PNNL-10939

U.S./Mexico Border Environmental Study Toxics Release Inventory Data, 1988-1992

R. F. O'Brien
C. A. LoPresti

February 1996

Prepared for the
U.S. Environmental Protection Agency
under Contract DE-AC06-76RLO 1830

Pacific Northwest National Laboratory
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Executive Summary

This document is part of a series of reports sponsored by the U.S. Environmental Protection Agency (USEPA), Center for Environmental Statistics, to provide exploratory analyses of environmental databases covering the U.S./Mexico Border Area. Other reports in this series are *The U.S./Mexico Border Environmental Report, Surface Water Quality (in preparation)* and *The U.S./Mexico Border Environmental Report, Air Quality (in preparation).*

This is a report on industrial toxic chemical releases and transfers based on information reported to the Toxics Release Inventory (TRI), a database maintained by the USEPA. This document discusses patterns of toxic chemical releases to the atmosphere, to water, to the land, and to underground injection; and transfers of toxic chemicals to Publicly Owned Treatment Works (POTW), and for disposal, treatment and other off-site transfers during the TRI reporting years 1988-1992. Geographic coverage is limited to the U.S. side of the "Border Area", the geographic area situated within 100 km of the U.S./Mexico international boundary. A primary purpose of this study is to provide background information that can be used in the future development of potential "indicator variables" for tracking environmental and public health status in the Border Area in conjunction with the implementation of the North American Free Trade Agreement (NAFTA).

Summary of Toxic Chemical Releases:

The TRI data indicate that a small number of chemicals and locations in the Border Area account for almost all of the chemical releases and that two of the least populated counties, Hidalgo and Grant Counties in New Mexico, account for about three-quarters of all the chemical releases. The remainder of the releases occur in the urban centers along the Border Area, where one would expect to find a large mix of industries. Except for Hidalgo and Grant Counties in New Mexico, the least populated counties add an insignificant amount of chemical releases to the Border Area. The TRI data show clearly that patterns of Border Area releases vary geographically and by industry.

From 1988 to 1992 a total of 179.6 million pounds of toxic chemicals were released to the environment by manufacturing facilities reporting to the TRI. The top ten chemicals, accounting for 92% of releases in the Border Area in this period, are given in Table 3.6. Copper and zinc compounds and 1,1,1-trichloroethane dominate the chemical species released from 1988 to 1992 and account for 80% of all releases in the Border area for this period.

In 1992, zinc compounds and propylene oxide both ceased to be among the top ten chemicals emitted in the Border Area. The largest reduction was in zinc compound releases, which accounted for more than 20% of all releases in the 1988-1992 period. Zinc compound releases dropped from about 11 million pounds in 1988 to 8.4 million in 1991. In 1992, zinc compound releases dropped to virtually zero due to a processing change at the Phelps Dodge smelter in New Mexico, the primary zinc releasing facility.

Over the 1988-1992 period, land and air releases accounted for 99.9% of all toxic chemical releases in the Border Area, with the remaining 0.1% emitted to water or underground injection. Most of the releases in New Mexico were reported as going to land, while in the remainder of the Border Area most of the reported releases were to the air.

The ten facilities with the largest total releases over the 1988-1992 period accounted for 88.6% of all reported releases in that period. It is no surprise that these facilities are located in the

five counties with the largest releases in the Border Area. The top ten facilities in the most recent reporting year of 1992 again accounted for 88.1% of all reported releases in that year. The locations of these 1992 top ten facilities are shown in Map 14 in the Appendix of this report (page A.30).

The majority of the TRI reporting facilities are situated around three urban population centers within the Border Area: San Diego (CA), Tucson (AZ) and El Paso (TX). However, the largest contributions to total chemical releases occur in one of the least populated areas in the Border Area, in the contiguous counties of Hidalgo and Grant in New Mexico. These two counties accounted for more than 77% of the total chemical releases in the Border Area from 1988 to 1992. In contrast, the three urban centers cited above collectively accounted for about 20% of the total chemical releases in the same reporting period. The two New Mexico counties plus the counties containing San Diego, Tucson and El Paso accounted for about 97% of the total toxic chemical releases over the 1988-1992 period.

For the chemicals listed in EPA's 33/50 program (the voluntary national program aimed at reducing certain high-priority chemical releases by 33% in 1992 and 50% in 1995, from 1988 levels) the Border Area by 1992 showed reductions in total releases of 47.1% since 1988. If this trend continues, the Border Area would meet its goal of 50% reductions ahead of schedule.

It is evident that releases of toxic chemicals to air along the Border Area show a steady downward trend, with a cumulative reduction in 1992 of about 31% compared to 1988. Moreover, 33/50 chemical releases are, on the whole, steadily dropping at target rates. Annual trends are mixed for each of the top ten chemical species released within 1988-1992, with some chemicals increasing, others decreasing and yet others appearing flat.

Summary of toxic chemical transfers:

Annual total transfers of toxic chemicals increased in the Border Area from about 2.5 million pounds in 1988 to about 14.0 million pounds in 1992; almost a 6-fold increase. Most of this increase was attributable to "Other" offsite transfers (transfers to disposal, treatment and other categories). Transfers to Publicly Owned Treatment Works (POTW's) decreased during this period. Border States, on the contrary, showed a decline in total transfers from about 229 million pounds in 1988 to about 137 million pounds in 1992.

Toxic chemical transfers in the Border Area are dominated by sulfuric acid, which accounted for about 82% of all chemicals transferred in 1992. The annual quantity of sulfuric acid transferred increased from about 300 thousand pounds in 1988 to about 11.6 million pounds in 1992. The bulk of this increase is accounted for by an increase in sulfuric acid transfers reported by the Phelps Dodge Refining Corporation at their El Paso Works, starting in 1990. This facility, in the primary metals industry, accounted for 82% of chemical transfers in the Border Area in 1992. No other facility in the Border Area accounted for more than 3% of the total amount of transfers.

Toxic chemical transfers in the Border Area originated almost entirely in the three most populated counties in the Border Area: San Diego (CA), El Paso (TX) and Pima (AZ). These counties accounted for 40.4 million pounds, or 99.5% of the reported total transfers originating in the Border Area in the period from 1988 to 1992.

Acknowledgements

This report was prepared for the U.S. Environmental Protection Agency by Robert F. O'Brien and Charles A. Lo Presti of Pacific Northwest National Laboratory. Many individuals have contributed to this document. Richard Gilbert and Derrick Bates, Pacific Northwest National Laboratory, provided technical support in the development stages. Frank Ryan, Pacific Northwest National Laboratory, provided assistance in the writing of this document. Ronald Shafer, U.S. Environmental Protection Agency (USEPA) initiated this project and provided guidance on its scope and Judith Calem, USEPA, provided technical guidance and review. Nicole Cortina, USEPA, and Lewis Summers, Lockheed Martin Corporation, provided technical assistance in the later stages of this report. The authors thank all these individuals for their support and fine work, as well as the reviewers for their excellent comments.

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1.0 Introduction

This document is part of a series of reports sponsored by the U.S. Environmental Protection Agency (USEPA), Environmental Statistics and Information Division, to provide exploratory analyses of environmental databases covering the U.S./Mexico Border Area. Other reports in this series are *The U.S./Mexico Border Environmental Report, Surface Water Quality* and *The U.S./Mexico Border Environmental Report, Air Quality* (in preparation).

This is a report on industrial toxic chemical releases and transfers based on information reported to the Toxics Release Inventory (TRI), a database maintained by the U.S. Environmental Protection Agency. This document discusses patterns of toxic chemical releases to the atmosphere, to water, to the land, and to underground injection; and transfers of toxic chemicals to Publicly Owned Treatment Works (POTW) and for disposal, treatment and other off-site transfers during the TRI reporting years 1988-1992. Geographic coverage is limited to the U.S. side of the "Border Area", the geographic area situated within 100 km of the U.S./Mexico international boundary. A primary purpose of this study is to provide background information that can be used in the future development of potential "indicator variables" for tracking environmental and public health status in the Border Area in conjunction with the implementation of the North American Free Trade Agreement (NAFTA).

Exploratory data analyses were performed to identify the major sources of toxic chemical releases and transfers in the Border Area by geographic, industrial, and chemical categories. The findings provide a general picture of industrial contributions to regional pollution in the Border Area. Findings are often presented in terms of aggregates -- sums of releases or transfers -- based on various subgroups of the data over the 1988-92 period and for 1992 alone.

Some of the motivation in the data analysis was to see how the TRI data could be used to help answer the following questions:

- What are the primary chemical species emitted in the Border Area?
- Which environmental pathways (e.g., air, water, land) are receiving toxic chemical emissions?
- How are toxic chemical emissions distributed geographically at the county and State level?
- Which facilities generate the majority of toxic chemical emissions in the Border Area?
- How do the TRI data on Border Area toxic chemical emissions compare with State and national data on emissions?
- What significant temporal trends can be discerned in these data?

It should be noted that this report is regional in scope as the analysis is limited to the U.S. Border Area , the portion of Border States and counties within the Border Area. A detailed analysis of point-source releases and transfers and their impacts on environmental and human health is outside the scope of this report.

Human exposure and environmental impacts are not discussed in detail, because they are most meaningful when considered within the context of specific risks of exposure to toxins, and hazards to health and safety due to such exposures. To assess such risks, it is necessary to know not only the quantities and locations of releases but also details about dispersion along the environmental pathways, chemical changes, uptakes into organisms, and ultimate exposure concentrations over periods of time. Some information about toxicities of specific chemicals discussed in this report may be found by reference to the Integrated Risk Information System (IRIS) database, maintained by the USEPA.

The remainder of this report is developed in four chapters. Chapter 2 provides background information on the USEPA Toxic Release Inventory database, the principal data source used in this report. Chapter 2 also discusses limitations and caveats to consider when using this information for decision making or planning. Chapter 3 presents the major findings from the analysis of the TRI data and discusses releases by environmental pathway, chemical species, 33/50 chemicals, Standard Industrial Classification Code (SIC), facility, county and by the top ten chemical releases in the Border Area. Chapter 4 presents information on the transfer of toxic chemicals in a format similar to Chapter 3. Chapter 5 gives a short summary of conclusions. References are listed in Chapter 6. The Appendix contains two tables which list the complete list of SIC codes for categories 20-39; and the year-by-year TRI data. Also included in the Appendix are two maps, the first showing all reporting facilities for the 1988-1992 period and the second showing the locations of the Top Ten reporting facilities in 1992.

2.0 Background and Data Limitations

This chapter gives background information on the Border Area and discusses the Toxic Chemical Release Inventory System (TRI) database which was used to generate the data discussed in this report. Section 2.1 gives a brief description of the Border Area along with a map. Section 2.2 explains how information from the Border Area was retrieved from the TRI for this report. Section 2.3 discusses pertinent issues related to the toxic chemical releases and transfers reported in the TRI and raises questions on limitations and appropriate caveats on the utility of the TRI data for decision making and planning purposes. Section 2.4 gives a brief discussion of data comparability as it relates to the information in this report.

2.1 The Border Area

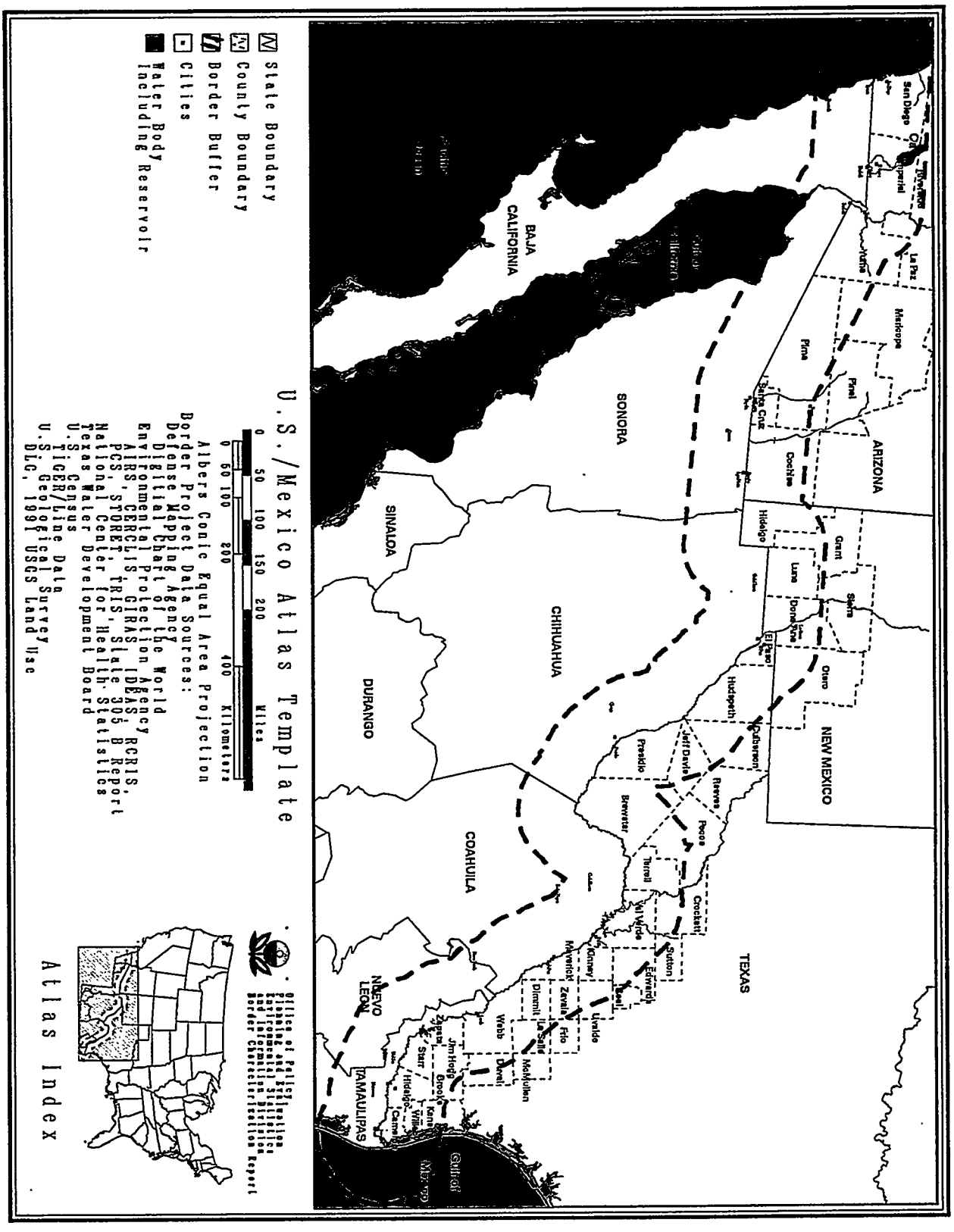
The Border Area in this report refers to the 100-kilometer (62.1 mile) wide zone on the U.S. side of the U.S./Mexico boundary, extending for nearly 2,000 miles from the Pacific Ocean to the Gulf of Mexico, and including areas in the states of Arizona, California, New Mexico and Texas. Map 1 shows the Border Area with the 100-km zone as well as the Border States and Counties in the U.S. and the Border States in Mexico. The U. S. Border Area covers 92,852.8 square miles.

2.2 The Toxics Release Inventory Database

The chemical release and transfer data used in this report were obtained from the TRI in February 1995 from the online system maintained at the USEPA's computer center in Research Triangle Park, NC. Official 1993 TRI data were not yet available at the time of data retrieval. Data records from TRI dated from 1988 through 1992 were retrieved for all facilities within the 48 counties that are wholly or partially within 100 kilometers of the U.S./Mexico international border. The 1988 data are considered the baseline year for this report. TRI records for those facilities found by geocoding to be within 100 km of the border were then retained for analysis. Also included in the Border Area data were records for ten facilities which are technically located outside the 100-km envelope, but were included due to anomalies in the geocoding of reported coordinates. These facilities are located around Tucson, Arizona, within 20 kilometers of the 100-km envelope, and the releases and transfers from these facilities have little or no impact on the analyses discussed in this report.

2.3 Data Considerations and Limitations

Only facilities which meet TRI reporting criteria are required to report releases and transfers. Year-to-year releases and transfers should be compared with caution because quantity thresholds for some categories of releases changed from year to year from 1987 through 1989, and because new substances were added to the list of reportable chemicals in various years,. Additionally, it was found that not all facilities reported transfers and recycling information to the same level of accuracy. A summary of these limitations is given below. The following information is condensed from the *1992 Toxic Release Inventory Public Data Release* (EPA, 1994), referred to hereafter as the "1992 TRI Report". More detailed information on reporting requirements and data inconsistences can be found in Chapter 7 of that report.



Map 1. The Border Area - County Map

- **Categories of Reporting Facilities.** The data reported in the TRI come from facilities classified in the Standard Industrial Classification primary codes as SIC 20-39; that is, manufacturers of chemicals, petroleum, metals, paper, plastics, etc. Releases and transfers from other types of facilities are not represented in the TRI. A complete list of SIC codes 20-39 is given in Table A.1 of the Appendix.

- **Facility Size.** Only facilities with ten or more employees, and facilities that meet the quantity use thresholds whatever the number of employees, are required to report TRI releases and transfers. Therefore, a large number of smaller facilities are not represented in this report.

- **Quantity Thresholds.** Facilities are required to report releases and transfers based on the minimum amounts of toxic chemicals used for different industrial purposes. Quantity thresholds for manufacturing, importing, and processing use were initially 75,000 pounds per year per chemical in 1987, then lowered to 50,000 pounds in 1988 for manufacturing and processing, and in 1989 lowered again to 25,000 pounds per year per chemical. Quantity thresholds for other purposes remained consistent at 10,000 pounds per chemical per year. In this report, the 1988 data probably under-represent the reporting facilities and quantities emitted because 1988 reporting limits were twice as large as later years.

- **Chemicals.** Only chemicals on the current EPA TRI list for a specified year were required to be reported in that year. This is discussed in Chapter 3, pp 155-156, of the 1992 TRI Report. Since the inception of the list in 1987, 12 reportable chemicals were deleted, 9 newly reportable chemicals were added in 1990, and 7 newly reportable chemicals were added in 1991, for a total of 16 additions. Questions Q22 and Q23 in the 1992 TRI Report list the changes to the list of chemicals. For this report, the authors verified that all chemicals shown in the tables were indeed on the reportable list for all years between 1988 and 1992, inclusive.

- **Quantity Estimates.** The amount of chemical releases and transfers from a facility are self-reported, and can be estimated in diverse ways. Methods range from monitored stack releases to best-guess engineering judgements. Moreover, these estimation methods may change from year to year when equipment is modified or replaced, or new plants are placed on line. Accuracies range from less than a percent to an order of magnitude, depending on substance, measurement method, environmental pathway, quantity, and other factors. Because reports do not include estimates of error or bias for reported chemical releases and transfers, it is impossible to ascertain more than generally how accurately aggregates in this report represent actual quantities released or transferred. This is further discussed in the 1992 TRI Report.

- **Additions to Reporting Requirements.** The Pollution Prevention Act of 1990 established additional requirements for reporting transfers. For 1987 through 1990, transfers to four categories were reported: Publicly Owned Treatment Works (POTW), Disposal, Treatment, and General Off-Site transfers. From 1991 on, transfers were additionally reported for Recycling and Energy Recovery as well. This is further discussed in the 1992 TRI Report.

- **Non-Reporting Bias.** There is also a non-reporting problem in the TRI, because not all facilities that should submit chemical release data do so in a timely manner. Therefore, there is a possible unknown downward bias in yearly aggregates of reported chemical releases for geographic areas and industrial classifications.

- **Other Sources of Bias.** This report does not take into account unreported or illegal releases or dumping of toxic chemicals in the Border Area. Further, no account is taken of air or water releases beyond but near the edge of the 100-km zone, that may infiltrate the border zone from U.S. and Mexican facilities.

2.4 Data Comparability

In this report, quantities being compared are chiefly aggregates -- sums of releases or transfers -- based on various subgroups of the data. Interpretation of year-to-year changes in aggregate chemical releases is often difficult to substantiate statistically because the accuracy and bias of any aggregate numerical values may be suspect, due to the considerations noted above. Release or transfer quantities being aggregated often vary widely in magnitude, from hundreds to millions of pounds. Although facilities are able to report estimation methods for quantities released or transferred, they do not ordinarily report measured or estimated error with their estimates of quantity. Moreover, quantities are often reported to no more than two significant digits, thereby establishing a lower limit on arithmetic accuracy.

However, in exploring these data it is still possible to get an indication of gross amounts and year-to-year trends in chemical releases and transfers in the Border Area, on a case-by-case basis. Although aggregate totals are often cited to the pound in this report, following the 1992 TRI Report, this precision is primarily for comparability with other reports and retrievals. Accuracy to better than 1% of the summary total of a total release or transfer is believed to be highly unlikely, and under-reporting or over-reporting biases cannot be estimated reliably from these data.

3.0 Toxic Chemical Releases

This chapter discusses toxic chemical releases in the Border Area from 1988 to 1992. Section 3.1 discusses the number of reporting facilities in the Border Area as well as the total toxic chemical releases by year within the Border Area. Sections 3.2 to 3.8 report on toxic chemical releases by different cross-classifications. The last section in this chapter , section 3.9, gives a comparison of the Border Area data to Border State data to assess how the Border Area compares within each State.

