Disposal	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Labeling	--	--	--	4	2	3	1	1	1	--	--	--	5	2	4
Manifest	2	1	2	2	1	2	3	2	2	--	--	--	7	3	5
Monitoring	--	--	--	1	1	1	1	1	1	--	--	--	2	1	2
Permitting	--	--	--	4	3	2	1	1	1	1	1	1	6	3	3
Recordkeeping	1	1	1	5	3	3	1	1	1	--	--	--	7	3	5
Secondary Containment	1	1	1	4	3	2	--	--	--	--	--	--	5	3	3

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 32 -- page 1b

Summary of RCRA Program Enforcement Responses by Violation Type*

Type of Violation	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Self-Inspections	--	--	--	2	1	2	1	1	1	--	--	--	3	1	3
Spill Prevention	--	--	--	4	1	4	1	1	1	--	--	--	5	2	4
Spill Response	1	1	1	2	1	2	1	1	1	--	--	--	4	1	4
Storage	--	--	--	4	1	4	2	1	2	--	--	--	6	2	5
Waste Determination	2	2	1	1	1	1	--	--	--	--	--	--	3	2	2
Miscellaneous	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 32 -- page 2a

Summary of RCRA Program Enforcement Responses by Violation Type*

Type of Violation	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Certification/Training	--	--	--	2	2	1	1	1	1	--	--	--	3	3	1
Closure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Improper Disposal	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Labeling	1	1	1	3	2	2	1	1	1	--	--	--	5	3	3
Manifest	--	--	--	9	6	2	6	6	1	--	--	--	15	12	2
Monitoring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Permitting	--	--	--	4	3	2	2	2	1	--	--	--	6	5	2
Recordkeeping	5	5	1	2	2	1	--	--	--	--	--	--	7	5	2
Secondary Containment	--	--	--	1	1	1	1	1	1	--	--	--	2	2	1

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 32 -- page 2b

Summary of RCRA Program Enforcement Responses by Violation Type*

Type of Violation	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Self-Inspections	--	--	--	3	2	2	--	--	--	--	--	--	3	2	2
Spill Prevention	--	--	--	1	1	1	3	2	2	--	--	--	4	3	2
Spill Response	--	--	--	1	1	1	1	1	1	--	--	--	2	1	2
Storage	1	1	1	--	--	--	1	1	1	--	--	--	2	1	2
Waste Determination	--	--	--	2	2	1	1	1	1	--	--	--	3	3	1
Miscellaneous	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 32 -- page 3a

Summary of RCRA Program Enforcement Responses by Violation Type*

Type of Violation	Combined Total														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Certification Training	--	--	--	3	2	2	2	1	2	--	--	--	5	3	3
Closure	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Improper Disposal	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Labeling	1	1	1	7	2	5	2	1	2	--	--	--	10	3	7
Manifest	2	1	2	11	6	4	9	6	3	--	--	--	22	12	7
Monitoring	--	--	--	1	1	1	1	1	1	--	--	--	2	1	2
Permitting	--	--	--	8	3	4	4	2	3	1	1	1	13	5	6
Recordkeeping	6	5	2	7	3	4	1	1	1	--	--	--	14	5	7
Secondary Containment	1	1	1	5	3	3	1	1	1	--	--	--	7	3	4

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 32 -- page 3b

Summary of RCRA Program Enforcement Responses by Violation Type*

Type of Violation	Combined Total														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Self-Inspections	--	--	--	5	2	4	1	1	1	--	--	--	6	2	5
Spill Prevention	--	--	--	5	1	5	4	2	3	--	--	--	9	3	6
Spill Response	1	1	1	3	1	3	2	1	2	--	--	--	6	1	6
Storage	1	1	1	4	1	4	3	1	3	--	--	--	8	2	7
Waste Determination	2	2	1	3	2	2	1	1	1	--	--	--	6	3	3
Miscellaneous	--	--	--	2	1	2	--	--	--	--	--	--	2	1	2

* Table values reflect only the number of enforcement responses in which each type of violation is addressed. They do not reflect the total number of enforcement responses or the total number of times a type of violation is cited in the enforcement responses.

