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Rachel M. Dinno
San Jose State University

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**Following the Trail of Poison: The transboundary movement of
hazardous wastes from the United States to Mexico**

Dinno, Rachel M., M.S.

San Jose State University, 1994

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FOLLOWING THE TRAIL OF POISON:
THE TRANSBOUNDARY MOVEMENT OF HAZARDOUS WASTES
FROM THE UNITED STATES TO MEXICO

A Thesis

Presented to

The Faculty of the Department of Environmental Studies
San Jose State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

By

Rachel M. Dinno

August 1994

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Rachel M. Dinno

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ABSTRACT

This thesis addresses the trends in the transboundary movement of hazardous waste by tracking the waste from "cradle-to-grave." It examines whether U.S. environmental legislation is reducing the amount and the overall effect of toxic material in the environment, as intended by legislation, or whether the burden of hazardous waste is merely shifting to new territories.

This is analyzed by examining government documents obtained through the Freedom of Information Act to assess current international policy, industrial practices, and the environmental and human health impact that the practice of trading hazardous waste has on communities which are denied the ability to participate in the political process.

This study recommends a global ban on the export of wastes while promoting the incorporation of clean production systems internationally. Furthermore, it outlines an international legislative framework in which all citizens have a right to participate in the decision-making process.

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CHAPTER 1

EXPORTING TOXICS: AN INTRODUCTION TO THE PROBLEM

In the 1920's Dr. Alice Hamilton wrote, "No lead industry has ever, under the strictest control, lost all its dangers. Where there is lead, some case of lead poisoning sooner or later develops" (Hamilton 1925, 333). The struggle to find cleaner alternatives for lead and other hazardous metals continues today. Americans are becoming increasingly aware of the threat posed by toxics in their communities and workplaces. With approximately 2,000 toxic clean-up sites across the country (40 CFR 1992, part 300 app. B), which cost taxpayers billions of dollars to clean-up, citizens are fighting to eliminate toxics in their neighborhoods. Frequently, they fight to place hazardous industries in other communities rather than reducing hazardous materials and the risks associated with them everywhere.

To reduce the toxics threat to human health in the United States, the government has adopted policies governing lead, and other hazardous wastes, regulating them from "cradle-to-grave" (from their origin to their disposal and beyond). Although these policies were designed to decrease the amount of toxics emitted into the environment and to protect human populations by minimizing the production of toxic wastes, they have often pushed the polluting industries into new communities beyond U.S. borders.

The export of hazardous waste from developed to developing countries is described as "toxic terrorism" or "toxic colonialism" (Ayadike 1988; O'Keefe

1988; Greenpeace 1992). The two year voyage of the freighter, Khian Sea, in the late 1980's was a widely publicized example of toxic colonialism. Loaded with toxic ash from Philadelphia, the barge hauled the waste by-products of the industrialized world across the oceans to developing countries for disposal (Greenpeace 1991a).

In an attempt to prevent the export of hazardous waste from industrialized countries to developing countries, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal of 1989 was negotiated under the auspice of the United Nations Environmental Program (UNEP 1989). The intention of the Basel Convention was to prevent the generation and the transboundary movement of hazardous waste, stating that "any state has the sovereign right to ban the entry or disposal of foreign hazardous wastes and other wastes in its territory" (UNEP 1989, Article 4). As of May 1994, the U.S. government has signed, but Congress had not ratified the multilateral agreement.

Developing nations came to the convention with the intention of banning hazardous waste export from the developed nations to the developing, but the OECD countries (USA, UK, FRG, USSR, Japan, etc.) opposed this, and the convention banned only the export of wastes to Antarctica (UNEP 1989). The convention left many loopholes through which countries continue to trade in toxic waste. The Convention did establish a monitoring procedure, which requires the receiving countries to consent to the import of waste. Furthermore, waste export is prohibited to countries that have a national policy banning imported waste. As of December 1993, governments in 103 countries have banned the import of hazardous waste

(Puckett 1993). But, four of these countries allow the import of waste as a recyclable product (Greenpeace 1990). One of the four countries is Mexico.

The outcome of the convention has been the deliberate targeting of developing countries with toxic trade proposals. Hazardous waste industries have turned to developing countries and proposed building "state-of-the-art" recycling facilities as incentives for economic development (Asante-Duah et al. 1992; Hilz and Ehrenfeld 1991; Greenpeace 1990). Yet, by legalizing and legitimizing the transfer of hazardous waste, these "recycling" industries will continue to expose humans and the environment to hazardous materials in the countries employing them.

In many developing countries, industries that produce hazardous waste have installed risky technologies in communities where the labor costs are low and environmental regulations are seldom enforced. In effect, the siting of hazardous waste facilities and the official sanctioning of toxic pollutants are sited in low-income communities where individuals are denied access to information and do not have the legal rights to oppose development projects (Anyinam 1991, 770).

Brian S. Moffat, chairman and chief executive of British Steel, Plc. outlined the waste export problem clearly in his address to the Steel Survival Strategies VIII Conference in New York, June 22-23, 1993:

As long as we have nationally based steel industries, governments will tend to see factors such as employment as more important than profit. . . Anti-dumping actions and subsidies are merely delaying actions. . . [O]ne way forward would be for the steel industry to enter into a multilateral steel agreement, . . result[ing] in less government interference. . . In my view, it is only through privatization and cross-border mergers that government influence will be broken down. . ."

This statement alludes to the reality that U.S. regulations governing hazardous waste essentially stop at the border. Thus, by developing private cross-border ties, industry can circumvent governmental regulations. Thus, while the United States is cleaning-up toxics in its communities, hazardous waste-generating industries can legally use developing nations to dispose of hazardous waste in environmentally destructive ways (Anyinam 1991; Chepesiuk 1991, 35). The path of least resistance from the United States flows south, where untreated hazardous wastes have been dumped in several locations (Asante-Duah 1992, 1689). One such community is Monterrey, Mexico.

Research Questions

This study asks whether a particular hazardous waste has been reduced, as is the intent of specific U.S. laws, or whether these laws have only allowed the waste to be moved to Mexico, unreduced in volume, with the consent of both governments. To test this hypothesis, dimensions of the transboundary movement of hazardous waste from the United States to Mexico will be explored and established. This transboundary movement of hazardous waste raises several issues that must be explicated:

- 1) The distribution of hazardous waste (in terms of the origin, destination, and environmental effect).
- 2) The procedural process by which this practice is guided by current legislation.

These issues will be analyzed by using a comparative approach of data documenting wastes exports from the United States to Mexico. This approach will verify the distribution of the hazardous waste exported from the United

States to Mexico from 1987 to 1993. To establish an export trend, the following questions were formulated:

- Where are U.S. hazardous wastes exported?
- What is the geographical distribution of the exported waste?
- What are the consequences of this practice?

The answers to these questions will provide a "cradle-to-grave" profile of the particular waste type exported to Mexico. Furthermore, this study includes a comparative analysis of Mexican and U.S. regulations. This comparison will be attained by examining the hazardous waste handling, treatment, and storage requirements. Further analysis will include an examination of the U.S. legislation guiding the waste across the border.

Past studies of the transboundary movement of hazardous waste and the emerging environmental justice movement have demonstrated that strict regulations have encouraged dirty industries to relocate (Cusack 1990; Hilz and Ehrenfeld 1991; Kiss 1991; Mumme 1985; Rose 1989; Rublack 1989; Shearer 1993). But, none of the studies have identified the actual path taken by U.S. industries. This study will illustrate how governments facilitate the practice of re-locating dirty industries from the United States into Mexico.

More specifically, by collecting data through the Freedom of Information Act and Public Records Act, this study illustrates how U.S. wastes are exported to Mexico under the guise of recycling.

Literature Review and the Conceptual Framework

This thesis analyzes the causes and consequences of the transboundary movement of hazardous waste from the United States to Mexico. It is based on the following assumptions made in previous studies:

- An increase in the generation of hazardous waste, tightened domestic laws, citizen opposition, limited disposal capacity, and increased disposal costs within the United States are motivating dirty industries to export hazardous waste to Mexico.
- Though prohibited by international and domestic laws, hazardous waste exporting is increasing to Mexico due to the low cost of labor and transportation, and its proximity to the United States.
- Banned from exporting for disposal, hazardous waste is increasingly exported from industrialized to developing countries as a "recyclable material."
- In recognition of the fact that the health of a society and the health of the environment are intricately linked, international laws guarantee the right of all individuals to a healthy environment and the right to information.

The following literature review defines these assumptions and elucidates the rationale in which the study is conceptually framed.

Transboundary Movement of Hazardous Waste

The transboundary movement of hazardous waste has been extensively studied by researchers who have documented the general distribution of hazardous wastes globally and the policies governing the practice of exporting hazardous waste (Cusack 1990; Hilz and Ehrenfeld 1991; Kiss 1991; Mumme 1985; Rose 1989; Rublack 1989; Shearer 1993). In an attempt to document and explain the increase in the transboundary

movement of hazardous waste, researchers have identified the following factors as the primary attributes:

1) *The generation of hazardous waste has increased within the industrialized countries.* The increase in the amount of hazardous waste generated within the industrialized countries has led to increased exports as hazardous waste generators seek new places to deposit their waste (Asante-Duah et al. 1992; Cusack 1990; Porterfeld and Weir 1987).

The United States is the largest manufacturer and exporter of hazardous wastes (Hilz and Ehrenfeld 1991, 39; Kiss 1991, 522). Currently, the U.S. hazardous waste industry has increased the amount of generated waste (Figure 1) from nine million tons in 1970 (Hilz and Ehrenfeld 1991, 28-29; Porterfeld and Weir 1987, 341) to 500 million tons in 1989 (Asante-Duah et al. 1992). Coupled with this increase, industry documents (Notice of Intent to Export documents) filed with the EPA indicate that the number of shipments of hazardous waste from the United States to developing countries has increased (Figure 2) from 12 in 1980 to 580 in 1988 (Asante-Duah et al. 1992, 1687; Hilz and Ehrenfeld 1991, 29).

Figure 1. Amount of hazardous waste generated in the U.S.
Source: Compiled by author.

Figure 2. Shipments of hazardous waste exported from the U.S.
Source: Compiled by author.

Although these studies provide an overview of the production and the export of all kinds of hazardous waste from the United States, they fail to show how waste is actually exported from the United States. To understand how hazardous waste is exported, it is important to discover first what kind of waste is actually exported and in what quantity. While existing studies have documented the number of shipments exported, they do not indicate the where the waste was shipped.

2) *Local opposition to hazardous waste development sites within the industrialized countries has increased in the past decade.* Responding to disasters such as Love Canal, grassroots activists in many communities have made it difficult for businesses to site facilities in the United States and in

other industrialized countries (Anyinam 1991, 770-771; Asante-Duah et al. 1992, 1689).

Increased government regulations have also made it difficult for industry to locate areas in which to place hazardous waste facilities. Environmental justice studies have illustrated the selective domestic targeting of polluting industries and unjust legislation that causes politically and economically powerless communities to bear the cost of the industrialized society (Bryant and Mohai 1992; Bullard 1990; Bullard 1993; Chavis 1993; Commission of Racial Justice 1987; LaVelle 1992). The authors of these studies attribute the disproportionate siting of hazardous waste facilities exposing selected communities to greater environmental and health risk burdens to several factors that each of these victimized communities share, such as: 1) the availability of inexpensive land and resources; 2) lack of local opposition to environmentally destructive development sites; 3) ineffective labor and environmental enforcement; and 4) poverty. It is important to note that each of the factors contributing to what is considered environmental injustice is present in greater extremes in developing countries.

Grassroots actions groups in some of these communities and studies by environmental groups have influenced Congressional legislation in correcting this injustice in the United States. But, while the "Environmental Justice" movement has forced industry and government to clean-up hazardous substances in some U.S. communities, industry has turned to developing countries as an alternative place to deposit waste (Asante-Duah et al. 1992, 1687). The result is that hazardous waste is moved across borders rather than mitigated, reduced, eliminated, or disposed of in its country of

origin. In this context, it is important to study the transboundary movement of waste.

By analyzing how U.S. waste is moved across borders, this study can be used by people trying to contain and curtail hazardous wastes export and import in different countries.

3) *Exporting waste to developing nations has increased due to tighter environmental regulations in the United States.* In effect, these regulations have increased the cost and liability of disposing of hazardous wastes within the United States

To address the growing problem of toxics in the environment, Congress adopted two measures. In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA), with subsequent amendments in 1984 and 1986. In 1980, Congress adopted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the subsequent amendment, the Superfund Amendments and Re-authorization Act (SARA), commonly referred to as "Superfund," which was passed in 1986. These environmental regulations (42 USC §§6901-6992k),

- prohibited the disposal of untreated hazardous waste;
- regulated the treatment, storage, and disposal of hazardous waste from "cradle-to-grave";
- compensated citizens for damages from either the generating/polluting company or the EPA for violations of the legislation.

According to the EPA "this change [in legislation] has led to an increase in exports" (Hilz and Ehrenfeld 1991, 32).

In direct correlation, these policies also led to an increase in handling costs, a decrease in the U.S. capacity to dispose of these wastes, and to increased insurance costs and liability (Anyinam 1991, 771-772; Asante-Duah et al. 1992; Cusack 1990; Hilz and Ehrenfeld 1991; Kiss 1991, 529; Perry et al. 1990; Rose 1989). As a result, the waste industries have turned to countries with less stringent environmental regulations.

Each of the above mentioned studies addresses the policy and export of hazardous waste from a global perspective. This thesis, by contrast, will analyze U.S. environmental regulations and show how they facilitate the hazardous waste exports to Mexico.

4) *Disposal sites within the industrialized nations are becoming scarce, further adding to the cost of transportation and disposal* (Anyinam 1991, 768-770; Asante-Duah et al. 1991; Cusack 1990; Hilz and Ehrenfeld 1991, 29-31; Perry et al. 1990; Porterfeld and Weir 1987, 341). Throughout the United States the high and increasingly adverse effects of hazardous waste disposal facilities on the environment and human health have become apparent. This awareness has forced disposal sites across the nation to close. According to the EPA, between 1987 and 1997 "more than half the states will have completely exhausted their landfill capacity and will be unable to accept hazardous waste" (Porterfeld and Weir 1987, 341).

This increase in disposal costs is forcing industry to find new and less-expensive areas where they can dispose of hazardous waste outside of the United States (Kiss 1991, 529). Studies repeatedly illustrate the motivating incentive to export hazardous waste due to the difference in land disposal costs between industrialized as compared to developing nations. In the

United States, the cost to dispose of hazardous wastes increased (Figure 3) from less than \$10 a ton in 1976 (Porterfeld and Weir 1987, 341), to more than \$350 a ton in 1990 (Asante-Duah et al. 1992, 1685; Hilz and Ehrenfeld 1991, 32-33) as compared with the average costs in the developing countries of \$40 a ton (Chepesiuk 1991, 35; Anyinam, 1991, 762-771).

Figure 3. Cost to dispose of hazardous waste within the United States from 1976 to 1991 (in \$U.S. per ton). Source: Compiled by author.

These four factors attributing to the exportation of hazardous waste have primarily been discovered through studies of the transboundary movement of hazardous waste. These studies document the exported waste primarily from industrialized countries, specifically the European Economic Community, to the Third World, mainly Africa (Anyinam 1991; Chepesiuk 1991; Hilz and Ehrenfeld 1991; Kiss 1991; Rublack 1989; Shearer, 1993; Wynne

1989) or from the United States to the Third World in general (Asante-Duah et al. 1992; Porterfeld and Weir 1987; Greenpeace 1990). Yet few studies have specifically documented the transboundary movement of hazardous waste from the United States to Mexico.

Furthermore, while these studies provide general, background information on the transboundary movement of hazardous waste, none of them provides an actual case study of the waste from the point of origin to its final destination. Thus, by documenting the flow of hazardous waste from "cradle-to-grave," this study will test the findings of the existing literature and enrich them with an analysis of a less-studied region, Mexico. The following section discusses the current studies tracking the transboundary movement of hazardous waste from the United States to Mexico.

Maquiladora Zone

When the issue of the transboundary movement of hazardous waste from the United States to Mexico is discussed in existing literature, the focus is on waste shipped to the Maquiladoras.¹ These studies primarily concentrate on the export, or relocation, of the waste generating industries to Mexico (Chepesiuk 1991; Henry 1990; Mumme 1985; Perry et al. 1990; Perry and Klooster 1992; Rose 1989; Stempler 1991).

From its inception to 1990 the number of factories in the Maquiladora zone increased more than 16,500 percent (Figure 4). In 1965, the Maquiladoras zone, starting with 12 foreign-owned, primarily textile industries, was

¹ "Maquila" referred to the toll of grain or flour paid to the miller or lord of a manor for the grain. Its more current usage refers to the labor and services provided and the term "maquiladora" refers to the actual production plant (Rose 1989, 223).

established (Figure 4). The industrial zone's growth expanded to 500 plants by 1974, and slowly increased to 585 by 1982. Within six years the industries had tripled in numbers, reaching 1,490 in 1988 (Perry et al. 1990). By 1990, the number of industries reached approximately 2,000 (U.S. GAO 1991, 3). This growth was mainly the result of chemical companies relocating from the United States to Mexico (Perry et al. 1990).

Figure 4. Number of industrial plants in the Maquiladora zone from 1965 to 1990. Source: Compiled by author.

Low labor and operation costs, Mexico's close proximity to the U.S. market, and low transportation and communication costs all contributed to economic growth in the maquiladora zone (Perry et al. 1990). In effect, multinational companies relocated the "dirtier" portions of their operations

to the newly created Maquiladora zone to avoid the stringent environmental regulations and labor laws enforced in the United States (Castelman 1978).

As of 1988, guided by *Ley General del Equilibrio Ecologico y la Proteccion al Ambiente* (Mexican General Law of Ecological Equilibrium and Environmental Protection), hazardous waste imported into Mexico for the Maquiladora industries and the hazardous waste generated by these industries must be returned to the country of origin (Diario Oficial de la Federacion, Article 55). According to government officials in Mexico, the export requirement is essential because Mexico's capacity for the treatment and disposal of hazardous waste "is insufficient to serve (its) own domestic needs" (U.S. GAO 1991, 8). But, according to EPA documents only 1 percent of the facilities operating in the Maquiladoras requested shipment of waste back to the United States (Perry et al. 1990, 447).

Further studies have documented the indiscriminate dumping of the hazardous waste from the Maquiladora industries into Mexico (Rose 1989; Henry 1990), and the threat hazardous industries pose to the environmental and human health of the impacted communities (Althaus 1988; Chepesiuk 1991; Johnston and Button 1992; U.S. GAO 1991). The industries have used legislative loopholes to dispose of their wastes legally, by either selling them as "recyclable" or claiming the waste was lost in the process (Rose 1989, 230; U.S. GAO 1991, 10-11).

Mexico's law states that while no waste is to be imported for disposal, it can be imported if it will be recycled or reused in Mexico (Article 153). The transboundary movement of hazardous waste "recyclable material" has not been adequately documented or analyzed. Further, the expected increase of

waste legally imported into Mexico for recycling has not been scrutinized in prior research which apparently operated under the belief that these wastes are for a legitimate purpose. It is important to do this because the cross-border transfer of this kind of waste is likely to continue.

This thesis will assess whether these hazardous wastes will follow the same process as Maquiladora waste, by which powerless communities are victimized. These questions are addressed in the following literature.

Recycling

In 1990, Greenpeace released a report that documents the waste trade operations and related transboundary policies, asking whether chemical industrial progress is worth the grave environmental and human health consequences (Greenpeace 1990). Greenpeace has conducted the most comprehensive inventory of the international trade and disposal of hazardous waste in developing countries caused by increasing disposal costs in industrialized countries. Greenpeace found that nearly 90 percent of all exports of hazardous waste, primarily includes scrap metal and plastic, were described by waste traders and governments as a kind of "recycling" (Greenpeace 1990).

The Greenpeace report summarized the main elements of waste trade laws and listed corresponding waste trade operations that have taken place throughout the world. The report argued that economically and politically powerless people around the world have been poisoned by industrialized nations' wastes.

In recent years the trade of toxic waste has been presented and sold to developing countries as a way to recycling or reuse valuable material. The hazardous waste trade is possible because loopholes in current law allow businesses to export toxics across borders in the name of "recycling." As governed by the Basel Convention, toxics can be presented as "secondary raw material" to be recycled or reclaimed for use as fertilizers, roads, and building materials (Greenpeace 1990). This act absolves the hazardous waste generator of any responsibility in the host country for the environmental and health consequences otherwise required in the United States under the Resource Conservation and Recovery Act.

It is important to document how waste is exported from the United States as a recyclable material. Although the Greenpeace Inventory lists each of the facilities around the world that accept hazardous waste material from the industrialized nations, none of the facilities are examined in great detail.² This study will examine the export of "recyclable" material to the Zinc Nacional facility in Mexico.

Human Rights and Development

As the development of hazardous waste-generating industries expands, it is important to analyze the ability of people to participate in the governmental decisions that affect them. In 1992, the Sierra Club Legal Defense Fund investigated the legal bases for the protection of the environment as a human right, and reviewed procedural mechanisms

² Though the Greenpeace Inventory does not list facilities in detail, a subsequent Greenpeace report discusses the recycling of imported hazardous waste at a particular facility in Spain (Greenpeace 1991).

currently in place that allow for "environmental due process" (Sierra Club Legal Defense Fund 1992). It found that individual's right to environmental protection is guaranteed by numerous international conventions and treaties, resolutions of the United Nations General Assembly, universal declarations, and national constitutions. After assessing these rights in a report to the United Nations, the Sierra Club Legal Defense Fund concluded, "[c]learly, it is already becoming part of the social contract between states and their citizens and also among states in the international community" (1992, 42). But it is noted that the "rights" have yet to be enforced or properly implemented.

The right to information, to public participation, to appeal before competent agencies, and to compensation when the environment has suffered significant damages, has been established over the past several decades by national and international law. Based on its review of these documents, the report concluded that while

(t)hese environmental due process rights guarantee the public neither an 'ideal' environment nor even an environment of certain minimum quality, they do provide significant legal protection for individuals particularly for traditionally disadvantaged sectors of society such as minorities and the poor who have suffered the brunt of environmental degradation (1992, 79).

These rights are designed to provide a check against environmentally destructive activities that may endanger the citizens who depend on the environment for a healthy life. The comprehensive report, concluded that citizens around the world may have a legal right to question the decision-making process.

This thesis, through its method of data collection and analysis of the procedural process by which distribution of hazardous waste is exported, will

examine whether the rights described by the Sierra Club report are being deliberately violated by industry with the consent of the United States and Mexican governments.

Chapter Summary

This literature review illustrates the assumptions made about the transboundary movement of hazardous waste from the United States to Mexico. By describing the trend of hazardous waste exports from industrialized nations and the consequences this has on developing countries, this review establishes the conceptual background that provides a framework for this study in documenting the export trends.

Past studies have provided a strong background in demonstrating the overall generation of hazardous waste and the effects these hazardous substances have on industrialized and developing countries. While concentrating primarily on the wastes exported to Africa, researchers have failed to address the actual flow of hazardous waste from the United States.

The first assumption illustrates the relationship between the rate of waste export to the developing countries and the generation of hazardous waste, tightening domestic laws, citizen opposition, and increased cost of disposal within industrialized countries. Although the current literature, while provides an understanding of the transboundary movement of the hazardous waste issue in general, it does not show how or where hazardous waste flows. Rather, the studies document where waste is generated, the policies governing its export, and the final consequences of its disposal. The studies discuss, generally, increased generation of hazardous waste, disposal

costs, environmental regulations, and local opposition, thus providing a foundation for further studies to specifically examine and track hazardous waste from cradle-to-grave.

The second and third assumptions, elucidating the increased exportation of hazardous waste to developing countries with lax environmental and labor enforcement standards, depict the need for further research and documentation of the waste exported to Mexico. Although the export of hazardous waste for final disposal to Mexico is prohibited, studies have indicated that there are alternative ways to export and dispose of waste. The existing literature primarily concentrates on the disappearance and illegal export of wastes to Mexico. However, it fails to differentiate between the waste generated within the Maquiladora zone and the waste that is imported directly from the United States under the guise of "recycling."

Furthermore, as depicted in the Maquiladora zone, hazardous waste-generating industries will seek regions in close geographical proximity to the free market industrialized nations to set up manufacturing centers (Perry et al. 1990). Coupled with the incentive to export waste directly to developing nations, it is assumed that hazardous waste-generating industries within the United States will seek out Mexico as a disposal ground, due to many of the same incentives.

In summary, this thesis examines the export of waste from the United States to Mexico. While there are extensive studies concerning the consequences of the transboundary movement of hazardous waste, none describe the actual "cradle-to-grave" flow of hazardous waste from its "cradle" in the United States to its "grave" in Mexico. This thesis will fill that void.

CHAPTER 2

THE RESEARCH DESIGN AND THE FREEDOM OF INFORMATION ACT

Have environmental laws regulating hazardous waste in the United States minimized the toxic threat to humans and the environment as they were intended to do, or has industry used faulty legislation to find new means to redistribute the toxic wastes? To answer the question, this study examines how hazardous waste are exported and what the consequences are from this exported waste.

To describe the process and analyze the impact of the transboundary movement of hazardous waste, this study is based on data provided by:

- 1) Government documents, which include annual and biennial reports filed by industry and compiled by environmental regulating administrators, notices of intent to export from industry, acknowledgment of consent from the United States Environmental Protection Agency (hereafter referred to as the EPA), notifier and handler computer database lists from the EPA, and EPA manifests that document the transboundary movement of hazardous waste;
- 2) Studies and records from the EPA, non-profit environmental organizations, and grassroots activists who monitor hazardous waste industries and the EPA's handling of hazardous waste sites;
- 3) Existing and proposed legislation pertaining to the transboundary movement of related hazardous waste and environmental justice issues. The

use of these techniques facilitated the documentation and analysis of export trends of hazardous waste.

The author postulated that the exports from the United States were increasing. Through the Freedom of Information Act, a list of U.S. hazardous waste exports showed that Mexico was receiving an increasing amount of hazardous waste. Further examination revealed that Mexico was actually receiving one waste type which was going to a specific site, Zinc Nacional, in the Northern state of Nuevo Leon. This waste type was found to be produced by the U.S. steel industry and exported to Mexico under the guise of "recycling," according to U.S. and Mexican law.

The year 1987 was chosen as the starting date for this research because this was the first complete year after the 1986 amendment to the Resource Conservation and Recovery Act (RCRA), which governs the handling, transportation, treatment, storage, and disposal of hazardous wastes. Thus, 1987 was the first year that the EPA compiled regulatory information needed for this study.

The study covers export from January 1, 1987 to December 31, 1993. As dictated by RCRA, regulating documents of the previous year's hazardous waste activities by individual facilities must be submitted by March of each year. To allow federal agencies to collect these documents through the Freedom of Information Act, it took between April 22, 1993 and April 29, 1994 to collect sufficient data to complete this study.

Method of Data Collection

To determine the trends in the exportation of hazardous waste from the United States, government documents were collected through the use of the Freedom of Information Act (FOIA) pursuant to 5 United States Code Service § 552 et seq. (Appendix A). This act established a right for the general public (this includes U.S. citizens, resident aliens, foreign nationals, corporations, associations, and universities) to request and obtain access to all federal "agency records." Though the federal agency is to provide the requested records regardless of the identity of the requester or the requester's purpose for seeking the information, the agency can refuse to disclose specific documents if they fall within one of the nine specific statutory exemptions listed under 5 U.S. C. § 552 (b).

The EPA defines an "agency record" as any printed documents or other information-bearing materials (writing, photograph, maps, computer tape and printouts, magnetic and sound recordings, drawings, technical reports or other similar things) upon which information has been preserved, from which the information can be retrieved and copied, and over which the agency has possession or control (40 CFR §2.100 (b)). These documents could have been created or acquired by the agency, its predecessors, its officers, and its employees using of government funds.

The author filed Freedom of Information requests with, and obtained data from, 21 federal and state environmental agencies and 14 federal and state occupation safety and health administrations (Appendix B). These agencies included each of the ten EPA regions throughout the United States, EPA headquarters in Washington D.C., EPA's National Enforcement

Investigation Center (NEIC) located in Denver, Colorado, EPA offices in individual states, and local environmental regulatory administrations throughout the United States.

Data from the EPA were collected to determine : 1) the extent of the hazardous waste trade export activity from the United States since 1987; 2) the purpose of the export and the technology employed; and 3) the consequences of this waste on a U.S. facility and on the Mexican facility to which the waste is exported.

The documents in Appendix A represent the process in which data were obtained. Though the sample letter for each type of request only addresses one agency, each of these letters was sent to a multitude of agencies, listed in Appendix B. The following section defines the documents requested and the agencies to which each letter was sent.