3.1 Number of Facilities and Total Chemical Releases

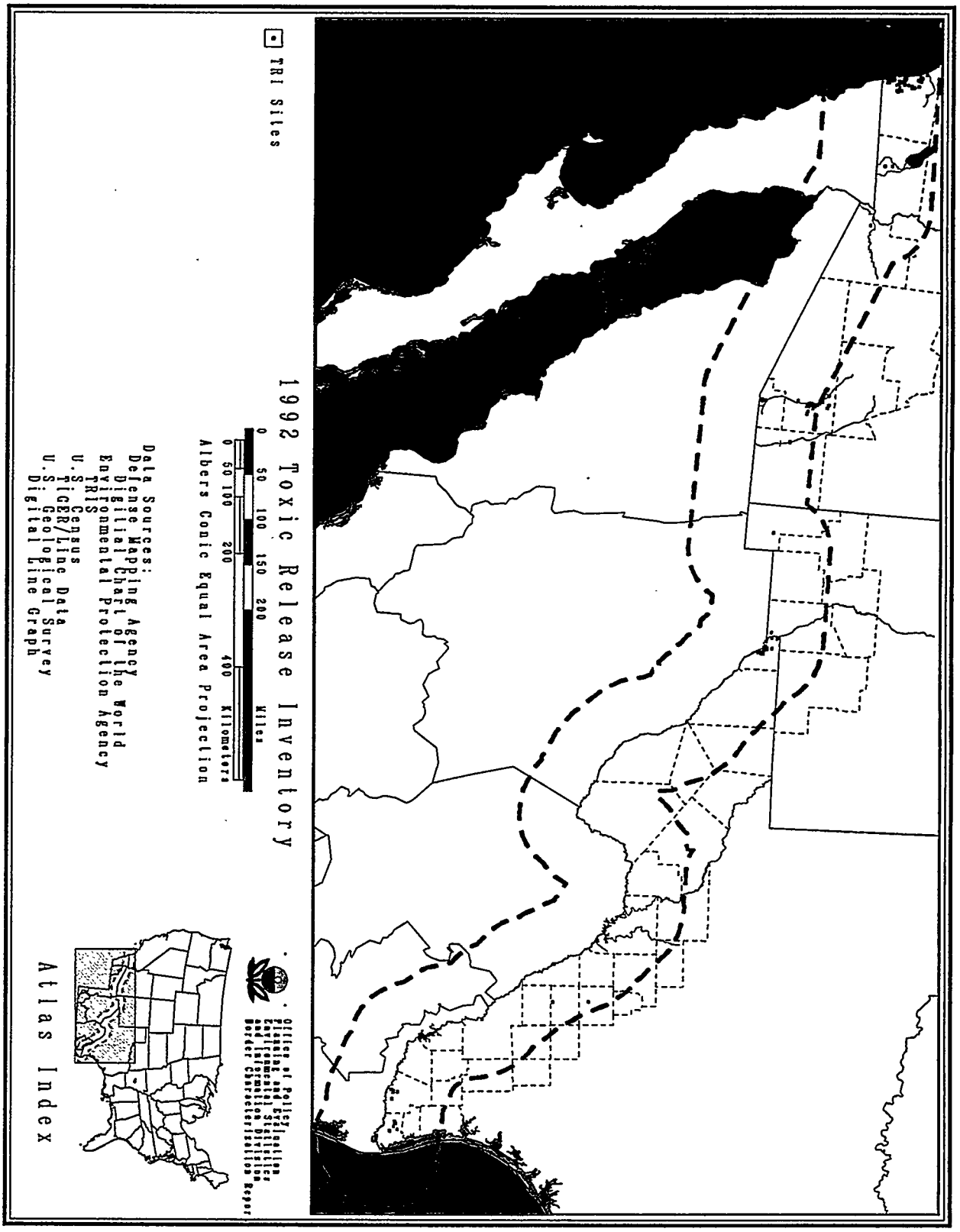
Records for 242 facilities appeared in the TRI database for the Border Area over the period 1988-1992. Of these, 224 facilities reported at least one non-zero chemical release in the 1988-1992 period. Of the facilities that reported for more than one year, some of these did not report releases of the same chemicals for all years. From 1988 to 1992, the number of yearly reporting facilities averaged 166 in the Border Area, and 162 facilities reported in 1992 (Table 3.1). The Border Area, the 100-km buffer zone, and the locations of the 1992 reporting facilities are shown in Map 2. All reporting facilities from 1988 to 1992 are shown in Map 13 in the Appendix.

In the Border Area there were 179.6 million ponds of toxic chemical releases over the period 1988 to 1992. Over the period 1988-1991, TRI facilities reported a total of 153.6 million pounds of toxic chemicals released to land, air and water, an average of approximately 38.4 million pounds per year. In 1992, TRI facilities reported toxic chemical releases to land, air and water totaling approximately 25.8 million pounds in the Border Area, a decrease of approximately 32.8% from the 1988-91 average. Yearly data are given in Table 3.2 and Figure 3.1 below.

Table 3.2 shows release totals for the aggregated Border Area, aggregated Border States and the entire USA for each reporting year. These totals and Figure 3.1 show that although the Border States and the U.S. appear to have experienced trends in the same downward direction for the 1989-1992 period, the Border Area trend is generally flat until a drop in 1992. In 1992, the Border Area releases decreased by 31.2% from 1991 levels, while the Border States and the U.S. experienced decreases of 7.8% and 6.4%, respectively, from 1991 levels. The explanation for the general downward trends in the Border States and the U.S. is outside the scope of this report. However, in the Border Area in 1992 the bulk of apparent changes can be traced to a major decrease in releases by a few large toxic waste generators, notably the large reduction of zinc compound releases by two smelter facilities in New Mexico.

Table 3.1. TRI Reporting Facilities by Year and State in the Border Area

State	1988	1989	1990	1991	1992
AZ	29	32	31	35	33
CA	74	85	79	87	76
NM	3	3	3	3	3
TX	44	55	55	53	50
Total	150	175	168	178	162



Map 2. Border Area and TRI Facility Locations in 1992

Table 3.2. Toxic Chemical Releases to Air, Land, Underground Injection and Water by Year for the Border Area, the Four Border States, and the U.S.A. for 1988-1992 (millions of pounds).

Year	Border Area	Border States[a]	Entire USA[a]
1988	39.6	967.2	4,852.9
1989	37.6	981.5	5,305.7
1990	38.9	642.5	3,693.1
1991	37.6	598.9	3,373.2
1992	25.8	552.2	3,157.3
Total	179.6	3,742.3	20,382.2
Average '88-'92	35.9	748.5	4,076.4
Average '88-'91	38.4	797.5	4306.2
%Change '92 from '91	-31.2%	-7.8%	-6.4%
% Change '92 from '88	-34.9%	-42.9%	-34.9%
% Change 1992 from '88-'91 Avg.	-32.8%	-30.7%	-26.7%

(a) 1988, 1990, 1991 and 1992 data obtained from "1992 Toxics Release Inventory: Public Data Release". The 1989 data were obtained from a special tabulation from the TRI database on May 22, 1995.

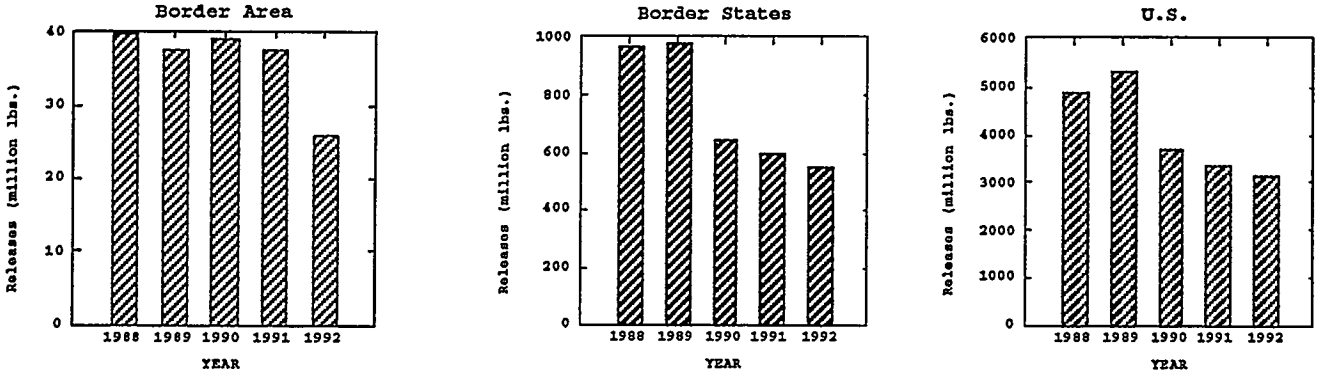


Figure 3.1. Total Releases by TRI Facilities in the Border Area, Border States, and U.S. by Year (millions of pounds)

It is interesting to note in Table 3.1 that California and Texas contain about three-quarters of the Border Area TRI reporting facilities for the 1988-1992 period. Yet, as shown later, they contributed less than 20% of the total releases in the Border Area. Two of the three reporting facilities in New Mexico accounted for more than three-quarters of the 179.6 million pounds of total releases in the Border Area in the period 1988-1992. This is discussed at greater length in other sections of this report.

3.2 Releases by Environmental Pathway

Roughly three-quarters of the toxic releases in the Border Area were emitted to the land, with the remaining quarter emitted to the air each year from 1988-1992 (Figure 3.2). However, this distribution of releases is dominated by the two copper smelters in New Mexico which account for approximately 75% of all releases in the Border Area, and 99.98 percent of all releases in New Mexico. These two smelters release the overwhelming bulk of their waste to land. Pie charts of relative releases by State, Figure 3.3, show that the other Border States are predominately releasing toxic chemicals into the air, with the exception of New Mexico which is dominated by the two smelters.

Tables 3.3, 3.4 and 3.5 summarize Border Area releases to various major environmental pathways. Releases to land over 1988-1992 represent on average 75% of total releases. The five-year average annual land release over 1988-1992 was about 27 million pounds. In 1992, the land release was about 18 million pounds, which is approximately a 36% drop from the previous four-year average of 29 million pounds per year. Inspection of yearly gross releases broken out by environmental pathway, Table 3.5, show air stack releases and air fugitive releases steadily declining each year. In 1992 all air releases were about 22% lower than the previous four-year average based on 1988-1991. There were no major changes in the proportion of stack air releases to fugitive air releases. The percents in Table 3.5 sum down the columns. They show that the proportion of releases to land, year by year, steadily increased until the 1992 drop.

It should be emphasized that these figures refer to the entire Border Area, and do not address specific regions where the proportions of releases to various environmental pathways could be quite different. Moreover, although releases to water and by underground injection are almost negligible compared to land and air releases in the Border Area, this does not negate the possibility that water or underground injection could result in very significant localized pressures.

Figure 3.4 is a bar chart of the total releases to land, air, water and underground injection by year, showing that yearly air releases steadily decreased over the 1988-1992 time period. Table 3.5 shows that both stack air and fugitive air releases declined. For land releases, no downward trend is apparent before 1992. The sudden decrease in land releases in 1992 is due largely to one event: an 8-million pound decrease in zinc compounds in New Mexico, reported by the Phelps Dodge Mining Company, the largest contributor to releases in the Border Area. Water and underground injection fluctuations are basically invisible in this figure since they are an extremely small percentage of all releases in the Border Area.

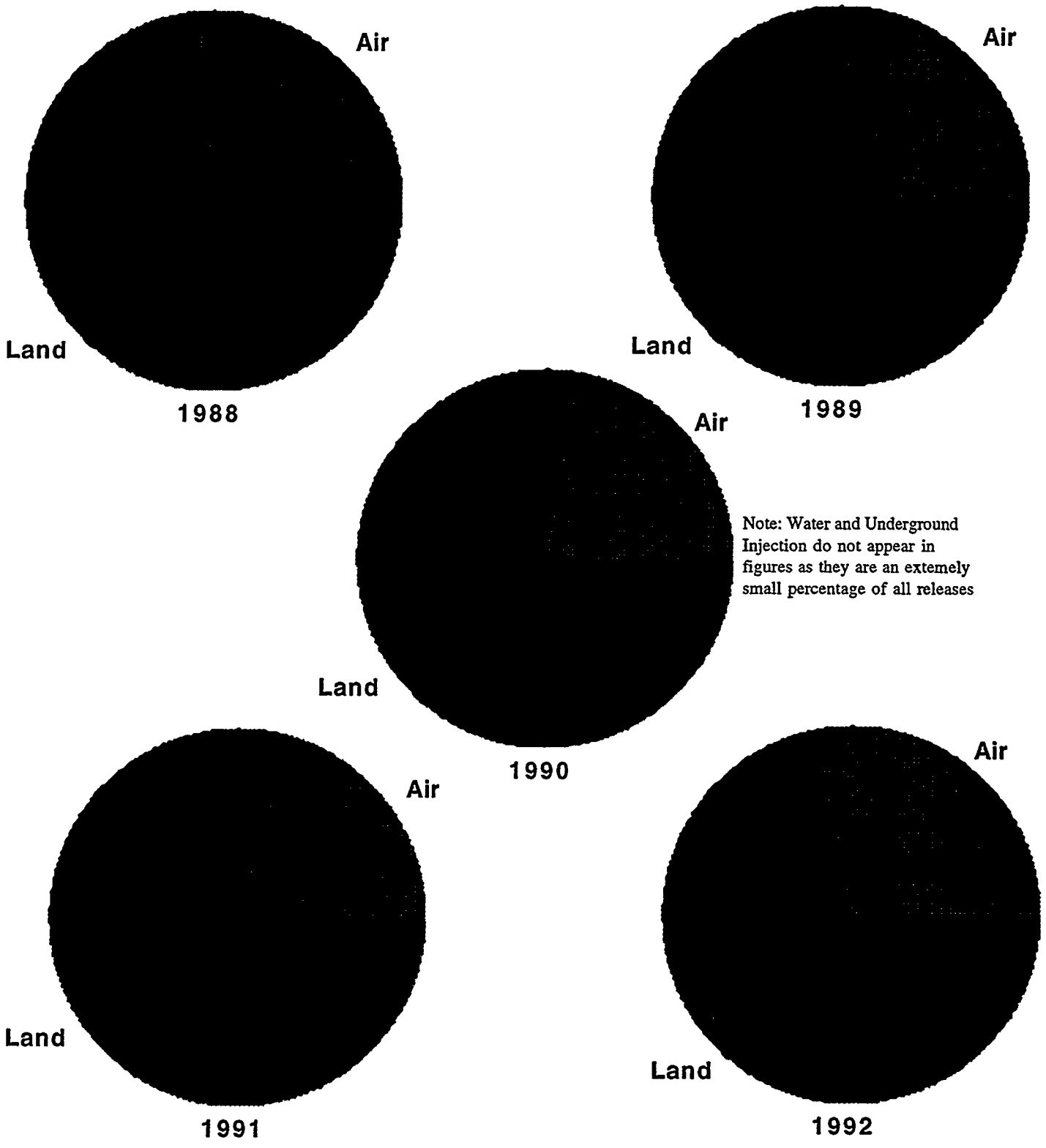
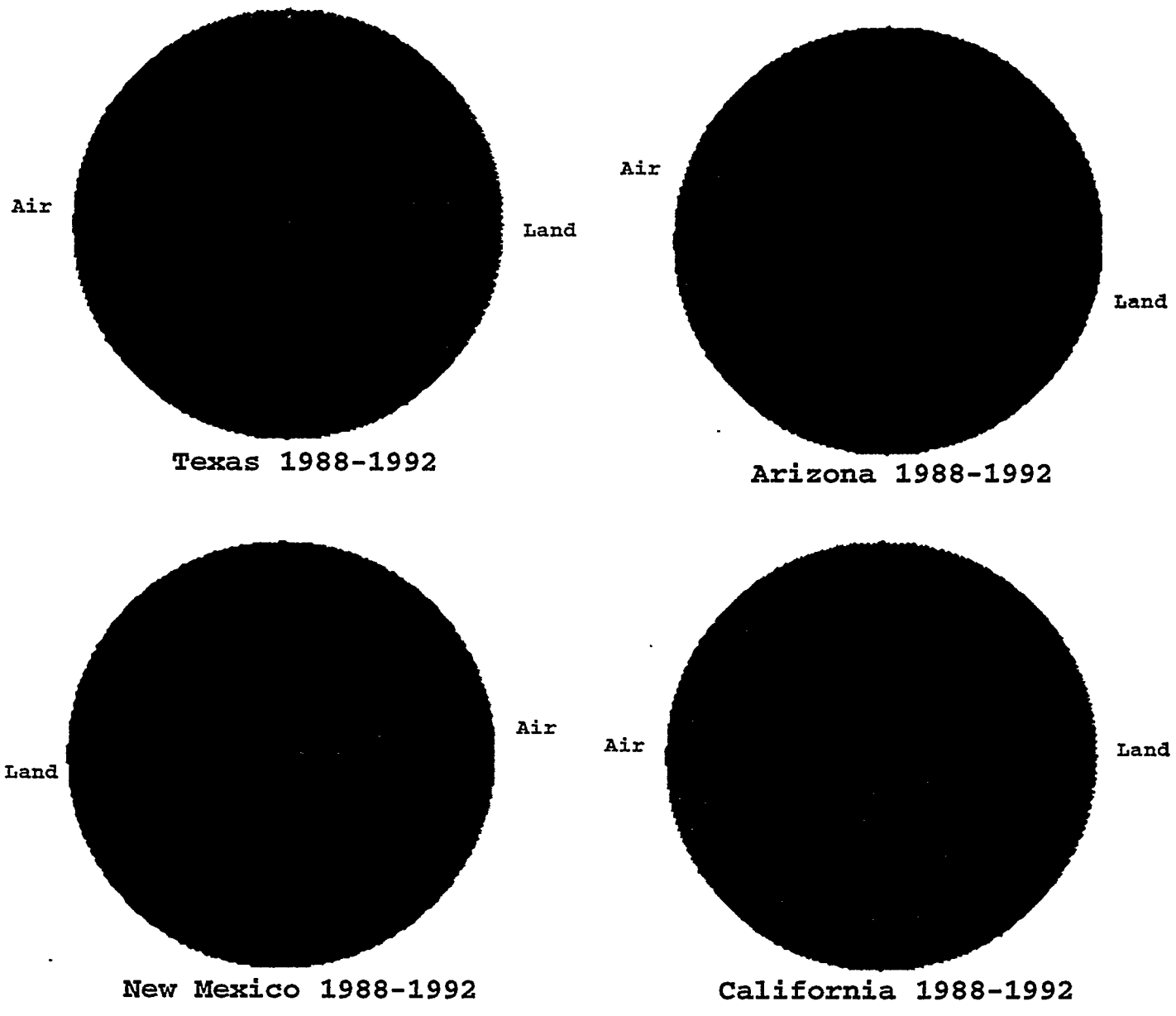


Figure 3.2 Total Releases to Land, Air, Water and Underground Injection by Year

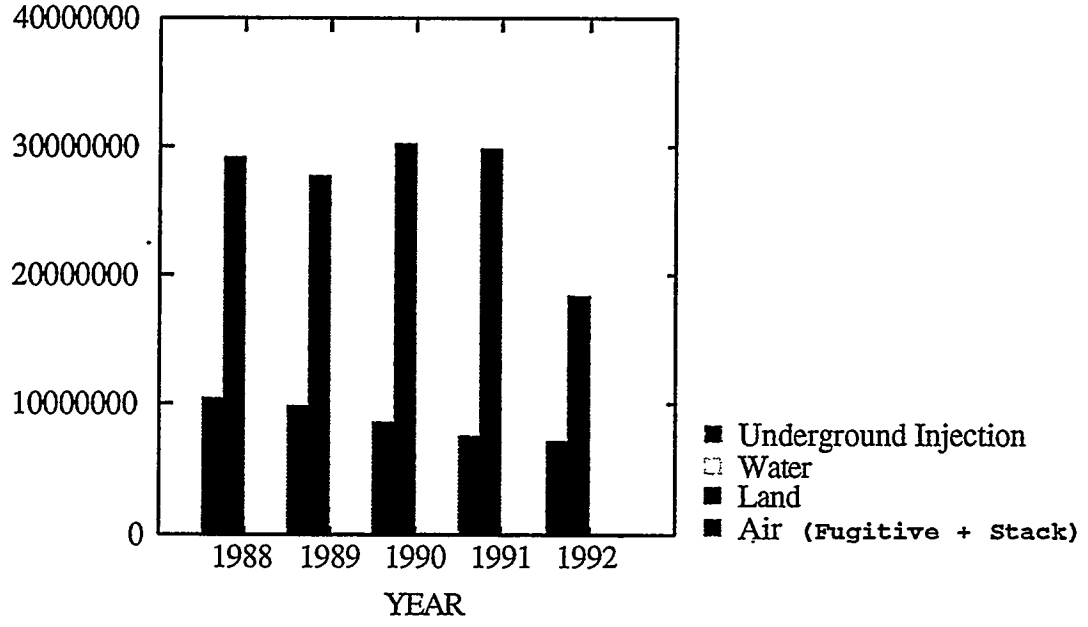


Note: Water and Underground Injection do not appear in figures as they are an extremely small percentage of all releases in the Border Area

Figure 3.3. Total Releases to Land, Air, Water, and Underground Injection by State from 1988-1992

Table 3.3. Releases By Environmental Pathway for the Border Area, 1988-1992

Environmental Medium	Amount (lbs)	% Total Releases 1988-1992	Cumulative %
Land	135,233,209	75.32	75.32
Air - Stack	27,489,333	15.31	90.63
Air - Fugitive	16,804,591	9.36	99.99
Water	26,848	0.01	100.00
Underground Injection	495	0.00	100.00
Total	179,554,476	100.00	100.00



Note: Water and Underground Injection do not appear in figures as they are an extremely small percentage of all releases

Figure 3.4. Releases of Toxic Chemicals to Land, Air, Water and Underground Injection by Year in the Border Area (in pounds).