TABLE 33 -- page 1a

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	5	2	4	2	1	2	--	--	--	7	2	5
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOF	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
EAF	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Hot Rolling Mills	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finishing -- Pickling	--	--	--	2	1	2	--	--	--	--	--	--	2	1	2
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hazardous Waste Storage Area (< 90 days)	--	--	--	2	2	1	--	--	--	--	--	--	2	2	1

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 1b

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Wastewater Treatment Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Waste Pile/ Surface Impoundment/Landfill	--	--	--	1	1	1	2	2	1	--	--	--	3	3	1
Buildings & Grounds	2	1	2	4	2	3	1	1	1	1	1	1	8	2	6
Laboratory	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Closure	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Financial Assurance	--	--	--	4	3	2	--	--	--	--	--	--	4	3	2
General: Inspecting	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Labeling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Manifest	2	1	2	2	1	2	3	2	2	--	--	--	7	3	5

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 1c

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Integrated Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills
General: Monitoring	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
General: Permitting	--	--	--	2	2	1	1	1	1	--	--	--	3	2	2
General: Plan	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
General: Recordkeeping	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
General: Reporting	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
General: Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Waste Analysis	2	2	1	--	--	--	--	--	--	--	--	--	2	2	1
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 2a

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOF	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EAF	--	--	--	1	1	1	1	1	1	--	--	--	2	2	1
Hot Rolling Mills	--	--	--	1	1	1	1	1	1	--	--	--	2	2	1
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Finishing -- Pickling	--	--	--	2	1	2	2	1	2	--	--	--	4	2	2
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hazardous Waste Storage Area (< 90 days)	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 2b

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Wastewater Treatment Plant	--	--	--	3	3	1	1	1	1	--	--	--	4	4	1
Waste Pile/ Surface Impoundment/Landfill	--	--	--	1	1	1	1	1	1	--	--	--	2	2	1
Buildings & Grounds	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Laboratory	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Closure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Financial Assurance	3	3	1	--	--	--	--	--	--	--	--	--	3	3	1
General: Inspecting	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
General: Labeling	1	1	1	1	1	1	1	1	1	--	--	--	3	2	2
General: Manifest	--	--	--	7	5	2	6	6	1	--	--	--	13	11	2

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 2c

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Mini Mills														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
General: Monitoring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
General: Permitting	1	1	1	2	2	1	1	1	1	--	--	--	4	3	2
General: Plan	1	1	1	--	--	--	--	--	--	--	--	--	1	1	1
General: Recordkeeping	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
General: Reporting	1	1	1	1	1	1	--	--	--	--	--	--	2	1	2
General: Training	--	--	--	2	2	1	1	1	1	--	--	--	3	3	1
General: Waste Analysis	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 3a

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Coke Plant	--	--	--	5	2	4	2	1	2	--	--	--	7	2	5
Blast Furnace	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BOF	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
EAF	--	--	--	1	1	1	2	1	2	--	--	--	3	2	2
Hot Rolling Mills	--	--	--	1	1	1	1	1	1	--	--	--	2	2	1
Finishing -- Cold Mill/Annealing	--	--	--	--	--	--	1	1	1	--	--	--	1	1	1
Finishing -- Pickling	--	--	--	4	1	4	2	1	2	--	--	--	6	2	4
Finishing -- Coating	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hazardous Waste Storage Area (< 90 days)	--	--	--	3	2	2	--	--	--	--	--	--	3	2	2

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 3b

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warn-ings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Act-ions	Most at 1 Mill	No. of Mills	No. of Resp-ones	Most at 1 Mill	No. of Mills
Wastewater Treatment Plant	--	--	--	3	3	1	1	1	1	--	--	--	4	4	1
Waste Pile/ Surface Impoundment/Landfill	--	--	--	2	1	2	3	2	2	--	--	--	5	3	2
Buildings & Grounds	2	1	2	4	2	3	2	1	2	1	1	1	9	2	7
Laboratory	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Closure	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
Financial Assurance	3	3	1	4	3	2	--	--	--	--	--	--	7	3	3
General: Inspecting	--	--	--	1	--	--	--	--	--	--	--	--	1	1	1
General: Labeling	1	1	1	1	1	1	1	1	1	--	--	--	3	2	2
General: Manifest	2	1	2	9	5	4	9	6	3	--	--	--	20	11	7