Data Sources

Pursuant to the Resource Conservation and Recovery Act (§6938 RCRA §3017), all facilities that generate, transport, dispose, store, or treat hazardous waste must notify the EPA of their activity. Each activity requires a different set of administrative requirements. The activities researched in this study included: 1) the exportation of hazardous waste; 2) the purpose of exporting hazardous waste as demonstrated by the exporting and treatment facilities to which the waste is exported as compared with similar facilities in the United States; and 3) the reports and studies of the environmental and human health consequences of the waste.

These activities were primarily documented by the hazardous waste industry and obtained in regulatory reports filed with the EPA. These documents are found within the following administrative reports: 1) Notification of Intent to Export; 2) Notifiers List; 3) Handlers List; 4) Annual Hazardous Waste reports (Form 8700-13A); 5) Biennial Hazardous Waste reports; 6) computer print-outs of legal and illegal emissions of toxics into the environment; and 7) technical reports of given waste and treatment sites (Appendix C).

Further documentation was provided by the American Iron and Steel Institute (AISI), the Steel Manufacturers Association (SMA), Greenpeace, and citizen activists in Monterrey, Mexico. During each stage of the study, the author conducted phone interviews with EPA officials and representatives of AISI, SMA, and Greenpeace.

Data on the Exportation of Hazardous Waste

To determine the extent to which hazardous waste has been exported from the United States and the regions to which the hazardous waste was exported, export documents filed by industry under RCRA, were collected. These documents included: 1) the Annual Notifiers List of exported amounts and facilities exporting waste as compiled by the EPA; 2) the Notification of the Intent to Export (NOI) from the exporting facilities; and 3) the Annual Hazardous Waste reports submitted to the EPA from the exporting facilities. These data were collected from each of the ten EPA regions, the EPA headquarters, and the NEIC.

Notifiers List

The Notifiers List is a computer print-out of data collected from the EPA's export database and biennial report summaries of the wastes exported from the United States, indicating the destinations of waste exports, amount of waste exported, and the types of wastes exported to each destination from 1987 to 1992. The data also identifies the generators, transporters, and storage facilities of hazardous waste exports, the amount and type of waste, and the waste export destination.

Once this export material was analyzed, further inquiries into the particular exportation of hazardous waste exported to Mexico, amounts, and frequency of shipments were sent to the EPA's headquarters in Washington, D.C, the ten EPA regional offices throughout the United States and the EPA's NEIC division. The data requested included: 1) reports filed with the EPA from the exporting facilities, including annual reports, letters of intent to export, interoffice memoranda, letters of correspondence between the EPA and the exporting facilities, and acknowledgment of consent notices from the EPA; 2) computer database printouts from the EPA's compilation of the hazardous waste generation and exportation data; and 3) published reports such as the National Biennial RCRA Hazardous Waste Report, generated by the EPA from required generator documents.

Notification of Intent to Export

As of 1984, a facility that wants to export hazardous waste must notify the receiving country of the export (40 CFR §262.53 (a)(1)(A)), must receive a written consent from the receiving country (40 CFR §262.53 (a)(1)(B)), and the

consent must be attached to each shipment that is exported (40 CFR §262.53 (a)(1)(C)). Pursuant to the intent to export regulations (40 CFR §262.53 (a)) the notification must include:

- 1) The name, address, phone number, and EPA identification number of the exporter;
- 2) The name, address, phone number and EPA identification number of the receiving facility;
 - i) A description of the waste, including the hazard class and identification number;
 - ii) The frequency/rate of export for the time period in which waste is to be exported;
 - iii) The quantity of waste exported;
 - iv) The point of entry;
 - v) The means of shipment;
 - vi) A description of the manner in which waste is to be treated, disposed, and/or stored;
 - vii) The name and address of the receiving facility;
 - viii) The name of transit countries through which the waste is sent;

Furthermore, hazardous waste generators are required to notify the EPA of an intent to export 60 days prior to the date on which the hazardous waste is scheduled to leave the United States (§262.53 (b)). The notification may extend over a 12 month or shorter period. The notification must be sent from the generator to the RCRA Enforcement Division of the EPA in Washington, D.C. Therefore, the request for copies of the actual notifications was only submitted to the EPA headquarters pursuant to the FOIA.

Annual Report

Pursuant to RCRA §2006, exporters of hazardous waste are also required to file a report annually with the EPA that summarizes the type(s), quantity(s), frequency(s), and destination of exported hazardous waste. This annual report includes: 1) the EPA identification number, name, and mailing and site address of the exporting facility; 2) the calendar year covered by the report; 3) the EPA identification number; 4) name and mailing and site address of the receiving facility; 5) a description of the waste, the amounts and frequency of exports; 6) a description of the effort undertaken by the generating facility to reduce waste volume and toxicity; and 7) a description in the change of volume and toxicity of the exported waste (40 CFR §262.56).

Although a FOIA request to obtain the Annual Reports should have been fulfilled by submitting a request only to the ten EPA regions, I also sent requests to the EPA headquarters and the NEIC to ensure a thorough collection of Annual Reports by the companies exporting hazardous waste.

Data on the Treatment and Exporting Facilities

To profile each of the exporting and treatment facilities' environmental record, the following data were collected from the EPA headquarters, and from each of the ten EPA regional offices: 1) Notifiers List; 2) Handlers List; 3) Annual Hazardous Waste Report; and 4) Biennial Hazardous Waste Report. Further information was obtained from the Resource Conservation and Recovery Information System (RCRIS) and the Toxic Chemical Release Inventory System (TRIS) on the LEXIS/NEXIS on-line computer database. These two systems list the legal amount of toxics

emitted into the environment from each hazardous waste facility. Lastly, information was obtained from the Occupational Safety and Health Administration and from the control-site, treatment facility within the United States.

These data allowed an accurate understanding of the amounts of hazardous waste generated by each of the facilities, the management of the hazardous waste material, the trends of disposal, reclamation, and exportation of each of the profiled facilities, the purpose of the exportation, and a comparison of the technology employed by treatment facilities within the United States and in Mexico.

Notifiers/Handlers List

The reports obtained from the EPA varied depending on the computer database of each region. One of two documents, either the RCRA notifier's list or the RCRA handler's list, was collected from each of the ten EPA regions. Information reported on these lists includes: 1) the name, mailing and site address, phone number, and contact person for each hazardous waste generating facility of each waste type identified; 2) the amount of waste generated and exported; and 3) the type of facility.

Annual Report

Data were requested and collected on each of the exporting facility's notification of regulated waste activity. These documents included Annual Reports filed by the individual facilities describing their hazardous waste export activity and permits obtained from the EPA establishing

environmental emissions standards for each facility. This required information, which is contained in the Annual Reports, is summarized in the previous section. Further data included the National Biennial RCRA Hazardous Waste Reports published by the EPA based on data from 1987, 1989, and 1991. This report was gathered from each of the ten EPA regions and the EPA's headquarters office in Washington, D.C.

Biennial Report

The Biennial Reports are filed with the EPA by the generators and handlers of wastes shipping wastes off-site that are designated as hazardous under RCRA. The reports describe the types and quantities of RCRA hazardous waste generated and handled by the waste generator. The reports are required to be submitted every even-numbered year, covering the activities of the previous year, and filed with the regional administrator pursuant to the Code of Federal Regulations (CFR § 262.41). The generating facility, as legislated by RCRA § 3002 and § 3004, is required to include:

- 1) The name and address of the generator;
 - 2) The calendar year covered by the report;
 - 3) The name, EPA identification number and the address of the off-site treatment, storage, and/or storage facility;
 - 4) The name, EPA identification number and the address of the off-site treatment, storage, and/or storage of each transporter;
 - 5) Accurate identification of the quantities, the constituents, and the EPA identification number of the generated hazardous waste;
-

- 6) Description of the efforts undertaken to reduce the waste volume and toxicity;
- 7) Description of the changes in volume and toxicity.

The EPA's Biennial Report, obtained and used for this study, is developed from the biennial reports submitted by the generators and handlers of hazardous waste. In particular the reports for the years of 1985, 1987, 1989, and 1991 provided essential information on hazardous waste generating facilities.

Control Site

Each of the above mentioned reports was coupled with technical and environmental reports of Horsehead Resource Development, a treatment facility within the United States. By studying the U.S. facility as a control site, the researcher was able to analyze and compare the technology employed and the effect of the facility on the local community. The documents on the control facility were obtained from the EPA, OSHA, and the Horsehead Resource Development facility.

Data on the Consequences to Environmental and Human Health

To determine the consequences of U.S. hazardous waste exports to Mexico, data were collected from the EPA headquarters, each of the ten EPA regional offices, state and local EPA, and nine state environmental regulating administrations such as the Environmental Quality Departments and Natural Resource Conservation Commission within individual states. Further information was collected from 15 Occupational Safety and Health

administrations, a non-profit environmental organization--Greenpeace International's Toxic Trade Campaign, and individual activists in Mexico.

Environmental Regulating Agencies

Documents requested and obtained from the EPA and the state environmental regulatory departments included: 1) technical reports, including inspection reports and test results, as well as the notifications of toxics emitted into the environment from the exporting hazardous waste facilities and treatment facilities; and 2) enforcement files that included violations of environmental and occupational safety and health regulations, legal proceedings, and penalties imposed, as well as letters and memoranda regarding relevant legal issues involved.

Documentation of the health effects of the hazardous waste material was gathered from information provided in EPA technical inspection reports and test results of the facilities' environments and surrounding communities. Further documentation was gathered from reports written by the EPA concerning the human health effects of hazardous waste constituents in the environment.

Furthermore, EPA personnel from Region VI went to Monterrey, Mexico and performed environmental tests and samplings at the treatment facility in collaboration with the Mexican environmental agency (SEDESOL). The two technical reports generated from this sampling include: 1) the Preliminary Site Assessment Report and 2) Sampling results. These reports were requested from EPA's region VI office and eventually the EPA's headquarters as an appeal to an initial denial from region VI.

Occupational Safety and Health

The information obtained from the Occupational Safety and Health Administration from the 15 states within the United States in which the hazardous waste exporters are located further demonstrated the effects of the waste type on workers. The documents requested include those pertaining to: 1) accidents, injuries, illnesses, and deaths; 2) citations; 3) complaints; 4) health and safety violations; 5) inspection reports; 6) penalties suggested; 7) penalties actually enforced; 8) videos of the site; and 9) documents regarding toxic exposure.

Environmental Organizations

Additional environmental samplings, laboratory reports, documents and videos pertaining to the recycling facility and community into which the hazardous waste is exported were obtained from an international environmental organization, Greenpeace.

To document the environmental effects and citizen opposition in the affected area, local researchers and citizen activists were identified. Though the author of the study contacted several academics and environmental organizations to assist in locating local activists (Bravo 1993; Perry 1993), only Greenpeace was able to assist. Citizens active in opposing the recycling facility in Monterrey, Mexico were identified by the Greenpeace International's toxic trade campaigners. These citizens, professors at the University of Monterrey, Mexico, have recently conducted human health studies in that region. Their report, though unpublished within Mexico, is assessed in this study.

Validity and Reliability of Secondary Data

A large source of data neglected by many researchers is that of secondary sources. Social science often employs methods of collecting and analyzing primary data. Primary data are information collected through research for a particular purpose, often through means of questionnaires, observations, or interviews.

But other methods of research exist through the utilization of secondary data. Secondary data refer to the compilation of documents or information that was originally gathered by others for a purpose other than that at hand (Bailey 1987; Stewart 1984).

Due to the information explosion of the past several decades, there is a plethora of secondary data to be analyzed for new research purposes. Secondary data in this study came in many forms ranging from unpublished studies and industrial observations to published or on-line computer regulatory data, government documents as compiled by law, and government reports. By utilizing the abundant secondary sources, the researcher was able to establish an export trend by analyzing existing data for a different purpose than that of the primary data collector. There were several advantages in using secondary data for this research. The primary advantages were:

(1) *Inaccessible Subjects*: The use of secondary data, in the form of government documents, was necessary because it allowed for the research of a particular subject for which there was no other method to physically access the material. While the government requires that industry to submit documents outlining the generations and handling practices of hazardous material, these industries do not have to generate and produce reports

requested by the general public. Therefore, the subject of transboundary waste movement could only be studied through the compilation of data, collected by the EPA. By comparing past recordings and data, the study will indicate the pattern and trend of U.S. hazardous waste exports.

(2) *Non-reactivity*: Because the author gathered secondary data from the EPA, the exporting facilities could not change or alter the documents in anticipation of the purpose or the outcome of this study.

(3) *Time and Cost*: Gathering information for the study from the primary data collector (the EPA) was not as time consuming or cost prohibitive as it was for the EPA to gather the same information for the first time. The primary attribute to the time and cost of the study was the dispersal the information.

(4) *Longitudinal Analysis*: The EPA data are well suited to study the trend and the process by which hazardous waste is exported over a long period of time. Due to the time and cost, as mentioned above, studies are often confined to shorter time segments. Yet, by using the EPA data, the researcher was permitted to observe patterns and understand processes over a longer period of time and was therefore able to establish trends.

(5) *Sample Size*: The EPA data allowed the researcher the ability to utilize large samples of information, thus giving more credibility to the generalizations made from the results. While studies may be limited in sample size, the EPA data allowed, the research to study a larger population of data.

(6) *High Quality*: The above mentioned advantages could allow for a higher quality of research, based on EPA data, that does not have the time, cost, and sampling constraints of primary research.

Data Limitations

There were five primary limitations of data collected for this study: 1) the lack of availability; 2) selective survival of documents; 3) the lack of a standard format among regulating agencies; 4) data adjustments; and 5) the time and cost to obtain documents. The following section briefly describes the disadvantages of the research encountered by the author's experience in secondary data collection:

(1) *Lack of Availability*: Because the documents were originally gathered for a purpose other than that of this research, information needed in the secondary study had not been recorded. The EPA relies heavily on industry for some of the information needed in this study. This information included the amount of the particular waste type generated within the United States and the cost to dispose of this material. Therefore, the researcher relies on information provided by the industries and environmental organizations for this data.

Furthermore, some information on the exporting industries was withheld by the administering official/agency. Particular records from both the EPA and Occupational Safety and Health Administration were withheld under exemptions stated in the Freedom of Information Act. Specifically, the exemptions stated in the withholding of documents for this study include: if the requested file contains information relating to "foreign policy" ((5 U.S.C.

552(b)(1)), internal personnel rules and practices of an agency ((5 U.S.C. 552(b)(2)), trade secrets and commercial and financial information obtained from a person that are privileged or confidential ((5 U.S.C. 552(b)(4)), information intended to protect the full and frank exchange in writing of ideas, views, and opinions necessary for the effective functioning of the Government and the making of decisions by its officers ((5 U.S.C. 552(b)(5)), personnel and medical files and similar files, the disclosure of which would constitute an unwarranted invasion of personal privacy, trade secrets or financial information, and/or threatened foreign policy ((5 U.S.C. 552(b)(1)), (6)), and documents pertaining to existing legal enforcement actions ((5 U.S.C. 552(b)(7)).

Documents that were withheld fell under a broad interpretation of the legal exemption may have been obtainable through an appeal. But the time required to retrieve these documents through legal action has been and will be time consuming. Therefore, many of the withheld documents were not obtained in time for the completion of this study.

Lastly, there is an unintentional administrative withholding of information, resulting from the distribution process to individual departments within an agency. The FOIA request, originally sent to the centralized FOIA office for each EPA region, was distributed to each of the four primary divisions of the EPA:

- The Water division;
 - The Air division;
 - The Land/Field division;
 - The Solid and Hazardous Waste division.
-

However, when a response was sent from one of the divisions back to the centralized office, the FOIA office would then forward this information to the requester and close the file, without inquiring any further as to whether other divisions had sent a response to the requested material.

To reopen the file, it was asked that the requester resubmit the request under the FOIA. Due to the delay involved in re-submission and processing by the appropriate EPA office, some material could not be used for the purpose of this study.

(2) *Selective Survival*: Some documents may not have been in the immediate interest of the primary researcher and were therefore placed in storage, making them practically inaccessible. The majority of federal OSHA offices make it a practice to send all existing information, such as that requested on the facilities in this study, to a Federal Records Center for storage. Due to the delay in retrieving the requested information from the storage facility, the material could not be used for the purpose of this study.

(3) *Lack of Standard Format*: The method of data collection varied from agency to agency. Although information can be requested and obtained pursuant to the Freedom of Information Act from federal agencies such as the Environmental Protection Agency, state and regional environmental agencies, such as state Departments of Environmental Quality or Regional Air and Water Boards, are governed by a different set of disclosure regulations. Furthermore, federal OSHA does not play an active regulatory role in the states of California, Utah, Virginia, and Washington. The state and regional agencies that often oversee the individual companies within the

local community make information available to the public through the individual state's Public Records Act/Open Records Act.

Under the Public Record Act/Open Records Act, the state, regional, and local agencies are not required to provide information to the requester, but are required to permit the requester to personally examine and photocopy the information during normal business hours, for a fee. Therefore, information concerning particular facilities in this study is incomplete due to the inability to compile information from each of the regulating agencies.

Furthermore, pertinent data available in a document from one agency may have either been limited or missing altogether in the documents provided by another agency. Each region and each office has a different method of compiling information. While some agencies had the documents needed for this study, other agencies never collected this information from the industries within the region.

Due to the inconsistent flow of information from individual EPA regions, the material, and in particular the data noting the amounts of K061 generated and exported, are not always consistent.

(4) *Data Adjustments:* Changes in recording of data over time are caused by external events such as legislation and economics. The development of laws regulating the collection of data from hazardous waste-exporting industries, coupled with the regulating agencies' ability to gather the data based on economic constraints, has limited the consistency of data. It was not until 1987 that the EPA began to collect comprehensive data including hazardous waste generators, waste types, and quantities (U.S. EPA 1993^e). Furthermore, the units of measurement within the recorded data differ from

the beginning years of documentation to the present. These data adjustments caused slight difficulty in establishing trends or understanding processes over a long period of time.

(5) *Time and Cost:* Though mentioned as an advantage of secondary research, these factors can also be to the secondary researcher's disadvantage. The secondary data obtained for this study was widely dispersed throughout the United States. To obtain this information first hand, the research would have had to travel extensively and spend a great amount of time gathering the original data from the individual facilities. Both tasks would have been cost and time prohibitive.

Evaluating Secondary Data

Reliability and validity are increased when the documents demonstrate the researcher's own experience (Bailey 23-33). However, since the data used for this thesis primarily consist of secondary data, it is essential to evaluate the documents' credibility. Stewart (1984) provides the following six criteria to evaluate secondary data: (1) the purpose of the original study, (2) who collected the original information, (3) what information was originally collected, (4) when the information was obtained, (5) how the information was obtained, and (6) comparison data. These questions are addressed individually.

(1) *Purpose of the original documents.* The intent of the primary data collection and the interests held by the primary collector may result in a biased outcome. Therefore, this study addresses the intent of the data collection of the federal agencies (EPA and OSHA), the Steel Industry

(American Iron and Steel Institute and the Steel Manufactures Association), non-profit environmental organization, and local citizens within Mexico.

The intent of the federal agencies in collecting the original data was to gather relevant information from hazardous waste generators in order to properly regulate as well as to provide information for an emergency plan and for concerned individuals within the community. The information gathered by the EPA is direct recordings by the generating industry required by RCRA as detailed in the above section. The data gathered by the OSHA were also for regulating purposes. This information was primarily centered around industry violations.

The information collected from the steel industry (AISI and SMA) primarily included annual reports written by the industry for stockholders. Though this information may be gathered by the industry to promote the industry, federal regulating agencies rely heavily on the industry's own data to document amounts of waste produced and treated.

The primary non-profit environmental organization from which information was gathered was the leading environmental organization that examines the toxic trade--Greenpeace. The information provided by Greenpeace was collected as part of its tracking of hazardous waste trade operations throughout Latin America. The primary Greenpeace contacts work on the Toxic Trade Campaign within Greenpeace International, one person located in Washington, D.C. and the other in the Mexico City office.

Though several federal agencies, environmental organizations, and maquiladoras academics within the United States were contacted with regard to local action groups within Mexico, Greenpeace was the only organization

that was able to identify anyone. The citizen activists identified in this study were the only local activists identified by Greenpeace Mexico. The purpose of the study by the local expert witnesses was to document and demonstrate the environmental and human health effects of the hazardous waste recycling facility within Monterrey, Mexico.

(2) *Collectors of the Information.* The credibility may rely on the technical and financial competence of, as well as the resources available to, the primary collector. Therefore, it was essential to identify and obtain documents from each of the subjects listed above. The primary collectors of primary documents that were used in this study include U.S. federal agencies (EPA and OSHA), the Steel Industry (American Iron and Steel Institute and the Steel Manufacturers Association), non-profit environmental organization (Greenpeace), and citizen activists within Monterrey, Mexico.

The majority of the documents were collected by federal agencies, as required by environmental legislation. The EPA is the largest gatherer of environmental documents and the primary administrator in charge of gathering the information needed for this study. The OSHA also provided documents used within this study. These documents included worker safety regulations and violations, of which OSHA is the primary federal regulating agency.

Greenpeace, a non-profit organization with a membership base of 5 million in 33 countries, is a leading authority on the transboundary movement of hazardous waste. The organization has several publications concerning this issue including The International Trade in Wastes (Greenpeace 1990) and a quarterly journal, Toxic Trade Update.

(3) *Information Actually Collected.* The empirical basis of the primary data is essential in evaluating the data. Thus, it is paramount to note that the factual basis and thoroughness of the collected information from hazardous waste exporting industries by federal agencies with enforcement capabilities is greater than that of an individual researcher who does not have legislatively-mandated enforcement powers to gain information. Further, while the public can access documents that the government possesses, it does not have a right to access documents from industry.

(4) *When the Information was Collected.* Technological and legal changes may alter the outcome of the data by rendering the information obsolete. Thus, data from 1987 to the present were chosen for this thesis because that information is the most current on this subject. The 1987 starting point is when U.S. environmental agencies were required to gather information about hazardous waste generating industries throughout the country.

(5) *How the Information Was Obtained.* An evaluation of the sampling procedure/methodology employed by the primary researcher was essential. The sampling size of the primary research for the federal documents included each industry generating hazardous waste, from which information was obtained, as required by law. The procedure has been outlined previously in this chapter (See Data Source).

(6) *Consistency With Other Information.* Credibility is increased by citing multiple sources. Therefore, the researcher gathered information from a multitude of organizations with an interest in the subject matter to ensure an accurate representation of the material exported to Mexico and the proper

documentation of environmental and human health-related effects. As discussed previously, these sources included federal regulating agencies and their data (EPA and OSHA), steel industry representatives (AISI and SMA), a leading environmental organization (Greenpeace) with issues pertaining to the trade of toxics, and local witnesses/professors to the destruction in Mexico. Within each segment of the three primary researched areas, material was obtained from several of these sources to ensure consistency within the gathered information.

Chapter Summary

Documents obtained through the Freedom of Information Act (FOIA) were the main source of data for this study. These included regulatory files, export documents, transportation, storage, disposal, and reclamation data, and technical reports. Additional documents were obtained through the Public Records Acts (PRA) of various states. While FOIA and the PRA were used to gain documents from the Environmental Protection Agency, Occupational Safety and Health Administration, non-profit environmental organizations and other researchers also voluntarily contributed data.

Once quantified, the agency documents revealed various trends documenting the extent of hazardous waste exports from the United States, the purpose of the export and the technology employed, and the consequences of the waste exports to the environment and human health.

Though the documents obtained through the FOIA and the PRA are secondary data, they are reliable sources of information for this study. The primary information gained through government documents was not tainted

or biased due to the reporting facilities lack of ability to predict the use of this data for the purpose of the present study. Further, the use of secondary data was essential in documenting an export trend through an extended period of time. Otherwise, information needed for this study would not have been accessible and would have been time and cost consuming

Data limitations are few, but include the lack of accessibility of stored government data, selective survival of data not necessary for the primary gather yet pertinent to the secondary research, and a lack of standard format in reporting requirements among various government agencies.

Each document was evaluated for this study by assessing the original purpose of the document, the reliability and objectivity of the primary gatherer of the data, and its consistency with other data.

CHAPTER 3

GENERATION AND MANAGEMENT OF HAZARDOUS WASTE WITHIN THE UNITED STATES

This chapter demonstrates how the industry portrayed in this study has not decreased its production of hazardous waste, despite following United States laws that promote reduction. Even though the cost of disposal and liability have increased and disposal options within the United States have decreased, the volume of the hazardous waste addressed in this study has remained the same. Because of these factors, the preferred alternative to disposal is the "recycling" of these wastes. Steel industry and EPA data shows, however, that the amount of waste being recycled in the United States has not increased, despite regulations encouraging it. Further, the data show that the industries generating this waste are generally migrating south, toward the United States/Mexico border.

The Steel Industry

The electric arc furnace (EAF) process is one of the principal methods of producing steel in the United States. This steel-producing technology has emerged as an essential segment of the steel-making industry in which scrap metal, primarily from automobiles, is melted and re-cast. From this secondary metal, steel mini-mills throughout the United States manufacture reinforcement bars, steel billets, bolts, rounds, angles, flats, and channels primarily used in reinforced concrete structures and manufacturing for

highway construction and mining industries. This process requires the high temperature to melt ferrous metals that inherently produces fumes, known as Electric Arc Furnace Dust (EAF).

By-product of the Industry

As of 1983, all steel mini-mills were required to install pollution control devices to recover the hazardous dust emitted from the electric arc furnaces (EPA 1984). The EAF dust is generated by melting scrap metal in electric arc furnaces at steel mini-mills. As the steel is melted into a homogeneous liquid, metals such as zinc, lead, cadmium, chromium, manganese, and nickel are volatilized. This heavy metal dust (Figure 5) is then captured in the scrubber or baghouse of the electric arc furnaces.

Figure 5. Electric Arc Furnace Dust from the steel manufacturing process.
Source: Greenpeace 1994.

The composition of EAF dust varies depending on the type of scrap metal fed into the furnace (Table 1). The zinc, lead, and cadmium in the EAF dust are primarily from automobiles (U.S. Department of Commerce 1982). Samples of EAF dust from U.S. steel mini-mills have also been found to contain radioactive material (Beirne 1993a).

Although the composition of the EAF dust varies widely due to fluctuations in the scrap metal feed placed into the furnace, the metals industry (Center for Metals Production 1988, 2) has found on an average, that EAF dust consists of a variety of metal:

TABLE 1
COMPOSITION OF EAF DUST

Constituent	%	mg/l
Lead	0.6-7.0%	60,000-700,000
Cadmium	0.2%	20,000
Chromium	1.0%	100,000
Zinc	5.0-50.0%	50,000-500,000

Source: Center for Metals Production, Electric Arc Furnace Dust Treatment Technology (Pennsylvania, Electric Power Research Institute, 1988): 2

Electric Arc Furnace Dust (K061) Defined

Electric Arc Furnace dust (EAF dust) is generated during the melting of scrap metal to manufacture steel. The dust is generated when particulate matter in the gases given off by electric arc furnaces during the production process is removed by air pollution control devices. Emissions from the melting are vented through a hole in the furnace roof and routed to a furnace baghouse (U.S. EPA 1992). The captured dust is light and powdery, of which 70 percent by weight is usually fewer than 5 microns in size, containing iron oxides, silica, lime, and the toxic metals lead, chromium, and cadmium (U.S. EPA 1980, 736-737).

The EPA classifies a hazardous waste as "any solid waste generated from treatment, storage, or disposal of a hazardous waste facility, including any . . . emission control dust. . ." (CFR 1992 § 261.3 (2)(i)). The EPA (1980) determined that K061 may pose a present or potential hazard to human health and the environment and thus must be managed based on the following considerations:

- (1) The emission control dusts contain significant concentrations of toxic metals chromium, lead, and cadmium;
 - (2) Lead, chromium and cadmium have been shown to leach in harmful concentrations from waste samples subjected to both a distilled water extraction procedure and the extraction procedure described in Subtitle C § 250.13 (d);
 - (3) A large quantity of these wastes is generated annually and is available for disposal. There is thus a likelihood of large scale contamination of the environment if these wastes are mismanaged;
 - (4) The wastes typically are disposed of by being dumped in the open, either on-site or off-site, thus posing a realistic possibility of migration of lead, cadmium, and chromium to underground
-

drinking water sources. These metals persist virtually indefinitely, presenting the serious threat of long-term contamination;

- (5) Off-site disposal of these wastes will increase the risk of mismanagement during transport.

EAF dust is listed by the EPA as a hazardous waste due to the presence of hexavalent chromium, lead, and cadmium. Individually, the reportable quantity is one pound for lead, 5,000 pounds for chromium, and 10 pounds for cadmium. Together the EAF control dust is reportable at one pound (CFR 1992^a § 171 and 172).