Table 3.4. Distribution of Releases By Release Category for the Border Area, for 1992 Only

Environmental Medium	Amount (lbs)	% Total Releases 1992	Cumulative %
Land	18,485,084	71.71	71.71
Air - Stack	4,494,751	17.44	89.15
Air - Fugitive	2,797,140	10.85	100.00
Water	275	0.00	100.00
Underground Injection	215	0.00	100.00
Total	25,777,465	100.00	100.00

Table 3.5. Distribution of Releases by Environmental Category for the Border Area by Year

Environmental Medium	1988	1989	1990	1991	1992	Total
Land	29,076,784 (73.4%)	27,627,115 (73.4%)	30,232,775 (77.7%)	29,811,451 (79.2%)	18,485,084 (71.7%)	135,233,209 (75.3%)
Air-Stack	6,361,833 (16.1%)	6,533,898 (17.4%)	5,468,954 (14.1%)	4,629,897 (12.3%)	4,494,751 (17.4%)	27,489,333 (15.3%)
Air Fugitive	4,151,267 (10.5%)	3,455,218 (9.2%)	3,209,709 (8.2%)	3,191,257 (8.5%)	2,797,140 (10.9%)	16,804,591 (9.4%)
Water	16,336 (0.0%)	2,025 (0.0%)	550 (0.0%)	7,632 (0.0%)	275 (0.0%)	26,848 (0.0%)
Underground	20 (.0%)	25 (0.0%)	20 (0.0%)	215 (0.0%)	215 (0.0%)	495 (0.0%)
Total	39,606,240	37,618,281	38,912,008	37,640,452	25,777,465	179,554,446
Percents are proportions of total annual releases allocated to the various environmental pathways.						

3.3 Releases by Chemical Species

Although 115 toxic chemicals were released and/or transferred from 1988 to 1992 in the Border Area, the bulk of the total quantity released is attributable to a few specific chemicals from a small number of reporting facilities in a few localized areas. Again, the chemicals included in this report were on EPA's list of TRI reportable chemicals during all five years from 1988 to 1992.

Tables 3.6 and 3.7 show release quantities for the top ten chemicals over the period 1988-1992 and for 1992, ordered by their percent contribution to total releases. Three chemicals alone accounted for more than 80% of releases over the period 1988 to 1992. In Tables 3.6 and 3.7, the "Cumulative %" columns show that the ten top chemicals taken together account for more than 92% of the total releases.

Table 3.6. Top Ten Border Area Chemical Releases, 1988-1992 (pounds)

Chemical	Amount (lbs)	% Total Releases 1988-1992	Cumulative %
Copper Compounds	94,750,541	52.77	52.77
Zinc Compounds	37,050,819	20.64	73.41
1,1,1-Trichloroethane	12,120,429	6.75	80.16
Freon 113	4,334,058	2.41	82.57
Barium Compounds	4,224,411	2.35	84.92
Dichloromethane	3,890,139	2.17	87.09
Sulfuric Acid	3,581,114	1.99	89.08
Ammonia	2,489,289	1.39	90.47
Acetone	1,893,078	1.05	91.52
Propylene Oxide	1,532,669	0.86	92.38
Remainder	13,687,929	7.62	100.00
Total	179,554,476	100.00	100.00

Table 3.7. Top Ten Border Area Chemical Releases in 1992 (pounds)

Chemical	Amount (lbs)	% Total Releases 1992	Cumulative %
Copper Compounds	18,041,974	69.99	69.99
1,1,1-Trichloroethane	2,148,643	8.33	78.32
Barium Compounds	896,013	3.48	81.80
Sulfuric Acid	711,948	2.76	84.56
Freon 113	576,294	2.29	86.80
Ammonia	588,770	2.24	88.99
Copper	421,964	1.64	90.63
Acetone	335,742	1.30	91.93
Dichloromethane	221,173	0.86	92.79
Dichlorodifluoromethane	178,445	0.69	93.48
Remainder	1,679,436	6.52	100.00
Total	25,777,465	100.00	100.00

In each of the years from 1988 to 1992, the ten largest chemical releases accounted for more than 90% of all chemical releases (yearly totals not shown). While the list of the ten largest chemicals changed somewhat from year to year, copper compounds consistently topped the list each year from 1988 to 1992, and accounted for more than 52% of 1988-92 total toxic chemical releases. Zinc compounds accounted for another 20% of 1988-92 total releases, and 1,1,1-trichloroethane for another seven percent. However, zinc compounds, the second highest chemical release over the 1988-1992 period, were not among the top ten releases in 1992. In 1992, copper compounds and 1,1,1-trichloroethane together contributed more than 78% of the total releases.

Although detailed case-by-case explanations for this variability are outside the scope of this report, several observations based on Tables 3.6 & 3.7 illustrate the nature of the variability in the TRI data.

- Why are zinc compounds not among the top ten releases in 1992?

  Zinc compound releases dropped from more than 11 million pounds in 1988 to 8 million pounds in 1991, and were absent in 1992; while copper compounds remained consistently high at 10.8 million pounds in 1992. The explanation begins with the observation that both metals are smelted in large quantities at the Phelps Dodge Mining Co. smelter in Hidalgo County, NM. Reported zinc compounds from Phelps Dodge Mining fell to zero pounds in 1992 for two reasons stated in the 1992 TRI Report (page 167): " 1) a chemical that does not contain zinc was substituted for zinc chromate which had been used to treat cooling water, and 2) the levels of zinc compounds in slag concentrate processes by the smelter were below de minimis concentration for reporting so the facility no longer reports the source." With zinc compounds dropping out of the 1992 top ten chemicals, 1,1,1-trichloroethane moved from 3rd place in 1991 to 2nd place in 1992.

- Why is propylene oxide not among the top ten releases in 1992?

  The only facility in the Border Area releasing propylene oxide was Merck & Company, San Diego, CA. Merck released 567,000 pounds and 810,000 pounds of propylene oxide in 1988 and 1989, chiefly to the air as a stack release. Starting in 1990, Merck's total releases of propylene oxide dropped to about 30,000 pounds per year through the stack. In 1992 Merck reported additional fugitive air releases of about 57,000 pounds. Even at these current release volumes, Merck's contribution to the toxic chemical release aggregate has dropped to about 15% of its 1988 value, therefore dropping propylene oxide out of the top ten.

- Why did metallic copper appear in the top ten in 1992?

  Copper was reported for each of the five years, but only in small amounts (e.g. 250 pounds in 1990 as stack air) through 1990. Phelps Dodge Refining Corporation El Paso Works reported about 301,000 pounds of copper in 1991 and 420,000 pounds in 1992 as stack air releases. These quantities were sufficient to place metallic copper among the top ten chemical releases for 1992. These figures should be used with caution, however, since it has been noted that some facilities reported the same substance as "copper compounds" in some years and as "copper" in other years (Pam Tsai, USEPA, 1995, personal communication).

- Why did dichlorodifluoromethane appear in the top ten in 1992?

  Dichlorodifluoromethane (also known as CFC-12) was listed in the Border Area TRI data starting in 1991, and by 1992 it was reported in the list of top ten chemical species. This chemical was released to the air by only two companies: Chevron Corporation El Paso Refinery, El Paso, TX, and National Medical Care Products, McAllen, TX. The 1991 aggregate was about 137,000 pounds with only National Medical Products reporting that year. In 1992 releases were about 178,000 pounds as reported by both National Medical Products and Chevron.

Further information can be obtained from Table A.2 in the Appendix.

3.4 33/50 Chemicals

The 33/50 Program is a voluntary pollution source reduction initiative set up with industry by the EPA. The TRI Report defines the 33/50 Program as follows: "The 33/50 Program... derives its name from its overall goals -- an interim goal of a 33% reduction in 1992 and an ultimate goal of a 50% reduction by 1995 in releases and transfers of 17 high-priority toxic chemicals, using 1988 TRI reporting as a baseline." Table 3.8 reports Border Area toxic chemical release performance in terms of 33/50 Program goals, comparing 1992 with 1988.

Table 3.8. Border Area Toxic Chemical Releases of 33/50 Chemicals for 1988 and 1992. Ordered by 1992 Amount, Showing Individual Chemicals.

Chemical	1988 (pounds)	1988 Percent	1992 (pounds)	1992 Percent	Quantity Change % 1988-1992
1,1,1-Trichloroethane	2,734,010	54.9	2,148,643	81.7	-21.4
Dichloromethane	1,158,395	23.3	221,173	8.4	-80.9
Toluene	471,648	9.5	149,333	5.7	-68.3
Tetrachloroethylene	552,098	11.1	87,227	3.3	-84.2
Benzene	37,085	0.7	22,415	0.9	-39.6
Lead	2,932	0.1	1,562	0.1	-53.3
Chromium	13,761	0.3	579	0.0	-95.8
Nickel	0	0.1	478	0.0	undefined
Chloroform	5,450	0.0	0.0	0.0	-100.00
Total 33/50	4,975,379	100.0	2,631,410	100.0	-47.1
Total non-33/50	34,630,861	-	23,146,055	-	-33.2
Total	39,606,240	-	25,777,465	-	-34.9
33/50 Percent of Total	12.6	-	10.2	-	-

Nine chemicals from the list of seventeen chemicals in the 33/50 Program are reported as releases in the Border Area. Two of these chemicals, 1,1,1-trichloroethane and dichloromethane, appear in the list of top ten releases for 1988-1992 and for 1992, as discussed above. These two chemicals together accounted for 78.2% of 33/50 releases in 1988, and 90.1% in 1992.

Table 3.8 shows that 1,1,1-trichloroethane and dichloromethane releases showed quantity reductions from 1988 levels to 1992 levels of about 21% and 81% respectively. Although the reduction for the largest single contributor, 1,1,1-trichloroethane, did not meet the 1992 goal, reductions for the other chemicals (except nickel) reported in the Border Area exceeded the goals. By 1992, releases of 1,1,1-trichloroethane alone had grown to almost 82% of all 33/50 releases to the Border Area environment.

Nickel appears to be a special case. Although it is the only chemical showing increasing releases from 1988 to 1992 in the table, 1992 nickel releases actually decreased from a 1989 release level of 1,709 pounds. Nickel can be considered an insignificant contributor to Border Area pollution on the whole, as its total contribution is very small at only 4,337 pounds over the entire 1988-1992 period.

Table 3.8 also compares 33/50 chemicals to non-33/50 chemicals. Table 3.8 shows the Border Area has reduced its 1992 33/50 chemicals releases by 47.1% from 1988 levels. This may be compared to the 33.2% reduction in non-33/50 chemicals, and to the 34.9% reduction in all chemicals, including 33/50 chemicals, between 1988 and 1992. The Border Area is therefore ahead of target considering all 33/50 chemicals, and ahead of target on all the chemicals individually, with the exception of 1,1,1-trichloroethane and nickel.

3.5. Releases of Top Ten Chemicals by Environmental Pathways

Section 3.2 discusses total releases by environmental pathways. Because the top ten chemicals over the period 1988-1992 and for 1992 alone account for more than 90% of releases in the Border Area, it is interesting to determine to which pathways these individual chemicals were released.

Figures 3.5 through 3.16 below show the pathways to which each of the top ten chemicals was released annually from 1988 to 1992. These figures include the top ten chemicals for 1988-1992 as well as the two new chemicals that made the top ten list in 1992.

The figures show that copper compounds, zinc compounds and barium compounds are by far the largest contributors to land disposal in the Border Area. Information calculated from Table A.2 in the Appendix shows that releases of copper, zinc and barium compounds, which made up three of the top five chemicals released over the 1988-1992 period, accounted for more than 98% of the total Border Area land releases in the 1988-1992 period. The remainder of the chemicals given in the figures were released predominately to the air, with minor quantities being emitted to water and underground injection. The air releases of the top ten chemicals account for more than 67% of all air releases over the 1988-1992 period.

Annual trends discussed elsewhere in this report can be observed in these plots. Land-released chemicals such as copper compounds increase and then decrease; zinc compounds decrease and then drop out, and barium compounds vary considerably between 1988 and 1992. Air-released chemicals

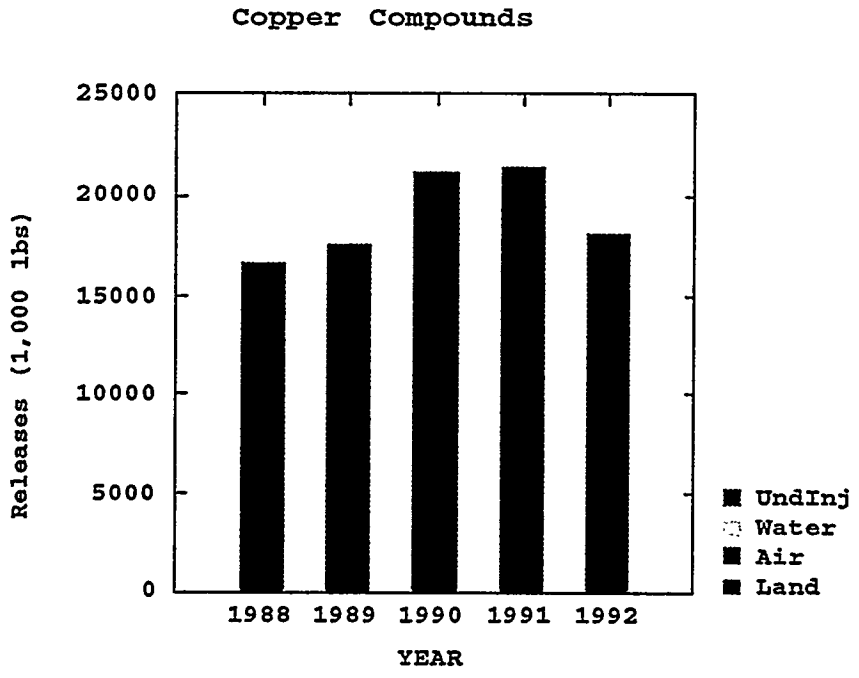


Figure 3.5. Total Releases to Land, Air, Water and Underground Injection for Copper Compounds by Year

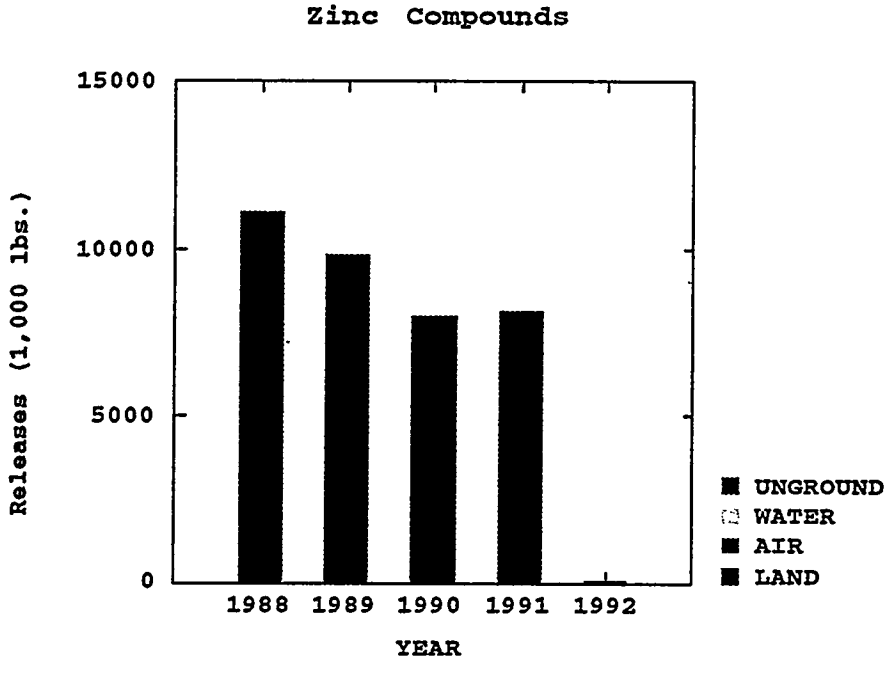


Figure 3.6. Total Releases to Land, Air, Water and Underground Injection for Zinc Compounds by Year

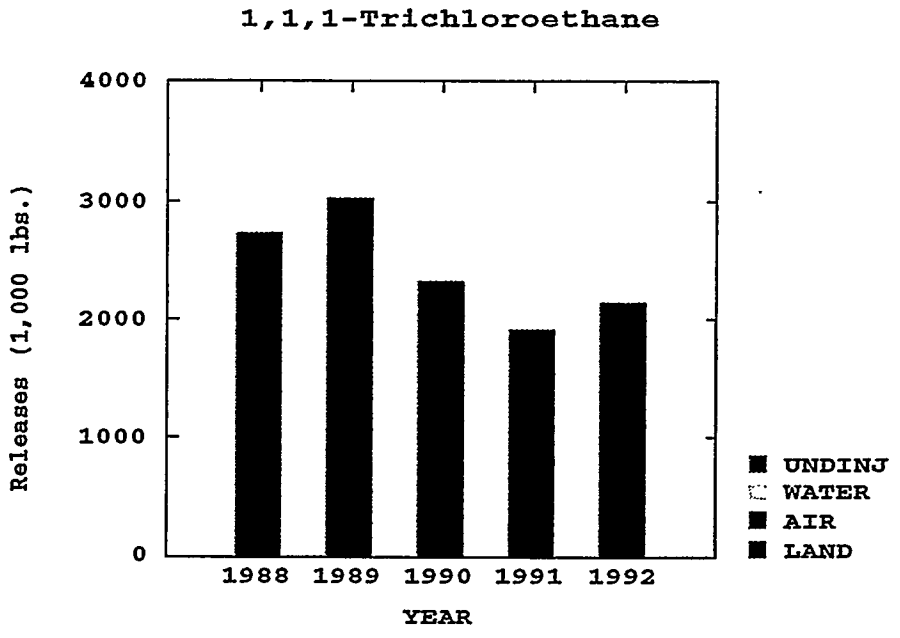


Figure 3.7. Total Releases to Land, Air, Water and Underground Injection for 1,1,1-Trichloroethane by Year

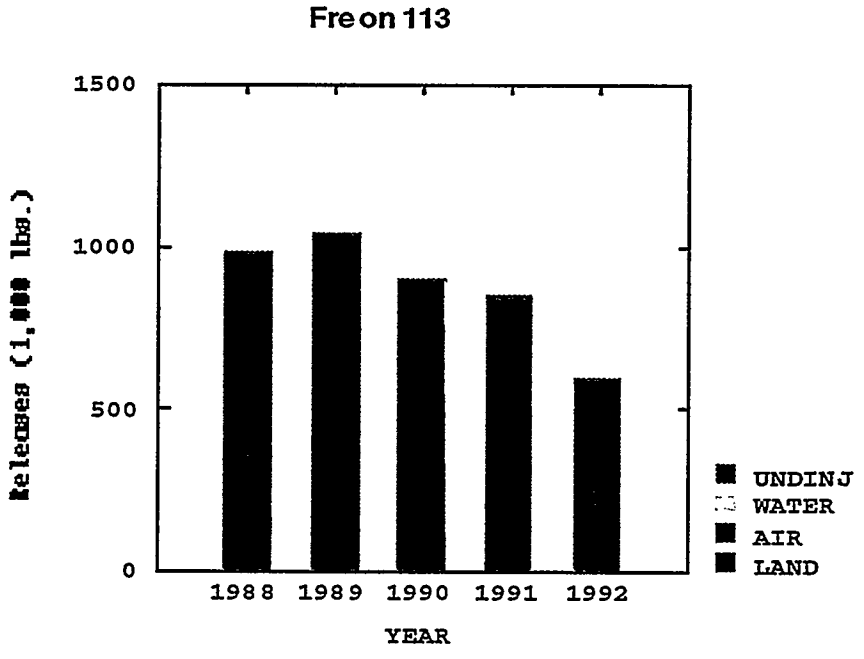


Figure 3.8. Total Releases to Land, Air, Water and Underground Injection for Freon 113 by Year

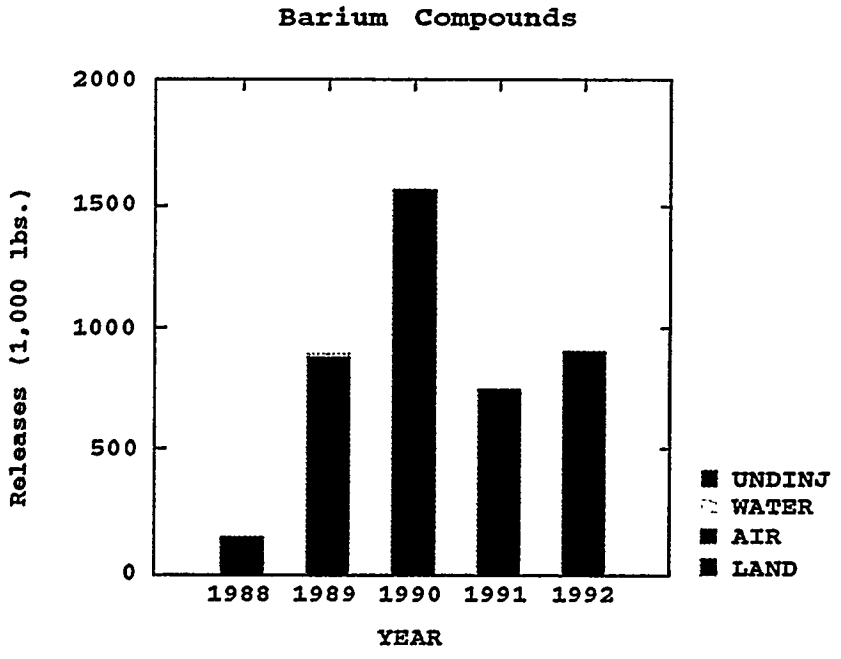


Figure 3.9. Total Releases to Land, Air, Water and Underground Injection for Barium Compounds by Year

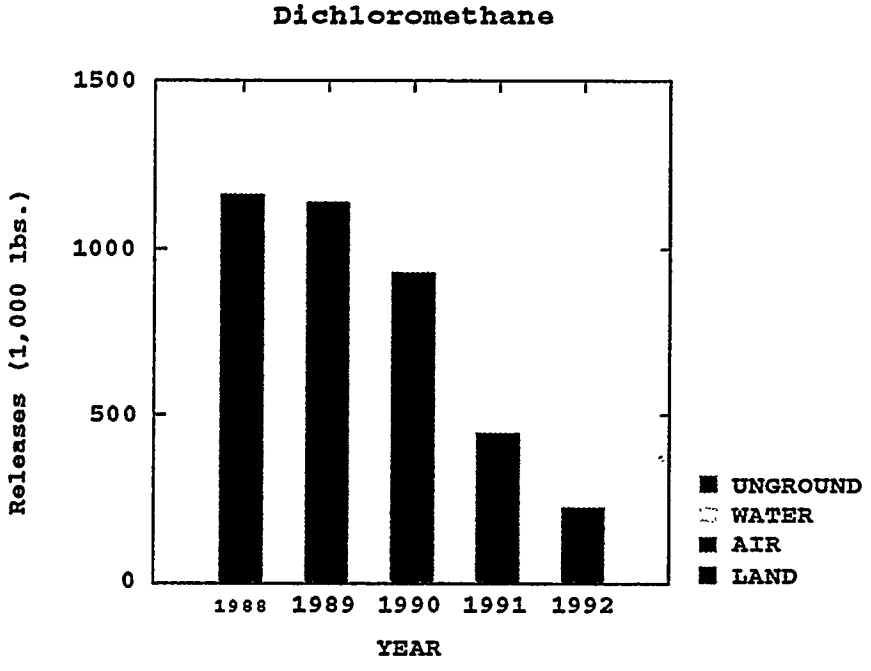


Figure 3.10. Total Releases to Land, Air, Water and Underground Injection for Dichloromethane by Year