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

TABLE 33 -- page 3c

Summary of RCRA Program Enforcement Responses by Process Type*

Type of Process	Integrated and Mini Mills Combined														
	Warnings			NOVs			Civil Admin.			Civil Judicial			Total		
	No. of Warnings	Most at 1 Mill	No. of Mills	No. of NOVs	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Actions	Most at 1 Mill	No. of Mills	No. of Responses	Most at 1 Mill	No. of Mills
General: Monitoring	--	--	--	1	1	1	--	--	--	--	--	--	1	1	1
General: Permitting	1	1	1	4	2	2	2	1	2	--	--	--	7	3	4
General: Plan	1	1	1	--	--	--	1	1	1	--	--	--	2	1	2
General: Recordkeeping	--	--	--	1	1	1	1	1	1	--	--	--	2	1	2
General: Reporting	1	1	1	2	1	2	--	--	--	--	--	--	3	1	3
General: Training	--	--	--	2	2	1	1	1	1	--	--	--	3	3	1
General: Waste Analysis	2	2	1	1	1	1	--	--	--	--	--	--	3	2	2
Not Specified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Table values reflect only the number of enforcement responses in which each type of process is addressed. They do not reflect the total number of enforcement responses or the total number of times a process is cited in the enforcement responses.

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Appendix A: Glossary

I. Air Program Terms

Air pollution source means any specific emission point where pollutants regulated under the Clean Air Act are emitted.

Continuous Emissions Monitoring System (CAMS) means a monitoring system for continuously measuring the emissions of a pollutant from an affected facility.

Continuous Opacity Monitoring System (COME) means a monitoring system for continuously measuring opacity emissions from an affected facility.

Fugitive emissions means air pollutants entering into the atmosphere from other than a stack chimney, vent, or other functionally equivalent opening (e.g., vapors, dust, fumes).

Mass emission standard means a regulatory standard limiting the emission of pollutants into the atmosphere that is related to pollutant weight (e.g., lbs/hour, up/m³, lbs of product, lbs/mmBtu, etc.)

Opacity standard means a regulatory emission limit that is based on the degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

Visible emissions means visible particulate or condensable particulate matter emitted from an air pollution source.

Visible emissions observation means any observation of emissions that meets the requirement of reference method 9 or an approved equivalent method under 40 CFR part 60, Appendix A.

II. Water Program Terms

Best Management Practice (BMP) means a permit condition used in place of or in conjunction with effluent limitations to prevent or control the discharge of pollutants. BMPs may include a schedule of activities, the prohibition of practices, maintenance procedures, or other management practices. BMPs may include, but are not limited to, treatment requirements, operating procedures, or practices to control plant site runoff, spillage, leaks, sludge or waste disposal, or drainage from raw material storage.

Bypass means the intentional diversion of wastestreams from any portion of a treatment (or pretreatment) facility.

Composite sample means a sample composed of two or more discrete samples. The aggregate sample will reflect the average water quality covering the compositing or sample period.

Contact cooling water means the water discharged from any cooling use to which any pollutant other than heat is added. The water must come into contact with the process.

Discharge Monitoring Report (DMR) means the EPA uniform national form, including any subsequent additions, revisions, or modifications, for the reporting of self-monitoring results by NPDES permittees. DMRs must be used by approved States, as well as EPA.

Effluent limit means any restriction on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into the waters of the United States, the waters of the contiguous zone, or the ocean.

Exceedance means any value greater than the effluent limit.

Grab sample means an individual sample collected over a very brief period of time (for example, not exceeding 15 minutes).

Indirect discharge means the introduction of pollutants into a POTW from any non-domestic source regulated under section 307(b), (c), or (d) of the Clean Water Act.

Industrial user means a source of water pollution that is an indirect discharger.

Intake means the process of taking in water from a supply source.

Interference means a discharge which, alone or in conjunction with a discharge or discharges from other sources, inhibits or disrupts the POTW and causes a violation of any requirement of the POTW's NPDES permit.

Internal outfall means the point at which an effluent is monitored prior to its combining with unregulated or other wastestreams.

Noncontact cooling water means the water discharged from any use to which the only pollutant added is heat. Water must not come into contact with the process.

NPDES (National Pollutant Discharge Elimination System) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 318, 402, and 405 of the Clean Water Act.

NPDES permit means a permit issued by US EPA or an authorized State to a direct discharger which permits wastewater discharge to a watercourse in accordance with the conditions of the permit.