The captured baghouse dust is classified as K061 by the U.S. EPA, receiving a toxicity/persistence rating of 18 (the highest rating on a scale from 1 to 18). K061 is specifically defined as "[e]mission control dust/sludge from the primary production of steel in electric furnaces" (CFR 1992 § 261.32). K061 residue, or "slag," is generated from a thermal process in which metals have been melted to a molten mixture in a high temperature metal recovery (HTMR) process.

Amount of EAF Dust Generated Within the United States

The U.S. EPA relies heavily upon the steel industry (in particular the Steel Manufacturing Association (SMA) and the American Iron and Steel Institute (AISI) to monitor the generation of EAF dust (U.S. EPA 1980). The amount of EAF dust generated within the United States is based on data from these two organizations.

The amount of EAF dust generated depends on the type of scrap material melted. According to Bruce Steiner, Vice President of Environment

and Energy for the AISI, steel producing plants average 29.48 pounds or 1.5 percent of EAF dust per ton of raw steel (Steiner 1993). According to Steiner, this amount has remained constant since 1986 at approximately 0.5 million tons of EAF dust generated each year (Table 2).

TABLE 2
GENERATION OF EAF DUST
1986 - 1994
(Volume in Tons)

Year	Generated
1986	450,000
1987	500,000
1988	500,000
1989	500,000
1990	550,000
1991	500,000
1992	500,000
1993	550,000

Source: Compiled by author from AISI data.

The EPA has documented the amount of electric arc furnace dust generated over the years and compiled a list of generators since 1987. According to RCRA, the EPA is required to collect information on hazardous waste generation every two years (CFR 1992 § 261.40). Due to limitations in

data collection as well as confusion in the interpretation of the RCRA regulations, it was not until 1987 that the EPA collected comprehensive data including generators, waste types and quantities (U.S. EPA 1993^e).

The EPA, estimating the annual generation of EAF dust at 500,000 tons (Federal Register 1991), defers to the AISI for an accurate total of electric arc furnace dust generated annually. This is the case even though the EPA itself is the public agency that collects this data through documents required to be filed by EAF dust generators biennially (CFR 1992 §§ 261.40). The amounts of EAF dust generated are documented in individual reports filed by the generators, entered into the EPA's computer database, and eventually published by the EPA as a Biennial Hazardous Waste Report. Amounts gathered from these three sources are documented below (Table 3).

TABLE 3
TONS OF ELECTRIC ARC FURNACE DUST GENERATED BY STATE

State	1987 (%)	1989 (%)	1991 (%)
Alabama	3,889 (0.8%)	12,282 (1.9%)	3,147 (0.56)
Alaska	0 (0%)	0 (0%)	0 (0%)
Arizona	0 (0%)	0 (0%)	0 (0%)
Arkansas	6,157 (1.27%)	19,763 (3.06%)	17,595 (3.16%)
California	0 (0%)	0 (0%)	8,081 (1.45%)
Colorado	11,941 (2.46%)	13,664 (2.12%)	11,128 (2.0%)
Connecticut	580 (0.12%)	0 (0%)	0 (0%)
Delaware	0 (0%)	1,826 (0.28%)	4,051 (0.73%)
Florida	7,644 (1.57%)	11,133 (1.73%)	10,141 (1.82%)
Georgia	10,309 (2.12%)	12,378 (1.92%)	11,882 (2.13%)
Hawaii	0 (0%)	0 (0%)	127 (0.02%)
Idaho	0 (0%)	0 (0%)	233 (0.04%)
Illinois	96,403 (19.86%)	90,777 (14.08%)	94,076 (16.88%)
Indiana	17,625 (3.63%)	17,015 (2.64%)	19,377 (3.48%)
Iowa	4,240 (0.87%)	3,727 (0.58%)	435 (0.08%)
Kansas	0 (0%)	0 (0%)	0 (0%)
Kentucky	6,934 (1.43%)	7,622 (1.18%)	6,834 (1.23%)
Louisiana	18,678 (3.85%)	12,243 (1.9%)	6,908 (1.24%)
Maine	0 (0%)	0 (0%)	0 (0%)
Maryland	1,701 (0.35%)	2,590 (0.40%)	1,686 (0.30%)
Massachusetts	0 (0%)	4 (<0.01%)	2 (<0.01%)
Michigan	28,780 (5.93%)	71,790 (11.13%)	32,186 (5.77%)
Minnesota	1,952 (0.4%)	4,915 (0.76%)	6,190 (1.11%)
Mississippi	0 (0%)	2,303 (0.36%)	0 (0%)
Missouri	19,464 (4.01%)	9,960 (1.70%)	11,393 (2.04%)
Montana	0 (0%)	0 (0%)	0 (0%)
Nebraska	1,703 (0.35%)	5,353 (0.83%)	4,973 (0.89%)
Nevada	0 (0%)	0 (0%)	0 (0%)
New Hampshire	0 (0%)	0 (0%)	0 (0%)
New Jersey	2,526 (0.52%)	16,260 (2.52%)	18,634 (3.34%)
New Mexico	0 (0%)	0 (0%)	0 (0%)
New York	5,949 (1.23%)	7,034 (1.09%)	6,135 (1.1%)
North Carolina	1,919 (0.4%)	2,078 (0.32%)	2,815 (0.5%)
North Dakota	0 (0%)	0 (0%)	0 (0%)
Ohio	70,490 (14.52%)	73,995 (11.47%)	56,172 (10.08%)
Oklahoma	4,036 (0.83%)	6,467 (1.0%)	7,394 (1.33%)
Oregon	3,312 (0.68%)	8,767 (1.36%)	11,642 (2.09%)
Pennsylvania	100,827 (20.77%)	128,308 (19.9%)	97,871 (17.59%)
Rhode Island	0 (0%)	1,022 (0.16%)	1,984 (0.36%)
South Carolina	9,124 (1.88%)	7,646 (1.19%)	15,407 (2.76%)
South Dakota	0 (0%)	0 (0%)	0 (0%)
Tennessee	3,321 (0.68%)	<0 (0%)	4,706 (0.84%)
Texas	34,967 (7.2%)	65,421 (10.15%)	64,814 (11.63%)
Utah	0 (0%)	8,947 (1.39%)	10,367 (1.86%)
Vermont	0 (0%)	0 (0%)	0 (0%)

Arkansas	6,157 (1.27%)	19,763 (3.06%)	17,595 (3.16%)
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Vermont	0 (0%)	0 (0%)	0 (0%)
Virginia	5,697 (1.17%)	7,749 (1.2%)	5,925 (1.06%)
Washington	3,903 (0.8%)	9,747 (1.51%)	1,878 (0.34%)
West Virginia	1,450 (0.3%)	2,047 (0.32%)	1,285 (0.23%)
Wisconsin	0 (0%)	0 (0%)	0 (0%)
Wyoming	0 (0%)	0 (0%)	0 (0%)
Total	485,521	644,832	557,473

Source: Compiled by author from the EPA's annual reports.

In 1987, the total generation of EAF dust was approximately 485,521 tons from 29 states within the United States. According to the EPA's Biennial Report, 176,681 tons³ (approximately 36 percent) of the generated EAF dust were disposed of in a landfill in 1987 (US EPA 1991^c, 2-26).

In 1989, 113 U.S. steel mini-mills (Appendix D) generated approximately 644,832 tons of EAF dust hazardous waste within thirty-two states (EPA 1994). The 1989 National Biennial Report identifies approximately 589,309 tons of EAF dust generated for this year from 30 states. According to the EPA's National Biennial Report, 360,237 tons of EAF dust were processed for metal recovery in 1989. Furthermore, 55,389 tons (approximately 9 percent) of the generated EAF dust were stabilized and disposed of in landfills (US EPA 1993^e, 2-49). These figures indicate that 61 percent of the total generated amount of EAF dust was processed and over 9 percent was stabilized and disposed.

By 1991, 113 U.S. steel mini-mills (Appendix D) generated approximately 557,473 tons of EAF dust within 35 states (EPA 1994^a). Though the amount of EAF dust generated nationally did not change, the number of states in which the EAF dust generators were located increased. The generating states increased from 29 in 1987 to 35 in 1991.

³ These figures may not be an exact representation of the generated amount since the data were calculated from the EPA's Biennial RCRA Hazardous Waste Report (U.S. EPA 1991^c). This report solely lists the amounts of the 40 largest hazardous waste generators and the amount generated by each state. If the EAF dust was not among the 40 largest generators for the state, the EAF dust was not listed in the EPA's report and was not documented in this analysis.

These reports demonstrate the annual variation between the amount of hazardous waste generated by the steel industry during the melting of scrap metals (Figure 6). However, the overall pattern of the generated amounts of this waste type during the past six years has not changed.

Figure 6. Tons of EAF dust generated within the United States between the years of 1987 and 1992. Source: Compiled by author.

Further examination illustrates that while the amount of K061 generated has remained constant, the regions where the waste is generated have changed.

Geographical Distribution

The majority of the EAF dust generating steel mini-mills are located throughout the mid-western states. However, throughout the past six years the industries producing the highest amount of EAF dust, hence the largest steel mini-mills, are moving south. This is demonstrated by a numerical and distributional analysis.

In 1987, the five states that generated the largest amount of EAF dust (Illinois, Michigan, Ohio, Pennsylvania, and Texas) accounted for over 68 percent of the total generation throughout the nation (Figure 7).

Figure 7. States in which steel mini-mills are located (shaded) with the percentages of the five largest EAF dust generating states in 1987.
Source: Compiled by author.

In 1989, the five states that generated the largest amount of EAF dust (Illinois, Michigan, Ohio, Pennsylvania, and Texas) accounted for over 66 percent of the total generation within the U.S (Figure 8). The ten states that generated the largest amount of EAF dust (including Arkansas, New Jersey, Colorado, Georgia, and Alabama) account for approximately 80 percent of the total amount generated within the United States.

Figure 8. States in which steel mini-mills are located (shaded) with the percentages of the five largest EAF dust generating states in 1989.
Source: Compiled by author.

In 1991, the five states that generated the largest amount of EAF dust (Illinois, Michigan, Ohio, Pennsylvania, and Texas) accounted for over 61 percent of the total generation of EAF dust throughout the nation (Figure 9).

Figure 9. States in which steel mini-mills are located (shaded) with the percentages of the five largest EAF dust generating states in 1991.
Source: Compiled by author.

The largest increase in the generation of EAF dust has occurred in the southern states of the United States. Texas had the greatest increase among the five leading states between the years of 1987 and 1991. The amount of EAF dust increased 54 percent during this four-year interval. Furthermore,

Texas increased the amount of EAF dust generation nationally, from 7 percent of the national amount in 1987 to 12 percent of the national amount in 1991.

Nationwide, the southern states of Arkansas, Florida, Georgia, North Carolina, Oklahoma, South Carolina, and Texas had the largest increase (Table 3). Arkansas became one of the top eight generators, in which the amount of EAF dust generated in 1987 increased three fold by 1991. The amount of EAF dust also increased in the western states of Oregon, California, and Utah. As will be demonstrated later in this chapter, these western facilities are further from the U.S. reclamation facility and closer to the Mexican reclamation facility.

The mid-western and eastern states decreased the amount of EAF dust generated between the years 1987 and 1992. The largest decreases occurred in the states of Iowa, Missouri, Ohio, and Pennsylvania. However, there was a slight increase in only three mid-western and eastern states. In particular the states of Minnesota, Nebraska, and New Jersey increased the amount of EAF dust generated (Table 3).

Management of Hazardous Wastes Within the United States

The Hazardous and Solid Waste Amendment (HSWA) to the RCRA, enacted on November 8, 1984, prohibits the land disposal of untreated hazardous wastes such as K061. Furthermore, HSWA requires the EPA to set ". . . levels or methods of treatment, if any, which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term

threats to human health and the environment are minimized" (USC 1990 § 3004(m)(1), and § 6924(m)(1)).

The EPA's standards are based on the performance of the Best Demonstrated Available Technology (BDAT), as determined by treatment data collected at the treatment systems. The EPA's final ruling on K061 determined two categories for the hazardous waste, with the 15 percent mark distinguishing between the two levels. The treatment standard for the low zinc subcategory (those wastes containing less than 15 percent by weight total zinc residue) is based on the performance of stabilization of the slag as the BDAT.

For the high zinc subcategory (equal to or greater than 15 percent total zinc by weight) the treatment standard was expressed as "no land disposal" based on the determination that high temperature metals recovery (HTMR) represents the BDAT (Federal Register 1988). The high zinc subcategory is estimated by the EPA to comprise 75 percent (by volume) of the 500,000 tons of K061 generated annually (Federal Register 1988).

On February 23, 1994, the EPA published a proposed rule prohibiting all slag residue from the HTMR process from being placed on land (Federal Register 1994). There are few exceptions which allow the commercial use (as opposed to encapsulated disposal) of this toxic waste. These exceptions include slag residue for road construction and fertilizers.

Land Disposal Restriction

On August 17, 1988, the EPA promulgated regulations implementing the congressionally mandated prohibitions on land disposal of hazardous waste listed in 40 CFR §268.10 (CFR 1992). This action was taken in response to amendments to the RCRA, enacted in the Hazardous and Solid Waste Amendment (HSWA of 1984). Congress required EPA to evaluate all hazardous wastes according to a schedule and to establish standards based upon the BDAT. Wastes that met the applicable treatment standards can be disposed of in or on the land. The evaluation schedule, treatment standards and accompanying regulations are collectively known as the land disposal restrictions (LDR). For the K061 high zinc category (greater than or equal to 15 percent total zinc), a final BDAT treatment standard of "no land disposal" became effective in August of 1990.

The effect of this land disposal regulation has lead to a decrease in the amount of K061 disposed. According to Bruce Steiner, the American Iron and Steel Institute's Environment and Energy Division Vice President, 70 percent of all generated K061 was disposed of in landfills in 1986 (Table 4). By 1990, 50 percent of the generated K061 was disposed of in landfills, and by 1993, less than 10 percent of all K061 generated in the United States was disposed of in landfills (Steiner 1993).

Furthermore, the requirement to either stabilize and dispose or to send to a facility for the reclamation of metals has added to the cost of handling the K061 hazardous waste. The cost range to landfill K061 is approximately \$300 - \$400 per ton of K061 hazardous waste (Satchell 1994, 66; Furtado 1993). This cost includes \$200 per ton for stabilization with an additional cost of \$200 per

ton for the land disposal after stabilization (Furtado 1993). The high cost of disposing of the K061 after stabilization is attributed to the increase in the added stabilizing material that doubles the amount of waste material. This cost of stabilization and disposal in the landfill is similar to the metal recovery process cost. Further costs may accrue if the K061 generator stabilizes and disposes of the waste in the United States due to the cost of insurance required to protect against environmental and human health problems, as well as the continued potential liability created by such problems, as provided under RCRA (42 USC §§6901-6992).

The second alternative for hazardous waste management of K061 within the United States is to send the hazardous waste material to a reclamation facility. By using the HTMR process, the generator avoids future liability as a "potentially responsible party," under RCRA, for potential clean-up of the disposal facility in which the stabilized hazardous waste was disposed.

High Temperature Metals Recovery

An EPA ruling on November 7, 1986 established a technology-based approach in treatment standards. The standards for treating hazardous waste are based on the performance of the best demonstrated and available technology (BDAT) identified for the constituents of the particular waste type (Federal Register 1986). The EPA determined that high temperature metals recovery (HTMR) represents the BDAT for treating the K061 hazardous waste generated by the mini-mills throughout the United States (Federal Register 1988).

Several high temperature metals recovery systems exist within the United States, including rotary kilns and flame reactors (as defined in 40 CFR 1992 § 260.10 (6), (7), and(12)). Presently, Horsehead Resource and Development Company (HRD) is the leading commercial facility that processes the K061 hazardous waste using the BDAT systems.

The high-temperature metal recovery (HTMR) process primarily consists of two processes: the Waelz process and the Calcine process. The two processes separate the volatile constituents of K061 (specifically zinc, lead, and cadmium) from the non-volatile constituents (iron and lime). The Waelz kiln process is a high-temperature thermal process that separates and collects the zinc, lead, and cadmium as oxides. The Calcine process refines the crude zinc oxide into a higher value zinc, free of lead and cadmium. The vaporized lead and cadmium elements are collected and later processed at yet another facility.

The majority of K061 within the United States is primarily treated through a zinc recovery, HTMR process (Table 4). According to Steiner, in 1986, only 30 percent of all K061 waste within the United States was processed for metal reclamation (Steiner 1993). This amount increased to 50 percent by 1990 (Federal Register 1991). By 1993, it was estimated that 90 percent of the treated, high-zinc subcategory was treated by HTMR, as opposed to stabilizing and disposing of the waste in landfills (Steiner 1993).

TABLE 4
COMPARISON BETWEEN HTMR AND STABILIZE/DISPOSING OF K061

Type of treatment or recovery	1986	1990	1993
HTMR	30%	50%	90%
Stabilization & Disposal	70%	50%	10%

Source: Compiled by author.

The increase in regulations banning the disposal of K061 hazardous waste has directly caused an increase in the cost of handling the waste and liability of hazardous waste generating facilities. As an alternative to this liability, hazardous waste generating facilities are sending their waste to reclamation facilities. This trend has been demonstrated during a seven-year time period, in which the amount of K061 disposed compared to the amount processed for reclamation purposes has been reversed.

Horsehead Industries, Inc

Within the United States, Horsehead Industries Inc. (HII) has the largest capacity to process K061 hazardous waste. Recognized as the leader in its industry in the United States, the Horsehead facility is referred to as "state-of-the-art" by both the EPA and the Steel Industry. The K061 is processed

through a joint venture agreement by two facilities, the Palmerton, Pennsylvania facility and the Bartlesville, Oklahoma facility. Together, these facilities complete the metals reclamation process. Once the zinc is reclaimed in the Palmerton facility, the remaining hazardous material goes to the Bartlesville facility for lead and cadmium reclamation (HRD 1991) in order to comply with U.S. environmental health regulations.

Horsehead Resource Development Company, Inc., a subsidiary of Horsehead Industries, Inc., is the United States' primary hazardous waste resource recovery handler for K061 (Figure 10). Currently HII's processing facilities (including the zinc processing plants in Monaca and Palmerton, Pennsylvania, Rockwood, Tennessee, and Bartlesville, Oklahoma) have the largest capacity to recover zinc oxide from K061 in the United States (HRD 1992). This processing capacity reached 450,000 tons of K061 per year in 1992 (HRD 1993).

Figure 10. The location of Horsehead Industries, Inc. K061 reclamation facilities throughout the United States. Source: Compiled by author.

The High Temperature Metal Recovery (HTMR) process demonstrated by Horsehead Resource Development's "Waelz kiln" technology has been designated by the EPA as the "Best Demonstrated Available Technology" (BDAT) for processing zinc-containing K061 (Richards 1992) of which HRD is the only U.S. commercial facility to do so.

No one plant can completely process the K061 (Kearney 1989). Horsehead Industries, Inc., through its subsidiary, Horsehead Resource Development, and its division, Zinc Corporation of America, is the only company that can complete this two-step recycling process. The first produces a crude zinc oxide. The second produces a zinc concentrate by-product, which after reclaiming the zinc, creates a lead-cadmium concentrate, considered to exhibit characteristics of a hazardous waste. HRD ships all the slag (lead-

cadmium concentrate) to a facility owned by Zinc Corporation of America, in Bartlesville, Oklahoma for further processing, where it is chemically treated to recover lead, zinc, and cadmium.

The primary product generated by the reclamation process is a zinc oxide concentrate, which is sold on the open market (HRD 1992). Another product generated in the process is iron-rich material (IRM) which is sold primarily as an additive in the manufacturing of cement and as anti-skid material for road maintenance (HRD 1991). As of 1993, IRM is no longer used on roads due to its high lead content (Shoener 1993), which was tested above 10,000 parts per million (Danielson 1993), 20 times greater than the EPA limit of soil contamination of lead (Mahler 1993).

Due to the August 1991 "land ban" of K061 with 15 percent or more zinc content, under RCRA, combined with HRD providing the only EPA commercially approved HTMR technology in the United States available to generators, the majority of K061 is processed at HRD. Because the cost to send the K061 to HRD is approximately \$150 per ton (Furtado 1993), the HTMR is the preferred method by most generators. Further, it eliminates the risk of possible future liability of K061 generators for clean-up of the landfill site.

Since the reclamation facility did not go public until 1990, some of the amounts processed prior to this time were not available (Table 5). The amounts of K061 waste listed below include the accumulated K061 hazardous waste from more than 65 percent of the generating steel mini-mills within the United States (HRD 1993).

TABLE 5
AMOUNT OF K061 GENERATED AND
PROCESSED BY HII, 1986 - 1994
(Volume in Tons)

Year	Generated	Processed
1986	450,000	120,000 (27%)
1987	500,000	N-A
1988	500,000	N-A
1989	500,000	335,000 (70%)
1990	550,000	340,000 (62%)
1991	500,000	345,000 (69%)
1992	500,000	367,000 (73%)
1993	550,000	381,000 (69%)

Source: Compiled by author from data obtained from HII through May 1994.

The amount of K061 waste processed within the United States by the HRD facilities during the past four years has remained constant. In 1989, the HRD facilities process over 335,000 tons of K061 waste, which is equivalent to 70 percent of the K061 waste generated within the United States. By 1993, the facilities were processing over 381,000 tons, or approximately 69 percent, of the nation's K061 dust (HRD 1994).

Chapter Summary

Mini-mills across the United States are generating K061 hazardous waste as a by-product of melting scrap metal, primarily from automobiles, for the production of reinforcement steel bars for road construction and railroad ties. While the amount of K061 generated in the United States between 1987 and 1992 has not changed, the location of the generating facilities has. Increasingly, the K061 waste generating facilities are moving south, towards the U.S.-Mexico border.

As guided by the Land Disposal Restriction, K061 containing less than 15 percent zinc must be stabilized and disposed of in landfills. K061 containing more than 15 percent zinc must be recycled through a high temperature metal recovery process (Federal Register 1988). Furthermore, the transport of these waste is regulated, and all permits must be obtained from the EPA and U.S. Department of Transportation. In turn, these regulations have increased the cost of handling, transporting, and disposing of K061. The cost to stabilize and dispose of hazardous waste within the United States is coupled with the increased cost of insurance and liability. The second alternative is sending the waste to a processing facility to reclaim the metal. Yet, the cost of this process is also high.

Documents from the EPA and the Steel Industries illustrate that the latter is the process preferred by K061 waste generating facilities. In 1986 only 30 percent of the K061 waste was processed, compared to the 70 percent disposed of in landfills. However, in a seven year span, this trend had reversed. By 1993, 90 percent was processed, as compared to the remaining 10 percent that was disposed.

But, the amount of K061 processed by the leading reclamation facility within the United States is not increasing. Rather, the amount has remained constant between 1989 and 1992. So, where are these hazardous wastes going? As illustrated, they are not being treated within the United States. Can we assume they are following the same path as the generating industries of this hazardous waste and moving south, towards the U.S.-Mexico border? The next chapter investigates that issue.

CHAPTER 4

THE TRAIL OF POISON

This chapter documents the process and increased practice of exporting hazardous waste from the United States into Mexico. Particularly, despite United States laws, some states are increasing their generation of a certain hazardous waste and are sending it south to Mexico. Most of these states are southern states, near the border, and this trend is on the rise. Scrap metal is actually being added to the particular hazardous waste being sent to Mexico so that the U.S. facilities can alleviate themselves of U.S. laws.

Meanwhile, the receiving facility in Mexico, which is supposed to be recycling constituents of the hazardous waste, is actually stockpiling the material--partly because of the volume it is receiving, and partly because it does not have to comply with the same engineering controls and time limitations of similar facilities in the United States. In short, the facility is stockpiling the recycled hazardous waste in open-air mounds, without controlling it with methods that are specifically required in the United States under our laws.

This chapter illustrates the importance of the proximity of the developing to the industrialized nation. Further, it demonstrates the lax environmental regulations in the developing nation as well as the established trend of hazardous waste exporters moving south, towards the U.S.-Mexico border.

Exporting Hazardous Waste from the United States

On August 8, 1986, the final regulations under the RCRA that apply to the export of hazardous waste was published by the U.S. EPA. To export hazardous waste legally, the primary exporter must comply with the initial guidelines as dictated by 40 CFR §262.42 subpart E (CFR 1992). This regulation requires the primary exporter to submit a written request through the EPA's Office of International Activities, notifying the receiving country of its intent to export (40 CFR § 262.53). The request then goes through the State Department to the foreign nation that will receive the material. If the nation gives its consent to receiving the material, a cable is sent to the EPA through the U.S. Embassy in the receiving country, describing the terms and conditions (40 CFR § 262.51) and the material is transported.

Though it may seem to be a tedious process, once the consent is received, the permit is valid for one year with an option for renewal. The EPA cannot prohibit the export of hazardous wastes in any form once the receiving country agrees to accept the material (Moyers 1990). Furthermore, while the EPA issues permits for export of metals contained in ash, of which the majority of the approved destinations for these exports go to Mexico, the EPA does not monitor what happens to the mountains of waste materials containing lead, zinc, and cadmium after a fraction of usable metals have been extracted.

Amount of Hazardous Waste Exported

Since 1987, the amount of all hazardous wastes exported from the United States for recycling and disposal purposes has increased on a yearly

basis. Hazardous waste has primarily been exported to eleven industrialized nations (Belgium, Canada, Finland, France, Germany, Japan, the Netherlands, South Africa, Spain, Sweden, and the United Kingdom) and three developing nations (Brazil, South Korea, and Mexico) (EPA 1993; EPA 1990, 1992, 1993a). Based on documents obtained in this study, the amount of hazardous waste exported from the United States is increasingly exported to developing nations (Table 6).

TABLE 6
SUMMARY OF HAZARDOUS WASTE EXPORTS
FROM THE UNITED STATES, 1987 - 1992
(Volume in Tons)

Year	Industrialized Nations		Developing Nations		Total
	Volume	Percent	Volume	Percent	
1987	84,892	86%	14,068	14%	98,960
1988	118,397	86%	19,205	14%	137,602
1989	113,875	80%	28,101	20%	141,091
1990	97,461	71%	39,209	29%	136,670
1991	80,223	58%	57,095	42%	137,318
1992	73,651	50%	72,239	50%	145,890

Source: Compiled by author from Annual Reports received by the EPA through September 13, 1993.

In 1987, Brazil, Canada, Mexico, and the United Kingdom received 98,960 tons of hazardous waste from the United States. Of this amount, 84,892 tons of hazardous waste, approximately 86 percent was exported to the industrialized nations of Canada and the United Kingdom (EPA 1990). The remaining 14,068 tons of hazardous waste, approximately 14 percent of the total, were exported to the developing nations of Brazil and Mexico (EPA 1990).

In 1988, the amount of hazardous waste exported from the United States had increased to 137,602 tons (EPA 1992). The industrialized nations, including Belgium, Canada, Finland, Japan, Spain, the United Kingdom, and West Germany, received 118,397 tons of hazardous waste (EPA 1992), approximately 86 percent of the total exports. The developing nations of Brazil and Mexico received 19,205 tons, approximately 14 percent, of the total hazardous waste exported (EPA 1992).

In 1989, the amount of hazardous waste exported from the United States increased to 141,091 tons (EPA 1993; EPA 1993^a). However, the amount exported to the industrialized nations (Belgium, Canada, Finland, Japan, South Africa, Sweden, the United Kingdom, and West Germany) decreased. The total amount of hazardous waste exported to the industrialized nations was 113,875 (EPA 1993; EPA 1993^a), approximately 80 percent. The remaining amount of hazardous waste exported this year, 28,101 (20 percent of the total), was sent to just one developing nation: Mexico (EPA 1993; EPA 1993^a).

By 1990 the amount of hazardous waste exported from the United States to the developing nations continued to increase. The industrialized nations of Belgium, Canada, Finland, France, Germany, Japan, Sweden, and

the United Kingdom imported 97,461 tons of hazardous waste from the United States (EPA 1993; EPA 1993a), 71 percent of the total amount exported. Meanwhile, the amount of hazardous waste sent Mexico had increased to 39,209 tons, approximately 29 percent of the total 136,670 tons exported (EPA 1993; EPA 1993a).

In 1991, 137,318 tons of hazardous waste were exported from the United States. The amount exported to industrialized nations, including Belgium, Canada, Finland, France, Japan, Sweden, and the United Kingdom, continued to decrease to 80,223 (EPA 1993; EPA 1993a), approximately 58 percent. The remaining 57,095 tons of hazardous waste, approximately 42 percent, were exported to Mexico (EPA 1993; EPA 1993a).