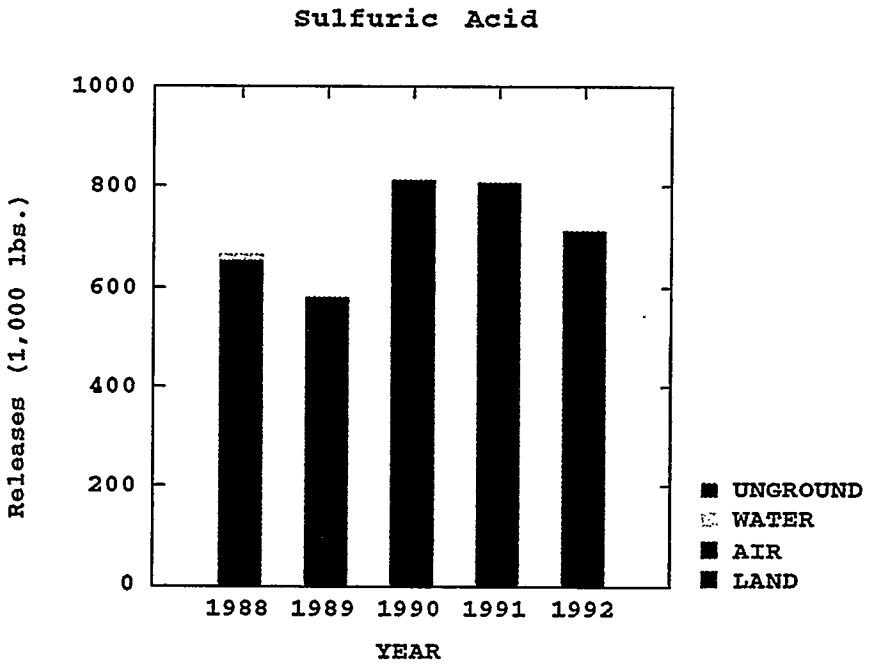


Figure 3.11. Total Releases to Land, Air, Water and Underground Injection for Sulfuric Acid by Year

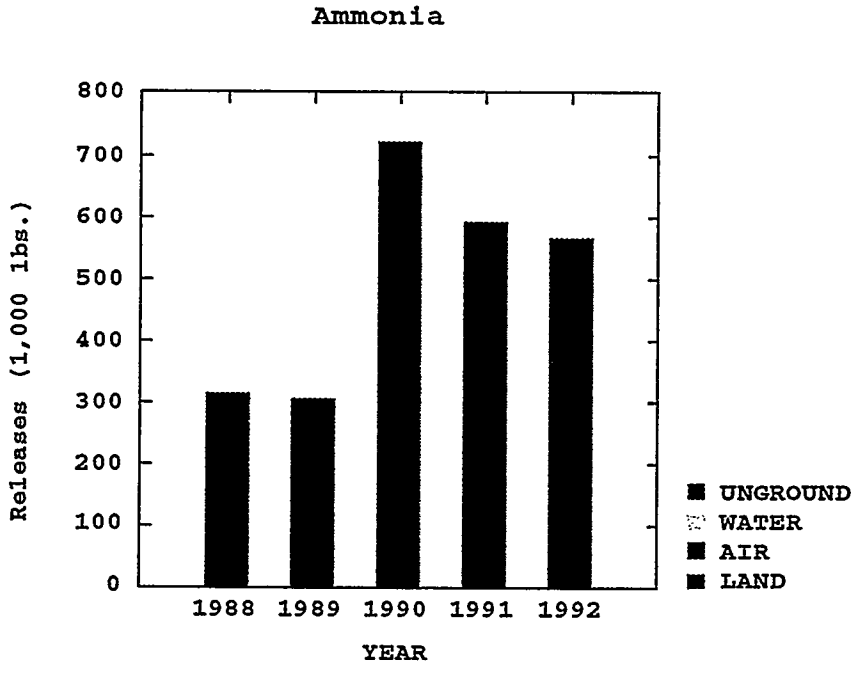


Figure 3.12. Total Releases to Land, Air, Water and Underground Injection for Ammonia by Year

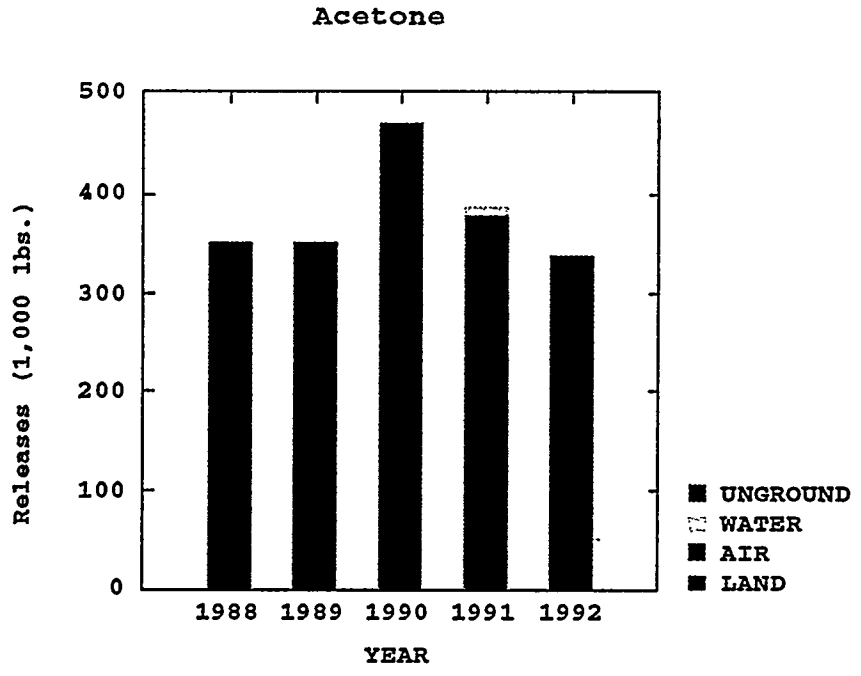


Figure 3.13. Total Releases to Land, Air, Water and Underground Injection for Acetone by Year

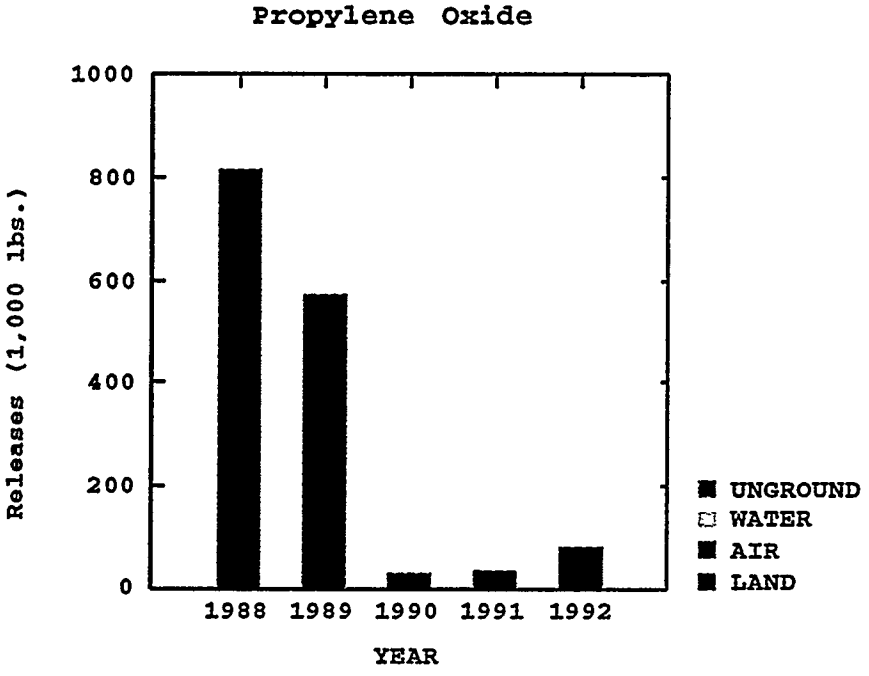


Figure 3.14. Total Releases to Land, Air, Water and Underground Injection for Propylene Oxide by Year

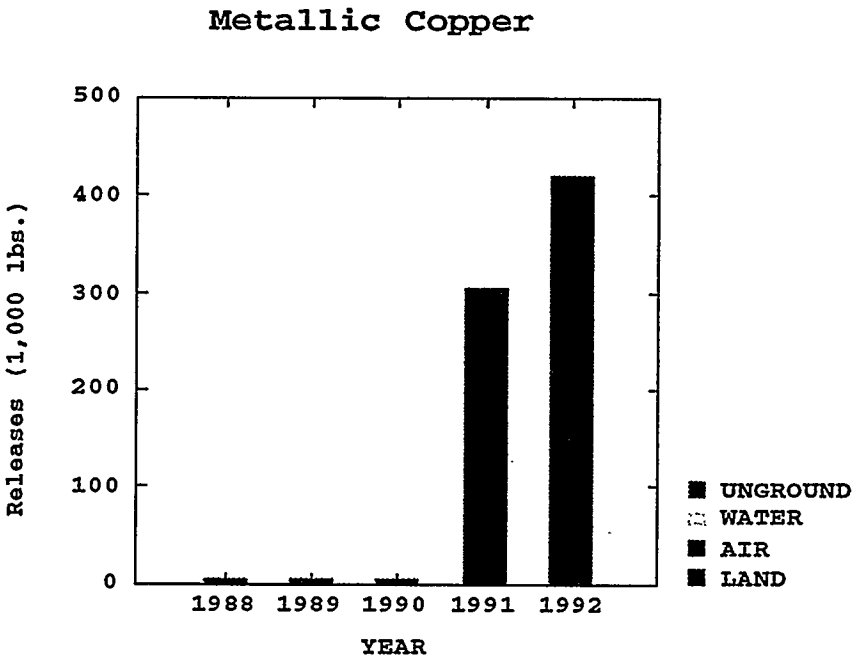


Figure 3.15. Releases of Metallic Copper to Land, Air, Water and Underground Injection by Year

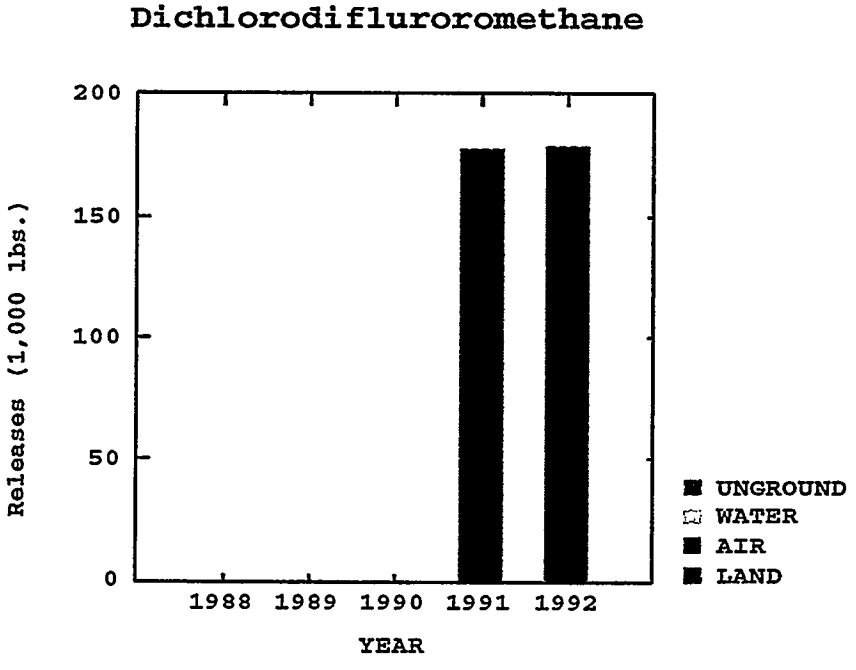


Figure 3.16. Releases of Dichlorodiflouromethane to Land, Air, Water and Underground Injection by Year

such as dichlorodifluoromethane and metallic copper show extremely large increases starting in 1991. Sulfuric acid and acetone releases show no definite trends upward or downward. Ammonia releases show a net large increase in 1990, but steadily decline afterwards.

3.6 Releases by SIC Code

Table 3.9 summarizes the top ten 1988-1992 releases by two-digit Standard Industrial Classification (SIC) codes. In the 1988-1992 period, the top four industries in terms of total toxic releases -- primary metals, transportation equipment, electrical industries, and plastics -- accounted for more than 90% of all releases. By far the largest contributor to Border Area toxic chemical releases was the primary metals industry (SIC code 33), accounting for more than 79% of release quantities. The primary metals industry reported releases of 94.6 million pounds of copper compounds and 37.1 million pounds of zinc compounds, which together totaled 131.7 (roughly 73%) of all chemical releases in the Border Area from 1988 to 1992. Other prominent chemicals released by primary metals industry facilities included 4.2 million pounds of barium compounds, and 1.3 million pounds of lead compounds. These four chemicals were chiefly released to land. In addition, the industry released 3.4 million pounds of sulfuric acid, but chiefly to air.

Table 3.9. Top Ten Releases by SIC Code, 1988-1992

2-Digit SIC Code / Industry	Amount (lbs)	% Total 1988-1992	Cum. %
33 Primary Metals	142,435,132	79.33	79.33
37 Transportation Equipment	12,944,064	7.21	86.54
36 Electrical	4,268,638	2.38	88.91
30 Plastics	4,151,296	2.31	91.23
38 Instruments	2,972,138	1.66	92.88
28 Chemicals	2,743,627	1.53	94.41
20 Food	2,014,313	1.12	95.53
39 Miscellaneous Mfg.	1,916,890	1.07	96.60
35 Machinery	1,623,345	0.90	97.50
29 Petroleum	1,602,551	0.89	98.39
Remainder	2,882,482	1.61	100.00
Total	179,554,476	100.00	100.00

Table 3.10 displays the top ten industries in terms of releases by two-digit SIC code for 1992. More than 90% of all 1992 toxic chemical releases were accounted for by four industries: primary metals, transportation equipment, instruments, and food. Again, by far the largest contributor to Border Area toxic chemical releases was the primary metals industry (SIC code 33), which accounted for more than 78% of all releases, consistent with the aggregated 1988-1992 period.

An interesting note in comparing Tables 3.9 and 3.10 is the absence of the plastics industry (SIC 30) from among the top ten industries in 1992. In the 1988-1992 period, the plastics industry averaged nearly 1 million pounds of releases per year. In 1992, the plastics industry reported releases of 114,869 pounds. This discrepancy is attributed to a change in reported SIC code for Signet Armorlite, Inc., San Marcos, CA. From 1988 to 1990, Signet Armorlite was classified as SIC 30, plastics; and in 1991 and 1992, it was classified as SIC 38, instruments. However, in all reporting years Signet Armorlite released the same mix of chemicals. One possible explanation for a SIC code discrepancy is a change of ownership of the facility: a new parent company might have a different SIC code. But Signet Armorlite was owned by the same parent company, Industrie Ottiche Europee, throughout 1988-92. Because Signet Armorlite is also one of the most prominent facilities reporting in the Border Area in 1988-1992 (see Section 3.7), this change involved large enough quantities to cause the apparent reduction in plastics industry releases and the apparent gain in instrument industry releases in the top ten list by SIC code. This illustrates another source of apparent variability in the TRI data.

Table 3.10. Top Ten Releases by SIC Code in 1992

2-Digit SIC Code	Amount (lbs)	% Total 1992	Cum.%
33 Primary Metals	20,278,334	78.67	78.67
37 Transportation Equipment	1,549,752	6.01	84.68
38 Instruments	855,515	3.32	88.00
20 Food	541,897	2.10	90.10
35 Machinery	441,295	1.71	91.81
29 Petroleum	394,630	1.53	93.34
36 Electrical	388,027	1.51	94.85
39 Miscellaneous Mfg.	359,568	1.39	96.24
34 Fabricated Metals	308,038	1.20	97.44
28 Chemicals	188,851	0.73	98.17
Remainder	471,558	1.83	100.00
Total	25,777,465	100.00	100.00

Table 3.11 shows a clear difference in annual trends between primary metal (SIC 33) industry releases and releases for all other industries aggregated. Primary metals releases remain almost steady at 29 million pounds until 1992, the year of a drop in zinc compound releases. In contrast, non-primary metals industries show releases steadily dropping for both land and other pathways; by 1992 total releases dropped to 5.5 million pounds, or 41% from the 1988 level.

Table 3.11 also shows an obvious difference in releases by environmental pathway between the two industry categories. For the period 1988-92, 94.2% of total primary metals releases (134.5 million pounds) going to land, and the remaining 5.8% of releases going to other pathways (chiefly to air). In contrast, 660 thousand pounds or 1.8% of non-primary metals industry releases go to land, and the remaining 36.5 million pounds, or 98.2%, is released to other pathways (chiefly to air).

One conclusion to be drawn from these data is that to properly assess the Border Area situation in terms of toxic chemical releases, it is worthwhile to consider the data in terms of two industrial categories: Primary metals (SIC 33) and all other industries (all other SIC codes), because the primary metals industry trends overwhelm all others in the Border Area.

Table 3.11. Comparing Releases by Primary Metals Industry (SIC 33) vs. All Other Industries, and by Land vs. All Other Environmental Pathways. Quantities in pounds.

Industry/ Pathway	1988	1989	1990	1991	1992	Total
SIC 33/Land	28,740,554	27,598,049	30,116,515	29,720,564	18,397,384	134,573,066
SIC-33/Other	1,344,750	1,328,464	1,495,234	1,812,668	1,880,950	7,862,066
SIC-33/Total	30,085,304	28,926,513	31,611,749	31,533,232	20,278,334	142,435,132
Other/Land	336,230	29,066	116,230	90,887	87,700	660,113
Other/Other	9,184,736	8,662,702	7,183,999	6,016,333	5,411,431	36,459,201
Other/Total	9,520,966	8,691,768	7,300,220	6,107,220	5,499,131	37,119,314

3.7 Releases by Facility

Over the 1988-1992 period, 224 different facilities reported non-zero releases of toxic chemicals in the Border Area. Table 3.12 shows that the bulk of the facilities released relatively small amounts of toxic chemicals (without regard to environmental pathways or toxicities). Half of the facilities released 27,750 pounds or less, and three fourths released 141,400 pounds or less. As shown in Table 3.13, 95.5% of the facilities (214 included in the "Remainder" category out of 224 facilities) released a total of 20.5 million pounds, or 11.5% of the total.

Table 3.13 shows how the top ten among these 224 reporting facilities account for 88.6% of all TRI chemical releases reported in the Border Area during this time period. For each of the reporting years from 1988-1992, two facilities, the Phelps Dodge Mining and Chino Mines smelters (both in New Mexico), together accounted for about 75% of each year's total chemical releases in the Border Area. Table 3.13 shows these two facilities accounted for 77.5% of all TRI reported toxic releases to the environment along the Border Area aggregated over 1988-1992. No other facility contributed more than 3.2% of the total annual release, aggregating all chemicals, in any of the reporting years.

Table 3.12. Distribution of Releases, 1988-92, in terms of Quantities Released by Facilities

Facilities	
Number reporting	**224**
Minimum release	14 pounds
First Quartile	4,337 pounds
Median	27,750 pounds
Third Quartile	141,400 pounds
Maximum	102, 574,680 pounds
Mean	801,583 pounds

A closer inspection of the yearly release data for the Phelps Dodge Mining and Chino Mines smelters reveals that from 1988 through 1991, Phelps Dodge consistently reported from 20.8 to 23.8 million pounds of releases (not tabulated in this report). In 1992, Phelps Dodge Mining reported only half that amount, a total of 11.8 million pounds. This decrease was due to the fact that the facility reduced its releases of zinc compounds from 8 million pounds in 1991 to 50,000 pounds in 1992. In contrast, Chino Mines consistently reported 6.8 to 7.9 million pounds of releases of chemicals from 1988 to 1991, and reported a similar value, 7.5 million pounds, in 1992.

Table 3.14 shows releases by the top ten facilities in 1992. In 1992 alone, the Phelps Dodge and Chino Mines smelters contributed together about 75% of total 1992 releases. All other facilities individually contributed less than 2.7 % of the 1992 total. The remaining eight of the top ten account for 13.3% of releases. In 1992, the top ten contributors accounted for 88% of reported 1992 chemical releases.