Outfall means the point at which effluent is discharged into receiving waters.

Pass through means a discharge of pollutants that exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

POTW (publicly owned treatment works) means any device or system, owned by the State or municipality, which is used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature.

Pretreatment means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW.

Slug means any discharge or a non-routine, episodic nature, including but not limited to an accidental discharge or a non-routine batch discharge.

Spill Prevention Control and Countermeasure Plan (SPCC) means a plan prepared by a facility to minimize the likelihood of a spill and to expedite control and cleanup activities should a spill occur.

Stormwater means stormwater runoff, snow melt runoff, and surface runoff and drainage.

Unauthorized discharge means the discharge of a pollutant that is not authorized in an NPDES permit.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

III. RCRA Program Terms

Closure refers to either a closed portion of a facility which an owner or operator has closed in accordance with the approved facility closure plan and all applicable RCRA closure requirements or the closure of all hazardous waste management units at the

facility in accordance with all applicable final closure requirements so that hazardous waste management activities are not longer conducted at the facility. The owner or operator must close the facility in a manner that minimizes the need for further maintenance and that controls, minimizes or eliminates the future threat to human health and environment.

Corrective action is required when a specific ground water standard set forth in the facility permit is exceeded or the facility's permit may simply include the requirement to establish a corrective action program. Corrective action requires the monitoring of ground water, removal or treatment of any hazardous constituents that exceed permit limits.

Container means any portable device in which a material is poured, transported, treated, disposed of, or otherwise handled.

Contingency plan means a document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.

Generator means any person, by site, whose act or process produces hazardous waste identified or listed in 40 CFR part 261 or whose act first causes a hazardous waste to become subject to regulation.

Hazardous waste means a solid waste identified as a characteristic or listed hazardous waste in 40 CFR § 261.3.

Hazardous waste accumulation area is a designated location to place wastes from several generation points in containers and/or tanks for a length of time not to exceed 90 days.

Land Disposal Restriction (LDR) is intended to restrict the land disposal of specific hazardous wastes prior to treatment and requires that the manifests of these wastes be accompanied by an LDR notice.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile.

Manifest means the shipping document originated and signed containing the information required by 40 CFR part 262, subpart B.

Part B permit is the permit issued to facility that treats, stores or disposes of hazardous wastes. The permits include the administrative and technical standards that are applied to a specific facility. Existing facilities that have applied for a permit, but have yet to be issued a RCRA permit are considered to be in interim status if they

applied for a Part A and Part B Permit and may continue to operate if they comply with the RCRA mandated Interim Status Standards.

Run-off means any rainwater, leachate, or other liquid that drains over land from any part of a facility.

Run-on means any rainwater, leachate, or other liquid that drains over land onto any part of a facility.

Satellite accumulation area means an area where no more than 55 gallons of a hazardous waste or no more than one quart of acute hazardous waste is accumulated at or near the point of generation. When the 55 gallon limit is reached, the operator has three days in which to move the waste to a 90-day storage area or to a permitted TSD facility.

Secondary containment includes structures, usually dikes or berms, surrounding tanks or other containers that are designed to contain spilled material from the storage containers.

Sludge means any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial waste water treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

Solid waste means garbage, refuse, sludge, and other discarded solid material resulting from industrial and commercial operations from community activities. It does not include solids or dissolved materials in domestic sewage or other significant pollutants in water resources.

Solid waste management unit (SWMU) means a site where waste disposal or contamination of soil and terrain may have occurred from industrial activities or operations.

Spill prevention includes those measures taken to avoid the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into or on any land or water.

Spill response includes the measures required to respond to the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into or on any land or water. This includes the containment, management and remediation of any spill or release.

Tank means a stationary device designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

Toxicity characteristic is one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) used to determine if a waste is hazardous. A solid waste exhibits the characteristic of toxicity if, by using the test methods described in 40 CFR part 261, Appendix II or an equivalent method approved by the Administrator, the extract from a representative sample of the waste contains any of the contaminants listed in 40 CFR § 261.24, Table 1 at a concentration greater than or equal to that in the table.

TSD facility is a facility permitted to treat, store or dispose of hazardous waste on-site.

Used oil means any oil that has been refined from crude oil, or any synthetic oil that has been used and, as a result of such use, is contaminated by physical or chemical impurities.