By 1992, the percentage of hazardous waste exported from the United States was shared 50/50 with industrialized nations and developing nations. Belgium, Canada, Finland, France, Japan, Sweden, the Netherlands, and the United Kingdom imported 73,651 tons of hazardous waste from the United States. (EPA 1993; EPA 1993a). Meanwhile the developing nations of South Korea and Mexico imported 72,239 tons of hazardous waste (EPA 1993; EPA 1993a).

This data demonstrates an increased trend in exports from the United States to developing nations. Within seven years the amount of hazardous waste exported from the United States to developing nations has increased 513 percent from 14,068 tons in 1987 to 72,239 tons in 1992. More specifically in illustrates the trend of increased exports to countries in close proximity to the United States. (Table 7).

TABLE 7
SUMMARY OF EXPORTS BY COUNTRY, 1987 - 1992
(Volume in Tons)

Country	1987	1988	1989	1990	1991	1992
MEXICO	10,710 (10.8%)	15,615 (11.3%)	28,101 (19.9%)	39,209 (28.7%)	57,095 (41.6%)	72,178 (49.6%)
CANADA	84,161 (85.1%)	113,252 (82.3%)	104,135 (73.8%)	92,099 (67.4%)	77,197 (56.2%)	71,969 (49.4%)
OVERSEAS*	4,089 (4.1%)	8,735 (6.4%)	8,855 (6.3%)	5,362 (3.9%)	3,026 (2.2%)	1,409 (1.0%)
Total	98,960	137,602	141,091	136,670	137,318	145,556

Source: Compiled by author from Annual Reports received by the EPA by September 13, 1993.

* Includes the Countries of Belgium, Brazil, Finland, France, Germany, Japan, South Korea, South Africa, Sweden, The Netherlands, and United Kingdom.

The majority of the hazardous waste was exported to two countries, the industrial country Canada and the developing country Mexico (Figure 11). In 1987, Canada imported 84,161 tons of hazardous waste from the United States, approximately 85 percent of the total exported waste, while Mexico imported 10,710, approximately 11 percent of the total exported waste (EPA 1993; EPA 1990). In 1988 the amount imported to both countries increased but the overall percentage remained the same with Canada receiving 82 percent compared to Mexico's 11 percent.

However, by 1989, Mexico was receiving 20 percent of the total exported waste from the United States while Canada's amount decreased to 74 percent of the total waste exported (EPA 1993; EPA 1993^a). In 1990, the reverse trend continued with Mexico now receiving 29 percent of all hazardous waste exported from the United States. Meanwhile, the amount of hazardous waste exported to Canada continued to decrease to 67 percent of the total U.S. exports (EPA 1993; EPA 1993^a). In 1991, Mexico was importing 42 percent of the hazardous waste exported from the United States as compared to Canada's 56 percent (EPA 1993; EPA 1993^a). By 1992, the amount exported to both countries was relatively even with Canada receiving 49.6 percent and Mexico receiving 49.4 percent of the U.S. hazardous waste exports (EPA 1993; EPA 1993^a).

Figure 11. Tons of hazardous waste exported from the United States from 1987 to 1994. Source: Compiled by author.

This trend of exporting primarily to Mexico as opposed to the industrialized nation to the north, Canada, is attributed to the increase in regulations and treatment and disposal costs within the United States as compared to Mexico (Vincent 1993). According to EPA enforcement official, Jim Vincent, Canada formerly received the largest amount of waste export, approximately 95 percent, due to lower environmental standards, while Mexico received approximately 5 percent (Vincent 1993). Today, Canada and Mexico each receive approximately 50 percent of the United State's exported hazardous waste, due to increased environmental standards in Canada (Vincent 1993).

Amount of Hazardous Waste Exported to Mexico

Currently, 100 percent of the hazardous waste exported from the United States to Mexico is K061 waste (EPA 1993; EPA 1993^b). Though the amount of this hazardous waste generated in the United States has not increased (as discussed in Chapter 3), the amount exported increases every year (Figure 12). Between the years of 1986 and 1992, the United States exported more than 227,200 tons of hazardous waste to Mexico, an increase of more than 674 percent.

Figure 12. Tons of hazardous waste exported to Mexico from the United States from 1987 to 1994. Source: Compiled by author.

The trend in the amount of K061 is continuing to increase. According to Jim Collins, President of the Steel Manufacturing Association, 80,000 tons of K061 hazardous waste were exported to Mexico in 1993 (Collins 1993), and

by 1994, eighteen U.S. mini-mills will export 130,000 tons of K061 exported (Perez 1991). Between 1987 and 1994 the amount will have increased 1,214 percent from the exported amount of K061 originally exported to Mexico in 1987.

Further, the amount of K061 exported from the United States to Mexico is expected to continue rising since "it is better business for the steel mini-mills in the southern region of the United States to export to Mexico--less cost in transportation and in state-to-state permits" (Collins 1993).

As of March 25, 1994, a ban was implemented at the Basel Convention, on hazardous wastes originating in Organization for Economic Cooperation and Development (OECD) nations and destined for non-OECD nations for both disposal and recycling purposes. However, as of April 1994, Mexico has been accepted as an OECD member nation. As an OECD country, prohibiting the export and import of hazardous waste between the United States and Mexico will be more difficult.

Geographical Distribution: Place of Origin v. Destination

Between the years of 1987 and 1992, the amount of hazardous waste exported, the number of shipments, facilities, and states exporting hazardous waste has increased. Originating from a total of fifteen steel mini-mills, primarily located along the U.S.-Mexico border, 100 percent of this hazardous waste was exported by rail to one reclamation facility, Zinc Nacional, located in the city of Monterrey, seventy kilometers south of the Texas border in the northern state of Nuevo Leon, Mexico.

According to the EPA's export database (EPA 1993), in 1987, five U.S. mini-mills exported 167 shipments, consisting of more than 12,413 tons, of K061 to Mexico (Table 8). Yet due to inconsistencies between EPA reports and the exported amounts recorded in the EPA's computer printouts, the exported amount used in this study is 10,710 tons of K061, approximately 11 percent of all of the hazardous wastes exported (EPA 1992).

TABLE 8
FACILITIES EXPORTING K061 TO MEXICO, 1987
(Volume in Tons)

Facility	Volume	State	% by State	Shipments
Nucor Steel	1,703.48	Nebraska	14%	20
Sheffield Steel Corp.	4,088.13	Oklahoma	33%	66
Border Steel Mills	1,182.09	Texas	42%	16
Nucor Steel	4,036.00	Texas	-	40
Nucor Steel Corp.	1,403.50	Utah	11%	25
Total	12,413.20			167

Source: Compiled by author. Based on EPA's export database (EPA 1993).

The majority of the K061 waste exported came from the southern states of Oklahoma and Texas (Figure 13). Together these two states exported 9,306 tons of K061 to Mexico, approximately 75 percent of the total exported amount in 1987.

Figure 13. Percentage of the total K061 exported in 1987 from United States.

By 1988, the amount of K061 and the number of facilities, states, and shipments of hazardous waste to Mexico had increased. Eight steel mini-mills exported more than 18,224 tons of K061 to Mexico (Table 9). While the percentage of the total hazardous waste exports from the United States remained the same, 11 percent, the amount exported directly to Mexico

increased 147 percent from the previous year. The states of Arkansas and California began exporting, increasing the number to six exporting states across the United States.

TABLE 9
FACILITIES EXPORTING K061 TO MEXICO, 1988
(Volume in Tons)

Facility	Volume	State	% by State	Shipments
Arkansas Steel Associates	1,531.33	Arkansas	22%	NA
Nucor-Yamato Steel Co.	2,394.50	Arkansas	-	26
Barbary Coast Steel Corp.	445.78	California	2%	10
Nucor Steel	1,077.93	Nebraska	6%	13
Sheffield Steel Corp.	4,915.80	Oklahoma	27%	76
Border Steel Mills, Inc.	1,982.42	Texas	41%	28
Structural Metals, Inc.	166.23	Texas	-	2
Nucor Steel	5,235.00	Texas	-	75
Nucor Steel Corp.	475.33	Utah	3%	7
Total	18,224.32			237

Source: Compiled by author. Based on EPA's export database (EPA 1993).

More than 89 percent of the K061 waste exported to Mexico came from the southern states of Arkansas, Oklahoma, and Texas. These three states shipped more than 16,225 tons of the 18,224 tons of K061 exported to Mexico. Only six percent originated in the mid-western state of Nebraska, and five percent from the western states of California and Utah. Each of the 237

shipments of hazardous waste from the United States was exported by rail to Zinc Nacional in Monterrey, Mexico (Figure 14).

Figure 14. Percentage of the total K061 exported in 1988 from United States.

By 1989, the amount of K061 waste exported to Mexico had increased 226 percent from the waste exported in 1987. This waste came from nine U.S. steel mini-mills, which exported approximately 28,101 tons of K061 to Mexico (Table 10). As mentioned previously, this amount represents 20 percent of all of the hazardous wastes exported (EPA 1993). Furthermore, the amount of states from which the K061 waste is exported increased. The state of Oregon began exporting, bringing the total to seven exporting states in 1989 (Figure 15).

TABLE 10
FACILITIES EXPORTING K061 TO MEXICO, 1989
(Volume in Tons)

Facility	Volume	State	% by State	Shipments
Arkansas Steel Associates	953.00	Arkansas	3%	12
Barbary Coast Steel Corp.	2,827.00	California	10%	58
Nucor Steel	297.20	Nebraska	1%	3
Sheffield Steel Corp.	8,015.70	Oklahoma	29%	102
Cascade Steel Rolling Mills	1,964.00	Oregon	7%	26
Border Steel Mills, Inc.	2,939.56	Texas	50%	32
Structural Metals, Inc.	6,092.48	Texas	-	71
Nucor Steel	4,913.00	Texas	-	57
Nucor Steel Corp.	98.60	Utah	<1%	1
Total	28,100.54			362

Source: Compiled by author. Based on EPA's export database (EPA 1993).

Again, more than 82 percent of the K061 waste exported to Mexico came from the southern states of Arkansas, Oklahoma, and Texas. These three states shipped 22,914 tons of K061 exported to Mexico. More than 17 percent (4,890 tons) of the total waste exported to Mexico originated in the western states of California, Oregon, and Utah. Each of these 362 shipments of hazardous waste was exported to Zinc Nacional (Figure 15).

Figure 15. Percentage of the total K061 exported in 1989 from United States.

During 1990, there were 485 shipments of K061 exported more than 39,208 tons of K061 to Mexico (Table 11). This increase parallels the 290 percent increase in the amount of hazardous waste export shipments. The exported waste to Mexico represented approximately 29 percent of all of the hazardous wastes exported from the United States (EPA 1993). The exported hazardous waste originated from eleven U.S. steel mini-mills located throughout nine states across the country, with the addition of Alabama and Mississippi (Figure 16).

TABLE 11
FACILITIES EXPORTING K061 TO MEXICO, 1990
(Volume in Tons)

Facility	Volume	State	% by State	Shipments
Birmingham Bolt Co.	3,668.60	Alabama	9%	39
Arkansas Steel Associates	1,710.80	Arkansas	4%	21
Barbary Coast Steel Corp.	2,876.87	California	7%	56
Birmingham Steel Corp.	455.13	Mississippi	1%	5
Nucor Steel	289.23	Nebraska	<1%	3
Sheffield Steel Corp.	6,270.34	Oklahoma	16%	86
Cascade Steel Rolling Mills	2,781.30	Oregon	7%	37
Border Steel Mills, Inc.	3,012.25	Texas	52%	31
Structural Metals, Inc.	12,339.60	Texas	-	144
Nucor Steel	5,122.00	Texas	-	57
Nucor Steel Corp.	682.65	Utah	2%	6
Total	39,208.77			485

Source: Compiled by author. Based on EPA's export database (EPA 1993).

Again, more than 83 percent of the K061 waste exported to Mexico came from the southern states of Alabama, Arkansas, Mississippi, Oklahoma, and Texas. These five states shipped 32,579 tons of K061 exported to Mexico (Figure 16). More than 16 percent (6,340 tons) of the total waste exported to Mexico originated in the western states of California, Oregon, and Utah.

Figure 16. Percentage of the total K061 exported in 1990 from United States.

During 1991, 690 shipments consisting of more than 57,095 tons of K061 was exported to Mexico (Table 12). The exported hazardous waste originated from thirteen U.S. steel mini-mills located throughout ten states across the country, with the addition of Illinois and Washington state (Figure 17). Furthermore, the mid-western state of Nebraska stopped exporting hazardous waste to Mexico.

TABLE 12
FACILITIES EXPORTING K061 TO MEXICO, 1991
(Volume in Tons)

Facility	Volume	State	% by State	Shipments
Birmingham Bolt Company	6,064.19	Alabama	11%	66
Arkansas Steel Associates	1,557.60	Arkansas	3%	19
Barbary Coast Steel Corp.	210.12	California	<1%	5
Birmingham Bolt Company	4,265.51	Illinois	7%	32
Birmingham Steel Corp.	2,719.18	Mississippi	5%	31
Sheffield Steel Corp.	7,393.85	Oklahoma	13%	99
Cascade Steel Rolling Mills	3,544.00	Oregon	6%	53
Border Steel Mills, Inc.	3,439.81	Texas	46%	35
Structural Metals, Inc.	11,880.91	Texas	-	140
Chaparral Steel Company	5,710.00	Texas	-	92
Nucor Steel	5,500.00	Texas	-	68
Nucor Steel Corp.	191.40	Utah	<1%	2
Salmon Bay Steel Corp.	4,618.53	Washington	8%	48
Total	57,095.10			690

Source: Compiled by author. Based on EPA's export database (EPA 1993).

More than 76 percent of the K061 waste exported to Mexico came from the southern states of Alabama, Arkansas, Mississippi, Oklahoma, and Texas. These five states exported 44,266 tons of K061 waste to Mexico. Meanwhile, 15 percent (more than 8,564 tons) of the total waste exported to Mexico originated in the western states of California, Oregon, Utah, and Washington. This hazardous waste was exported to Zinc Nacional (Figure 17).

Figure 17. Percentage of the total K061 exported in 1991 from United States.

In 1992, more than 72,178 tons of K061 hazardous waste were exported to Mexico (Table 13), approximately 50 percent of all of the hazardous wastes exported (EPA 1993). The export included 811 shipments during the one year period. The exported hazardous waste originated from eleven U.S. steel mini-mills located throughout eight states across the country (Figure 18). The western states of California and Utah stopped exporting hazardous waste to Mexico.

TABLE 13
FACILITIES EXPORTING K061 TO MEXICO, 1992
(Volume in Tons)

Facility	Volume	State	% By State	Shipments
Birmingham Bolt Company	5,941.70	Alabama	8%	65
Arkansas Steel Associates	1,587.75	Arkansas	2%	19
Birmingham Bolt Company	8,989.37	Illinois	12%	98
Birmingham Steel Corp.	2,709.15	Mississippi	4%	29
Sheffield Steel Corp.	7,537.97	Oklahoma	10%	89
Cascade Steel Rolling Mills	6,271.00	Oregon	9%	94
Border Steel Mills, Inc.	1,265.25	Texas	42%	13
Structural Metals, Inc.	11,454.12	Texas	-	126
Chaparral Steel Company	11,710.00	Texas	-	122
Nucor Steel	6,008.00	Texas	-	67
Salmon Bay Steel Corp.	8,704.00	Washington	12%	89
Total	72,178.31			811

Source: Compiled by author. Based on EPA's export database (EPA 1993).

More than 67 percent of the K061 waste exported to Mexico came from the southern states of Alabama, Arkansas, Mississippi, Oklahoma, and Texas. These five states exported 44,266 tons of K061 waste to Zinc Nacional in Monterrey, Mexico (Figure 18). However, the largest increase came from the western region, Oregon and Washington, from which more than 14,975 tons (approximately 21 percent) of hazardous waste were exported to Mexico.

Figure 18. Percentage of the total K061 exported in 1992 from United States.

The government documents examined in this study illustrate the increase in exports from the United States to Mexico. The amount of hazardous waste has increased more than 581 percent between the years of 1987 and 1992. During this time, more than 227,220 tons of hazardous waste were exported from approximately 15 U.S. steel mini-mills (Table 14). Furthermore, the number of shipments exported from the United States to Mexico has increased 486 percent from 167 shipments exported in 1987 to 811 shipments exported in 1992.

TABLE 14
SUMMARY OF EXPORTS TO MEXICO BY STATE
1987 - 1992
(Volume in Tons)

Rank	State	Volume	Percentage
1	Texas	103,988.72	46%
2	Oklahoma	38,221.79	17%
3	Alabama	15,674.49	7%
4	Oregon	14,560.30	6%
5	Washington	13,322.53	6%
6	Illinois	13,254.88	6%
7	Arkansas	9,734.98	4%
8	California	6,359.77	3%
9	Mississippi	5,883.46	3%
10	Nebraska	3,367.84	1%
11	Utah	2,851.48	1%
	Total	227,220.24	

Source: Compiled by author. Based on EPA's export database (EPA 1993).

Lastly, the southern states export the majority of hazardous waste into Mexico. Between 1987 and 1992, more than 173,503 tons of hazardous waste were exported to Mexico from five southern states: Alabama, Arkansas, Oklahoma, Mississippi, and Texas. The amount exported from Texas alone increased from 5,218 tons in 1987 to more than 30,437 tons in 1992 (Figure 19).

Figure 19. Percentage of the total K061 exported from United States between the years of 1987 - 1992.

Based on government documents, this study provides evidence portraying generators and exporters of hazardous waste K061 moving towards the U.S.-Mexico border. As illustrated in Chapter 3, while the amount of K061 generated throughout the United States has not changed, there has been a change in the states generating the hazardous waste. When coupled with the exporting states, it becomes evident that those states with an increase in waste generation are also the states with an increase amount of waste exported. Within the southern region, the states with an increased rate in the generation of K061 are also the leading exporters: Texas, Oklahoma, and Arkansas. It should be noted that exports from Oklahoma, one of the leading hazardous waste exporters, bypass a reclamation facility within its own borders (See Chapter 3).

The western region of the United States has also increased the amount of K061 generated as well as the amount exported. In particular, the states with an increased rate of K061 generation, California, Oregon, Utah, and Washington, have also increased the amount of waste exports from five percent of the total exports in 1988 to 21 percent by 1992. This trend may be attributed to the high cost involved in the transferring of the waste across the United States to the mid-western and southern reclamation facilities.

Furthermore, the mid-western states of Nebraska and Illinois (the mid-western states increasing K061 generating) bypass U.S. reclamation facilities to export 16,623 tons of hazardous waste to Mexico.

Each of these steel mini-mills exported 227,220 tons of hazardous waste in the last seven years (a highly toxic substance, even at the one pound limit in the United States) to only one location in Mexico, where it does not receive

a "hazardous" classification. According to Mexican law, hazardous wastes are not allowed to be imported into the country. Imported into Mexico for reclamation purposes, this hazardous substance is neither handled, treated, nor disposed of as a hazardous material as it is in the United States. Rather it is sold and received as a "raw material" (Schultes 1993; Sperling 1993).

Management of Hazardous Waste in the United Mexican States

Since 1992, Mexico's environmental legislation has been regulated and enforced at a centralized national level under the Secretariat of Social Development (SEDESOL). One of SEDESOL's 17 ministries includes the National Institute of Ecology, which monitors the environment. SEDESOL has taken over the environmental programs of the former Secretariat to Urban Development and Ecology (SEDUE). The Federal Environmental Protection Laws of 1982 and the 1984 amendments set the regulations regarding air, water, marine and soil contamination caused by hazardous waste pollution (Article 21).

With regard to hazardous waste imports, the only waste legally imported into Mexico under Mexico's environmental law *Ley General del Equilibrio Ecológico y la Protección al Ambiente* is limited to material that can be recycled or reclaimed (SEDUE 1988, Article 153). Larry Sperling, an EPA attorney who works closely with the Mexican government said that "once the material classified in the United States as toxic crosses the border, it is no longer considered a waste by the Mexican government; rather it is treated as a raw material" (Sperling 1993).

U.S. steel industries have found methods to comply with Mexico's laws while avoiding EPA regulations, the increased cost, and the liability of disposing hazardous waste (with less than a 15 percent zinc-content) by adding recyclable material to their hazardous waste and exporting it to Mexico. Assisting in this process, "KayO 61," a private consulting firm, advises and assists the steel mini-mills in the exportation of K061 to Mexico.

In advising a steel mini-mill to export, David Allison of KayO 61 and Associates assured an exporting facility of the firm's success in assisting the export of K061, stated that the steel mill "could solve [its] EPA dilemma by contracting with Zinc Nacional. . . ." (Allison 1988). While referring to the chemical analysis of the K061 from the facility that documents a low reading of zinc and a high content of lead and cadmium, Allison stated that an "addition of zinc-bearing scrap to [the] charge should solidify the desirability of the dust for Zinc Nacional" (Allison 1988). Thus, by adding zinc to the hazardous waste, they were able to avoid the liability and high cost of stabilizing and disposing of the waste in the United States.

Zinc Nacional

Currently, 100 percent of the exported K061 is shipped by covered railcars (Figure 20) to one facility in the northern state of Nuevo Leon, Mexico, where, according to the EPA, it undergoes thermal treatment for metals/metallic compound recovery (EPA 1993). The zinc reclamation facility, Zinc Nacional, to which the K061 is exported, is located 70 kilometers south of the Texas-Mexico border, at Hidalgo Pte. 674 Aparado Postal #985 in Monterrey. According to Jim Collins, President of the Steel Manufacturers Association, 85 percent of Zinc Nacional's total business consists of imports of K061 from U.S. steel mini-mill facilities (1993).

Figure 20. Export of electric arc furnace dust by railcar from the United States to Mexico. Source: Greenpeace 1994.

Although there are few documents concerning the zinc reclamation facility in Monterrey, Mexico, the facility is also referred to as a "state-of-the-art" facility similar to that in Palmerton (Collins 1993; Schultes 1993). The EPA has designated both facilities as using the "Best Demonstrated Available Technology" (BDAT) for processing K061 (Figure 21). According to EPA export documents, the system is the same as that used by Horsehead Industries Inc., which includes the Waelz kiln pyrometallurgical technology to produce commercial zinc (Grieder 1986). However, unlike its U.S. counterpart, there is not a second phase of the process. The hazardous waste is not sent on for further processing once the zinc oxide has been reclaimed.

Figure 21. The Zinc Nacional reclamation facility, Monterrey, Mexico.
Source: Greenpeace 1994.

The reported capacity of the zinc reclamation facility is 100 tons of K061 per day, or 36,500 tons per year (Greenpeace 1993). Since Zinc Nacional is receiving more than twice this amount from the United States., it is assumed that the remaining K061 is stockpiled on the site of the facility. Yet, the exact details concerning the capacity and the handling of hazardous waste at this facility cannot be obtained from the EPA (Alexander 1993).

A significant difference in the regulations between United States and Mexico is how hazardous wastes are stored. Whereas the United States. has a 90-day limit on hazardous waste storage, Mexico has no time-limit in its regulations (Perry and Klooster 1992). Hazardous material can and is stockpiled in Mexico for an indefinite amount of time without adequate disposal to contain or treat the stockpiled hazardous material (Figure 22).

Figure 22. The stockpiled residual of the recycled electric arc furnace dust at the Zinc Nacional facility in Monterrey, Mexico. Source: Greenpeace 1994.

According to EPA's export coordinator, the recycled slag residual is stockpiled in uncovered mounds on a 200-acre open lot (Schultes 1993). Though this area is not designated as a disposal site, the waste material has been piled on this lot for more than 40 years (Schultes 1993).

Currently, slag residue from the recovery process is piled up at the site to be used for multiple purposes throughout the state of Nuevo Leon. According to EPA official Joe Schultes (a member of the technical team that visited the site), the slag is used for road-fill throughout the state of Monterrey (Schultes 1993). After Zinc Nacional reclaims zinc oxide from the K061, the remaining slag is used in three ways: 1) as fertilizer for agribusiness in Mexico (Schultes 1993); 2) in its gravel form, the slag is used throughout the region as road-fill (Vincent 1993); and 3) for construction bricks and distributed to families throughout the area (Greenpeace 1993a).

As dictated by 40 CFR § 261 Subpart C, K061 exhibits hazardous characteristics and must continue to be covered before and after the reclamation process pursuant to RCRA (Varga 1994). Though the listing of K061 is currently under consideration within the EPA,⁴ the EPA does not permit this practice of using K061 slag for the use of construction bricks within the United States due to the potential of leaching of the slag residue. According to United States law, the ability of the hazardous waste to leach requires that the material be covered.

⁴ Encouraged by the Steel Manufacturing lobby, the EPA is currently re-evaluating K061 slag residual as a hazardous waste (Varga 1994). If the waste is de-listed the legal restrictions will no longer apply.

Chapter Summary

Based on government documents, this chapter illustrates the trend of U.S. exports to Mexico. This trend was established by analyzing 1) the directional and numerical trend of all U.S. hazardous wastes exported, 2) the facilities and regions from which waste is exported to Mexico, and 3) the environmental management practices of the facility to which the hazardous waste are destined. Furthermore, this chapter illustrates the incentives to export hazardous waste from the United States.

During the past six years, the trend to export hazardous waste to industrialized nations as opposed to developing nations has begun to reverse. In 1987, industrial nations, primarily Canada, were receiving 86 percent of the total hazardous export as compared to 14 percent received by developing nations. Within six years the industrialized nations and developing nations were receiving the same amount of hazardous waste from the United States.

Within this trend, it is apparent that the majority of the exported hazardous waste is shipped to countries close in proximity to the United States, Canada and Mexico. However, during the past six years, the amount of waste exported from the United States has been shipped increasingly to Mexico. In 1987 Mexico received 10,710 tons, approximately 11 percent, of the U.S. waste exports. By 1992, the amount of hazardous waste had increased 674 percent in which 72,178 tons, approximately 49 percent of total U.S. hazardous waste exports, were shipped to Mexico.

Furthermore, most of the facilities exporting hazardous waste to Mexico are located in the southern region of the United States. This trend complements both the steel industry's and the EPA's rationale of

exporting due to transportation costs in sending the waste to a reclamation facility within the United States.

However, a closer analysis illustrates that these exporting facilities are shipping their hazardous waste past reclamation facilities within the United States, directly to Mexico. Furthermore, when coupled with the data presented in the previous chapter, it is apparent that the regions that are increasing their shipments to Mexico are also the regions increasing the amount of generated K061 hazardous waste. This further demonstrates how much of the steel industry is moving south towards the U.S.-Mexico border.

According to the president of the Steel Manufacturers Association (SMA) "[i]f SMA-member companies can no longer send their K061 to Zinc Nacional for zinc reclamation, additional . . . K061 will flood the already saturated domestic market" (Collins 1991). Yet when Collins addressed this forum, the leading domestic zinc reclamation facility had a capacity of 435,000 tons a year of K061 to be processed, but had processed only 345,000 tons of K061 (HRD 1992). In 1992, Horsehead Industries Inc. had a processing capacity of 450,000 tons of K061 per year, 83,000 tons more than the amount of K061 processed (HRD 1993).

The actual incentive was more clearly stated by EPA official Rose Tonner. According to Tonner, though there are U.S. facilities that accept K061 hazardous waste for recycling and reclamation purposes, "companies are sending their wastes to Mexico because it is just cheaper per ton" (Tonner 1993). Although the exact cost to recycling K061 in the United States as compared to Mexico could not be obtained from the EPA (Potts 1993), Greenpeace, estimates the cost of recycling K061 at Zinc Nacional to be

approximately \$40.00 to \$50.00 per ton (Furtado 1993), 1/3 of the cost to send K061 to HRD (Greenpeace 1993^a). With this differentiation in costs, U.S. industries are encouraged to export wastes rather than seek cleaner technology developments.

EPA's import/export coordinator predicts that more United States companies will be sending waste and building more hazardous waste facilities in Mexico as disposal and reclamation costs in both the United States and Canada increase (Schultes 1993). "There is nothing wrong with this," states Schultes. "It's a matter of good business to do so. It has to happen. It's simply the wave of the future" (Schultes 1993).

Therefore, it is demonstrated that the trend of exporting hazardous waste to Mexico is attributed to not only Mexico's proximity to the United States, but rather due to the less stringent environmental regulations in Mexico and the increased cost of handling hazardous waste within the United States.

Based upon this chapter's documentation of the toxic properties and the increasing amount of hazardous waste shipped to Mexico, the following chapter will discuss the environmental and human health consequences of this export pattern.

CHAPTER 5

ENVIRONMENTAL AND HUMAN HEALTH CONSEQUENCES OF K061

This chapter addresses the environmental and human health consequences of K061 waste in the United States and in Mexico. The particular hazardous waste in this study is comprised of materials that are known to cause cancer and central nervous system disorders. If left in the open, K061 has been found to leach into the soil and ground water around it. In fact, the major zinc reclamation facilities in the United States have participated in the Superfund process as a result of this contamination. These facilities have either been designated Superfund sites or have received Superfund monies.