Table 3.13. Releases for Top Ten Reporting Facilities, 1988-1992

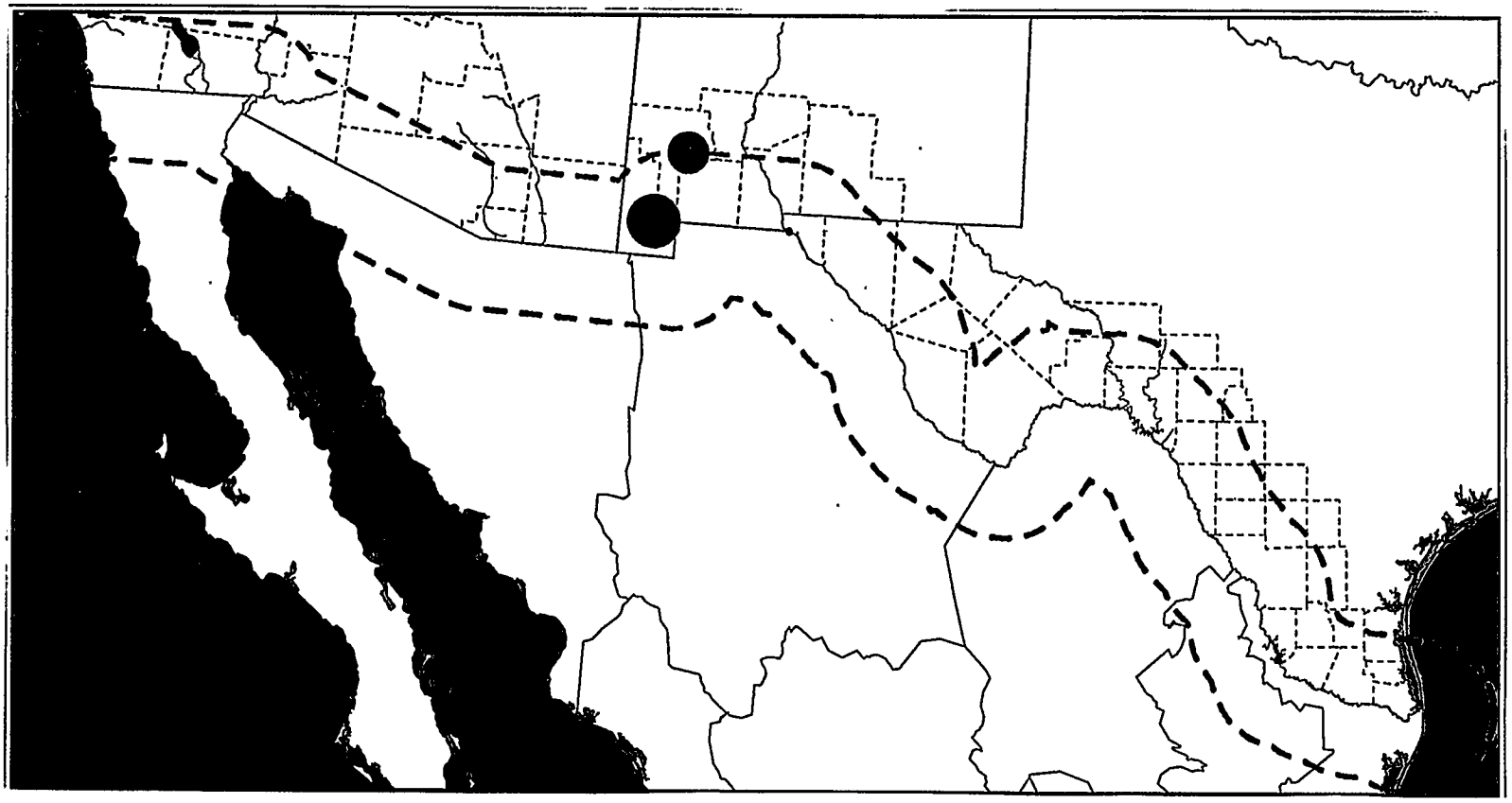
Facility	City/State	Amount (lbs)	% Total 1988-1992	Cum. %
Phelps Dodge Mining Co.	Playas, NM	102,574,680	57.13	57.13
Chino Mines Co.,	Hurley, NM	36,605,840	20.39	77.51
Signet Armorlite Inc	San Marcos, CA	4,600,938	2.56	80.08
Rohr Inc.,	Chula Vista, CA	4,117,430	2.29	82.37
USAF Plant No. 44	Tuscon, AZ	3,214,737	1.79	84.16
Asarco Inc.	El Paso, TX	2,243,024	1.25	85.41
Merck & Co. Inc. Kelco Div.	San Diego, CA	1,569,106	0.87	86.28
General Dynamics Corp. Space Systems	San Diego, CA	1,523,460	0.85	87.13
Chevron Corp. El Paso Refinery	El Paso, TX	1,338,454	0.75	87.88
Holly Sugar Corp.	Brawley, CA	1,215,755	0.68	88.55
Remainder		20,551,052	11.45	100.00
Total		179,554,476	100.00	100.00

Table 3.14. Releases for Top Ten Reporting Facilities in 1992

Facility	City/State	Amount (lbs)	% Total 1992	Cum. %
Phelps Dodge Mining Co.	Playas, NM	11,792,355	45.75	45.75
Chino Mines Co.	Hurley, NM	7,478,832	29.01	74.76
Rohr Inc.	Chula Vista, CA	694,968	2.70	77.46
Asarco Inc.	El Paso, TX	485,215	1.89	79.34
Phelps Dodge Refining Corp.	El Paso, TX	420,056	1.63	80.97
USAF Plant No. 44	Tuscon, AZ	396,805	1.54	82.51
Signet Armorlite Inc	San Marcos, CA	384,548	1.49	84.00
Holly Sugar Corp.	Brawley, CA	384,005	1.49	85.49
Chevron Corp. El Paso Refinery	El Paso, TX	350,300	1.36	86.85
Pilkington Barnes Hind	San Diego, CA	302,300	1.17	88.02
Remainder		3,088,081	11.98	100.00
Total		25,777,465	100.00	100.00

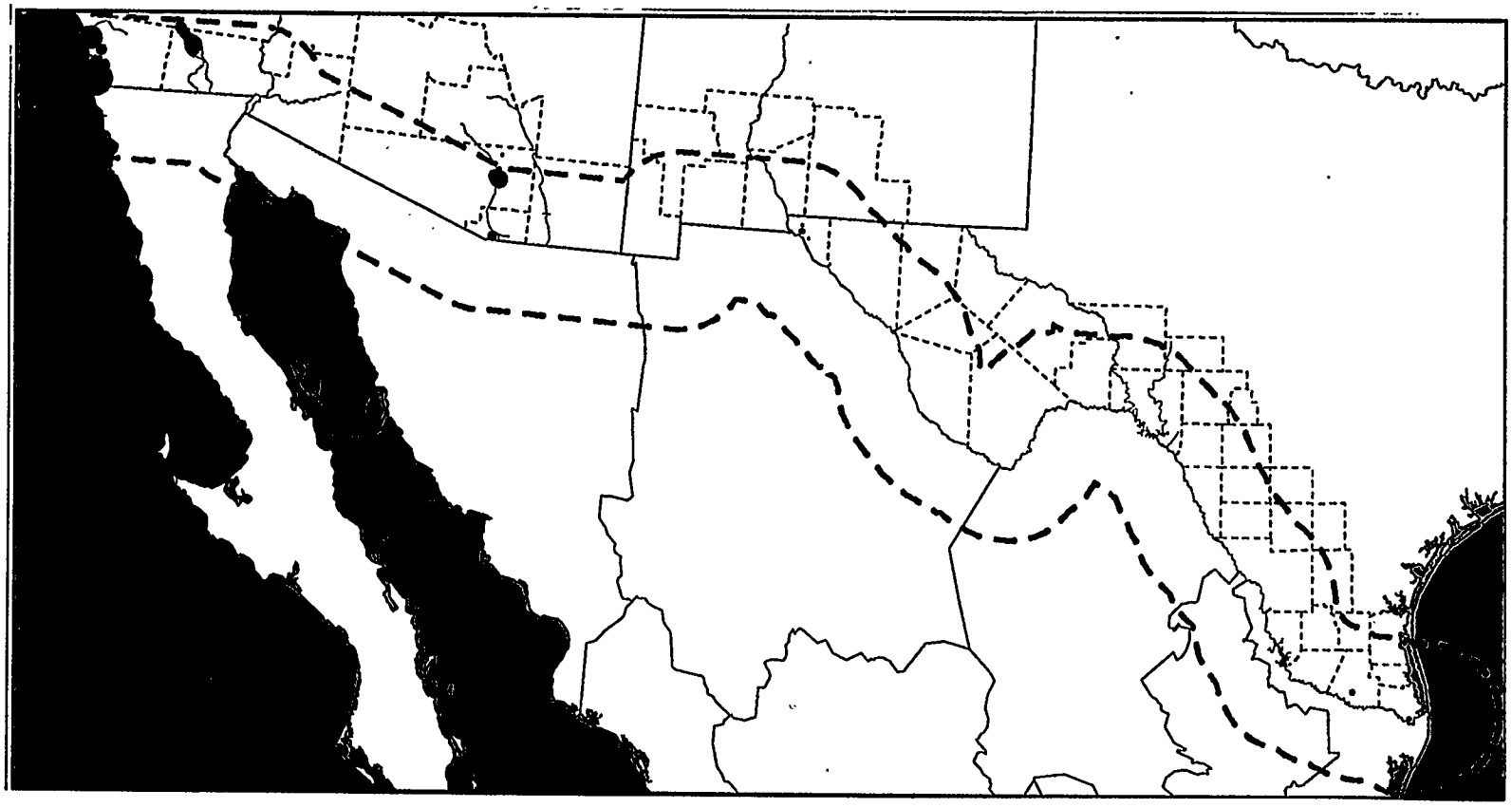
Maps 3 through 12 show the locations of selected facilities in 1992 which released each of the top ten chemicals of 1992. These maps show the facility locations with red circles. The circle diameters represent the percentage of the facility's contribution to the total amount released for the specific chemical in 1992. Thus, the larger the red circle for a facility, the larger the proportional contribution to the overall total releases for that chemical. Also listed with the maps are the top ten facilities releasing the specific chemicals, so that they can be identified with locations on the map. In some cases, dots for several facilities in the same area overlap each other so that the separate facilities are not readily discernible. (A similar map showing the locations of the top ten facilities in 1992 is in the Appendix - Map 14)

It is easily noted in the maps how the facilities which release toxic chemicals are localized to just a few sites in the Border Area, such as the two smelters in New Mexico and the cities of San Diego, El Paso, Tucson and Brownsville. Notable are two exceptions that appear in only one map each: the Holly Sugar Corp. in Brawley (Imperial County, CA), the largest releaser of ammonia (Map 8); and the San Antonio Shoe Co. in Del Rio (Val Verde County, TX), the second largest releaser of acetone (Map 10).



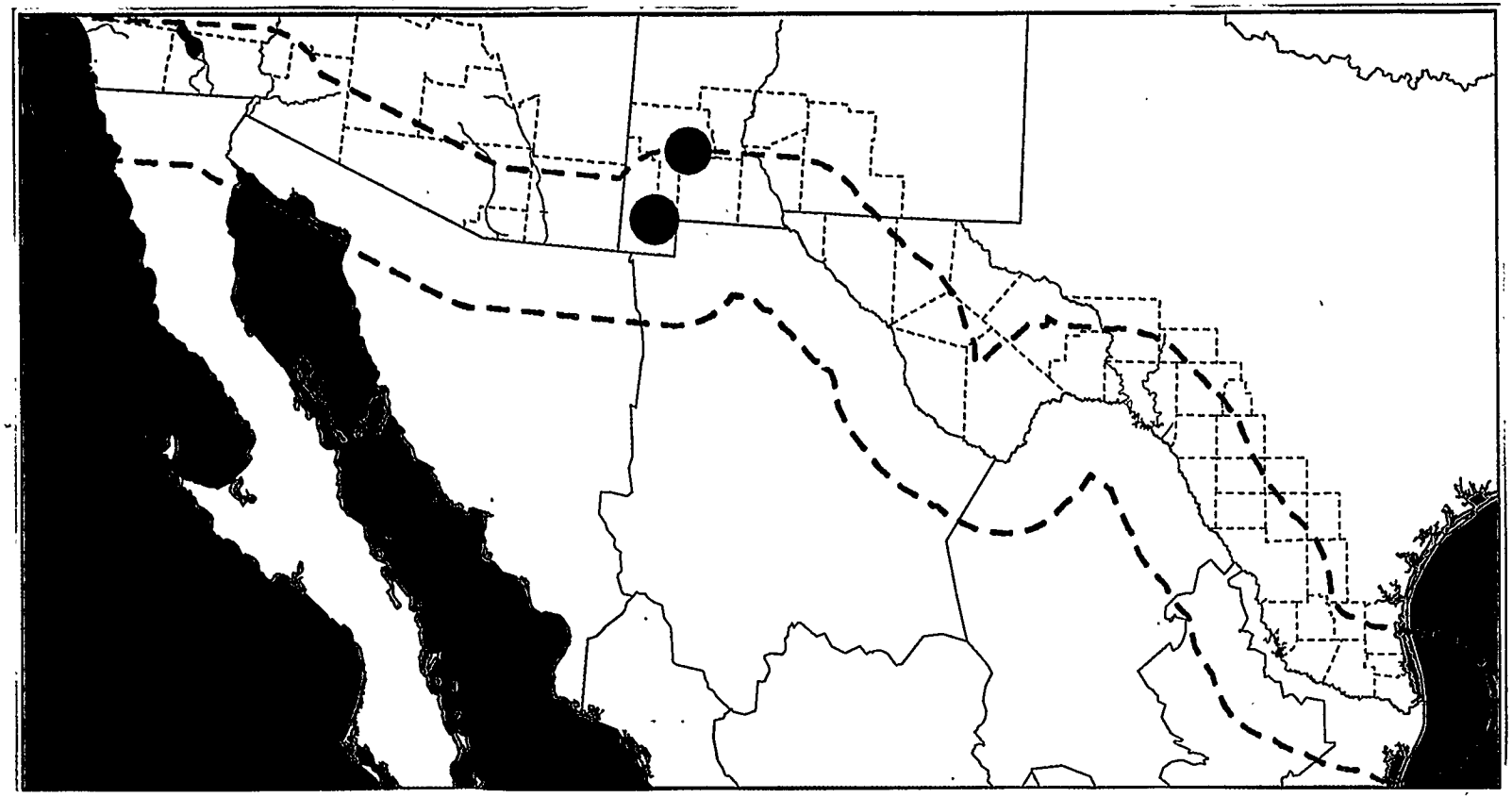
Map 3. Facilities releasing Copper Compounds in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	% Cum
Phelps Dodge Mining Co. Hidalgo Smelter	Playas	Hidalgo NM	33	10,876,736	60.29	60.29
Chino Mines Co. Hurley Smelter	Hurley	Grant NM	33	6,894,176	38.21	98.50
Asarco Inc. El Paso	El Paso	El Paso TX	33	241,950	1.34	99.84
Weiser Lock Co.	Tucson	Pima AZ	34	10,090	0.06	99.89
USAF Plant No. 44	Tucson	Pima AZ	37	9,955	0.06	99.95
Phelps Dodge Copper Prods.	El Paso	El Paso TX	33	9,050	0.05	100.00
Chevron Corp. El Paso Refinery	El Paso	El Paso TX	29	11	0.00	100.00
Chem-Tronics Inc.	El Cajon	San Diego CA	37	6	0.00	100.00
Total				18,041,974	100.00	



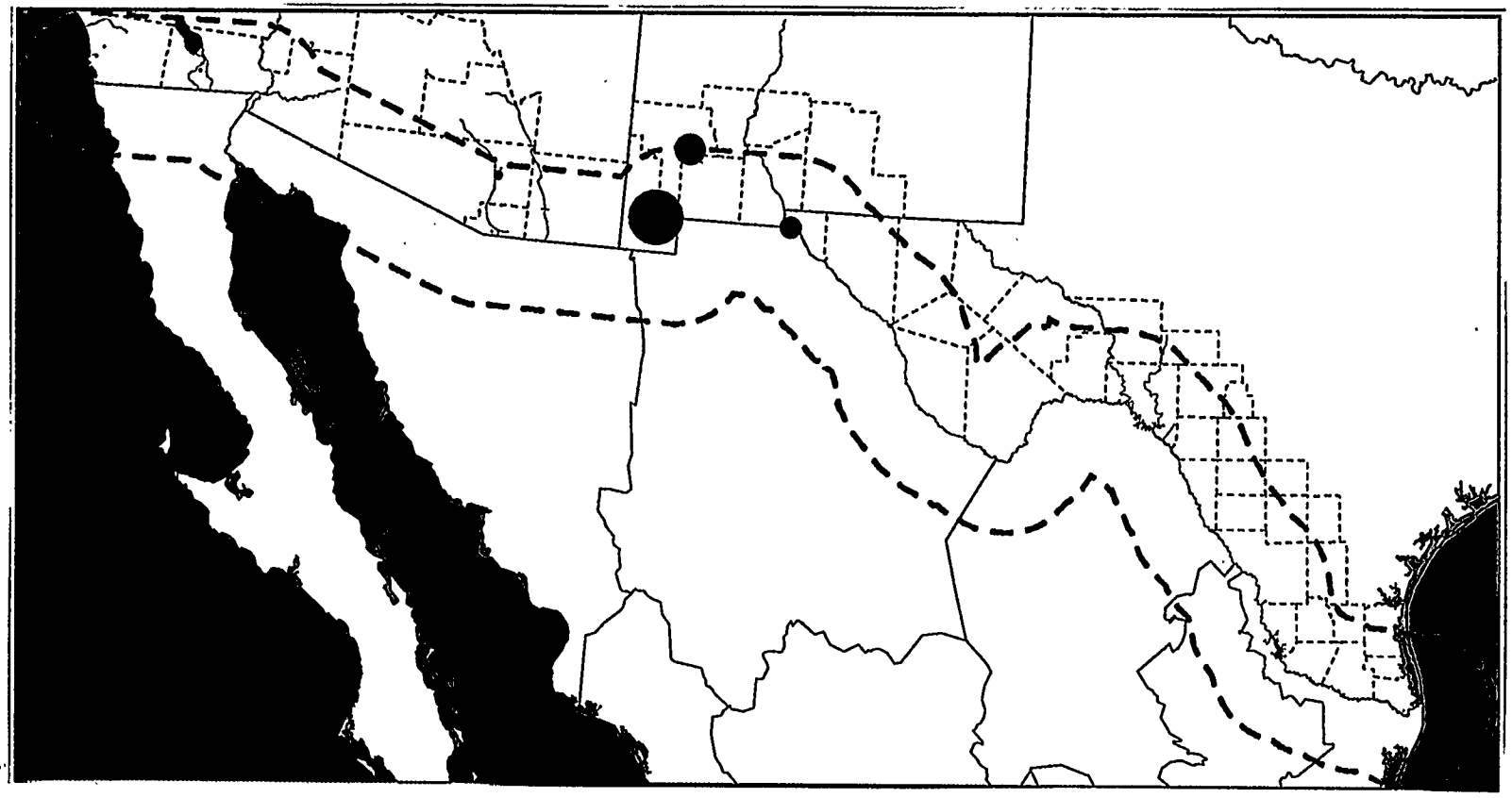
Map 4. Facilities releasing 1,1,1-Trichloroethane in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	% Cum
Rohr Inc.	Chula Vista	San Diego CA	37	554,400	25.80	25.80
Callaway Golf	Carlsbad	San Diego CA	35	264,445	12.31	38.11
USAF Plant No. 44	Tucson	Pima AZ	37	170,000	7.91	46.02
Solar Turbines Inc.	San Diego	San Diego CA	35	141,000	6.56	52.58
Weiser Lock Co.	Tucson	Pima AZ	34	119,636	5.57	58.15
Upper Deck Co.	Carlsbad	San Diego CA	27	117,385	5.46	63.62
General Dynamics Corp. Convair Div.	San Diego	San Diego CA	37	98,000	4.56	68.18
General Dynamics Corp. Space Systems Div.	San Diego	San Diego CA	37	93,670	4.36	72.54
Aldila Inc.	San Diego	San Diego CA	39	66,000	3.07	75.61
United Musical Instruments Inc.	Nogales	Santa Cruz AZ	39	55,385	2.58	78.19
Remainder				468,722	21.81	100.00
Total				2,148,643	100.00	



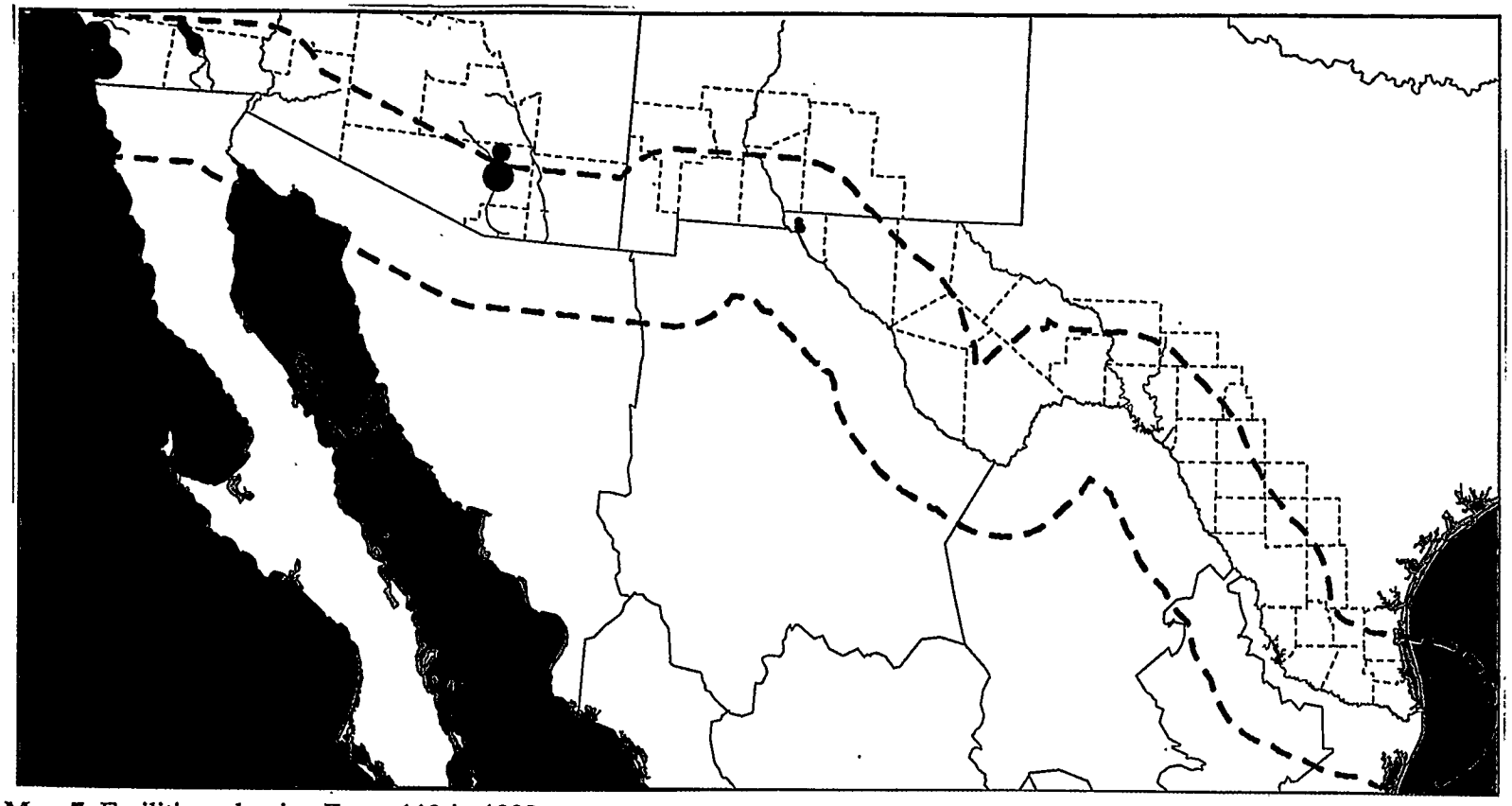
Map 5. Facilities releasing Barium Compunds in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	% Cum
Phelps Dodge Mining Co. Hidalgo Smelter	Playas	Hidalgo NM	33	470,263	52.48	52.48
Chino Mines Co. Hurley Smelter	Hurley	Grant NM	33	425,500	47.49	99.97
Frazee Ind.	San Diego	San Diego CA	28	250	0.03	100.00
Total				896,013	100.00	