According to documents leaked from the U.S. EPA as well as studies by professors in the region in which the Mexican facility is located, there are significant health problems in the area caused, at least in part, by contamination of the soil and groundwater from the stockpiled hazardous waste. This chapter demonstrates the consequences of the continued production and disposal of this hazardous waste on all communities.

Effects of K061 Constituents on Human Health

The main threat to public health and the environment from the hazardous constituents of K061 is from lead and cadmium (CFR 1992 § 261.33). According to EPA Import/Export Coordinator Joe Schultes, an

average sample of K061 consists of iron, copper, and zinc, as well as lead, hexavalent chromium, cadmium, and nickel (Schultes 1993).

This study's analysis of the metals in the environment will focus solely on a few of the materials listed as hazardous constituents in K061 in 40 CFR Appendix VII, which include only lead, cadmium, chromium, nickel, and zinc (Table 15). Though zinc has not been proven to be as hazardous as the other constituents of K061, it will be briefly analyzed since it is the primary metal for which the K061 is sent to Mexico for reclamation.

TABLE 15
EFFECTS OF THE TOXIC CONSTITUENTS OF K061 ON HUMAN HEALTH

Toxic Constituent	Effects
Lead	Nervous System, Intellectual, Psychological, Sensory, and Neuromuscular Disorders
Cadmium	Listed as a Carcinogen by the EPA. Causes Reproductive and Pulmonary Cancer and Related Kidney and Liver Damage.
Chromium	Listed as a Carcinogen by the EPA. Causes Respiratory Cancer and Related Nasal Damage.
Nickel	Causes Pulmonary and Nasal Cancer. Increases Fetal Mortality Rates.
Zinc	Listed by the EPA as Toxic and Hazardous, Causing Fever, Chills, and Gastroenteritis. Non-EPA Studies Demonstrate Increases in Tumors and Stomach Cancer.

Source: Compiled by author.

Lead

Over the centuries many people have been poisoned by lead. During this century economically poor children in urban areas have been the primary victims of lead poisoning caused from the contamination of air, water, and food (Mahaffey 1978, 1). Lead poisoning in adults is usually occupational and due mainly to inhalation of lead dust or fumes (Spaulding 1992). According to OSHA, lead may cause adverse health effects such as stomach ailments, adverse reproductive effects, and damage blood-forming cells, kidneys, nerves, and potentially fatal to humans (OSHA). It has been documented that lead impairs the renal, hemopoietic, and nervous systems (Posner 1978, 173), which may lead to a deterioration of intellectual functions, sensory functions, neuromuscular functions, and psychological functions (Posner 1978, 176).

Lead is poisonous in all forms. It is one of the most hazardous of the toxic metals because it accumulates in many organisms, and its deleterious effects are numerous and severe. Lead may enter the human system through inhalation, ingestion, or skin contact.

Lead has proven to be a highly toxic metal because it produces a wide range of adverse environmental and human health effects. Fetuses and children are considered to be most susceptible to lead. Studies have found that environmental exposure to even low levels of lead can cause delays in the cognitive abilities and the central nervous system (ATSDR 1988; ATSDR 1990; Landrigan et al 1976) as well as other physical developmental, learning, and behavioral disorders (Needleman et al. 1979 and 1981; Landrigan 1975),

increased blood pressure, and reproductive disorders (Stowe et al. 1971; ATSDR 1988; ATSDR 1990).

Lead in the environment has proven to be highly damaging as it accumulates in various resources over time. Lead in water has been associated with mental retardation and hypertension (Mahaffey 1978, 5). Lead residue occurs in food as a result of the biological uptake of lead from pesticides and soils. Industries such as lead smelters have greatly changed the lead concentrations in dust and soils. In El Paso, Texas, persons living two miles beyond the smelter were found to have high concentrations of lead in their blood.

Among environmental hazards, lead is the single most frequent source of poisoning in domestic animals and wildlife. Because of their curiosity and their indiscriminate eating habits, cattle experience the greatest incidence of lead toxicity (Forbes 1978, 228). Among the sources of lead most frequently cited are fallout from smelters onto pastures and agricultural fields (Forbes 1978, 226). Though the cumulative effect of lead in the food chain is still uncertain, studies have shown lethal amounts of toxics in animals high on the food chain (Gish 1973).

Cadmium

Over the past few decades, the effects of cadmium on the environment and on human health have increased with the increase in its release during mining and smelting activities. Several studies deal directly with incidence of cancer among workers occupational exposed to cadmium, as well as studies providing evidence of increased mortality in cancer of the prostate and lung

(Elinder 1986, 211). Listed as a carcinogen by the EPA, the exposure of cadmium has been reported to cause an increase in the number of deaths due to chronic bronchitis and lung cancer in exposed humans as well as to cause reproductive harm, liver damage, and induce deficiencies in essential minerals such as iron, copper, and zinc (Kanzantzis 1990).

The principal chronic toxic effect of cadmium is on the kidney, causing low weights and renal failure (Landrigan 1982). After World War II, the fatal renal disease, known as Ranconi's Syndrome, also called itai-itai (ouch-ouch), named from the moan of the patients who suffered intense bone pains, was found in Japan. This disease was later identified as chronic cadmium poisoning resulting from the contamination of river water, soil, and food by cadmium (Kobayashi 1978, 200). A disease similar to itai-itai was found along the channel between Japan and Korea, which was polluted with cadmium, zinc, and lead (Kobayashi 1978, 207).

Chronic exposure to cadmium is associated with emphysema and, in occupationally exposed populations, with the development of prostate and lung cancer (Piscator 1981).

Chromium

Chromium is listed by the EPA as both a hazard and a toxic material (CFR 1992 § 261.24, § 261.3). Exposure to chromium has been attributed to an increase in respiratory cancers in occupationally exposed workers (Federal Register 1984; Mancuso 1975; Satoh et al. 1981; Korallus et al. 1982).

Chromium is emitted into the air during the manufacturing and use of metal chromates and is absorbed rapidly through inhalation (Langard et al. 1978).

Documented health effects include nasal tissue damage, including perforated septums (Cohen and Kramkowski 1973; Gomes 1972), ulcerated septums (Kleinfeld and Russo 1965; Cohen and Kramkowski 1973; Gomes 1972), nosebleeds, and inflamed mucosa (Gomes 1972). There is sufficient evidence of respiratory carcinogenicity in occupational workers exposed to high levels of chromium. In evaluating chromium, the Carcinogen Assessment Group of the EPA has classified chromium as Group A- Human Carcinogen (Federal Register 1984).

Nickel

Nickel is commonly emitted into the air from smelting and processing facilities. Nickel exposure has been attributed to an increase in tumors of the nasal cavities and lungs in occupationally exposed workers (EPA 1984).

Exposure to nickel has been documented to cause a higher incidence of fetal mortality (Ambrose et al. 1976; Schroeder and Mitchener 1971) from oral exposure (food and water), eye malformation in fetuses (teratogenic effects) (Sunderman et al. 1959), and cancer of the nasal cavities and lungs by inhalation (Doll et al. 1977; Padersen et al. 1973). In evaluating nickel, the Carcinogen Assessment Group of the EPA has classified nickel as Group A for nickel refining (EPA 1984).

Zinc

Zinc oxide and Zinc sulfate are the main metals extracted from the K061 in the reclamation process. Though zinc is not classified as hazardous in the United States and is less toxic than other trace elements, the effects on

the environment and subsequently on human health are numerous. In areas where a person has been exposed to zinc fumes, the reaction in humans has been reported to be fever, chills, and gastroenteritis (Prasad 1980, 51).

Furthermore, zinc toxicity that involves water, causes nausea, vomiting, fever, and severe anemia (Prasad 1980, 51).

Early demonstrations of zinc as a carcinogen have been found by Michalowsky (1929) and Falin (1940) where tumors were induced in cockerels when injected with zinc salts, such as zinc sulfate (Phillips 1980, 200). Though the relationship between malignancies and zinc ingestion is still uncertain, reports have indicated a correlation between excessive intakes of zinc and various forms of cancer in humans. In 1964, P. Stocks and R.I. Davies, working in England, found the ratio of zinc to copper to be high in gardens of individuals who had died of stomach cancer, while other researchers found the same relationship in Japan and Africa (Phillips 1980, 201).

Effects of K061 in the Environment

EPA- and industry- conducted studies report that the leachate of lead, chromium, and cadmium from EAF dust exceeds U.S. national concentration standards (U.S. EPA 1980). The result of the EPA's acetic acid method and the industry's distilled water method that demonstrated the EAF dust may leach harmful concentrations of lead, cadmium, and hexavalent chromium under relatively mild conditions. In the water solubility test, which would produce lesser leachate readings, EAF sludge waste demonstrated concentrations of chromium and lead of 94 parts per million and 2.0 parts per million, respectively (U.S. EPA 1980).

When exposed to a more acidic environment, such as a landfill or disposal environment subject to acid rainfall, the concentrations of lead, cadmium and chromium in the leachate would most likely be higher, as these metals are more soluble in acid than in distilled water (U.S. EPA 1980).

The leach test results in all cases, using two different method types, exceed national water standards (Table 16). Sample 5, supplied by Allegheny Ludlum Steel Corporation, used the distilled water method that would generally demonstrate milder results. However, even this method produced leachate results that exceeded nation water standards.

TABLE 16
LEACHATE TEST RESULTS OF K061

Metal	National Water Standard	#1 Sample (mg/l)	#2 Sample (mg/l)	#3 Sample (mg/l)	#4 Sample (mg/l)	#5 Sample (mg/l)	#6 Sample (mg/l)
Cd	0.05	0.05	2.84	3.85	4.8-13.4	3.5	-
Cr	0.1	<0.1	0.48	-	0.05	1,248.0	120.0
Pb	0.015	0.5	0.06	36.7	<0.2	0.3	0.16

Source: U.S. EPA, Listing Background Document, (Washington, D.C., 1980), 739.

Consequences of K061 in the United States

In the United States the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the subsequent amendment, the Superfund Amendments and Reauthorization Act (SARA) commonly referred to as "Superfund" provides federal funds to cleanup hazardous waste sites, and requires all "potentially responsible parties" for a particular toxic release to fund the cleanup. Further amendments of CERCLA established a public notification process for all remedial action, provide for citizens suits against private individual and public administrators (i.e. the President, or the EPA) for violating the Act, as well as requiring health assessments for families affected by the hazardous material around the site (USC 1990 §§9601-9675).

Superfund is administered by the EPA and requires it to respond to the initial discovery of a hazardous waste site by conducting a preliminary assessment of the alleged contaminated area to determine if the contaminant may present substantial danger to the public health, welfare, or environment (USC 1990 §§9602). If there is reasonable documentation of a contaminated site based upon the initial study, a site inspection is conducted in which the EPA conducts tests and monitors the area to determine the extent of and to rank the threat posed to the environment.

The collected information is used to determine the Hazard Ranking System score in which the EPA assesses the waste type, quantity, and toxicity, as well as the number of individuals potentially exposed, the route of exposure, and the vulnerability of water supplies. If the site scores a 28.5 or above, it may be proposed to be placed on the Superfund National Priorities

List. Potentially responsible parties for the contamination of the site are then identified and notified of their liability.

A remedial investigation of the hazardous waste site is then conducted to better determine the clean-up strategy. This investigation includes extensive sampling and laboratory analyses of the waste and the contaminated soil and water of the site to assess the risk to the environmental or human health of the community. A feasibility study is undertaken to evaluate alternative cleanup strategies and a clean-up is conducted. Further clean-up or "post clean-up" is conducted by the state in which the area is maintained to prevent future environmental and human health hazards (Buchholz 1993; Environmental Law Institute 1992; U.S. EPA 1994).

Facilities Exporting K061

According to the EPA export database, 15 steel mini-mills have exported K061 off-site to Zinc Nacional. Before these facilities began to export the K061, they either stored the hazardous waste on-site of their facility in containment units or sent the hazardous waste to be disposed in a landfill. From these past actions, each facility has been penalized for endangering the environmental and human health in the surrounding area. Seven of the exporting facilities have been reported as a potential hazardous waste site and inspected to ascertain whether the facility should be included on the EPA's National Priorities List for hazardous waste sites under the Superfund Amendment (U.S. EPA 1994). Furthermore, off-site to disposal facilities to

which the generating facilities sent the K061 are undergoing the superfund process as detected hazardous waste sites posing a threat to the environment.

The Department of Justice and the EPA filed complaint and compliance orders for nine of the fifteen facilities exporting waste to Mexico in violation of the hazardous waste export regulations under the RCRA (U.S. EPA 1991^b). These violations included shipping amounts of K061 to Mexico in excess of the agreed upon amount (U.S. EPA 1993^a; U.S. EPA 1991; U.S. EPA 1991^a; U.S. EPA 1991^b; U.S. EPA 1993^d), failure to submit an annual report summarizing the types, quantities, frequencies, and destinations of the exported hazardous waste (U.S. EPA 1991^d; U.S. EPA 1993^b; U.S. EPA v. CSRM Inc. 1991), and the improper completion of manifest documents for shipments to Mexico (U.S. EPA 1993^b; U.S. EPA v. CSRM Inc. 1991). The EPA recognized the regulation limitations of such violations in stating that ". . . the potential for harm to the environment cannot be readily assessed because the waste is shipped to a foreign country. . ." (U.S. EPA 1993^a).

While the exact number of incidents in which K061 shipments containing a high content level of radiation is unknown, three of the facilities exporting hazardous waste to Mexico, Border, Chaparral, and Nucor, were discovered to be carrying radioactive material in the K061 shipments (Beirne 1987; Beirne 1993; URS 1992).

Zinc Reclamation Facilities

This section profiles the environmental and human health consequences of two zinc reclamation facilities, 1) Horsehead Resources Development and 2) Zinc Nacional. Due to the lack of a right-to-know law in

Mexico, it is essential to profile the occupational health and the environmental record of a similar zinc reclamation facility in the United States to obtain an understanding of the probable environmental and human health consequences posed by the facilities in Mexico.

Horsehead Industries, Inc.

As of 1991, Horsehead Industries, Inc. (HII) employed approximately 582 persons within five of the facilities (HRD 1991). Of these 582 employees, 423 are represented by labor unions (HRD 1991). The following section includes penalties that the facility received for violating the workers occupational rights at two of the HII's facilities.

Health of the Employees at the Facility

During the period between September 1988 and March 1989, the Palmerton facility alone was penalized for violating 630 instances of willful violations of OSHA's lead standard, including overexposing workers to the substances (Department of Labor 1989). Although the permissible exposure limit (PEL) for lead, established by OSHA to prevent cumulative blood and neurological effects, is set at a maximum of 50 micrograms per cubic meter of air over an eight-hour period, OSHA found airborne lead concentrations more than 312 times greater (Department of Labor 1989, 2). The lead concentrations in the plant ranged from 69 to 15,600 micrograms per cubic meter of air (Department of Labor 1989). Workers in areas with excessive airborne lead concentrations had elevated levels of lead in their blood, ranging from 50 to 175 micrograms per 100 grams of whole blood

(Department of Labor 1989). The company knew about the necessary precautions, since it had been cited for lead violations three times previously in the past nine years (Department of Labor 1992).

Further citations during this time period included "serious violations" pertaining to hazards likely to cause death or serious physical harm to employees due to the failure to label chemical containers, provide material safety data sheets, and provide the required employee training, improperly stored of chemicals, safety equipment was not installed (Department of Labor 1989). Willful violations of various standards regulating labeling of the containers to be shipped off-site, access to employee medical records, noise, respirators, lead, arsenic exposure, and general housekeeping, were also violated (Department of Labor 1989).

Health of the Environment Around the Facilities

Horsehead Industries Inc. is affiliated with five zinc reclamation/processing facilities throughout the United States. The two facilities highlighted in this study are the Palmerton facility, managed by its Horsehead Resources Development division, and the Bartlesville facility, managed by its Zinc Corporation of America division. These facilities process the largest amount of zinc within the United States. Combined these two facilities are recognized as "state-of-the-art," yet both facilities are undergoing the EPA's superfund process.

Palmerton Facility. Horsehead Resource Development recycles hundreds of thousands of tons of K061 every year, touting itself as an

"economic recyclery." However, the Palmerton, Pennsylvania plant is on the EPA's Superfund hazardous waste clean-up list under CERCLA § 106 (a) and RCRA § 7003. The dust that was emitted into the environment has resulted in 2,000 acres now standing lifeless, as the facility's emissions defoliated the neighboring Blue Mountain. Other affected areas include surface and groundwater contamination of the only water source for more than 7,000 Palmerton residents (Toxics Law Reporter 1988, 2).

Local populations have filed suit against the facility for contaminating the ground water of two nearby communities by a 33-million ton "pile" of hazardous waste more than two miles long (U.S. v. Horsehead Industries Inc. 1992). According to the plaintiffs, "significant levels" of highly toxic chemicals have been detected in the hair and blood of area residents. The residents are in further danger due to the consumption of plants and animals with a high concentration of heavy metals, airborne dust and particulate, and contact with contaminated soil (U.S. v. Zinc Corporation of America 1988).

Bartlesville Facility. The Bartlesville, Oklahoma facility uses hydrometallurgical technology to recover the zinc, lead, and cadmium for further refining of the concentrate produced by the Palmerton facility. Recognized for its "state-of-the-art" technology, this facility has been under investigation by the Oklahoma state EPA for 10 years, and by EPA Region VI for the three years in which the facility has been undergoing a ranking process to be placed on the EPA's Superfund list.

On November 1, 1979, after several reports from neighboring residents with concerns of lead contaminated soil, the facility was assessed by the EPA.

A screen site inspection took place on June 1, 1981, which resulted in the removal of soil contaminated within the facility's property, as well as removal of soil throughout the community of Bartlesville, in which the K061 slag material had been use as fill-dirt. The EPA established that the contamination was caused by the ". . . improper use or disposal of slag and other waste material from the smelting process" (U.S. EPA 1993, 1).

According to Donn Walters one of the EPA's Environmental Protection Specialists and Community Relations Coordinator in the Superfund Division of Region VI, the clean-up and removal will be ongoing process (Walters 1993). Walters states that the affected areas are within a five mile radius of the facility, in which soil, air, and potential ground and surface water have been contaminated by lead and cadmium. Soil tested and excavated within a eight square mile area surrounding the site contained 500 parts per million for lead and 30 parts per million for cadmium. These levels required an immediate emergency removal by the EPA, allowing the area to be funded by Superfund before even being officially placed on the list. The excavated areas include a school playground, parks, day care centers, and residential yards. Although the Superfund money was spent to conduct these service and the subsequent remedial investigations and remedial designs (September 22, 1992) at this facility, the facility has yet to be placed officially on the National Priorities List (U.S. EPA 1994). The site is considered an EPA "pilot project" under the Superfund Accelerated Model (SACM) in which the facility is receiving funding for a rapid clean-up.

In 1991 and 1992 studies were performed by the Oklahoma Department of Environmental Quality (ODEQ) on the public health assessment for the

areas affected by the hazardous waste in Bartlesville. The test results indicated that approximately 14 percent of the children living within the lead- and cadmium-contaminated areas had blood lead levels greater than the Centers for Disease Control advisory level of 10 micrograms per deciliter.

Consequences of K061 in Mexico

Various tests have been performed by the EPA of the environment in and around the Zinc Nacional facility. According to EPA's attorney George R. Alexander, Jr. of EPA Region VI, one such visit was in February 1993 in which the EPA supported Mexico's Secretaria de Desarrollo Social/Instituto Nacional de Ecologia (SEDESOL/INE) during a technical assistance visit to Zinc Nacional. The EPA furnished SEDESOL with two reports from this visit: 1) a preliminary site assessment report and 2) a final report containing sampling results.

Though the tests were performed and the reports written by the U.S. EPA with U.S. taxpayer money, copies of the reports could not be obtained by the general public. According to Alexander, the reports are withheld as "Country to Country Confidential" in accordance with Article 16 of the La Paz Agreement of 1983 (Alexander 1993).

The initial denial was appealed on the grounds that this withheld document clearly constituted an "agency record" under 552 (a) (4) (B) of the FOIA since the EPA was in possession of the document at the time of the request. As pursuant to the "Country to Country" confidential under the La Paz Agreement of 1983, disclosure of the information is to be provided if the third party (in this case, the Mexican government) gives consent. Greenpeace

Mexico obtained written consent from the Mexican authorities from the Instituto Nacional de Ecologia, SEDESOL. The information has yet to be furnished to the public by the EPA (Walsh 1994). But, while the EPA is withholding the reports for unfounded reasons, the report in question has been leaked to me for the purpose of this study.

The following section profiling the consequences to environmental and human health in a region of Monterrey from the practices employed by the Zinc Nacional facility is the compilation of these EPA reports, a report conducted by two professors at the University of Monterrey, Mexico, and samples and test results from an independent lab provided to the author by the international environmental organization, Greenpeace.

Health of the Community Surrounding the Zinc Nacional Facility

Many of the related health consequences of the toxic constituents of the hazardous waste reclaimed at the facility may not appear until several years of continued exposure due to the properties of the hazardous waste. But two professors at the University in Monterrey, Mexico have studied and documented the comparison between the mortality rate and the principal cause of death in Mexico, the state of Nuevo Leon, in Monterrey, and four surrounding communities of the Zinc Nacional facility (Ahumada and Cano 1993).

The study demonstrated that the state of Nuevo Leon suffers from circulatory related deaths 3 percent more than the national Mexican average, deaths caused by malignant tumors more than 30 percent than the national

average, and deaths caused by diabetes in more than 20 percent than the national average (Table 17).

The principal types of cancer reported in the state of Nuevo Leon compared to the types of cancer reported nationally also varied greatly.

TABLE 17
CAUSE OF DEATH IN THE STATE OF NUEVO LEON:
COMPARISON TO THE NATIONAL AVERAGE, 1986

Cause of Death	Per 100,000 habitants	% of Nat'l Average
Circulatory	95.33	103.08
Malignant Tumor	61.23	130.52
Diabetes	53.42	120.55

Source: Ahumada, Horacio Tovalin and Raul Rubio Cano. "Efectos en la Salud de una Poblacion Vecina a una Planta Recicladora." Unpublished. (Monterrey, Mexico, 1993). p. 3, table 1.

The principal types of cancer found in the state of Nuevo Leon are lung, stomach, breast, and leukemia. Lung cancer is more than 115 percent more common, breast cancer more than 77 percent more common, stomach cancer is more than 20 percent more common, and leukemia more than 9 percent more common in Nuevo Leon than the rest of Mexico (Table 18).

TABLE 18
DEATH RATE FOR DIFFERENT TYPES OF CANCER
IN NUEVO LEON, 1986

Type of Cancer	Per 100,000 Habitants	% of Nat'l Average
Lung	11.99	215.26
Stomach	5.83	120.45
Breast	3.95	177.92
Leukemia	3.13	109.44

Source: Ahumada, Horacio Tovalin and Raul Rubio Cano. "Efectos en la Salud de una Poblacion Vecina a una Planta Recicladora." Unpublished. (Monterrey, Mexico, 1993). p. 4, table 2.

Further, Ahumada and Cano's study found that the population exposed to the emission control dust experiences general symptoms of respiratory and skin problems. The study demonstrated an increase in reports of skin cancer, leukemia, congenital malformation, and low birth weight among the local population surrounding the zinc reclamation facility as well as problems with liver failure and hypertension (Table 19).

TABLE 19
DISCOMFORTS AND ILLNESSES:
PERCENTAGE OF THOSE AFFECTED IN THE VICINITY OF
ZINC NACIONAL AND THE CONTROL GROUP

Discomforts & Illnesses	Vicinity of ZN	%	Control Group	%
Irritation of eyes and respiratory	179	19.8%	66	8.9%
Allergies	116	12.8%	82	11.0%
Sleeping Problems	74	8.2%	28	3.7%
Bronchitis	69	7.7%	34	4.6%
Ear Infection	59	6.5%	18	2.4%
Excessive Fatigue	63	6.9%	19	2.5%
Skin Irritations	80	8.8%	20	2.7%
Hypertension	48	5.3%	35	4.7%
Asthma	34	3.8%	24	3.2%

Source: Ahumada, Horacio Tovalin and Raul Rubio Cano.
"Efectos en la Salud de una Poblacion Vecina a una Planta
Recicladora." Unpublished. (Monterrey, Mexico, 1993). p. 19-20,
table 7.

Results of a study conducted in four communities surrounding the facility, as compared to a control group within Monterrey, documented that

currently the neighboring populations to the Zinc Nacional facility experienced a 95 percent higher risk of skin cancer, fatigue, eye and ear infections, and bronchitis (Ahumada and Cano 1993).

Health of the Environment In and Around the Zinc Nacional Facility

The EPA performed a site assessment at the Zinc Nacional facility in which potentially hazardous locations were sampled. These tests included ten sediment and three wastewater samples, of which two were analyzed. The samples were tested (pursuant to 40 CFR § 261.24) by the Toxicity Characteristic Leachate Procedure (TCLP), that assesses whether the sample is hazardous or not, and the Extraction Procedure (EP), assessing whether the sample can be disposed safely or if it must be treated. Within the United States the regulation standards for both these tests are the same (cadmium has a regulatory limit of 1.0 mg/l, and lead has a regulatory limit of 5.0 mg/l).

Three of the sediment samples exceed the U.S. TCLP limits, one of which also exceeded the Mexican TCLP limits (Keepper 1993). Further, both of the analyzed wastewater samples exceeded the U.S. discharge standards. Sediment at the confluence of the drainage pipe and ditch (Arroyo) exceeded both the United States and Mexican TCLP concentration by 310 percent for cadmium, while lead exceed U.S. land treatment standard by 860 percent. Additionally, sediment samples from the drain box of the storage area exceed U.S. land treatment standards for both cadmium and lead. Lastly, old slag exceeded the U.S. land treatment standard for lead.

The following data, provided by Greenpeace, demonstrates similar test results to those conducted by the EPA at the Zinc Nacional facility (Table 20). These tests were taken by Greenpeace officials and analyzed by the Citizens' Environmental Laboratory in Massachusetts. The laboratory utilized a flame atomic absorption analysis method on a Perkin Elmer Model 5100 spectrophotometer, in which the samples were digested in nitric acid and hydrochloric acid. Each test is compared to the maximum allowable contamination level in drinking water as guided by the National Primary Drinking Water Standards for the United States.

TABLE 20

TEST RESULTS* OF SEDIMENT AND WASTEWATER DISCHARGE FROM ZINC NACIONAL
AS COMPARED TO U.S. NATIONAL PRIMARY DRINKING WATER STANDARDS

Constituent	National Standard	I	II	III	IV	V	VI
Cadmium	0.005	21.7	22.3	874.0	513.0	15.6	1490.0
Chromium	0.1	0.49	0.70	22.1	28.4	0.12	127.7
Lead	0.015	9.63	18.3	4,400.0	2270.0	2.06	9120.0
Nickel	0.1	0.503	0.565	42.9	28.7	0.504	100.5
Zinc	5.0**	40,250.0	75,250.0	597,000.0	144,000.0	2,432.0	360,000.0

Source: Compiled by author from 40 CFR part 141 and the Citizens' Environmental Laboratory, Toxic Metals in Water and Sediment Samples. (Boston, Massachusetts, 1992).

* All samples are represented in mg/l, equivalent to parts per million (ppm).

** Secondary Maximum Contaminant Level is not enforceable, merely used as a guideline.

Samples of Zinc Nacional's sediment and wastewater discharge were taken by Greenpeace in December 1991 (Table 21). The laboratory analysis indicated exceptionally high levels of cadmium, lead, and arsenic in the water samples, as compared to U.S. drinking water standards.

TABLE 21
TEST RESULTS OF TOXIC METALS IN WATER
SAMPLES FROM ZINC NACIONAL

Constituent	National Standard	Sample 1 (mg/l)*	Sample 2 (mg/l)*
Cadmium	0.005	5.54	9.57
Lead	0.015	0.46	1.93
Zinc	5.0**	55.5	8.31

Source: Citizens' Environmental Laboratory, Toxic Metals in Water Samples. (Boston, Massachusetts, 1993).

* mg/l is equivalent to parts per million (ppm).

** Secondary Maximum Contaminant Level is not enforceable, merely used as a guideline.

In 1992, Mexico's Federal Environmental Protection Agency (SEDESOL) closed Zinc Nacional for violating environmental regulations until Zinc Nacional improved its waste water treatment system. In October 1993 Greenpeace returned and took further samples of the water (Table 20). The

results of the water samples again indicated high levels of lead and cadmium (Citizens' Environmental Laboratory 1993).

Chapter Summary

Electric arc furnace dust (K061) has been scientifically proven to be hazardous in all forms due to the effect from its carcinogenic and toxic properties on both the environment and humans.

In the United States this hazardous waste has become highly regulated since 1986. Despite the regulations, facilities generating and importing this waste still pose a threat to both the employees of the facilities and the communities in which they are located. Repeatedly, the facilities exporting hazardous waste to Mexico violate RCRA, CERCLA, and OSHA regulations. Furthermore, disposal and reclamation facilities within the United States accepting this hazardous waste are on the national priority's list as a leading environmental and human health threat, in which the air, water, and soil in the communities have been contaminated and require cleaning up and excavation.

However, the CERCLA, RCRA, and the right-to-know regulations do not apply to the hazardous wastes from the United States once they once they have crossed the border into Mexico. Thus, information on the effects to the environment in Mexico from the United States exports is difficult to obtain

The leaked results of environmental sample from the EPA and the limited Greenpeace data from the reclamation facility in Mexico,

both document high lead and cadmium in both the sediment and the water. These studies coupled with the health studies in the region documenting an increase in EAF dust related illnesses illustrate the industrial and international government practices of exporting superfund sites from the United States into Mexico.

CHAPTER 6

CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS

This thesis demonstrates that international and domestic policy decisions guided by economic development practices have had detrimental environmental effects on a targeted community in Mexico. This study questions the process and the distributional outcome of U.S. export practices that facilitate the transboundary movement of hazardous waste. This issue is addressed by examining the seven year trend of hazardous waste exports to Mexico. This case study provides a detailed perspective of the waste trade, which is essential in answering the research questions and assessing the validity of previous research.

The method employed in this thesis, re-compiling and analyzing government documents, addresses the issue of the transboundary movement of hazardous waste. Although the original data was documented by the hazardous waste industry and gathered by the EPA, neither of these groups want to divulge the problems to the public. Industry will not disclose the information directly to the public. Further, the underfunded EPA does not have the resources to address all the environmental issues. By exporting hazardous waste from the United States, the EPA is relieved of administrative duties and clean-up costs. Therefore, this thesis brings forward and makes public information that otherwise would not be known to environmental researchers and activists.

This study asked whether Mexico was becoming the new dumping ground for undesirable hazardous waste by-products from the United States. Several research questions, based on findings and assumptions made in past studies, tested the possible incentives for the export by examining the distribution and process of the transboundary movement of hazardous waste.

The analysis of the data collected for this thesis clearly depicts the deliberate export practices of the hazardous waste generating industries in the United States. Although the environmental regulations within the United States are intended to motivate "dirty" industries to develop cleaner production systems, this intention has been side-stepped by certain industries, that export the hazardous waste for "recycling," with its grave environmental and human health impacts, rather than taking measures to reduce the waste. This side-stepping approach has been used with the knowing consent of the governments of both countries, despite provisions in U.S., Mexican, and international law.

The assessment of this data further provides a lucid illustration of the unequivocal factors attributing to the incentive of industry to export hazardous waste from the United States.

Summary of Findings from the Research Questions

Increased hazardous waste regulations, disposal costs, and citizen action within the United States have encouraged industry to send its hazardous waste to Mexico. U.S. companies have avoided pollution prevention policies by sending wastes, classified by the EPA as both hazardous and toxic, containing high levels of lead, cadmium, and chromium, to one

hazardous waste facility south of the U.S.-Mexico border. Rather than exporting zinc to a zinc reclamation facility, the U.S. companies are admittedly sending hazardous waste, containing lead, chromium, and cadmium, with just enough added zinc to be accepted into Mexico.

This thesis demonstrates that though the amount of K061 generated in the United States has been constant from year to year, the amount of this hazardous waste exported to Mexico has increased sevenfold since 1987. Furthermore, the exported waste is coming from an increased number of steel mills, and traveling increased distances. Because treatment costs in Mexico are one-third that of treating and disposing of the material in the United States, both the EPA and the Steel Manufacturers Association are promoting this export as an economically wise investment without promoting incentives for cleaner production systems and with little concern for environmental impact.

Exported for "recycling," the hazardous waste is used in Mexico for purposes that are either highly regulated (road fill) or not permitted (construction material) in the United States. Both of these practices have been documented by the EPA as environmentally destructive.

The technology employed and legal requirements between the United States and Mexico are notably different. By comparing a similar technology used at a U.S. zinc reclamation facility with that of a Mexican facility, this study documents the environmental and human health hazards posed by the technology employed by the Mexican facility. Although the United States has rigid requirements concerning the handling of the waste, the U.S. zinc reclamation facility remains on the EPA's superfund site list. Meanwhile, the

technology currently used in Mexico utilizes only half of the reclamation processes employed in the United States. While reclaiming the zinc in Mexico, the hazardous constituents of the waste are stockpiled in an open area for unlimited time periods.

The author was denied access to certain government documents for purposes of this study. Therefore, other studies conducted in and around the Mexican reclamation facility by private organizations and individuals have been used to demonstrate environmental degradation far beyond what would be permitted in the United States. Although the health effects on the population surrounding the zinc reclamation facility in Mexico could not be accurately documented, this study demonstrates that the local population has a 95 percent higher risk of skin cancer, and eye, ear, and lung infections--the consequences documented by further studies of the hazardous constituents.

If permitted, industry will continue to find regions where it can relocate polluting facilities. Public policy, both nationally and internationally, must force the polluter to be accountable for the environmental degradation and provide citizens with access to the environmental decision-making process. Until these issues are addressed, the problems of increased environmental and health risks will continue to spread into international communities in the name of "economic development."

One of the primary purposes of developing hazardous waste regulations, such as RCRA, was to encourage the elimination or reduction of hazardous waste. However, due to loopholes in these laws, hazardous waste-generating industries have sought to merely transfer their dirty technologies

abroad rather than attempt to comply with the spirit of the U.S. hazardous waste regulations.

Global Implications

This individual case study affirmed several factors of past transboundary waste studies, while disproving others. By analyzing the data collected to answer the research questions, incentives to export hazardous waste were identified for the United States in particular. This study does not solely pertain to the United States and Mexico. The following section outlines the implications of this study on a global level for academics, governmental policy makers, and environmental activists.

Transboundary Movement of Hazardous Waste

Contrary to past studies, the amount of hazardous waste generated in the United States did not parallel the increasing amount of hazardous waste shipments exported to Mexico. In documenting the generation of one particular waste type, this study illustrates that while the generated amount remains constant, the amount of waste exported and number of shipments have increased (Figure 23).

This fact implies a greater severity of the direction of the transboundary movement of hazardous waste. Although the regulations guiding the disposal and treatment and the generation of this waste have not altered during the seven year span of this study, this finding clearly depicts the blatant intention of the waste industry to export wastes to politically- and economically-powerless communities, beyond the U.S. border.

Figure 23. Amount of exported waste type (K061) generated each year (represented in thousands of tons) compared with the number of shipments of the waste type. Source: Compiled by author.

While discovering that amount of waste generated does not contribute to the amount of waste export, this thesis identifies the leading attributes of the transboundary movement of hazardous waste. The direct attributes primarily include:

1) *Proximity* of a developing nation to the industrialized nation contributes immensely to the destination of hazardous waste. This attribute can be evidenced by virtue of the fact that Mexico is not only the closest developing country to the United States, but it happens to be receiving more than 50 percent of all U.S.-exported hazardous waste.

Further proof of this is demonstrated through the government export documents depicting the regions within the United States from which the waste is exported. In comparing the waste export trend throughout the past

seven years, this thesis illustrates the increase in wastes exported and the industries exporting from southern regions.

This attribute has not been documented in past studies on the transboundary movement of hazardous waste. To understand this attribute it was essential to analyze an actual case study. By tracking hazardous waste from "cradle-to-grave," this document is valuable in that it will help future researchers predict which areas will receive U.S. waste exports. This will allow for a greater in-depth understanding of issues pertaining to the transboundary movement of hazardous waste.

2) *Unequal trading partners.* Without a uniform standard of environmental regulations and enforcement, hazardous waste exports will increasingly flow along the path of least resistance. This thesis demonstrates the unequal enforcement of the handling, storage, and disposal regulations between the United States and Mexico. As a result, the cost of exporting hazardous waste to Mexico is approximately one third of the cost of handling the waste in the United States.

U.S. laws hold the hazardous waste-generating industries potentially liable for any environmental and human health hazards this waste may cause in the future. Yet by exporting the waste for recycling purposes, industries are absolved of any future responsibility.

3) *Inability to participate in the political process.* Although guaranteed by international human rights treaties, U.S. economic development practices within Mexico do not support the rights of individuals to a safe environment. As demonstrated by the limitations on the method used in this thesis, the "right-to-know" is denied to individuals on both sides of the

U.S.-Mexico border. Information documenting the effects of U.S. export practices was denied without proper justification. Furthermore, individuals directly victimized by these hazardous practices are not granted the right-to-know of the hazardous threat posed to their community.

Industries are further motivated to export due to international and domestic laws that supports political oppression. The right to appeal and to seek compensation for environmentally-destructive practices is supported domestically within the United States as provided under RCRA and CERCLA. However, this international human right is not supported when hazardous waste is imported into Mexico. Hazardous waste exported to Mexico is legally classified as a "recyclable product" as it crosses the border. These laws absolve the industries, which, in turn, economically benefits the governments overseeing the process of any related environmental and human health consequences.

International treaties state that humans have a right-to-know, to appeal, and to seek compensation. However, these rights are continuously denied as wastes move across the border. Although the EPA has conducted studies on the area in and around the facility, these documents will not be given to the public--exempt from disclosure by the very document by which the waste is permitted to enter into Mexico. Furthermore, the citizens in Mexico have less of a legal ability to be informed of the hazards in and around their community, with absolutely no right to compensation for injuries caused to them by the facility's hazardous and environmentally degrading practices.

Environmental Justice

This thesis depicts the possible expansion of environmentally unjust development practices coupled with government decisions victimizing powerless communities internationally. Environmental justice studies, previously reviewed, have identified inexpensive costs of operation, weak environmental regulations and enforcement, poverty, and lack of political opposition as the primary factors contributing to unjust industrial practices and government policy.

This thesis demonstrates that environmental justice is not merely a domestic issue. As other studies have demonstrated (Bullard 1990, Chavis 1993), the unjust practices of polluting industries can only be stopped through the citizens' rights not only to know, but to decide what industries will and will not operate in their communities. The method employed in this study demonstrates that these rights still do not fully exist in our country and exist to an even lesser extent in developing countries. Without banning the industries from exporting hazardous waste, for any reason, these practices will continue.

Furthermore, this case study of the movement of hazardous wastes can be used as testimony to the EPA of the environmental injustice that will be further committed if the EPA deregulates particular hazardous wastes. The deregulating of the wastes would further the environment injustice by allowing industries to export their wastes without having to pay the cost of state-to-state permits. This action alone could increase the rate at which hazardous waste is exported by assuring a greater economic advantage to shipping wastes to areas with inexpensive land and minimal political

organization. This would further take incentive away from the generators to require them to consider alternatives that would otherwise reduce or eliminate the amount of hazardous waste generated.

Maquiladora

As demonstrated with the studies of the Maquiladora industry, the incentive to re-locate or, particularly with this study, the incentive to export hazardous waste, is attributed to 1) less stringent environmental legislation, 2) the proximity, and 3) the low cost of operation with regard to transportation and treatment, as discussed previously. Although this imported waste is not governed by the same laws governing the Maquiladora industries, the findings of this thesis illustrate an extension of the dirty industries, supported by U.S. industrial practice, beyond the immediate U.S.-Mexico border.

Suggestions for Future Research

This thesis concentrates on the procedural and the distributional outcome of the hazardous waste exported to Mexico for recycling purposes. However, there are several areas not addressed by this study concerning other waste types exported, the extension of environmental injustice with transboundary industrial practices to areas without right-to-know legislation, and the expansion of the Maquiladora industries within Mexico.

The waste type documented in this study is not the only waste exported from the United States and other industrialized nations. Waste that is not classified hazardous, yet has detrimental effects on the receiving

communities, is commonly exported from an industrialized nation. Although there is a new global ban of hazardous waste exported from the industrialized to the developing nations, this ban does not include "safe recyclable wastes" such as scrap metal, plastic, textile, and plastics.

Further, the documented waste type is the incinerated dust of scrap metal. However scrap metal itself is not considered hazardous. Therefore, the data on the hazardous waste exported to Mexico did not label the scrap metal directly exported as a "recyclable" product. Yet, Mexico and other developing nations around the world continue to import this lead-, cadmium-, and chromium-ridden product. Thus, further research could track the exportation of the scrap metal directly to steel mini-mills overseas and the environmental and human consequences of this action.

Secondly, studies are needed which document the transboundary movement of hazardous waste as an environmental justice issue. In particular, studies concerning and expanding upon the right-to-know of dangers posed to these communities, is paramount. The right-to-know laws in the United States has empowered communities to force facilities to clean-up their industrial polluting practices. However, this right has not been enforced internationally, thereby motivating polluting industries to re-locate to politically powerless communities.

The General Law in Mexico does not provide for the public reporting of toxic releases required by the Superfund Amendments and Reauthorization Act's--the "community right-to-know" provisions. Under NEPA (National Environmental Policy Act) an environmental impact assessment is required in which alternative actions must be analyzed and public participation is

mandated. However, Mexico has no similar regulation. In fact, the laws and judicial system generally do not permit citizen suits to enforce environmental laws. Mexican citizens are then left with limited ability to bring actions in U.S. courts for injury caused by U.S.-owned corporations operating in Mexico.

Therefore, there is a need to further study the implications of development in regions in which the international right to information and compensation from hazardous industries is not enforced. This can be achieved by utilizing the environmental justice framework as outlined by environmental justice leader Carl Anthony. This framework includes five dimensions of analyzing the benefits and burdens of environmental and social effected areas (Anthony 1992). The five areas of study include 1) biological well being, 2) psychological and spiritual well being, 3) sustainable (appropriate) technology, 4) access to resources, and most importantly, 5) control and decision-making.

In particular, further research is needed in Monterrey to measure the right to environmental decision making within local communities, the biological consequences in Monterrey from a lack of this right, and an analysis of the psychological and spiritual well being and access to resources dimensions. This research is needed to provide an analysis of the control and decision-making process within the study area. These areas were difficult to study based on information from various agencies within the United States. More field research in the Monterrey region could provide valuable insight into the benefits or burdens this community experiences as well as provide

policy-makers with information on the environmental and human health implications of development without this right.

Lastly, further research is needed on the extension of the Maquiladora industries. Though the facility documented in this study is not a U.S.-based company, the growth of the trade in hazardous waste is directly attributed to the same incentives as those for the U.S.-based industries within the Maquiladora zone. This study portrayed the direction steel mini-mills are re-locating. Further research can address the geographical distribution and procedural process of other "dirty" industries in Mexico.

This expansion of the "dirty" industries can be documented by answering the following questions: Where are "dirty" industries located throughout Mexico? How long have these companies been operating in Mexico? What are the practices employed by these industries? What technology is being employed? Who owns these industries? Who benefits and who bears the cost of the growth of these industries? What is the environmental and human health consequences to the local communities? How sustainable are their practices to the local community?

Recommendations

This thesis assesses important aspects of environmentally destructive policies and practices that are in immediate need of political and economic reform and further research. Citizen activists, environmental organizations, scientists, and policy-makers throughout the United States are identifying substances harmful to humans and the environment and are creating policies to curb their production. However, while these toxic substances are banned

or highly regulated in the industrialized countries, the export and use of the substances in developing nations is permitted. The resulting effect is one in which powerless communities throughout the world are bearing the environmental cost of industrialized societies.

Attempts are made to alter this practice, yet loopholes still remain. Recently attendees of the Basel Convention (March 25, 1994) signed legislation stating industrialized, OECD nations will no longer be able to export waste for recycling to developing, or non-OECD, nations as of December 1997. This global ban is believed to provide an end to toxic colonialism by banning the trade in polluting wastes (Knickerbocker 1994, 16). However, this ban is not complete. With Mexico as a new OECD country (as of April 1994), the United State's new trading partners will be allowed to import hazardous waste. Thus, prohibiting the export and import of hazardous waste between the United States and Mexico will be more difficult.

Furthermore, as the loop tightens, banning the import/export of hazardous waste between OECD and non-OECD nations, industry is working to redefine the definition of hazardous waste and to de-list its wastes from the hazardous waste list. In particular, this holds true for K061 which is currently under consideration by the EPA to be de-listed (Varga 1994). If de-listed, the trade of hazardous waste will continue and cleaner technologies will not be sought.

What does this imply about environmental policy? How can this study be used to implement democratic environmental rights of local communities and re-establish socially responsible environmental democracy and justice policies? This thesis can be used to understand the relationship between

environmental degradation and human rights abuses. More specifically, it can be used to address the resulting effect of the environmental inequities of industrial practices and governmental policies.

To address this issue, policy-makers must adopt a national and international environmental framework incorporating the right of all individuals to be protected from environmental degradation. This can be accomplished by three legislative regulations to accompany all national and international development issues:

- Implement a global ban of all substances harmful to humans and the environment.
- Strengthen the enforcement of national laws and implement and enforce international right-to-know treaties.
- Adopt and develop clean production systems and the transference of biologically safe technologies internationally.

A global ban of the transboundary movement of all environmentally harmful substances should include hazardous and nuclear wastes, as well as pesticides, insecticides, herbicides, fungicides, and fumigants. As demonstrated in this thesis, until a ban is implemented, dirty industries will continue to seek new communities in which to place their polluting technology.

This policy must accompany the implementation and enforcement of an international right-to-know law, which will enable the public access to information and the ability to participate in the sustainable development process. If a global ban in the transboundary movement of these hazardous materials is implemented, the industries are likely to re-locate their industry across the border and ship the non-hazardous product to the consumers in

the north. This right must include the right to information, the right to appeal, the right to compensation, and most importantly, the right to decide. This right will empower all individuals within a community to decide what economic development will occur and what technology will be employed. As demonstrated by the method employed in this thesis, this right is denied to individuals in both the United States and in Mexico.

This environmental and economic policy will provide a strong foundation for the prevention of environmentally- and occupationally-destructive practices and technologies. By enabling citizens the ability to participate in the development process, industry will be encouraged to use cleaner production systems which preserve the earth's biological balance and sustain all communities equally.

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APPENDIX A

SAMPLE LETTERS FILED TO REGULATING AGENCIES
AS PURSUANT TO THE FREEDOM OF INFORMATION ACT

- I Notifier/Handler List
 Reminder Notice
 Appeal
- II Notification of Intent to Export
- III Notification Reports
- IV Annual Reports
- V Biennial Reports
- VI National Biennial RCRA Hazardous Waste Report
- VII Technical/Enforcement Documents
- VIII Self Reporting Data
- IX Zinc Nacional Documents
 Re-submission
 Appeal
- X Occupational Safety and Health Administration Documents
- XI Fee Waiver Request

2 November 1993

Damita David
U.S. EPA Region IV
Freedom of Information Office
345 Courtland Street, NE
Atlanta, GA 30365

Dear Ms. David:

As per our conversation this morning, I am sending you a specific request of environmental regulatory information from Region IV to complete a study on the Hazardous Waste Trade. This is an edited version of the original request which I sent May 25, 1993. Please provide me with hazardous waste (K061) documents including, but not limited to, the following information for the years of 1987 to the present:

- List of the K061 generators (including address, telephone number, and contact name) in Region IV.
- Amount of K061 material each generator has generated per year in Region IV.
- List of facilities in Region IV (addresses, telephone numbers, and contact names) that handle K061 for disposal, treatment, storage, recycling, and/or reclamation.
- Amount of K061 material disposed, treated, stored, recycled, and/or reclaimed in these facilities per year in Region IV.

Other EPA regions have provided this information from the RCRA Notifiers List for the specific waste code type (K061), the RCRIS Handler Waste Code Report, and the RCRIS Notifiers List.

Thank you for the assistance. Please do not hesitate to call me at (408) 353-1183 if you have any questions.

Sincerely,

Rachel M. Dinno

August 12, 1993

Charlotte B. Hudgins
Freedom of Information Office
U.S. EPA--Region IV
345 Courtland Street, N.E.,
Atlanta, Georgia 30365

RE: Freedom of Information Act request 04-RIN-01832-93

Dear Ms. Hudgins:

This letter is in response to the past several telephone conversations, the last being August 5, 1993, concerning my request which you received June 1, 1993.

There appears to have been lack of proper handling in regards to my request under the Freedom of Information Act. I have yet to receive a proper reply since the last conversation, or for that matter, throughout this process regarding the June 1, 1993 request. Therefore, I am writing to:

1. Remind you of the material from the written and verbal requests; edited from the original. I believe my request was fairly specific, asking only for any and all documents pertaining to KO61, in regard to:
 - List of generators, treatment, disposal, and storage facilities, and transports that handle KO61 in Region IV. To include but not limited to, contact names, address, and phone numbers.
 - Amounts of KO61 generated, stored, treated, transported, and disposed in Region IV, as well as the amount exported from Region IV.
 - Any and all documents in the possession of EPA Region IV pertaining to KO61; constituents, residual from treated material, studies, investigations. These documents can include, but should not be limited to, memoranda and notes.
 2. Amend the original request in asking that if any of these documents requested are denied, I request that you specifically identify each document that EPA is withholding, as well as the legal reason for such withholding.
-

3. Remind you that your office is in violation of my rights under FOIA in regards to my June 1, 1993 request. Due to this unexpected delay, I request that you promptly reply in writing with a date which I can expect to receive the requested material.

I appreciate your time and consideration, and look forward to your prompt compliance with FOIA in providing me with the requested information.

Sincerely,

Rachel M. Dinno

19 October 1993

Charlotte B. Hudgins
Freedom of Information Office
U.S. EPA--Region IV
345 Courtland Street, N.E.,
Atlanta, Georgia 30365

RE: Freedom of Information Act request 04-RIN-01832-93

Dear Ms. Hudgins:

This is a letter of appeal pursuant to the Freedom of Information Act, 5 U.S.C. §552(a)(6). Your office is in violation of the FOIA as I have not received requested information within a reasonable amount of time.

On May 25, 1993 I sent a letter under the FOIA requesting a list of all handlers of K061 which should include generators, transporters, storage, and disposal facilities. This list was to include names, addresses, phone numbers, and amounts of K061 handled for the years of 1988 -1993. This request was assigned FOIA number 04-RIN-01832-93 and an acknowledgment letter was sent to me on June 1, 1993. To date I have spoken with your office (mainly Pauline Anderson) twenty-two (22) times via phone, written letters to remind you of the request, and letters regarding fee waivers. I have not received any of the material requested.

I expect a reply as to the status and the legal reasoning for the holding of this material within the twenty (20) working-day time limit. If I do not receive a reply within this time I plan to initiate all necessary administrative and legal recourse to obtain the requested information.

Sincerely,

Rachel M. Dinno

18 November 1993

Jeraline B. Green
Freedom of Information Officer
Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

RE: Notification of Intent to Export to Mexico.

Dear Ms. Green:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below. Please provide me with copies of:

- A copy of the Intent to Export notification for each facility exporting material to Mexico, including all attachments by the reporting company, as submitted to the Office of Waste Programs Enforcement for the years of 1983-1993. The Notification of the Intent to Export should include, but not limited to, the following facilities.

Birmingham Bolt Co., Inc.	EPA I.D. #ALD000622852
Quanex Corporation	EPA I.D. #ARD053730701
Arkansas Steel	EPA I.D. #ARD091691261
Nucor-Yamato Steel Company	EPA I.D. #ARD981908890
Barbary Coast Steel Corp.	EPA I.D. #CAD009133489
Birmingham Bolt Co., Inc.	EPA I.D. #ILD980996862
Bayou Steel Corporation	EPA I.D. #LAD094919339
Armco, Inc.	EPA I.D. #MOD007118029
Birmingham Steel Corporation	EPA I.D. #MSD008158685
Nucor Steel	EPA I.D. #NED087069050
Sheffield Steel Corporation	EPA I.D. #OKD007219181
Cascade Steel Rolling Mills, Inc.	EPA I.D. #ORD045776432
Armco Advance Materials Corp.	EPA I.D. #PAD004325254
Border Steel Mills, Inc.	EPA I.D. #TXD007398175
Structural Metals, Inc.	EPA I.D. #TXD008119414
Chaparral Steel Company	EPA I.D. #TXD066362559
Nucor Steel-Texas Division	EPA I.D. #TXD071378582
Nucor Steel Corporation	EPA I.D. #UTD021533054
Norfolk Steel Corporation	EPA I.D. #VAD003178035
Salmon Bay Steel Corporation	EPA I.D. #WAD042480210
Salmon Bay Steel Corporation	EPA I.D. #WAD988487583

If any one of these document requests are denied, I ask that you specifically identify each document that the EPA is withholding, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, please contact me for approval of the copying fees.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

enclosure

September 21, 1993

EPA-NEIC
Building 53
Box 25227
Denver, CO 80225

Dear Mr. Vincent:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below. Please provide me with copies of all documents related to K061, including but not limited to the following information:

- Any and all *notification reports* listing the name of the **generator**, **location**, **phone number**, and the **amounts** of K061 generated by each of the facilities which *exports* the K061 material from the United States for the years 1985 - 1993.
- Any and all reports listing the name of the **generator**, **location**, **phone number**, and the **amounts** of K061 generated by each of the facilities which *actually exported* K061 from the United States for the years 1985 - 1993.

If any one of these document requests are denied, I ask that you specifically identify each document that the EPA is withholding, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, I am prepared to pay up to \$50.00 for the documents in question; please contact me if the copying fees will exceed this amount.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

15 October 1993

Jeraline B. Green
Freedom of Information Officer
Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

RE: Annual Hazardous Waste Export Reports.

Dear Ms. Green:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below. Please provide me with copies of:

- A copy of the Annual Report by all Hazardous Waste Generators of K061 shipping wastes to Mexico, including all attachments by the reporting company, as submitted to the Office of International Activities for the years of 1983-1993. The Annual Report for each facility should include, but not limited to, the following facilities.

Birmingham Bolt Co., Inc.	EPA I.D. # ALD000622852
Quanex Corporation	EPA I.D. # ARD053730701
Arkansas Steel	EPA I.D. # ARD091691261
Nucor-Yamato Steel Company	EPA I.D. # ARD981908890
Barbary Coast Steel Corp.	EPA I.D. # CAD009133489
Birmingham Bolt Co., Inc.	EPA I.D. # ILD980996862
Bayou Steel Corporation	EPA I.D. # LAD094919339
Armco, Inc.	EPA I.D. # MOD007118029
Birmingham Steel Corporation	EPA I.D. # MSD008158685
Nucor Steel	EPA I.D. # NED087069050
Sheffield Steel Corporation	EPA I.D. # OKD007219181
Cascade Steel Rolling Mills, Inc.	EPA I.D. # ORD045776432
Armco Advance Materials Corp.	EPA I.D. # PAD004325254
Border Steel Mills, Inc.	EPA I.D. # TXD007398175
Structural Metals, Inc.	EPA I.D. # TXD008119414
Chaparral Steel Company	EPA I.D. # TXD066362559
Nucor Steel-Texas Division	EPA I.D. # TXD071378582
Nucor Steel Corporation	EPA I.D. # UTD021533054
Norfolk Steel Corporation	EPA I.D. # VAD003178035
Salmon Bay Steel Corporation	EPA I.D. # WAD042480210
Salmon Bay Steel Corporation	EPA I.D. # WAD988487583

The document for each exporting facility should include: 1) Name, address, and phone number; 2) Year of export; 3) EPA ID #, 4) Name and address of each foreign TSDF to which waste was shipped; 5) Description, EPA waste number, DOT hazardous class, quantity of each hazardous waste shipped; 6) Description of efforts taken during the year to reduce the volume and toxicity of the waste generated; 7) Description of actual changes in volume and toxicity of waste during the year as compared to the previous years; and 8) The signature of the authorized preparer of the report.

If any one of these document requests are denied, I ask that you specifically identify each document that the EPA is withholding, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, please contact me for approval of the copying fees.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

22 September 1993

Rowena L. Michaels
Freedom of Information Office
US EPA--Region VII
726 Minnesota Avenue
Kansas City, KS 66620

RE: Biennial Reports -- EPA form #8700-13A.

Dear Ms Michaels:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below from the Solid and Hazardous Waste Office. Please provide me with copies of:

- A copy of the Biennial Report as recorded on Form # 8700-13A by all Hazardous Waste Generators of K061 shipping wastes to Mexico from Region VII, including all attachments by the reporting company, as submitted to the Regional Administrator for the years of 1983-1993. The Biennial Report for each facility should include, but not limited to, the following facilities.