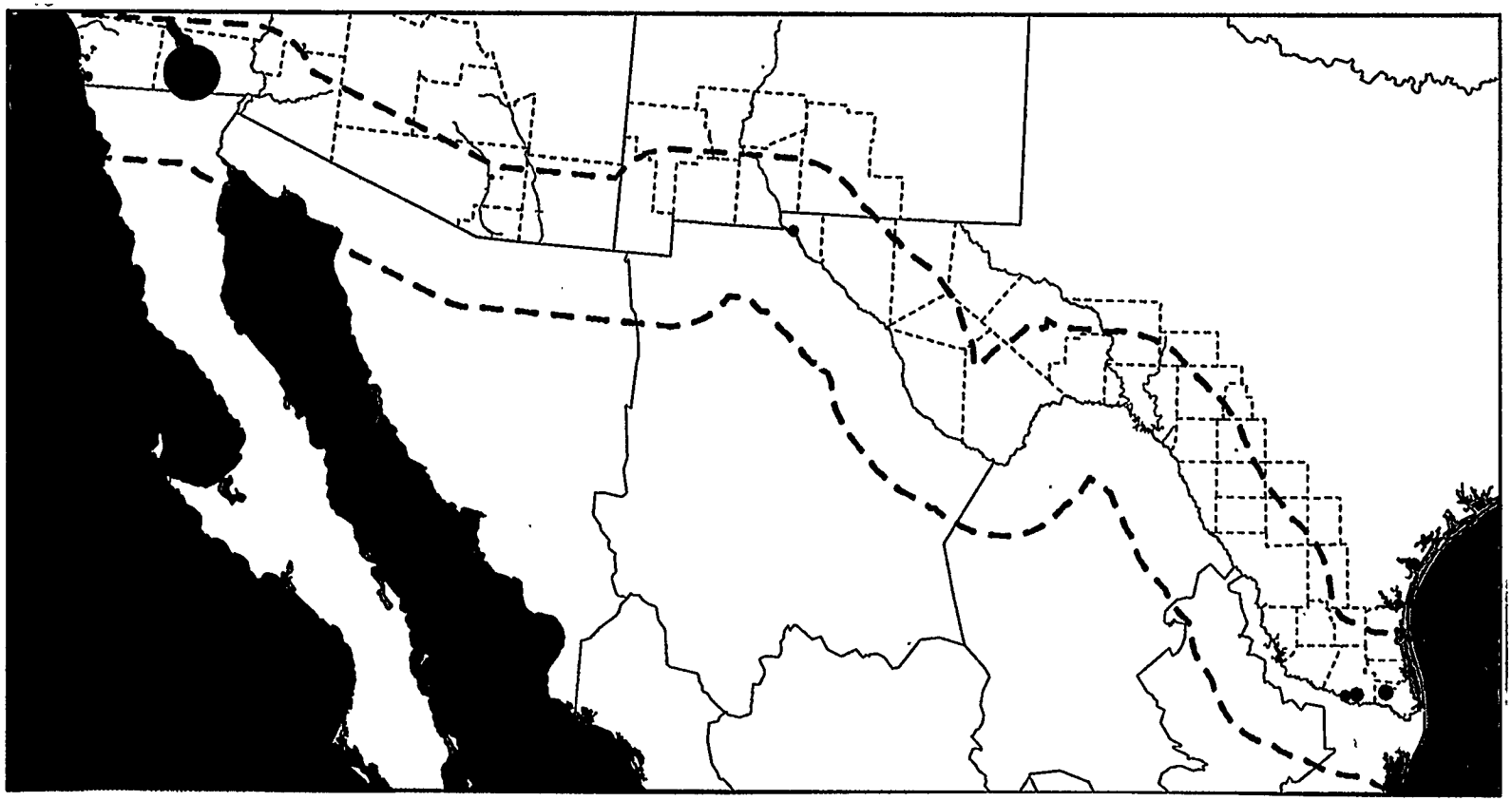
Map 6. Facilities releasing Sulfuric Acid in 1992

Name	City	County/State	SIC	Amount (lbs.)	%Total	%Cum
Phelps Dodge Mining Co. Hidalgo Smelter	Playas	Hidalgo NM	33	444,606	62.45	62.45
Chino Mines Co. Hurley Smelter	Hurley	Grant NM	33	159,156	22.36	84.80
Asarco Inc. El Paso	El Paso	El Paso TX	33	83,250	11.69	96.50
USAF Plant No. 44	Tucson	Pima AZ	37	14,800	2.08	98.58
El Paso Refinery L.P.	El Paso	El Paso TX	29	3,705	0.52	99.10
Holly Sugar Corp. Brawley Factory	Brawley	Imperial CA	20	1,500	0.21	99.31
Toppan West Inc. Industrial Circuits Div.	San Diego	San Diego CA	36	1,188	0.17	99.47
United Musical Instruments Usa Inc.	Nogales	Santa Cruz AZ	39	500	0.07	99.54
Remainder				3,243	0.46	100.00
Total				711,948	100.00	



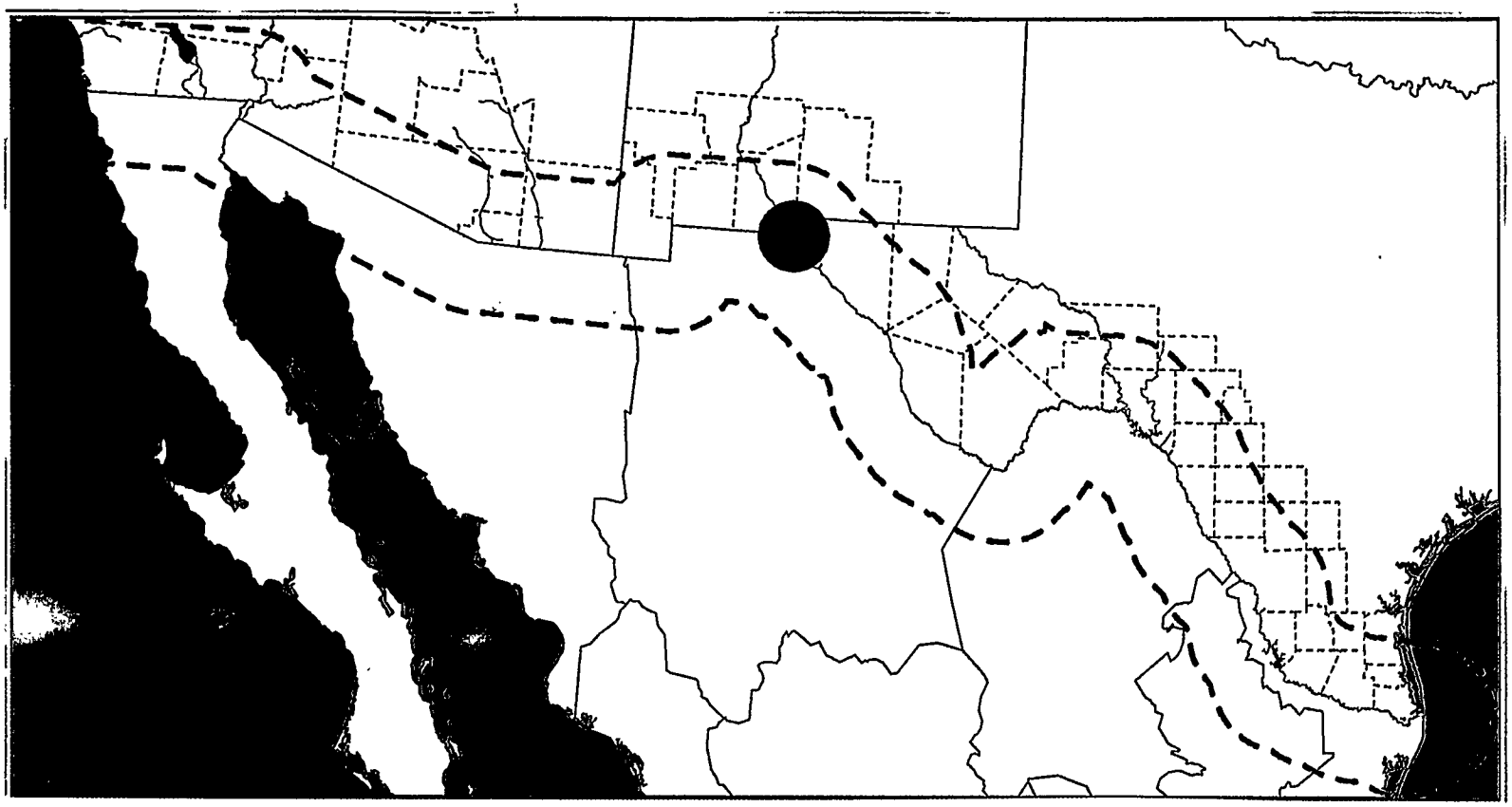
Map 7. Facilities releasing Freon 113 in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	%Cum
Pilkington Barnes Hind	San Diego	San Diego CA	38	150,000	26.03	26.03
USAF Plant No. 44	Tucson	Pima AZ	37	127,250	22.08	48.11
Signet Armorlite Inc.	San Marcos	San Diego CA	38	109,628	19.02	67.13
Allied-Signal Controls & Accessories-Tucson	Tucson	Pima AZ	37	52,000	9.02	76.16
Alcoa Electronic Packaging Inc.	San Diego	San Diego CA	36	29,270	5.08	81.23
Humphrey Inc.	San Diego	San Diego CA	39	26,403	4.58	85.82
Rockwell Intl. Corp. Dcd/Ntsd	El Paso	El Paso TX	36	16,700	2.90	88.71
General Dynamics Corp. Electronics Div.	San Diego	San Diego CA	38	13,943	2.42	91.13
Huck Intl. Inc.	Tucson	Pima AZ	34	12,670	2.20	93.33
Rockwell Intl. Corp.	El Paso	El Paso TX	36	10,900	1.89	95.22
Remainder				27,530	4.78	100.00
Total				576,294	100.00	



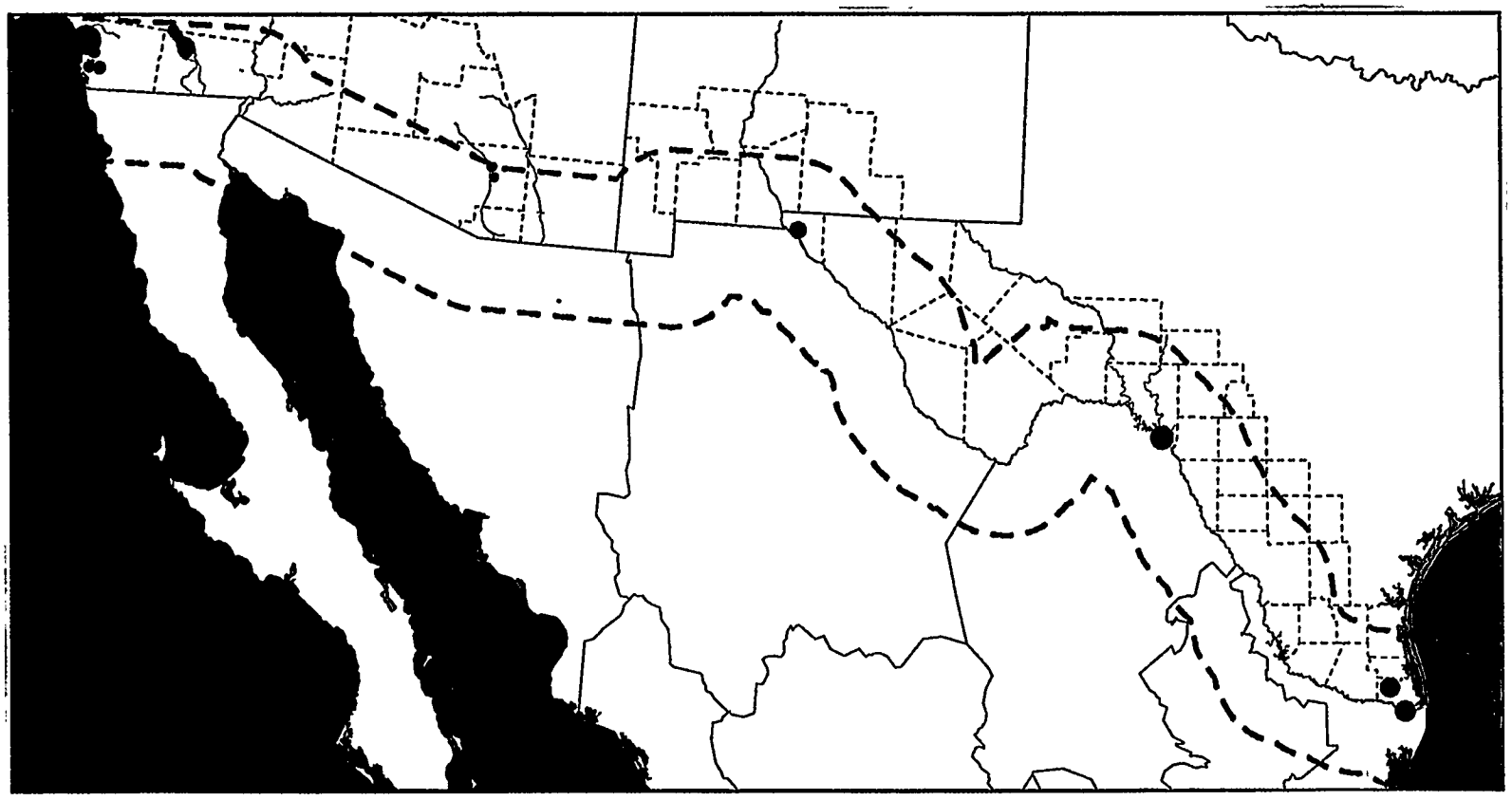
Map 8. Facilities releasing Ammonia in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	%Cum
Holly Sugar Corp. Brawley Factory	Brawley	Imperial CA	20	381,995	67.51	67.51
Crystal Ice & Cold Storage Inc.	El Centro	Imperial CA	20	50,119	8.86	76.37
Gorges Foodservice Inc.	Harlingen	Cameron TX	20	35,877	6.34	82.71
Southern Frozen Foods	Alamo	Hidalgo TX	20	30,946	5.47	88.18
Rio Grande Foods Inc.	Mc Allen	Hidalgo TX	20	20,250	3.58	91.76
Swift-Eckrich Inc.	El Paso	El Paso TX	20	16,950	3.00	94.75
Cal-Doran Metallurgical Services	National City	San Diego CA	33	13,468	2.38	97.13
Toppan West Inc. Industrial Circuits Div.	San Diego	San Diego CA	36	4,800	0.85	97.98
USAF Plant No. 44	Tucson	Pima AZ	37	3,350	0.59	98.57
Sony Eng. & Mfg. Co. Of America	San Diego	San Diego CA	36	2,000	0.35	98.93
Southeastern Public Service Co.	Harlingen	Cameron TX	20	2,000	0.35	99.28
Remainder				4,078	0.72	100.00
Total				565,833	100.00	



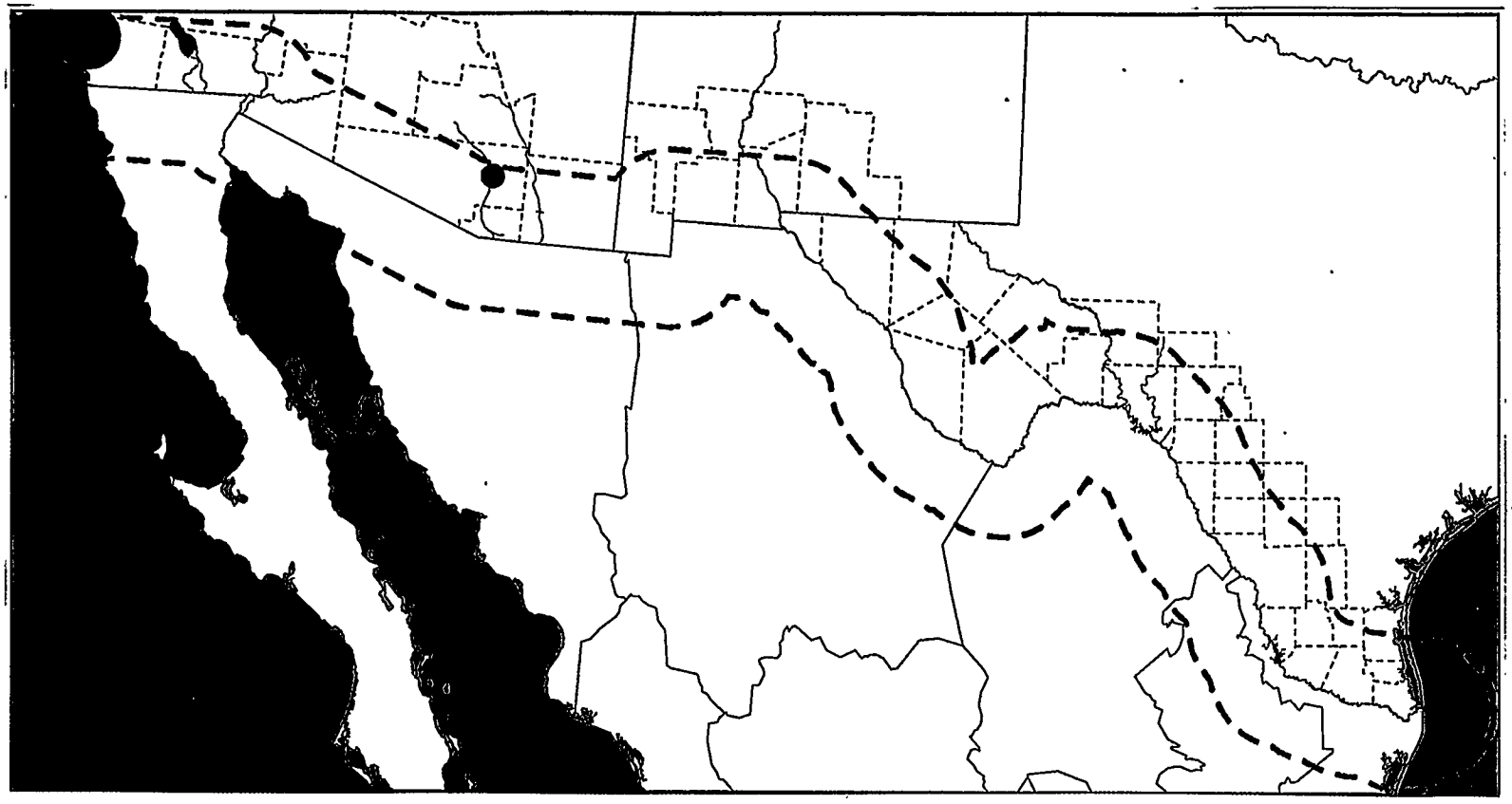
Map 9. Facilities releasing Copper in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	% Cum
Phelps Dodge Refining Corp. El Paso Works	El Paso	El Paso TX	33	420,000	99.53	99.53
Trico Technologies Corp.	Brownsville	Cameron TX	37	750	0.18	99.71
Tucson Fndy. & Mfg. Inc. Dba Tucson Foundry	Tucson	Pima AZ	33	500	0.12	99.83
Deutsch Co. E.C.D.	Oceanside	San Diego CA	36	318	0.08	99.91
Magnetek National Electric Coil Inc.	Brownsville	Cameron TX	36	250	0.06	99.97
Honeywell Inc. Home & Buildingcontrols W.	San Diego	San Diego CA	38	99	0.02	99.99
Titleist & Foot-Joy Worldwide Titleist Golf Div.	Escondido	San Diego CA	39	42	0.01	100.00
A. O. Smith Water Prods. Co.	El Paso	El Paso TX	34	5	0.00	100.00
Total				421,964	100.00	



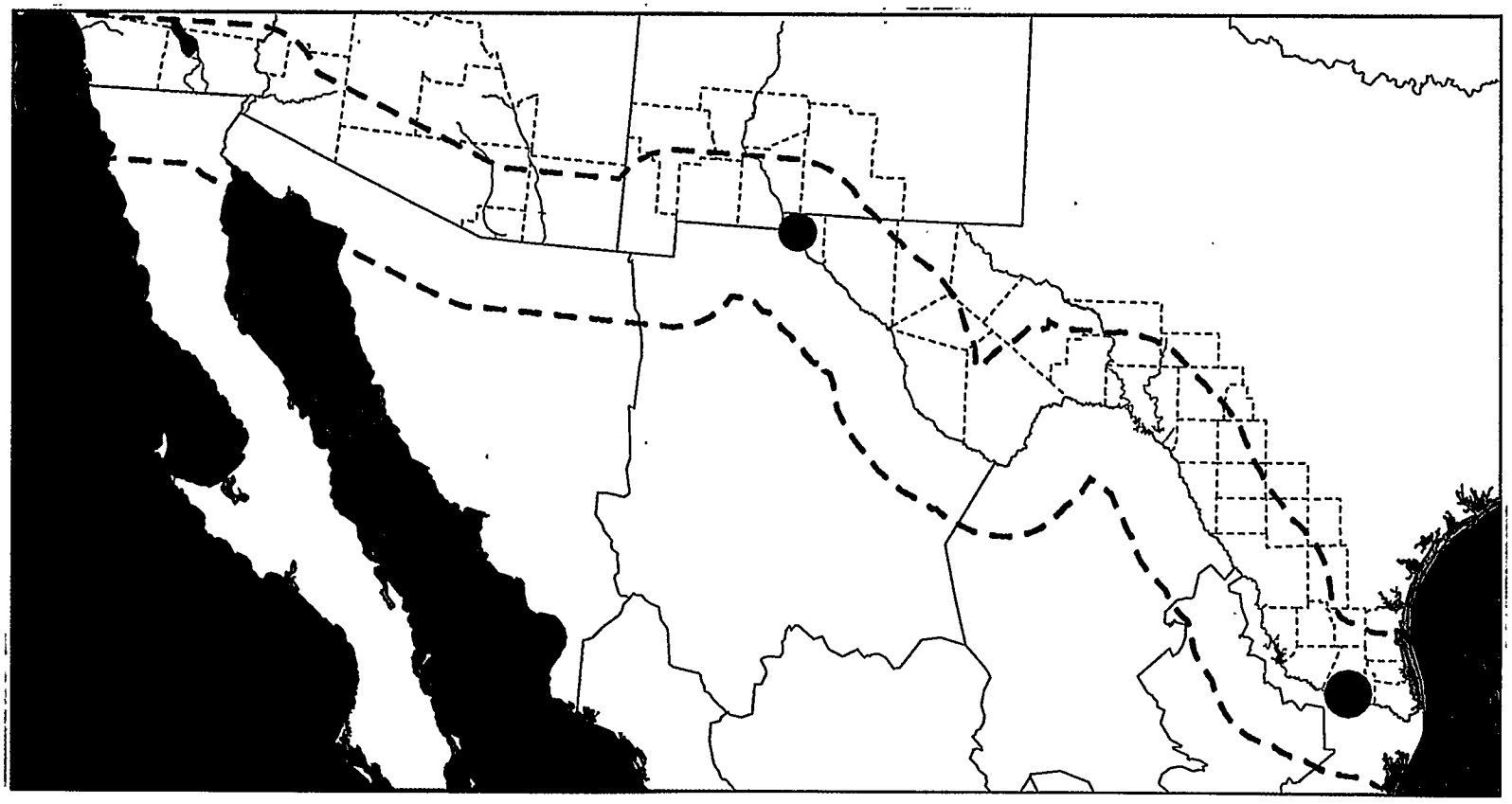
Map 10. Facilities releasing Acetone in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	% Cum
Signet Armorlite Inc.	San Marcos	San Diego CA	38	72,018	21.45	21.45
San Antonio Shoe Co. Inc.	Del Rio	Val Verde TX	31	46,807	13.94	35.39
Magnetek National Electric Coil Inc.	Brownsville	Cameron TX	36	37,000	11.02	46.41
Chem-Pruf Door Co.	Brownsville	Cameron TX	39	34,600	10.31	56.72
Tony Lama Boot Co. Inc.	El Paso	El Paso TX	31	26,049	7.76	64.48
Custom Craft Marble	Santee	San Diego CA	32	16,758	4.99	69.47
Manufacturers Folding Carton	El Paso	El Paso TX	26	16,243	4.84	74.31
Sony Eng. & Mfg. Co. Of America	San Diego	San Diego CA	36	14,046	4.18	78.49
Solar Turbines Inc.	San Diego	San Diego CA	35	12,600	3.75	82.24
Aldila Inc.	San Diego	San Diego CA	39	12,000	3.57	85.82
Remainder				47,621	14.18	100.00
Total				335,742	100.00	



Map 11. Facilities releasing Dichloromethane in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	% Cum
Signet Armorlite Inc.	San Marcos	San Diego CA	38	190,317	86.05	86.05
Learjet Inc.	Tucson	Pima AZ	37	30,826	13.94	99.99
Telios Pharmaceuticals	San Diego	San Diego CA	28	30	0.01	100.00
Total				221,173	100.00	



Map 12. Facilitiies releasing Dichlorodifluromethane in 1992

Name	City	County/State	SIC	Amount (lbs.)	% Total	% Cum
National Medical Care Medical Products Div.	Mc Allen	Hidalgo TX	38	106,445	59.65	59.65
Chevron Corp. El Paso Refinery	El Paso	El Paso TX	29	72,000	40.35	100.00
Total				178,445	100.00	

3.8 Releases by County

The 100-km demarcation of the Border Area includes 48 counties or county parts in the four Border States. Of these, only 17 counties contain facilities reporting releases over the period 1988-1992, and only 15 counties reported releases in 1992. All counties are shown on Map 1, and counties with reporting facilities in 1992 can be seen on Map 2. Tables 3.15 and 3.16 list those counties with reporting facilities whose geographical coordinates lie within the 100-km envelope, with one exception: emissions from ten facilities around Tucson, Arizona, outside the 100-km envelope, are also included in the totals in this report. Table 3.17 gives 1990 Census counts for those counties or county parts lying within the 100-km Border Area. These census counts were tabulated from Census Block counts whose centroid geographical coordinates were within the 100-km Border Area.

Over the period 1988-1992, the top ten counties in the Border Area accounted for more than 99% of the total chemical releases. The two New Mexico counties, Hidalgo and Grant, homes of the Phelps Dodge Mining and Chino Mines smelters, accounted for approximately 75% of the overall reported releases in the 1988-1992 period, as well as in 1992 alone. The portions of Hidalgo and Grant within the 100-km Border Area have small 1990 Census populations totalling 5,947 people and representing only 0.12% of the population for both counties. In contrast, the most populated counties in the Border Area, San Diego (CA), El Paso (TX), and Pima (AZ), accounted for about 20% of the 1988-1992 and 1992 releases, but contained 3,509,129 people or 42% of the Border Area population.

Table 3.15. Border County Releases, 1988-92

County	State	Amount (lbs)	% Total	Cum. %
Hidalgo	NM	102,574,680	57.13	57.13
Grant	NM	36,605,840	20.39	77.51
San Diego	CA	22,809,545	12.70	90.22
El Paso	TX	7,760,648	4.32	94.54
Pima	AZ	5,012,906	2.79	97.33
Imperial	CA	1,450,759	0.81	98.14
Cameron	TX	1,271,441	0.71	98.85
Hidalgo	TX	795,012	0.44	99.29
Cochise	AZ	387,082	0.21	99.51
Santa Cruz	AZ	316,434	0.18	99.69
Val Verde	TX	228,516	0.13	99.82
Yuma	AZ	212,679	0.12	99.94
Webb	TX	60,975	0.03	99.97
Zavala	TX	28,050	0.01	99.98
Dona Ana	NM	27,959	0.01	99.99
Pinal	AZ	11,700	0.01	100.00
Uvalde	TX	250	0.00	100.00
Total	-	179,554,476	100.00	100.00

Table 3.16. Border County Releases in 1992

County	State	Amount (lbs)	% Total	Cum. %
Hidalgo	NM	11,792,335	45.75	45.75
Grant	NM	7,478,832	29.01	74.76
San Diego	CA	3,059,314	11.87	86.63
El Paso	TX	1,621,244	6.29	92.92
Pima	AZ	771,509	2.99	95.91
Imperial	CA	434,763	1.69	97.60
Hidalgo	TX	188,694	0.73	98.33
Cameron	TX	163,422	0.63	98.96
Val Verde	TX	110,337	0.43	99.39
Santa Cruz	AZ	91,390	0.35	99.74
Yuma	AZ	43,760	0.17	99.91
Webb	TX	12,685	0.05	99.96
Cochise	AZ	8,824	0.00	100.00
Uvalde	TX	250	0.00	100.00
Dona Ana	NM	86	0.00	100.00
Pinal *	AZ	0	0.00	100.00
Zavala *	TX	0	0.00	100.00
Total	-	25,777,465	100.00	100.00

* Reported Releases prior to 1992

The five most populated counties in the Border Area (San Diego, CA; El Paso, TX; Pima, AZ; Cameron, TX; Hidalgo, TX) account for about 44% of the Border Area population and about 21% of the total Border releases for 1988-1992 and for 1992 alone. If we subtract the contributions from Hidalgo and Grant counties in New Mexico, then the five most populated counties account for 90% of the adjusted total chemical releases to the Border Area. In other words, if we ignore the contributions from Grant and Hidalgo counties in New Mexico, which account for the vast majority of all land releases in the Border Area, then the highly populated counties in the Border Area receive most of the residual chemical releases -- chiefly through the air pathways.

This data emphasizes that Hidalgo and Grant Counties are special cases compared to the remainder of the Border counties. What we are observing in the chemical release data from the TRI database is that a small number of locations in the Border Area account for almost all of the chemical releases and that two of the least populated counties, Hidalgo and Grant Counties in New Mexico, account for about three-quarters of all the chemical releases. The remainder of the releases occur in the urban centers along the Border Area, where one would expect to find a large mix of industries. Except for Hidalgo and Grant Counties in New Mexico, the least populated counties add an insignificant amount of chemical releases to the Border Area (see Tables 3.15 and 3.16). Clearly, patterns of Border Area releases vary geographically and by industry.

Table 3.18 shows 1992 per capita and per area releases by county, ordered by release quantity. If we consider all counties wholly or partially within the 100-km area, we can estimate from the numbers provided in Tables 3.16 and 3.17 a 1992 per capita release of 5.13 pounds in the Border Area. The top ten counties reporting releases have a combined release rate of 5.93 pounds per capita,

Table 3.17. 1990 Census Population of County or County Parts within the 100-km Border Area. Border Area Populations Based on Census Block Counts within the 100-km Border Area

County	State	Area	Area as % of total Border Area[a]	1990 Population	Border Area Pop. as a % of Total Border Pop.[a]
Cochise	AZ	5,200.3	5.60	92,332	1.09
La Paz	AZ	874.7	0.94	156	0.00
Maricopa	AZ	1,468.9	1.58	997	0.01
Pima	AZ	8,255.8	8.89	430,936	5.10
Pinal	AZ	142.96	0.15		
Santa Cruz	AZ	1,238.1	1.33	29,676	0.35
Yuma	AZ	4,846.8	5.22	106,333	1.26
Arizona Subtotal		22,027.6	23.72	660,430	7.81
Imperial	CA	4,481.7	4.83	109,303	1.29
Riverside	CA	1,113.6	1.19	12,132	0.14
San Diego	CA	4,137.8	4.46	2,486,583	29.42
California Subtotal		9,732.8	10.48	2,608,018	30.86
Dona Ana	NM	3,136.5	3.38	133,986	1.59
Grant	NM	1,301.0	1.40	326	0.00
Hidalgo	NM	3,129.6	3.37	5,621	0.07
Luna	NM	2,965.3	3.19	18,110	0.21
Otero	NM	1,968.8	2.12	1,462	0.02
Sierra	NM	126.8	0.14		
New Mexico Subtotal		12,628.0	13.60	159,505	1.89
Brewster	TX	5,739.3	6.18	4,170	0.05
Brooks	TX	669.0	0.72	703	0.01
Cameron	TX	899.5	0.97	260,728	3.08
Crockett	TX	1,165.5	1.26	288	0.00
Culberson	TX	1,945.6	2.10	3,407	0.04
Dimmit	TX	1,334.5	1.44	10,433	0.12
Duval	TX	852.4	0.92	5,080	0.06
Edwards	TX	1,363.6	1.47	715	0.01
El Paso	TX	1,014.7	1.09	591,610	7.00
Frio	TX	71.9	0.08		
Hidalgo	TX	1,582.7	1.70	383,545	4.54
Hudspeth	TX	4,423.6	4.76	2,623	0.03
Jeff Davis	TX	1,851.3	1.99	1,946	0.02
Jim Hogg	TX	1,136.2	1.22	5,109	0.06
Kenedy	TX	728.7	0.78	460	0.01
Kinney	TX	1,365.3	1.47	3,119	0.04
La Salle	TX	1,066.9	1.15	5,117	0.06

Table 3.17. (cont'd)

County	State	Area	Area as % of Total Border Area[a]	1990 Population	Border Area Pop. as a % of Total Border Pop.[a]
Maverick	TX	1,291.7	1.39	36,378	0.43
McMullen	TX	41.1	0.04		
Pecos	TX	1,673.1	1.80	1,451	0.02
Presidio	TX	3,856.3	4.15	6,637	0.08
Real	TX	86.0	0.09	678	0.01
Reeves	TX	12.8	0.01		
Starr	TX	1,229.3	1.32	40,518	0.48
Sutton	TX	288.6	0.31	167	0.00
Terrell	TX	2,357.8	2.54	1,410	0.02
Uvalde	TX	931.6	1.00	19,586	0.23
Val Verde	TX	3,232.4	3.48	38,721	0.46
Webb	TX	3375.5	3.64	133,239	1.58
Willacy	TX	578.9	0.62	17,097	0.20
Zapata	TX	1,058.2	1.14	9,279	0.11
Zavala	TX	1,240.7	1.34	12,162	0.14
Texas Subtotal		48,464.5	52.20	1,596,376	18.89
Border Area Total	-	92,852.8	100.00	5,024,329	100.00

(a) County percents do not add up to exact State percents of total releases and populations due to rounding errors.

and the remaining counties in the Border Area have, in contrast, a combined release rate of 0.10 pounds per capita. Hidalgo and Grant Counties in New Mexico have a combined release rate of 3240.5 pounds per capita. In contrast, the remaining eight of the top ten counties (excluding Hidalgo and Grant Counties) release 1.49 pounds per capita. As Hidalgo and Grant counties account for almost all the land releases in the Border Area, this means that the 1.49 pounds per capita exposure in these remaining counties is mainly due to air releases.

Per area releases also vary considerably between counties. Grant and Hidalgo Counties in New Mexico have by far the highest per area releases. The two most urbanized counties, El Paso County, Texas, and San Diego County, California, are third and fourth highest in terms of release per area.

3.9 Comparison with State Summary Data

Tables 3.19 and 3.20 compare Border Area releases with Border State releases. State release aggregates and proportions include the Border Area releases. The quantity of chemical release from facilities in the Border Area reporting to the TRI database, with the exception of those facilities in New Mexico, is a small percentage of total chemical releases in the four Border States (Table 3.19). For example, the Border Areas of Arizona, California, and Texas each contribute 1.99%, 4.95% and 0.5% respectively to their reported State total chemical releases. The exception, New

Table 3.18. 1992 Per Area and Per Capita Releases For Counties Reporting Releases in the TRI

County and State	1992 Release pounds	Release per area (lbs/sq mi)	Per capita Release (lbs/per person)
Hidalgo NM	11,792,335	3,767.9	2,098.0
Grant NM	7,478,832	5,748.7	22,941.0
San Diego CA	3,059,314	739.3	1.23
El Paso TX	1,621,244	1,597.5	2.74
Pima AZ	771,509	93.5	1.79
Imperial CA	434,763	97.1	3.98
Hidalgo TX	188,694	119.5	0.49
Cameron TX	163,422	181.0	0.63
Val Verde TX	110,337	34.0	2.85
Santa Cruz AZ	91,390	73.5	3.08
Yuma AZ	43,760	0.0	0.41
Webb TX	12,685	3.6	0.10
Cochise AZ	8,824	0.0	0.10
Uvalde TX	250	0.3	0.01
Dona Ana	86	0.0	0.00
Remainder	0	0.0	0.00

Table 3.19. Border Area Releases by State in 1992

State	National Rank for State Releases	Number of Reporting Facilities			Toxic Chemical Releases		
		State Total	Border Area		State Total (lbs)	Border Area	
			Total	% of State		Total (lbs)	% of State
AZ	22	181	33	18.23	46,114,093	915,483	1.99
CA	14	1,830	76	4.15	70,552,047	3,494,077	4.95
NM	32	44	3	6.82	20,369,370	19,271,167	94.61
TX	2	1,238	50	4.04	419,562,029	2,096,738	0.50
	Total	3,293	162	4.92	556,597,539	Total	4.63

Mexico, stands out from the other Border States in that more than 94% of total New Mexico releases come from its Border Area. The reason for the New Mexico exception is the predominance of releases from the two smelters in Grant and Hidalgo Counties, as previously discussed. The Border Area as a whole accounted for only 4.63% of the 1992 total chemical releases by the four Border States. It should be noted that this release rate for the Border Area is also consistent with and proportional to the percentage of TRI facilities reporting in the Border Area when compared to total TRI facilities in the Border States (4.92%). In general, even though Border Area total releases may appear to be large, when compared to Border State total releases they are proportionate to the number of Border Area facilities reporting within the Border States.

It is also interesting to note in Table 3.20 that the per capita chemical release in the Border Area is about half that of the aggregated Border States (5.13 versus 10.71 pounds per person). Also, with the exception of New Mexico, we can see that each State's Border Area has a per capita release rate that is significantly lower than its State's per capita release rate. This reflects the Border Area's sparse population and generally lower level of industrialization. Similarly, the per area release rate in the Border Area of 278 pounds per square mile is about a fifth of the Border States release rate of 1,315 pounds per square mile.

Table 3.20. 1992 Border State and Border Area Releases Per Capita and Per Area

	State (includes Border Area)				Border Area			
	Per Capita		Per Area		Per Capita		Per Area	
	1990 Population X 1000	Release per capita	Area sq. mi.	Release per sq. mi.	1990 Population X 1000	Release per capita	Area sq. mi[a]	Release per sq. mi.
AZ	3,665	12.58	72,960	632.04	660	1.39	22,028	41.56
CA	29,760	2.37	101,572	694.06	2,608	1.34	9,733	359.00
NM	1,515	13.44	77,819	261.75	160	120.8	12,628	1526.1
TX	16,987	24.70	170,756	2457.08	1,596	1.31	48,464	43.26
Tot	51,927	10.71	423,107	1315.50	5,024	5.13	92,853	277.62

(a) Entire area within Border envelope for each State

4.0 Toxic Chemical Transfers

This chapter discusses toxic chemical transfers in the Border Area from 1988 to 1992. Section 4.1 and 4.2 give an overview of toxic chemical transfers in the Border Area and discuss the discrepancies in the reporting of transfers to the TRI. The remaining sections in this chapter, sections 4.3-4.8 report on toxic chemical transfers by different cross-classifications. Section 4.9 compares the Border Area to Border State data.

4.1 Transfers of Toxic Chemicals

This section of the report covers transfers to Publicly Owned Treatment Works (POTW) and transfers to an "Others" category. "Others" includes transfers to "Treatment", "Disposal", and "Other Transfers" categories, following the 1988-1990 definition (*1992 Toxic Release Inventory: Public Data Release*, EPA, 1994, pp 159-160). This report does not cover offsite recycling nor offsite energy recovery; nor does it cover onsite transfers of any category. The analysis covers transfers originating in the Border Area as reported by facilities.

The primary analysis method was to identify the top ten sources of transfers originating in the Border Area by geographic, industrial, and chemical categories. Only primary originators were considered. Tracking the chain of custody of transferred material across county, State, or national borders was considered outside the scope of this report, even though transfer destinations are reported in the TRI data. Quantities reported transferred by one facility to another may eventually be released to the environment by the last facility in the chain of custody. Such releases can in principle be traced but, practically, this would be difficult due to numerous factors. Chains of custody may also cross State and national boundaries.

4.2 Ensuring Comparability between 1988-90 and 1991-92 Data

The 1988-1990 TRI data enumerate transfers to Publicly Owned Treatment Works (POTW) and also to an "Others" category, which includes transfers to "Treatment, "Disposal", and "Other Transfers" as defined by the 1992 TRI Public Release (pp 159-160). Separate estimates of transfers to off-site energy recovery and recycling were not required to be reported to EPA during those years. After 1990, EPA required this additional data, and the 1991-92 TRI data include these quantities in the "Others" transfers category, as well as listing them separately.

The intention in this report is to observe trends for transfers over the full five-year period. The 1991-92 "Others" data included all offsite energy recovery and recycling in the non-POTW transfers. To make the 1991-1992 transfer data comparable to 1988-1990 transfer data, it was necessary to subtract the offsite energy recovery and recycling data from the "Others" category for each facility. This subtraction yielded 1991-92 "Adjusted Others" transfer quantities that are comparable in principle to the 1988-90 quantities for "Other" transfers. The total transfers for 1991-1992 were then recalculated as the sum of POTW and "Adjusted Others".

However, difficulties with this approach arise from several sources. The 1992 TRI Report states that the total transfers for 1988-90 may not be comparable to 1991-92 and following years, because the data for Other off-site transfers for 1988-90 may in some cases include transfers reported with valid energy recovery or recycling codes. Moreover, it is considered likely that with the introduction of the new Form R in 1991, many of the reporting firms made errors due to misunderstandings of the new forms, and thereby reported erroneous data unintentionally.