Armco, Inc.
Nucor Steel

EPA I.D. # MOD007118029
EPA I.D. # NED087069050

The document for each exporting facility should include: 1) Name, address, and phone number; 2) Year of export; 3) EPA ID #, 4) Name and address of each foreign TSDF to which waste was shipped; 5) Description, EPA waste number, DOT hazardous class, quantity of each hazardous waste shipped; 6) Description of efforts taken during the year to reduce the volume and toxicity of the waste generated; 7) Description of actual changes in volume and toxicity of waste during the year as compared to the previous years; and 8) The signature of the authorized preparer of the report.

If any one of these document requests are denied, I ask that you specifically identify each document that the EPA is withholding, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, please contact me for approval of the copying fee.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

31 August 1993

Sharon Jang
Freedom of Information Office
US EPA--Region IX
75 Hawthorne
San Francisco, CA 94105

RE: National Biennial RCRA Hazardous Waste Report.

Dear Ms Jang:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below from the Solid and Hazardous Waste Office. Please provide me with copies of:

- Any and all annual National Biennial RCRA Hazardous Waste Reports for each state within Region IX for the years of 1986 through 1993.
 - Any and all documents on the Amounts of Hazardous Wastes Generated for each state within Region IX for the years of 1986 through 1993.
 - Any and all documents on the Amounts of Hazardous Waste Imports and Exports for each state within Region IX for the years of 1986 through 1993.
 - Any and all documents on the Rank and Order of the Largest Amounts of Hazardous Wastes Generated for each state within Region IX for the years of 1986 through 1993.
 - Any and all documents on the Quantities and Types of RCRA Hazardous Waste Managed, by RCRA Management Method for each state within Region IX for the years of 1986 through 1993.
 - Any and all documents on the rank and order of the Largest Hazardous Waste Generators and RCRA Quantity Generated for each state within Region IX for the years of 1986 through 1993.
-

- Any and all documents on the Largest RCRA Hazardous Wastes Facilities for each state within Region IX for the years of 1986 through 1993.

If any one of these document requests are denied, I ask that you specifically identify each document that the EPA is withholding, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, I am prepared to pay up to \$50.00 for the documents in question; please contact me if the copying fees will exceed this amount.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

21 October 1993

Michael F. Gearheard
US EPA--Region X
1200 Sixth Avenue
Seattle, Washington 98101

Dear Mr. Gearheard:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below. Please provide me with copies of:

- Documents of toxic and/or hazardous material emitted into the environment for the years of 1983-1993. These documents should include, but not be limited to: 1) Notifications records of material legally emitted into the environment, 2) Violations, 3) Inspection Reports, 4) Test Results, and 5) Penalties. Please provide copies of these documents for each of the following facilities.

Cascade Steel Rolling Mills, Inc.	EPA I.D. # ORD045776432
Salmon Bay Steel Corporation	EPA I.D. # WAD042480210
Salmon Bay Steel Corporation	EPA I.D. # WAD988487583

If any one of these document requests are denied, I ask that you specifically identify each document that the EPA is withholding, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, please contact me for approval of the copying fee.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

8 November 1993

Lisa Roberts, Esq.
Legal Service Division
Texas Natural Resource Conservation Commission
1700 N. Congress Avenue
P.O. Box 13087, Capitol Station
Austin, Texas 78711

Dear Ms. Roberts:

This is an amendment to my request under the Texas Open Records Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below. Please provide me with copies of:

- Any and all documents on toxic and/or hazardous material emitted into the environment for the years of 1983-1993. These documents should include, but not be limited to: 1) The **self reporting records** of material emitted into the environment. Please provide copies of these documents for each of the following facilities.

Border Steel Mills, Inc.
Structural Metals, Inc.
Chaparral Steel Company
Nucor Steel-Texas Division

If any one of these document requests are denied, I ask that you specifically identify each document that the TNRCC is withholding, as well as the legal reason for such withholding.

I appreciate your time and consideration. Please do not hesitate to call if you have any questions.

Sincerely,

Rachel M. Dinno

August 12, 1993

Jerva Durham
Freedom of Information Office
EPA Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

RE: EPA Action Suit Against Zinc Nacional, Monterrey, Mexico.

Dear Ms. Durham:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents listed below.

Janice Pearson from the Hazardous Waste Branch in Region VIII, informed me that Mr. Schultes, Region VI, RCRA Enforcement Branch, could provide me with a copy of documents pertaining to a EPA action against Zinc Nacional in regards to KO61. Please provide me with copies of all documents related to this suit, including but not limited to the following information:

- Any and all suits filed against Zinc Nacional and/or individual violators working with Zinc Nacional.
- Any and all documents pertaining to the violations at Zinc Nacional and/or individual violators working with Zinc Nacional.
- Any and all citations issued to Zinc Nacional and/or violators working with Zinc Nacional.
- Any and all enforcement orders issued to Zinc Nacional and/or violators working with Zinc Nacional.
- Any and all findings of the investigation of Zinc Nacional and/or individuals working with Zinc Nacional.
- Any and all documents regarding a preliminary investigations on Zinc Nacional.
- Any and all subsequent reports and findings on Zinc Nacional. This should include but not be limited to the investigation and tests performed in February of 1993.

- Any and all correspondence, memoranda, and notes pertaining to Zinc Nacional.

If any one of these document requests are denied, I ask that you specifically identify each document that the EPA is withholding, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, I am prepared to pay up to \$50.00 for the documents in question; please contact me if the copying fees will exceed this amount.

I appreciate you time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

5 October 1993

US EPA--Region VI
1445 Ross Avenue
Dallas, TX 75202-2733

RE: FOIA request (6)RIN-2391-93.

Dear Ms Durham:

This is a resubmission of a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to resubmit a request for the following documents.

- Any and all findings and investigations of Zinc Nacional and/or individual corporations exporting waste to Zinc Nacional.
- Any and all reports and documents regarding a preliminary investigation of Zinc Nacional
- Any and all subsequent reports and findings on Zinc Nacional. This should include but not be limited to the investigation and tests performed by the U.S. EPA on February 22-24, 1993.

These documents were denied under FOIA request (6) RIN-2391-93, stating Article 16 of the La Paz Agreement of 1983. The La Paz Agreement of 1983 is not listed under the FOIA exemptions. Therefore, I am resubmitting the request of the above mentioned documents from the EPA.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, please contact me for approval of the copying fees.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter.

Sincerely,

Rachel M. Dinno

19 October 1993

Jeraline B. Green
Freedom of Information Officer
Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

RE: Freedom of Information Act Appeal (6)RIN-2391-93.

Dear Ms. Green,

This is to appeal the denial of my request for information pursuant to the Freedom of Information Act, 5 U.S.C. § 552(a)(6).

On September 2, 1993, I received a letter from George R. Alexander, Jr. from Region 6 denying my request for access for two reports including a preliminary site assessment report and a final report containing sampling results as well as additional sampling and quality assurance project plan and trip reports. These reports were the product of tests conducted by the U.S. EPA from February 22-24, 1993 of Zinc Nacional in Monterrey, N.L., Mexico.

I am enclosing a copy of this denial along with a copy of my request. I trust that upon examination of these communications you will concede that the information I am seeking should be disclosed. As pursuant to 40 CFR § 2.100 (b) these reports are public records due to the fact the testing and the reports were made possible by Government funds which are the specific records that the Freedom of Information Act addresses. Furthermore, EPA only has to have possession or control of this information, which Mr. Alexander has confirmed these documents are in possession of the EPA, and therefore they are subject to the Freedom of Information Act under section 552 (a) (4) (B).

As provided for in the act, I will expect to receive a reply within 20 working days. If you decide not to release the requested information, I plan to initiate all necessary administrative and legal action to obtain the requested information.

Sincerely,

Rachel M. Dinno

3 November 1993

Jeraline B. Green
Freedom of Information Officer
Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

RE: Appeal letter dated October 19, 1993.

Dear Ms. Green:

This is in regards to an appeal October 15, 1993 and an Appeal letter dated October 19, 1993. I have yet to receive any response as to the status of the appeal. Therefore, I am sending this letter to remind you of the appeal and of the "strong new spirit of openness in government" as established by President Clinton's and Attorney General Janet Reno's new policy on the release of information under the Freedom of Information Act.

I believe under this new policy, you will find further justification to release the material in question. As stated the Justice Department "will no longer defend an agency's withholding of information merely because there is a 'substantial legal basis' for doing so." The new standard for withholding any document is whether there is any "foreseeable harm." The Justice Department will only defend a denial "where the agency reasonably foresees that disclosure would be harmful to an interest protected by an exemption." Furthermore, in determining whether to defend the agencies decisions, the Justice Department will apply a "presumption of disclosure."

Enclosed you will find my original Appeal, letters from President Clinton and Attorney General Janet Reno, and a copy of FOIA request sent October 15, 1993 to which I have yet to receive a response.

Thank you for your time and consideration. Please do not hesitate to call if you have any questions.

Sincerely,

Rachel M. Dinno

21 October 1993

California-OSHA
7700 Edgewater Drive, Suite 125
Oakland, CA 94621

Dear Mr. Thomas Hanley:

This is a request under the Freedom of Information Act. I am writing on behalf of myself, a graduate student at San Jose State University, to request the documents on Hazardous and Toxic Material Exposure related instances for the facility listed below. The exposure may include, but not be limited to, air contaminants, chemicals, hazardous or toxic substances, lead, carcinogens. Please provide me with copies of the records for the years of 1987-1993 of the following facility:

- Barbary Steel Corp., P.O. Box 1228 Emeryville, CA 94662

The document for each facility should include: 1) Accidents; 2) Injury, Illness, or Deaths; 3) Citations; 4) Complaints; 5) Violations; 6) Inspection reports, summary reports; 7) Penalties suggested; 8) Actual penalty enforced; 9) List of possible videos available of accident site; and 10) Any other documents that may be available regarding hazardous and/or toxic exposures.

If any one of these document requests are denied, I ask that you specifically identify each document that is being withheld, as well as the legal reason for such withholding.

The disclosure of the above-mentioned documents is in the public interest. Because the documents to be furnished would contribute significantly to public understand of the operations and activities of the EPA and OSHA, and are not sought for a commercial gain, I ask that any fees associated with this request be waived. If this request is denied, please contact me for approval of the copying fee.

I appreciate your time and consideration. I am sure you understand that you have 10 days in which to reply to this letter. Please do not hesitate to call to inform me of what information is available.

Sincerely,

Rachel M. Dinno

18 November 1993

Jeraline B. Green
Freedom of Information Officer
U.S. Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

RE: Fee Waiver for FOIA request

Dear Ms. Green:

This letter is intended to clarify my fee waiver request. Following the Department of Justice's 1987 guidelines on fee waivers, I believe that a waiver should be granted because:

1. Disclosure of the information is in the public interest because it is likely to contribute significantly to public understanding of the operations and activities of the United States Environmental Protection Agency.
 - A. The documents I seek concern the transboundary waste operations and activities overseen and regulated by the government. This information is clearly in the public's interest to understand the ways in which American consumer by-products are handled and tracked by their governmental agencies.
 - B. This information will be used to form a case study of a particular waste type as it is currently tracked throughout the U.S. and thus quite likely to contribute to an understanding of governmental regulatory operations and activities.
 - C. The information will provide the documents needed for my graduate thesis - a requirement by the department at San Jose State University. Because the document will be bound and disseminated both within the department and the library as well as used by non-profit interest groups as further research for their transboundary waste reports and disseminated to both its members and the general public, through the media and other fora, the material will contribute to the public understanding of the working of the United States Environmental Protection Agency.

- D. Because the documents concern crucial information regarding waste exports and because only these documents could shed light on the waste activity, they will significantly contribute to the public understanding of the United States Environmental Protection Agency's operations and activities.
2. The disclosure of this information is not primarily in the commercial interest of the requester.
- A. The material is to assist in the understanding of United States Environmental Protection Agency activities within the context of my thesis--a graduate requirement. I have no "personal" interest, financial or otherwise, in the disclosure of the information--my interest is solely professional, and I am making the request on behalf of myself, as a student of environmental studies.¹
 - B. No one in the department, which the paper will be submitted, has any personal financial interest in the information, and thus my interest in the documents is clearly not primarily commercial.

Further, I understand that a thesis alone does not justify a fee waiver, yet the resulting work has and will continue to be disseminated to the public, which is justification *See Larson*, 843 F.2d at 1483; *Ettlinger*, 596 F. Supp. at 877. Greenpeace, a non-profit organization with a membership base of 5 million in 29 countries, has recently published information gained by my research of United States Environmental Protection Agency data. While there is no rigid formula for determining whether there is public interest in the subject of the requested documents, the courts have found that benefit to a population group of some size distinct from the requester alone is sufficient. *Ettlinger*, 596 F. Supp. at 876. I am sure you will find the publication to a large membership base to satisfy this requirement. Furthermore, as I have proven other people and groups are interested in knowing the contents of the records requested, it is unfair to require the first requester to bear the search costs associated with this request.

¹ As an unemployed student, I cannot afford to pay for documents requested under FOIA, providing an additional basis for a waiver. While indigence is not dispositive, fees can be waived on the grounds of indigence because otherwise fees would be an obstacle to disclosure, contrary to the pro-disclosure thrust of FOIA. *See, e.g., Blue v. Bureau of Prisons*, Civ. No. C75-2092A (N.D. Ga. 1976), *rev'd on other grounds*, 572 F.2d 529 (5th Cir. 1978).

Lastly, I wish to remind you of the history of the fee waiver standard established by the 1974 amendments clearly indicates that Congress intended to create a public interest/benefit test for granting FOIA fee waivers that was to be "liberally construed," and was "consistently associated with requests from journalists, scholars, and non-profit interest groups who it was intended to benefit." *Ettlinger v. FBI*, 596 F. Supp. 867, 872 (D. Mass. 1984); *Lybarger v. Cardwell*, 577 F.2d 764 (1st Cir. 1978).

For these reasons, I request that you waive any fees associated with my FOIA requests. If this request is denied, I ask that the legal rationale is given.

I thank you for your time and consideration, and look forward to your prompt compliance with FOIA in providing me with the requested information.

Sincerely,

Rachel M. Dinno

APPENDIX B

AGENCIES TO WHICH
FREEDOM OF INFORMATION ACT
REQUESTS WERE FILED

-
-
- I Environmental Protection Agencies
- II State Environmental Regulatory Departments
- III Occupational Safety and Health Administration Offices

ENVIRONMENTAL PROTECTION AGENCIES

Region I

(Massachusetts, Connecticut, Maine, New Hampshire, Rhode Island, Vermont)

U.S. Environmental Protection Agency
Freedom of Information Officer
JFK Federal Building
Boston, MA 02203-2211

Region II

(New Jersey, New York)

U.S. Environmental Protection Agency
Freedom of Information Officer
26 Federal Plaza, Room 505
New York, NY 10278

Region III

(Delaware, Maryland, Pennsylvania, Virginia, West Virginia, District of Columbia)

U.S. Environmental Protection Agency
Freedom of Information Officer
841 Chestnut Street
Philadelphia, PA 19107

Region IV

(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

U.S. Environmental Protection Agency
Freedom of Information Officer
345 Courtland Street, NE
Atlanta, GA 30365

Region V

(Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

U.S. Environmental Protection Agency
Freedom of Information Officer
77 West Jackson Boulevard
Chicago, IL 60604-3590

Region VI

(Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

U.S. Environmental Protection Agency
Freedom of Information Officer
1445 Ross Avenue
Dallas, TX 75202-2733

Region VII

(Iowa, Kansas, Missouri, Nebraska)

U.S. Environmental Protection Agency
Freedom of Information Officer
726 Minnesota Avenue
Kansas City, KS 66620

Region VIII

(Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)

U.S. Environmental Protection Agency
Freedom of Information Officer
999 18th Street, Suite 500
Denver, CO 80202-2405

Region IX

(Arizona, California, Hawaii, Nevada)

U.S. Environmental Protection Agency
Freedom of Information Officer
75 Hawthorne
San Francisco, CA 94105

Region X

(Alaska, Idaho, Oregon, Washington)

U.S. Environmental Protection Agency
Freedom of Information Officer
1200 Sixth Avenue
Seattle, Washington 98101

Headquarters

U.S. Environmental Protection Agency
Freedom of Information Officer
401 M Street, SW
Washington, D.C. 20460

National Enforcement Investigation Center
U.S. Environmental Protection Agency
Freedom of Information Officer
Building 53
Box 25227
Denver, CO 80225

STATE ENVIRONMENTAL AGENCIES**Alabama**

Land Division
1751 Cong. W.L. Dickinson Drive
Montgomery, Alabama 30130

Arkansas

Arkansas Department of Pollution Control and Ecology
Hazardous Waste Division
7001 National Drive
P.O. Box 8913
Little Rock, AR 72219-8913

Illinois

Illinois Environmental Protection Agency
2200 Churchill Road
P.O. Box 19276
Springfield, IL 62794-9276

Louisiana

Louisiana Department of Environmental Quality
Hazardous Waste Division
Office of Solid Waste
H.P. Garlock Building
7290 Bluebonnet
P.O. Box 82215
Baton Rouge, LA 70884-2215

Mississippi

Department of Natural Resources
Hazardous Waste Division
P.O. Box 10385
Jackson, MS 39209

Oklahoma

Oklahoma State Department of Health
Hazardous Waste Management Service
1000 Northeast Tenth Street
P.O. Box 53551
Oklahoma City, OK 73117-1299

Oregon

Oregon Department of Environmental Quality
Hazardous and Solid Waste Section
Executive Building
811 S.W. Sixth Street
Portland, Oregon 97204

Texas

Texas Natural Resource Conservation Commission
Industrial and Hazardous Waste Division
1700 N. Congress Avenue
P.O. Box 13087, Capitol Station
Austin, Texas 78711

Washington

Washington Department of Ecology
Solid and Hazardous Waste Program
P.O. Box 47600
Olympia, Washington 98504-7600

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION**Alabama**

Department of Labor-OSHA
2047 Canyon Road
Birmingham, AL 35216

Arkansas

Department of Labor-OSHA
425 West Capital, Suite 450
Little Rock, AR 72201

California

California-OSHA
7700 Edgewater Drive, Suite 125
Oakland, CA 94621

Illinois

Department of Labor-OSHA
1600 167th Street
Calumet City, IL 60409

Louisiana

Department of Labor-OSHA
2156 Wooddale Boulevard, Suite 200
Baton Rouge, LA 70806

Missouri

Department of Labor-OSHA
6200 Connecticut Avenue, Suite 100
Kansas City, MO 64120

Mississippi

Department of Labor-OSHA
3780 Fifty-Five North, Suite 210
Jackson, MS 39211

Nebraska

Department of Labor-OSHA
6910 Pacific Street, Suite 100
Omaha, NE 68106

Oklahoma

Department of Labor-OSHA
420 West Main, Suite 300
Oklahoma City, OK 73102

Oregon

Department of Labor-OSHA
9500 S.W. Barbara Boulevard, Suite 200
Portland, Oregon, 97219

Pennsylvania

Department of Labor-OSHA
Federal Building, Room 1428
Pittsburgh, PA 15222

Texas

Department of Labor-OSHA
525 Griffin Street, Suite 602
Dallas, TX 75202

Utah

Department of Labor-OSHA
P.O. Box 146650
Salt Lake City, UT 84114-6650

Virginia

Department of Labor-OSHA
Powers Taylor Building
13 South 13th Street
Richmond, VA 23219

Washington

Department of Labor-OSHA
P.O. Box 44632
Olympia, WA 98504-4632

APPENDIX C
SAMPLES OF THE COLLECTED DATA
AS REQUESTED PURSUANT TO THE
FREEDOM OF INFORMATION ACT

- I Notifier List
- II Handler List
- III Notification of Intent to Export
- IV Annual Report
- V Biennial Report
- VI Enforcement Document
- VII State Agency Technical Report
- VIII Occupational Safety and Health Administration Document

RCRA Notifiers List

Region IX Merge Database

Run 16.38.00 06/25/93

Facility/ID Leg. Dist	Contact - Name	- Phone	Notif. Date	Facil. Type	TRNS	BBL	REC
POST TRANSPORTATION CO NVD034928473 Facil.: BLDG T30 BHI Mail: PO BOX 1000	ENVIRONMENTAL MANAGER HENDERSON LONG BEACH	(702)565-8771 NV CA	08/08/90 89015 CLARK CO. 90801	-N-	TRNS	-	-
PURDY RON SCRAP METAL NVD066657594 Facil.: 6951 VEGAS VLY DR Mail: 6351 VEGAS VLY DR	ENVIRONMENTAL MANAGER LAS VEGAS LAS VEGAS	(702)457-8077 NV NV	04/01/82 89122 CLARK CO. 89122	-N-	TRNS	-	-
QUICKS RADIATOR NVD986774404 Facil.: 2408 LAS VEGAS BLVD NORTH Mail: 2408 LAS VEGAS BLVD NORTH	THOMAS HEMMINGS NORTH LAS VEGAS NORTH LAS VEGAS	(702)642-1163 NV NV	07/08/92 89030 CLARK CO. 89030	CEG	TRNS	-	-
QUICKS RADIATOR NO 2 NVD986774412 Facil.: 3071 N MELLIS BLVD Mail: 3071 N MELLIS BLVD	THOMAS HEMMINGS LAS VEGAS LAS VEGAS	(702)644-1193 NV NV	07/08/92 89115 CLARK CO. 89115	CEG	TRNS	-	-
REFINERIES SERV INC NVD980895619 Facil.: 10500 LOCKWOOD DR Mail: PO BOX 1171	ENVIRONMENTAL MANAGER PATTERSON	(209)892-6742 NV CA	12/10/84 89431 WASHOE CO. 95363	-N-	TRNS	-	-
REFINERIES SERVICE NVT330010307 Facil.: HWY80-MUSTANG OFF RAMP Mail: PO BOX 1171	ENVIRONMENTAL MANAGER SPARKS PATTERSON	(209)892-6742 NV CA	07/31/90 89431 WASHOE CO. 95363	-N-	TRNS	-	-
RENO CITY OF NVD982495889 Facil.: 1640 E COMMERCIAL ROW Mail: P O BOX 1900	DENNIS KRAUSE RENO RENO	(702)334-2246 NV NV	08/14/90 89512 WASHOE CO. 89505	LOG	TRNS	-	-
RENO DRAIN OIL SERV NVD980893663 Facil.: 11970 I80 E Mail: 11970 I80 E	STEVE AGUILAR SPARKS SPARKS	(702)342-0551 NV NV	12/16/92 89431 WASHOE CO. 89431	SQG	TRNS	BBL	-
RUBY DUME INC NVD982442048 Facil.: 2211 N FIFTH ST Mail: 2211 N FIFTH ST	ELKO ELKO	() NV NV	12/30/91 89801 ELKO CO. 89801	-	TRNS	-	-
S & S STORAGE NVT330011107 Facil.: 5 KETTEN RD Mail: PO BOX 647	TONOPAH TONOPAH	() NV NV	07/31/90 89049 NVE CO. 89049	-N-	TRNS	-	-
SAFETY KLEEN CORP 7 087 01 NVT330010208 Facil.: 1655 STOCKER ST Mail: 777 BIG TIMBER RD	ENVIRONMENTAL MANAGER LAS VEGAS ELGIN	(312)697-8460 NV IL	11/18/80 89030 CLARK CO. 60120	LOG	TRNS	-	-
SANDIA NATIONAL LABORATORIES NTS NVT2990090002 Facil.: NEVADA TEST SITE PO BOX 238 Mail: P O BOX 238	ENVIRONMENTAL MANAGER MERCURY MERCURY	(505)844-7285 NV NV	03/06/92 89023 NVE CO. 89023	LOG	TRNS	-	-

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION I
 NEW ENGLAND HAZARDOUS WASTE HANDLERS
 HANDLERS OF K061 RIN #971
 HANDLER IDENTIFICATION REPORT

PAGE: 7
 RUN: 08/19/93
 16:04:04

FACILITY ID	NAME / ADDRESS	CONTACT INFORMATION	SUB	NON NOTIF	RECEIPT DATE	ACTIVITY TYPE
CTD093616613	ENVIRITE CORP OLD WATERBURY RD (Continued)	CHRISTOPHER-M BEYUS OLD WATERBURY RD 203/283-9235			08/06/80-Not	LG TR LD ST

Waste Stream: 0019
 Volume
 Waste Codes: K008
 Associated Processes: D80 S02 T01
 Reported A 11/19/80
 37.920-M

Waste Stream: 0020
 Volume
 Waste Codes: K061
 Associated Processes: U80 S02 T01
 Reported A 11/19/80
 34.320-M

Waste Stream: 0021
 Volume
 Waste Codes: K069
 Associated Processes: U80 S02 T01
 Reported A 11/19/80
 30.374-M

Waste Stream: 0022
 Volume
 Waste Codes: K110
 Associated Processes: D80 S02 T01
 Reported A 11/19/80
 37.920-M

Waste Stream: 0023
 Volume
 Waste Codes: U134
 Associated Processes: D80 S02 T01
 Reported A 11/19/80
 18.920-M

Cascade steel rolling mills, inc.

198

P.O. Box 687

320' North Highway 99W

McMinnville, Oregon 97128-9399

(503) 472-4181 Portland 222-6824

TWX 910-452-7011 Telefax (503) 434-5735

NOTICE OF INTENT TO EXPORT

40 CFR 262.53 (a)

AVISO DE INTENCION DE EXPORTAR

40 CFR 262.53 (a)

AUTHORIZATION FOR ONE (1) YEAR BEGINNING JANUARY 1, 1994

AUTORIZACION POR UN (1) AÑO COMENZANDO EL 1 DE ENERO DE 1994

NAME OF PRIMARY EXPORTER:

NOMBRE DE EXPORTADOR:

CASCADE STEEL ROLLING MILLS, INC.

MAILING ADDRESS:

DIRECCION POSTAL:

P.O. BOX 687

MCMINNVILLE, OR 97128

TELEPHONE:

TELEFONO:

503-472-4181

U.S. EPA GEN. ID NUMBER:

NUMERO DE IDENTIFICACION DEL

GENERADOR DE LA EPA DE E.U.A.:

ORD 045776432

CONSIGNEE:

CONSIGNATARIO:

ZINC NACIONAL, S.A.

SERAFIN PENA #938 SUR

APDO POSTAL 3062

MONTERREY, N.L. MEXICO 64000

a. DESCRIPTION OF WASTE:

(40 C.F.R. 261 SUBPARTS C & D)

ELECTRIC ARC FURNACE ("EAF") DUST

U.S. EPA HAZARDOUS WASTE K061

DESCRIPCION DEL RESIDUO:

(40 C.F.R. 261 SUBPARTES C y D)

POLVOS DE HORNOS DE ARCO ELECTRICO

CLASIFICADO POR LA EPA DE LOS E.U.A.

COMO RESIDUO PELIGROSO NUMERO K061

b. U.S. DOT SHIPPING INFOR.:

RQ (REPORTABLE QUANTITY) HAZARDOUS
WASTE SOLID, N.O.S. (NOT OTHERWISE
SPECIFIED), (EMISSION CONTROL DUST/
SLUDGE FROM PRIMARY PRODUCTION OF
STEEL IN ELECTRIC FURNACE), CLASS
9, NA3077, PG III, (K061), ERG #31

CLASIFICACION DEL DEPARTAMENTO
DE TRANSPORTE DE LOS E.U.A.:

CR (CANTIDAD REPORTABLE) RESIDUO
SOLIDO PELIGROSO, N.C. (NO
CLASIFICADO DE NINGUNA OTRA MANERA),
(POLVO/LODO RESULTANTE DEL CONTROL DE
EMISIONES PROVENIENTE DE LA PRODUCCION
PRIMARIA DE ACERO EN HORNOS DE ARCO
ELECTRICO) CLASE 9, NA3077, PG III,
(K061), ERG #31

c. HAZARD CLASS: CLASS 9 OTHER REGULATED MATERIAL
CLASE DE RESIDUO: CLASE 9 OTROS MATERIALES REGULADOS

d. ESTIMATED EXPORT RATE/FREQUENCY: 1 RAIL CAR/2 DAYS; 230 TONS/7 DAYS
FRECUENCIA Y CANTIDAD ESTIMADA DE EXPORTACION 1 CARRO CADA 2 DIAS; 230 TONELADAS CADA DE 7 DIAS

e. PERIOD OF TIME: 1 YEAR BEGINNING JANUARY 1, 1994
PERIODO: 1 AÑO COMENZANDO EL 1 ENERO 1994

f. TOTAL QUANTITY OF WASTE: ~~10,000 TONS~~ (METRIC)
CANTIDAD TOTAL DEL RESIDUO: 10,000 TONELADAS

g. POINTS OF ENTRY: NUEVO LAREDO, TAMAULIPAS, MEXICO
PUNTOS DE ENTRADA:

h. MEANS OF SHIPMENT: COVERED HOPPER-BOTTOM RAIL CARS
MEDIO DE TRANSPORTE: CARROS DE FERROCARRIL CERRADOS DE FONDO CONICO

i. DESCRIPTION OF THE MANNER IN WHICH THE HAZARDOUS WASTE WILL BE TREATED: THIS RECYCLABLE MATERIAL WILL BE USED AS A DIRECT SUBSTITUTE FEED STOCK IN THE PRODUCTION OF ZINC, CADMIUM, AND LEAD PRODUCTS IN A PYROMETALLURGICAL ZINC ORE AND ZINC CONCENTRATE PROCESSING PLANT.

DESCRIPCION DE LA MANERA EN QUE SERAN TRATADOS LOS RESIDUOS PELIGROSOS:

ESTE MATERIAL RECICLABLE SERA UTILIZADO COMO SUBSTITUTO DIRECTO DE MATERIA PRIMA EN LA PRODUCCION DE PRODUCTOS DE ZINC, CADMIO, Y PLOMO EN UNA PLANTA PIROMETALURGICA PROCESADORA DE MINERAL DE ZINC Y CONCENTRADOS DE ZINC.

OTHER CONSIGNEES:
OTROS CONSIGNATARIOS:

NONE
NINGUNO

NAME OF TRANSIT COUNTRIES:
NOMBRE DE OTROS PAISES POR LOS QUE TRANSITA:

NONE
NONE

DATE:
FECHA:

OCTOBER 01, 1993
OCTUBRE, 01, 1993

PREPARED BY:
PREPARADA POR:

LUKE PIETROK
PURCHASING MANAGER
(GERENTE DE COMPRADORES)

PAGE 1

06/11/93

ANNUAL REPORTS FOR CONSIGNEE: ZINC NACIONAL SA
FOR YEARS 1987 TO 1992

GENERATOR I.D. NO. : ALD000622852	YEAR OF REPORT: 90
GENERATOR NAME : BIRMINGHAM BOLT COMPANY, INC.	
ADDRESS : SOUTHERN UNITED STEEL DIVISION	
A SUBSIDIARY OF BIRMINGHAM STEEL CORP	
2301 HUNTSVILLE ROAD	
TRANSPORTER 1 I.D. NO. : N700000000000	TRANSPORTER 1 NAME : UNKNOWN
TRANSPORTER 2 I.D. NO. : N700000000000	TRANSPORTER 2 NAME : ZINC NACIONAL SA
CONSIGNEE I.D. NO. : NC000000000001	CONSIGNEE NAME : ZINC NACIONAL SA
WASTE STREAM NO. : 1	
WASTE DESCRIPTION: EMISSION CONTROL DUST	
EPA WASTE NO. : K061	DOT HAZARD CLASS : ORME
QUANTITY : 3,668.60	
NO. OF SHIPMENTS : 39	
GENERATOR I.D. NO. : ALD000622852	YEAR OF REPORT: 91
GENERATOR NAME : BIRMINGHAM BOLT COMPANY, INC.	
ADDRESS : SOUTHERN UNITED STEEL DIVISION	
A SUBSIDIARY OF BIRMINGHAM STEEL CORP	
2301 HUNTSVILLE ROAD	
TRANSPORTER 1 I.D. NO. : GAD006820417	TRANSPORTER 1 NAME : NORFOLK SOUTHERN RAILWAY
TRANSPORTER 2 I.D. NO. : NMD048341788	TRANSPORTER 2 NAME : BURLINGTON NORTHERN
CONSIGNEE I.D. NO. : NC000000000001	CONSIGNEE NAME : ZINC NACIONAL SA
WASTE STREAM NO. : 1	
WASTE DESCRIPTION: EMISSION CONTROL DUST	
EPA WASTE NO. : K061	DOT HAZARD CLASS : 9
QUANTITY : 6,064.19	
NO. OF SHIPMENTS : 66	
GENERATOR I.D. NO. : ALD000622852	YEAR OF REPORT: 92
GENERATOR NAME : BIRMINGHAM BOLT COMPANY, INC.	
ADDRESS : SOUTHERN UNITED STEEL DIVISION	
A SUBSIDIARY OF BIRMINGHAM STEEL CORP	
2301 HUNTSVILLE ROAD	
TRANSPORTER 1 I.D. NO. : GAD006820417	TRANSPORTER 1 NAME : NORFOLK SOUTHERN RAILWAY
TRANSPORTER 2 I.D. NO. : NMD048341788	TRANSPORTER 2 NAME : BURLINGTON NORTHERN
CONSIGNEE I.D. NO. : NC000000000001	CONSIGNEE NAME : ZINC NACIONAL SA
WASTE STREAM NO. : 1	
WASTE DESCRIPTION: EMISSION CONTROL DUST	
EPA WASTE NO. : K061	DOT HAZARD CLASS : 9
QUANTITY : 5,941.70	
NO. OF SHIPMENTS : 65	

GENERATION AND MANAGEMENT LIST FOR 1991 BIENNIAL REPORT
OVERSITE WASTE MANAGEMENT REPORT FOR FOIA REQUEST RIN# 7972A
ALL GENERATORS(LGS) OR MANAGERS(TSD) OF WASTES CONTAINING K061

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*****
EPA ID ALD067123570
LOCATION ADDRESS: 101 SOUTH 50TH ST
BIRMINGHAM, AL 35212-0000
COMPANY NAME: SHI STEEL INC
MAILING ADDRESS: P O BOX 321188
CERTIFIER: JACK WHEELER
CONTACT: MICHAEL ROBINSON

-----
TONS OF WASTE DESCRIBED AS: K061
3,146.500 TONS GENERATED .000 TONS RECEIVED 3,146.500 TONS SHIPPED .000 TONS MANAGED
*****
EPA ID ARD053730701
LOCATION ADDRESS: 5225 PLANTERS RD
FT SMITH, AR 72916-0000
COMPANY NAME: QUANEX MACSTEEL
MAILING ADDRESS: PO BOX 1592
CERTIFIER: JOHN FISHER
CONTACT: WARREN TAFF

-----
TONS OF WASTE DESCRIBED AS: K061
4,543.280 TONS GENERATED .000 TONS RECEIVED 4,543.280 TONS SHIPPED .000 TONS MANAGED
*****
EPA ID ARD091691261
LOCATION ADDRESS: VAN DYKE RD
NEWPORT, AR 72112-0000
COMPANY NAME: ARKANSAS STEEL ASSOCIATES
MAILING ADDRESS: PO BOX 280
CERTIFIER: YOSHIHIRO YASUDA
CONTACT: BILLY FERGUSON

-----
TONS OF WASTE DESCRIBED AS: K061
1,557.600 TONS GENERATED .000 TONS RECEIVED 1,557.600 TONS SHIPPED .000 TONS MANAGED
*****
EPA ID ARD09190890
LOCATION ADDRESS: HWY 18 EAST RIVER LANDINMAILING ADDRESS: 5929 EAST STATE HWY 18
BARFIELD, AR 72310-0000
COMPANY NAME: INOCOR YAMATO STEEL
MAILING ADDRESS: 4300 EASTSHORE HWY
CERTIFIER: TIMOTHY WHITEHAN
CONTACT: TIMOTHY WHITEHAN

-----
TONS OF WASTE DESCRIBED AS: K061
11,493.830 TONS GENERATED .000 TONS RECEIVED 11,493.830 TONS SHIPPED .000 TONS MANAGED
*****
EPA ID CAD009133489
LOCATION ADDRESS: 4300 EASTSHORE HWY
EMERYVILLE, CA 94508-2408
COMPANY NAME: BARBARY COAST STEEL
MAILING ADDRESS: 4300 EASTSHORE HWY
CERTIFIER: SIDNEY L MORGAN
CONTACT: SIDNEY L MORGAN

-----
TONS OF WASTE DESCRIBED AS: D006 D007 D008 K061
239.500 TONS GENERATED .000 TONS RECEIVED 29.400 TONS SHIPPED .000 TONS MANAGED
*****
EPA ID CAD982361404
LOCATION ADDRESS: 12459 ARROW HWY B
RANCHO CUCAMONGA, CA 91739-0000
COMPANY NAME: TAPCO
MAILING ADDRESS: P. O. BOX 325
CERTIFIER: LEONARD E ROBINSON
CONTACT: LEONARD E ROBINSON

```

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION 10, 1200 Sixth Avenue
 Seattle, Washington 98101

IN THE MATTER OF:

Cascade Steel Rolling Mills, Inc.,
 ORD045776432

CHIEF, WASTE MANAGEMENT
 BRANCH, EPA REGION 10

COMPLAINANT

vs.

Cascade Steel Rolling Mills, Inc.

RESPONDENT

Proceeding pursuant to Section 3008(a)
 of the Resource Conservation and
 Recovery Act, 42 U.S.C. § 6928(a).

RECEIVED
 SEP 23 1980
 NOTICE OF LEGAL
 PROCEEDINGS;
 OPPORTUNITY FOR
 HEARING; OPPORTUNITY
 FOR SETTLEMENT
 CONFERENCE
 EPA Docket No.
 1091-09-03-3008(a)

YOU ARE HEREBY GIVEN NOTICE AS FOLLOWS:

1. Administrative proceedings have been commenced against you, and a Complaint and Compliance Order has been issued to you by the U.S. Environmental Protection Agency ("EPA").

2. You are hereby NOTIFIED of, and served with, the ATTACHED TRUE COPY of the Complaint and Compliance Order filed in these proceedings. It contains a demand for a civil penalty from you, and directives which must be obeyed by you.

3. The signed original of the attached Complaint and Compliance Order has been filed with the EPA Regional Hearing Clerk, M/S SO-125, 1200 Sixth Avenue, Seattle, WA 98101, (206) 442-1141.

P

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TWC SW INSPECTION REPORT
For RCRA Permitted Facilities
CONTENTS SHEET

HW Permit 30661

- ☒ 1. Data Entry Form 0814
 - ☒ 2. Inspection Coversheet
 - ☒ 3. Permit Compliance Checklist
 - ☒ 4. Facility Standards Checklist
 - ☒ 5. Generators Checklist (Non-Permitted Facilities)
 - 6. Permitted Units Checklists:
 - N/A Containers (C)
 - N/A Tanks (T)
 - N/A Surface Impoundments (SI)
 - N/A Waste Piles (WP)
 - N/A Land Treatment (LT)
 - ☒ Landfills (LF)
 - N/A Incinerators (I)
 - N/A Thermal Treatment (TT)
 - N/A Chem, Phy, Biol Treatment (TR)
 - N/A Other (O)
 - 7. Non-Permitted Units Checklists:
 - N/A Satellite Accumulation Area (SA)
 - N/A Containers (C)
 - ☒ Tanks (T)
 - N/A Surface Impoundments (SI)
 - N/A Waste Piles (WP)
 - N/A Land Treatment (LT)
 - N/A Landfills (LF)
 - N/A Incinerators (I)
 - N/A Thermal Treatment (TT)
 - N/A Chem, Phy, Biol. Treatment (TR)
 - N/A Other (O)
 - N/A 8. Compliance Plan Review Sheet
 - ☒ 9. Closure/Post Closure Checklist
 - N/A 10. Closure-In-Progress Checklist
 - 11. Land Disposal Restrictions:
 - ☒ Form A - Waste Determination
 - ☒ Form B - TSD
 - ☒ Form C - Manifesting
 - ☒ Form D - F solvents & Dioxins
 - ☒ Form E - California List
 - N/A 12. TWC Registration
 - N/A 13. Maps, Plans, Sketches
 - N/A 14. Photographs
 - N/A 15. Sample Analysis Results
 - ☒ 16. Notice of Violation (NOV) Letter
 - ☒ 17. Interoffice Memorandum (IOM)
 - ☒ 18. Other (describe): General Facilities Checklist (Non-Permitted) for Interim Status Tank
- NOTE: If a required checklist is omitted, explain: _____

U.S. Department of Labor
Occupational Safety and Health Administration

Citation and Notification of Penalty

U.S. Department of Labor
Penn Place - Room 2005
20 North Pennsylvania Avenue
Wilkes-Barre, PA 18701

1. Type of Violation(s)	2. Citation Number
Serious	02

The violation(s) described in this Citation are alleged to have occurred on or about the day the inspection was made unless otherwise indicated within the description given below.

3. Issuance Date 03/15/89	4. Inspection Number 000627018
5. Reporting ID 0317700	6. CSHO ID L77421
7. Optional Report No. 191	8. Page No. 17 of 22

10. Inspection Date(s):

9/15/88 - 3/10/89

11. Inspection Site:

4th St. & Delaware Ave.
Palmerton, PA 18071

a. To
ZINC CORPORATION OF AMERICA, ET AL
and its successors
4th St. & Delaware Ave.
Palmerton, PA 18071

Penalties
Are Due
Within 15
Days of
Receipt
of This
Notification
Unless
Contested
(See
enclosed
Booklet)

This Section
May Be
Detached
Before
Posting

THE LAW REQUIRES that a copy of this Citation be posted immediately in a prominent place at or near the location of violation(s) cited below. The Citation must remain posted until the violations cited below have been abated, or for 3 working days (excluding weekends and Federal holidays), whichever is longer.

This Citation describes violations of the Occupational Safety and Health Act of 1970. The penalty(ies) listed below are based on these violations. You must abate the violations referred to in this Citation by the dates listed below and pay the penalties proposed, unless within 15 working days (excluding weekends and Federal holidays) from your receipt of this Citation and penalty you mail a notice of contest to the U.S. Department of Labor Area Office at the address shown above. (See the enclosed booklet which outlines your rights and responsibilities and should be read in conjunction with this form.) You are further notified that unless you inform the Area Director in writing that you intend to contest the Citation or proposed penalties within 15 working days after receipt, this Citation and the proposed penalties will become a final order of the Occupational Safety and Health Review Commission and may not be reviewed by any court or agency. Issuance of this Citation does not constitute a finding that a violation of the Act has occurred unless there is a failure to contest as provided for in the Act or, if contested, unless the Citation is affirmed by the Review Commission.

12. Item Number	13. Standard, Regulation or Section of the Act Violated	14. Description	15. Date by Which Violation Must Be Abated	16. Penalties
29	CFR 1910.1025(f)(3)(ii):	Qualitative fit tests were not conducted in accordance with Appendix D of the lead standard:	04/15/89	800.00
	(a)	An employee, conditioner, was exposed to lead and was given an irritant fume protocol qualitative respirator fit test which did not include talking, November 16, 1988.		
	(b)	An employee, Sinter Bagroom Attendant, was exposed to lead and was given an irritant fume protocol qualitative respirator fit test which did not include talking, November 17, 1988.		
	(c)	An employee, Repairman, was exposed to lead and was given an irritant fume protocol qualitative respirator fit test which did not include talking, November 17, 1988.		
	(d)	An employee, Yardman, was exposed to lead and		
17.	Area Director	Andrew J. Jodeah		

Last Pg

NOTICE TO EMPLOYEES — The law gives an employee or his representative the opportunity to object to any abatement date set for a violation if he believes the date to be unreasonable. The contest must be mailed to the U.S. Department of Labor Area Office at the address shown above within 15 working days (excluding weekends and Federal holidays) of the receipt by the employer of this Citation and penalty.

EMPLOYER DISCRIMINATION UNLAWFUL — The law prohibits discrimination by an employer against an employee for filing a complaint or for exercising any rights under this Act. An employee who believes that he has been discriminated against may file a complaint no later than 30 days after the discrimination with the U.S. Department of Labor Area Office at the address shown above.

EMPLOYER RIGHTS AND RESPONSIBILITIES — The enclosed booklet outlines employer rights and responsibilities and should be read in conjunction with this notification.

CITATION AND NOTIFICATION OF PENALTY

CASE FILE COPY

Total
Penalty
for This
Citation
Make Check or
Money Order
Payable to:
"DOL-OSHA"
Indicate
Inspection
Number
on
Remittance

APPENDIX D

INDUSTRIES GENERATING ELECTRIC ARC FURNACE DUST
WITHIN THE UNITED STATES, 1989 and 1991

APPENDIX D
INDUSTRIES GENERATING ELECTRIC ARC FURNACE DUST
WITHIN THE UNITED STATES, 1989 and 1991

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
Birmingham Bolt Inc.	8,760.0		
Mobile Pulley & Machine	85.1		
SMI Steel Inc.	3,437.4	3,146.5	
Alabama Total:	12,282.5	3,146.5	
% of National Total:	(1.9%)	(0.56%)	
Arkansas Steel Associates	953.0	1,557.6	
Nucor Yamato Steel Company	13,118.9	11,493.8	
Quanex Corp. (MacSteel Div.)	5,691.3	4,543.3	
Arkansas Total:	19,763.2	17,594.7	
% of National Total:	(3.06%)	(3.16%)	
Barbary Coast Steel		239.5*	D006, 07, 08
TAMCO		7,841.0	
California Total:		8,080.5	
% of National Total:		(1.45%)	
CF&I Steel Corporation	13,664.0	11,128.1	
Colorado Total:	13,664.0	11,128.1	
% of National Total:	(2.12%)	(2.0%)	

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
CitiSteel USA Inc.	1,826.0	4,051.1*	D006, 08
Delaware Total:	1,826.0	4,051.1	
% of National Total:	(0.28%)	(0.73%)	
Florida Steel Corp./Tampa	2,910.0	2,029.3	
Florida Steel Corp./Baldwin	8,222.7	8,112.2	
Florida Total:	11,132.7	10,141.5	
% of National Total:	(1.73%)	(1.82%)	
Atlantic Steel Company	6,775.0		
Atlantic Steel Co./Cartersville	5,603.0	11,882.2	
Georgia Total:	12,378.0	11,882.2	
% of National Total:	(1.92%)	(2.13%)	
Hawaiian Western Steel		126.7*	D006, 08
Hawaii Total:		126.7	
% of National Total:		(0.02%)	
Envirosafe Services		233.2*	D002, 04, 05, 06, 07,
Idaho Total:		233.2	08, 09, 10, F005, 06,
% of National Total:		(0.04%)	07, 08, 09, 19, K046, 62, 69, P106

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
A Finkle & Sons Company	432.1	119.9	
Birmingham Bolt Co. Inc.	1,450.3	2,983.7*	D006, 07, 08
Charter Electric Melting Inc.	185.4	1,091.0	
Calumet Steel Company	1,009.3	766.0	
Cid Recycling and Disposal		15,883.7*	D006, 08,
Keystone Steel & Wire Co.	14,405.3	7,154.5	F003, 05, 06,
Laclede Steel Company		11,531.7	K084
Land & Lakes/Willow Ranch	3,742.9		
Northwestern Steel & Wire #2	40,064.3	37,282.7	
Peoria Disposal Company #1	4,474.8	2,929.5	
Thomas Steel Corporation		2,182.5	
US Steel Corporation	25,012.2	12,150.6	
Illinois Total:	90,776.7	94,075.8	
% of National Total:	(14.08%)	(16.88%)	
Four County Landfill	7,698.4*		D008, F006,
Inland Steel Company	7,511.0	4,112.0	K069
Slater Steels Corporation	641.8	600.9	
Nucor Steel	280.0	14,601.0*	D006, 08
Heritage Env. Services (HES)	883.4*		D002, F006,
Kobelco Metal Powder		63.0	K040
Indiana Total:	17,014.6	19,376.9	
% of National Total:	(2.64%)	(3.48%)	
North Star Steel	3,727.2	434.9	
Iowa Total:	3,727.2	434.9	
% of National Total:	(0.58%)	(0.08%)	

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
Kentucky Electric Steel Co.	3,615.1	2,908.8*	D006, 08
Green River Steel Corporation	774.8	852.5	
Newport Steel Corporation	3,232.0	3,073.2	
Kentucky Total:	7,621.9	6,834.5	
% of National Total:	(1.18%)	(1.23%)	
Bayou Steel Corporation	12,242.7	6,907.8	
Louisiana Total:	12,242.7	6,907.8	
% of National Total:	(1.9%)	(1.24%)	
Rodney Hunt Company	4.0	2.4	
Massachusetts Total:	4.0	2.4	
% of National Total:	(0%)	(0%)	
Baltimore Specialty Steel, Corp.	1,372.0	533.0	
Eastern Stainless Steel Co.	1,218.0	1,153.0	
Maryland Total:	2,590.0	1,686.0	
% of National Total:	(0.4%)	(0.30%)	
Michigan Disposal, Inc.	50,907.5	14,062.0	D008, 09
National Steel Corporation	3,279.8*		
McLouth Steel-Trenton Plant	1,487.0		
Quanex Corp.-MacSteel Div.	2,242.0	2,367.9	
North Star Steel Company		9,282.0	
Rouge Steel Company	13,874.0	6,474.3	
Michigan Total:	71,790.3	32,186.2	
% of National Total:	(11.13%)	(5.77%)	

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
North Star Steel	4,915.0	6,190.0	
Minnesota	4,915.0	6,190.0	
% of National Total:	(0.76%)	(1.11%)	
Armco, Inc.	9,957.0	11,393.0*	D006, 08
Continental Cement Co. Inc.	2.6*		D006, 07, 08,
Missouri Total:	9,959.6	11,393.0	F006, K069
% of National Total:	(1.54%)	(2.04%)	
Mississippi Steel Division	2,303.0		
Mississippi Total:	2,303.0		
% of National Total:	(0.36%)		
Florida Steel Corporation	2,077.9	2,814.9	
North Carolina Total:	2,077.9	2,814.9	
% of National Total:	(0.32%)	(0.50%)	
Nucor Steel	5,353.0	4,973.0	
Nebraska Total:	5,353.0	4,973.0	
% of National Total:	(0.83%)	(0.89%)	
Hoeganaes Corporation		506.3	
New Jersey Steel Corporation	6,510.0	6,781.8	
Raritan River Steel Company	9,749.9	11,345.4*	D008
New Jersey Total:	16,259.9	18,633.5	
% of National Total:	(2.52%)	(3.34%)	

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
Al Tech Specialty Steel Corp.	625.7	667.6	
Allegheny Ludlum Steel	63.0	57.1	
Auburn Steel Co., Inc.	5,796.7	4,953.9	
Crucible Specialty Metals Div.	548.6	456.1	
New York Total:	7,034.0	6,134.7	
% of National Total:	(1.09%)	(1.10%)	
Copperweld Steel Company	4,760.0	3,604.0	
Empire Detroit Steel Division	10,890.0	8,344.0	
LTV Steel	3,694.5		
Larson Foundry	62.0	22.0	
Marion Steel Company	11,686.7	6,629.1	
North Star Steel	4,754.0	5,230.0	
Republic Engineered Steels	25,630.1	20,849.6	
Timken Company	12,517.5	11,493.8	
Ohio Total:	73,994.8	56,172.5	
% of National Total:	(11.47%)	(10.08%)	
Sheffield Steel Corporation	6,466.6	7,393.8	
Oklahoma Total:	6,466.6	7,393.8	
% of National Total:	(1.0%)	(1.33%)	
Cascade steel Rolling Mills, Inc.	4,450.0	4,568.9	
Oregon Steel Mills	4,316.7	7,072.6	
Oregon Total:	8,766.7	11,641.5	
% of National Total:	(1.36%)	(2.09%)	

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
Allegheny Ludlum Steel	6,077.9	7,519.3	
Armco Advanced Materials	12,596.0	11,106.9*	D006, 07
Armco Stainless and Alloy	562.6	349.7	
Bethlehem Steel Corp./Steelton	8,445.0	7,230.9	
Bethlehem Steel Corp./Johnsto	48,858.0	18,068.0	
Bethlehem Steel Corp./Bethle	3.7		
Braeburn Alloy Steel	2.5		
CMI-Quaker Alloy, Inc.	31.6	33.8*	D007, 08
Carpenter Technology Corp.	2,109.0	1,593.0	
Durasteel Abrasive Company	67.9	42.2	
Edgewater Steel Company	325.0	293.0	
Electralloy Corporation	256.0	263.6*	D002, 10
Ellwood Uddeholm Steel	1,908.7	894.8	
Ervin Industries, Inc.	594.8		
First Miss Steel Inc.	642.1	764.5*	D006, 08
Horsehead Resource	450.0		
INMETCO Inc.	4,200.0	8,040.8	
J&L Specialty Products Corp.	10,711.0	12,347.2	
Jessop Steel Company	384.2	288.5	
Koppel Steel Corporation		809.9	
Latrobe Steel Company	298.0	312.4	
Lukens Steel Company	18,356.0	17,339.0	
Mill Service, Inc.	617.4*		F006, 07, 08, 09, 19, K069
National Forge Co. (Eire Plant)	239.3	342.7	
National Forge Co. (Irvine)	264.4	245.5	
North Star Steel/Milton Mfg.	1,476.4	331.3	
Sharon Steel Corporation	4,107.9	4,749.7	
Standard Steel Div. (Burnham)	2,504.0	2,223.0*	D006
Standard Steel Div. (LaTrobe)	493.0	364.1*	D006, 08
Teledyne Vasco	122.6	129.6	
Union Electric Steel Corp.	217.9	185.1	
Washington Steel Corporation	1,384.0	2,002.9	
Pennsylvania Total:	128,307.9	97,871.4	
% of National Total:	(19.9%)	(17.56%)	

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
Ocean State Steel Inc.	1,022.0	1,984.0	
Rhode Island Total:	1,022.0	1,984.0	
% of National Total:	(0.16%)	(0.36%)	
Chemical Leaman Tank Lines		.5	
Georgetown Steel Corporation	5,925.9	9,304.0*	D006, 07, 08
Nucor Steel		4,319.7	
Owen Electric Steel Company	1,720.4*	1,782.3	D008
South Carolina Total:	7,646.3	15,406.5	
% of National Total:	(1.19%)	(2.76%)	
Allied-Signal, Inc.		1.5*	D007
Florida Steel Corporation		3,078.4	
Hoeganaes Corporation	.4	758.6	
Tennessee Valley Steel Corp.		867.4*	D006, 07, 08
Tennessee Total:	.4	4,705.9	
% of National Total:	(0%)	(0.84%)	
Border Steel Rolling Mills, Inc.	2,939.0	3,440.0	
Chaparral Steel Company	27,790.0	27,082.0	
Lone Star Steel Company	3,975.0	4,021.6	
Marathon LeTourneau Co.	568.0	392.6	
North Star Steel Texas Inc.	11,945.0	10,668.0	
Nucor Steel-Texas Division	5,172.0	5,500.0	
Structural Metals Inc.	12,978.0	13,648.8	
Taylor Foundry Company	36.0*	40.4*	D006, 08
Western Iron Works Inc.	18.0	20.8	
Texas Total:	65,421.0	64,814.2	
% of National Total:	(10.15%)	(11.63%)	

APPENDIX D - Continued

Facility:	1989 Generated:	1991 Generated:	Includes Wastes
Nucor Steel-Utah Division	8,947.1*	10,367.0*	D006, 07, 08
Utah Total:	8,947.1	10,367.0	
% of National Total:	(1.39%)	(1.86%)	
Norfolk Steel	1,161.5		
Roanoke Electric Steel	6,588.0	5,925.2	
Virginia Total:	7,749.5	5,925.2	
% of National Total:	(1.2%)	(1.06%)	
Earle M. Jorgensen Company	101.6	61.2	
Salmon Bay Steel Corp.	3,173.6	1,105.8	
Seattle Steel Inc.	6,471.4	680.2*	D006, 08
Western Steel Casting Co.		30.7	
Washington Total:	9,746.6	1,877.9	
% of National Total:	(1.51%)	(0.34%)	
Steel of West Virginia, Inc.	2,047.0	1,285.0	
West Virginia Total:	2,047.0	1,285.0	
% of National Total:	(0.32%)	(0.23%)	
TOTAL:	644,832	557,473	

APPENDIX D - Continued
EPA HAZARDOUS WASTE CODES

Code	Waste Description
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Characteristic Hazardous Waste

D002	Corrosive Waste
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium
D008	Lead
D009	Mercury
D010	Selenium

Hazardous Waste from Nonspecific Sources:

F003	Spent nonhalogenated solvent mixtures.
F005	Spent nonhalogenated solvent mixtures.
F006	Wastewater treatment sludge from electroplating.
F007	Spent cyanide.
F008	Cyanide residues.
F009	Cyanide stripping and solutions.
F019	Wastewater treatment sludge from coating of aluminum.

Hazardous Waste from Specific Sources:

K040	Wastewater treatment sludge from the production of phorate.
K061	Emission control dust/sludge from the primary production of steel.
K062	Spent pickle liquor from steel finishing operations of plants that produce iron or steel.
K069	Emission control dust/sludge from secondary lead smelting.
K084	Wastewater treatment sludge generated during the production of veterinary pharmaceuticals from arsenic or organoarsenic compounds.

Discarded Commercial Chemical Products--Acute Hazardous Waste:

P106	Sodium cyanide
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Source: Compiled by author from the EPA's National Biennial RCRA Hazardous Waste Report (U.S. EPA 1993e).