In verifying our adjustments of the 1991-92 transfer data, it was observed that for most of the records, the final calculated quantities were as expected: the sum of reported offsite energy recovery and recycling totals ("R and R") was found to be less than or equal to the "Others" quantities. However, we observed that 53 of the records in the 1991-1992 data set were inconsistent in that the sum of reported offsite energy recovery and recycling amounts was larger than the corresponding totals in the "Others" column. This implies that totals for these particular data records were calculated for the TRI in a different manner than for the remainder of the records in the TRI. The total discrepancy here was considerable, being on the order of 29,690,000 pounds. The report with the largest discrepancy contributed 27,000,000 pounds, or 97.7%, of the total discrepancy, and the next report contributed 2,174,000 pounds. The remaining net discrepancy was 180,443 pounds distributed over 51 reports.

About a third of these inconsistent records had a net negative percent discrepancy of 3% or less in the "Others" column, after subtraction. For these records the discrepancies were considered as involving rounding errors in reporting quantities and the "Others" column for these records was reset to the "R and R" value.

The remaining inconsistent records were those with the largest discrepancies on the order of 20 thousand to 100 thousand pounds, or for example in the two cases cited above, millions of pounds. To avoid problems, these records were treated as if the "Others" field already had offsite energy recovery and recycling transfers subtracted out. That is, for these records, the total transfer quantity was used as supplied in the TRI data.

Hence, in the following tables "Others" refers to all non-POTW transfers as defined in 1988-90 versions of the TRI database. "Others" therefore does not include off-site energy recovery or recycling categories. Although Border Area reporting after 1990 will not be complete without consideration of offsite energy recovery and recycling, these categories of transfers are not discussed further in this report.

This adjustment procedure is admittedly an ad hoc solution intended to account for one source of error in these results. The obvious long term solution would be to correct the TRI database so that "Others" would consistently measure the same quantity throughout.

4.3 Total Transfers

Table 4.1 summarizes annual transfers for the Border Area, Border States as a whole, and the entire U.S.A. Over the period 1988-1992, Border Area TRI facilities reported a total of 40.58 million pounds of toxic chemicals transferred off site. Table 4.1 shows the Border Area transfer total dramatically increasing in 1990 and 1991. In spite of a slight decrease in 1992, TRI facilities reported toxic chemical transfers totaling approximately 14.04 million pounds in the Border Area, which is a six-fold increase over the average of the 1988 and 1989 amounts.

In contrast to the Border Area, transfers in the Border States steadily decreased in the range of 10 to 15% per year. The U.S.A. as a whole experienced fluctuations between 1 billion pounds and 1.6 billion pounds between 1988 and 1992. Compared to 1990 transfer totals, the U.S.A. experienced substantial increases of 31% in 1991 and an additional 28% in 1992. The Border Area was not dissimilar to the entire U.S.A. in this respect, but the rate of increase in the Border Area was higher by ten-fold.

4.4 Distribution of Annual Transfers by Transfer Type

Table 4.2 shows gross transfers to POTW and to "Others" for the reporting years 1988-1992. After 1990, POTW transfers steadily decreased, and by 1992 POTW had decreased by 40.5% from the 1988 POTW transfer levels. Transfers to "Others" increased after 1989 by very substantial amounts, and the 1992 transfer to Others is nearly 10 times the 1988 level.

Table 4.1. Toxic Chemical Transfers to POTW and Other by Year for the Border Area, the Four Border States, and the Entire U.S.A. Quantities are in millions of pounds transferred.

Year	Border Area	Border States[a]	Entire U.S.A.[a]
1988	2.50	229.03	1,043.27
1989	1.94	207.52	1,471.96
1990	6.30	176.07	1,018.63
1991	15.80	152.12	1,333.36
1992	14.04	137.39	1,615.37
Total	40.58	902.13	6,482.59
Average '88-'92	8.12	180.42	1,296.51
Average '88-'91	6.64	191.19	1,216.81
% Change '92 from '91	-11.14	-9.68	+21.15
% Change '92 from '88	+461.60	-40.01	+54.84
% Change 1992 from '88-'91 Avg.	+111.5%	-28.1%	+32.7%

(a) 1988, 1990, 1991 and 1992 data was obtained from "1992 Toxics Release Inventory Public Data Release". The 1989 data was obtained from a special tabulation from the TRI database on May 22, 1995.

Table 4.2. Distribution of Border Area Transfers by Transfer Type, 1988-1992

Transfers	1988	1989	1990	1991	1992	Total
POTW	1,113,929 (44.6%)	981,923 (50.5%)	1,192,198 (18.9%)	837,148 (5.30%)	662,665 (4.72%)	4,787,853 (11.80%)
Other	1,383,695 (55.4%)	962,507 (49.5%)	5,105,609 (81.1%)	14,964,294 (94.70%)	13,376,990 (95.28%)	35,793,095 (88.20%)
Total	2,497,624	1,944,430	6,297,807	15,801,442	14,039,645	40,580,948
Percents represent proportion of total annual transfers transferred to POTW or to Others within each year						

4.5 Transfers by Chemical Species

The TRI Database reports 78 chemical species transferred in the Border Area during reporting years 1988-1992. In 1992, 59 of these chemicals were involved in transfers. The bulk of the toxic chemical transfers are for sulfuric acid, which represents almost 71% of the 1988-1992 total, and almost 83% of the 1992 total. No other chemical species makes up more than a few percent of the total quantity.

The top ten transfers by chemical species over 1988-92 is shown in Table 4.3. Table 4.4 shows the corresponding data for 1992 alone. The cumulative percent columns show that the top ten chemicals taken together account for 87.9% of all transfers in 1988-92, and 95.9% in 1992 alone.

Table 4.3. Top Ten Border Area Chemical Transfers Over 1988-1992 Period

Chemical	Amount (lbs)	% Total Transfers 1988-92	Cumulative Transfers %
Sulfuric Acid	28,788,524	70.94	70.94
Copper	1,055,481	2.60	73.54
Ammonia	844,970	2.18	75.62
Lead Compounds	837,331	2.06	77.69
1,4-Dioxane	830,604	2.05	79.73
Ammonium Sulfate (Solution)	774,075	1.91	81.64
Chromium Compounds	708,918	1.75	83.39
Nitric Acid	685,099	1.69	85.08
Cadmium Compounds	626,755	1.54	86.62
Methanol	528,726	1.30	87.92
Remainder	4,900,447	12.08	100.00
Total	40,580,948	100.00	100.00

Table 4.4. Top Ten Border Area Chemical Transfers, 1992

Chemical	Amount (lbs)	% Total Releases 1992	Cumulative %
Sulfuric Acid	11,602,989	82.64	82.64
Copper Compounds	393,789	2.80	85.45
Copper	305,666	2.10	87.63
Ammonia	268,785	1.91	89.54
1,4-Dioxane	204,878	1.46	91.00
Chromium Compounds	187,276	1.33	92.33
Lead Compounds	181,485	1.29	93.63
Acetone	120,679	0.86	94.49
Ammonium Sulfate (Solution)	100,787	0.72	95.20
Diethanolamine	90,580	0.65	95.85
Remainder	582,731	4.15	100.00
Total	14,039,645	100.00	100.00

The roster of chemicals contributing to the bulk of transfers each year is variable. Table 4.5 shows the top twelve chemical transfers (POTW and Other aggregated) by chemical species for each reporting year. The table is organized so that year-to-year additions, deletions, and changes in amounts can be readily tracked. During 1988-1992, a total of twenty four chemical species appeared among the top twelve for each year. The table shows great year-to-year variability in the occurrence and amounts of transfers.

Sulfuric acid was not the top chemical transferred until 1990 and thereafter, with amounts transferred increasing from a few hundred thousand pounds to over twelve million pounds in two years. The bulk of the sulfuric acid was found to be contributed by one company: Phelps Dodge Refining Corp. In El Paso, TX. Cadmium compounds, which appear in the top ten list over the 1988-1992 period (Table 4.3) actually are shown in substantial quantities only in 1991, although very small amounts were transferred in other reporting years. Copper compounds were transferred only in 1992, and appear among the top ten for that year. Figures for copper and copper compounds should be interpreted with caution, since it has been noted that some facilities reported the same substance as "copper compounds" in some years and as "copper" in other years (Pam Tsai, USEPA, 1995, personal communication). Likewise, zinc compounds were reported transferred only in 1992, and are among the top twelve in that year.

Table 4.5. Top Twelve Chemical Transfers During Each Reporting Year. Ordered by Top 1992 Chemical Transfers.

Chemical	1988	1989	1990	1991	1992
Sulfuric Acid	342,215	85,423	3,966,323	12,791,592	11,602,989
Copper Compounds	-	-	-	-	393,789
Copper	666,849	0	0	0	305,666
Ammonia	-	103,949	287,869	126,388	268,785
1,4-Dioxane	125,330	103,489	124,360	192,547	204,878
Chromium Compounds	69,382	180,911	133,245	138,104	187,276
Lead Compounds	-	-	234,376	357,360	181,485
Acetone	58,547	92,458	104,310	114,830	120,679
Ammonium Sulfate	153,377	173,588	172,233	174,100	100,787
Diethanolamine	-	100,091	-	-	90,580
Nitric Acid	137,941	-	205,131	212,632	82,806
Zinc Compounds	-	-	-	-	69,426
Polychlorinated Biphenyls	79,020	-	-	-	-
Methyl Ethyl Ketone	-	87,860	-	-	-
Methanol	90,944	158,005	197,487	-	-
Manganese Compounds	-	58,669	-	-	-
Hydrogen Fluoride	-	109,670	-	-	-
Hydrochloric Acid	71,524	-	-	-	-
Freon 113	63,636	-	-	-	-
Dichloromethane	-	-	-	172,719	-
Chromium	-	-	64,883	-	-
Cadmium Compounds	-	-	-	620,250	-
Barium Compounds	-	-	144,152	134,995	-
1,1,1-Trichloroethane	110,700	87,079	145,834	86,844	-
Remainder	528,159	523,238	517,614	679,081	430,449
Total Transfer	2,497,624	1,944,430	6,297,807	15,801,442	14,039,645

"-" indicates amount too small to be in the top twelve. Refer to Table A.2 (Appendix) for details.

4.6 Transfers by SIC Code

Table 4.6 summarizes 1988-1992 transfers by Standard Industrial Classification 2-digit SIC codes, while Table 4.7 summarizes this information for 1992 only. By far the largest contributor to Border Area toxic chemical transfers was the primary metals industry (SIC code 33), which accounted for more than 71% of the total amount transferred in 1988-1992 period and 83.7 % in 1992 alone. The electrical industry was in second place with slightly more than 13% for 1988-1992 and 8.7% in 1992.

Table 4.6. Top Ten Transfers by SIC, 1988-1992.

Two-Digit SIC Code / Industry	Amount (lbs)	% Total 1988-92	Cum. %
33 Primary Metals	29,065,033	71.62	71.62
36 Electrical	5,336,106	13.15	84.77
37 Transportation Equipment	2,290,593	5.64	90.41
29 Petroleum Refining	1,151,573	2.84	93.25
30 Rubber and Plastics	900,362	2.22	95.47
39 Miscellaneous	450,001	1.11	96.58
28 Chemicals	444,705	1.10	97.68
35 Industrial Machinery	280,043	0.69	98.37
38 Instruments	205,682	0.51	98.88
34 Fabricated Metal Products	204,515	0.50	99.38
Remainder (20,23,25,26,27)	252,335	0.62	100.00
Total	40,580,948	100.00	100.00

Table 4.7. Top Ten Transfers by SIC, 1992

Two-Digit SIC Code / Industry	Amount (lbs)	% Total 1988-92	Cum. %
33 Primary Metals	11,746,954	83.67	83.67
36 Electrical	1,216,241	8.66	92.33
37 Transportation Equipment	282,108	2.01	94.34
29 Petroleum Refining	258,507	1.84	96.18
30 Rubber and Plastics	190,475	1.36	97.54
39 Miscellaneous	173,031	1.23	98.77
38 Instruments	51,691	0.37	99.14
28 Chemicals	51,306	0.37	99.51
35 Industrial Machinery	39,928	0.28	99.79
34 Fabricated Metal Products	23,162	0.16	99.95
Remainder (20,26,27 only)	6,242	0.05	100.00
Total	14,039,645	100.00	100.00

4.7 Transfers by Facility

Tables 4.8 and 4.9 tabulate transfers for the top ten facilities. In the Border Area, 145 of the 242 facilities in the TRI database reported transfers of any category during one or more of the reporting years 1988-1992. The top ten reporting facilities accounted for 87.34% of the total amount reported transferred in the TRI database for the Border Area , aggregated over 1988-1992. Phelps Dodge Refining Corp, in El Paso contributed the bulk of transfers, at 69.10% of the total. No other single facility contributed more than 5% of the total quantity.

In 1992, 61 of the 162 facilities reporting in the TRI reported transfers of any type. The top ten reporting facilities accounted for 94.71% of the total amount reported transferred in the TRI database for the Border Area in 1992. Phelps Dodge Mining Company El Paso Works contributed the bulk of transfers at 82.29% of the total. No other single facility contributed more than 3% of the total amount transferred.

4.8 Transfers by County

Counties are shown ranked by their contribution to the aggregate 1988-1992 transfer total in Table 4.10. Twelve of the 48 counties included in the Border Area generated transfers during 1988-1992. Table 4.10 shows that ten of the Border Area counties contributed virtually all of the transfers recorded in the TRI from 1988 through 1992. By far the greatest contributors were El Paso County, Texas, and San Diego County, California, which together contributed 96% of all transfers of all types. Both counties contain major urban areas.

Table 4.8. Top Ten Reporting Facilities for Transfers, 1988-1992

Facility	Amount (lbs)	% Total 1988-92	Cum. %
Phelps Dodge Refining Corp. El Paso Works	28,040,210	69.10	69.10
SONY Eng. & Mfg. Co. of America	2,004,092	4.94	74.04
General Dynamics Corp. Convair Division	873,556	2.15	76.19
Fluid Sys. Corp.	805,292	1.98	78.17
ASARCO Inc. El Paso	778,250	1.92	80.09
Southwest Marine, Inc.	652,750	1.61	81.70
3M Data Storage Tape Technology	621,189	1.53	83.23
Chevron U.S.A. Inc. El Paso Refinery	611,445	1.51	84.74
El Paso Refinery L. P.	540,128	1.33	86.07
Hughes Aircraft Co.	517,204	1.27	87.34
Remainder	5,136,832	12.66	100.00
Total	40,580,948	100.00	100.00

Table 4.9. Top Ten Reporting Facilities for Transfers, 1992

Facility	Amount (lbs)	% Total 1992	Cum. %
Phelps Dodge Refining Corp. El Paso	11,552,860	82.29	82.29
Herco Tech. Corp.	414,916	2.96	85.24
Toppan West Inc. Industrial Circuits Div.	353,109	2.52	87.76
Fluid Sys. Corp.	179,674	1.28	89.04
Chevron Corp. El Paso Refinery	175,649	1.25	90.29
SONY Eng. & Mfg. Co. of America	172,053	1.23	91.51
3M Data Storage Tape Technology	130,860	0.93	92.45
ASARCO Inc. El Paso	128,240	0.91	93.36
Rohr Inc.	101,774	0.72	94.08
General Dynamics Corp. Convair Div.	88,400	0.63	94.71
Remainder	742,110	5.29	100.00
Total	14,039,645	100.00	100.00

Table 4.10. Top Ten Counties for Transfers, 1988-1992

County	State	Amount (lbs)	% Total 1988-92	Cum. %
El Paso	TX	30,382,969	74.87	74.87
San Diego	CA	8,594,549	21.18	96.05
Pima	AZ	1,391,811	3.43	99.48
Santa Cruz	AZ	80,559	0.20	99.68
Hidalgo	TX	72,540	0.18	99.86
Cameron	TX	29,060	0.07	99.93
Grant	NM	15,371	0.04	99.97
Yuma	AZ	11,449	0.03	100.00
Webb	TX	2,315	0.01	100.00
Cochise	AZ	250	0.00	100.00
Remainder	Border	75	0.00	100.00
Total	Border	40,580,948	100.00	100.00

Table 4.11 shows transfers by county for the eight counties which contributed transfers of any type in 1992. The same top six counties appear in the same order in both Tables 4.10 and 4.11. El Paso county, Texas, and San Diego County, California remain the top two transfer generators, with El Paso County generating an even greater proportion for the total transfers in 1992 than it generated over the aggregate five years.

Table 4.12 shows the most prominent facilities in the top three Border counties for transfers of any type during 1992. From Table 4.11, the top three counties accounted for 99.65% of all transfers during 1992. Table 4.12 shows that within the Border Area, only a relatively small number of facilities account for the bulk of transfers.

4.9 Comparison with State Summary Data

Table 4.13 shows amounts transferred tabulated by State and year. Texas transfer trends are outstanding for their precipitous increase after 1989. Texas reported less than 250,000 pounds transferred in 1988. By 1990 the amount transferred skyrocketed 16-fold to 4 million pounds. In 1991 Texas reported an approximate three-fold increase over 1990 to 13.7 million pounds, while two of the other three States reported decreases in amounts transferred. These quantities were principally due to sulfuric acid transfers initiated by Phelps Dodge Refining in El Paso.

Table 4.11. Top Eight Counties for Transfers, 1992

County	State	Amount (lbs)	% Total 1988 - 1992	Cum. %
El Paso	TX	11,966,737	85.24	85.24
San Diego	CA	1,796059	12.79	98.03
Pima	AZ	227,490	1.62	99.65
Santa Cruz	AZ	22,932	0.16	99.81
Hidalgo	TX	18,853	0.13	99.94
Cameron	TX	5,254	0.04	99.98
Webb	TX	2315	0.02	100.00
Zavala	TX	5	0.00	100.00
Remainder	Border	0	0.00	100.00
Total	Border	14,039,645	100.00	100.00

Table 4.12. Facilities within the Top Three Border Counties for Transfers in 1992.

County / Facility	Amount (lbs)	% County 1992 Total	Cum %
El Paso (TX)			
Phelps Dodge Refining Corp. El Paso	11,552,660	96.54	96.54
Chevron Corporation El Paso Refinery	175,649	1.47	98.01
ASARCO Inc. El Paso	128,240	1.07	99.08
El Paso Refinery L. P.	82,858	0.69	99.77
Border Steel Mills, Inc.	25,121	0.21	99.98
Remainder	76,779	0.01	100.00
San Diego (CA)			
HERCO Tech. Corp.	414,916	23.10	23.10
Toppan West Inc. Industrial Circuits Div.	353,109	19.66	42.76
Fluid Sys. Corp.	179,674	10.00	52.76
SONY Eng. & Mfg. Co. of America	172,053	9.58	62.34
Rohr, Inc.	101,774	5.67	68.01
General Dynamics Corp. Convair Div.	88,400	4.92	72.93
Hydranautics	84,750	4.72	77.65
Desalination Sys. Inc.	53,528	2.98	80.63
Applied Micro Circuits, Inc.	51,000	2.84	83.47
Hughes Aircraft Inc.	50,918	2.83	86.30
Remainder	245,937	13.70	100.00
Pima (AZ)			
3M Data Storage Tape Technology	130,860	57.52	57.52
Tucson Fndy. & Mfg. Inc. DBA Tucson	37,341	16.41	73.93
U.S.A.F. Plant No. 44	16,533	7.29	81.22
Weiser Lock Co.	14,337	6.30	87.52
R. E. Darling Co., Inc.	10,046	4.42	91.94
Thermal Eng. of Arizona, Inc.	5,948	2.62	94.56
LearJet Inc.	5,862	2.58	97.14
Remainder	6,653	2.86	100.00
Note: Cumulative percents apply within each county			

Table 4.13. Border Area Transfers by Year for each Border State, ordered by 1992 Transfer Amount

State	1988	1989	1990	1991	1992	Total
TX	249,497 (10.0%)	477,185 (24.5%)	4,086,716 (64.9%)	13,680,377 (86.6%)	11,993,164 (85.4%)	30,486,939 (75.1%)
CA	2,028,911 (81.2%)	1,099,434 (56.5%)	1,856,405 (29.5%)	1,813,760 (11.5%)	1,796,059 (12.8%)	8,594,569 (21.2%)
AZ	208,016 (8.3%)	363,640 (18.7%)	354,686 (5.6%)	307,305 (1.9%)	250,422 (1.8%)	1,484,069 (3.7%)
NM	11,200 (0.04%)	4,171 (0.02%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	15,371 (0.0%)
Total	2,497,624	1,944,430	6,297,807	15,801,442	14,039,645	40,580,948
Percents represent proportion of total annual transfers within each year						

In 1988 California contributed more than 81% of the total transferred, and Texas contributed only 9.9% in the Border Area . By 1992, Texas contributed 85.4% of the total transfers for the Border Area, while California contributed only 12.8%, even though its 1992 transfer total was quite close to its 1988 amount of 2 million pounds.

Table 4.14 compares 1992 TRI chemical transfers from the Border Area with State totals. This table shows that in 1992 Texas contributed the bulk (85%) of toxic chemical transfers of all types, followed by California and Arizona. New Mexico contributed to toxic chemical transfers in the years prior to 1992; however, in 1992 no transfers were reported..

Table 4.14. Comparison of Border Area Transfers to Border State Transfers, 1992

State	Number of facilities reporting transfers	Total Transfers, Border Area (pounds)	% Total Border Transfer	Total State Transfers (pounds)	Border Area as % Total State Transfers
TX	56	11,993,164	85.42%	100,329,663	11.95%
CA	107	1,796,059	12.79%	33,895,515	5.30%
AZ	32	250,442	1.79%	2,853,542	8.77%
NM	0	0	0%	313,339	0%
Total	195	14,039,645	100.0%	137,392,059	10.22%

5.0 Conclusions

This report presents summary information pertinent to assessing the environmental status of the U.S./ Mexico Border Area in terms of chemical releases and transfers of toxic chemicals by manufacturing industry during reporting years 1988-1992. Principal findings are presented in the Executive Summary. It is evident that the Border Area is not homogeneous but rather is better considered as several sectors, based on the pattern of releases and transfers. For example, primary metals industry emissions have different characteristics, patterns, and trends than do emissions from other industries. More detailed analysis in terms of these sectors would be expected to reveal a more useful characterization of the Border Area than analysis based on a simple Border Area aggregate.

It is expected that this information may be of use in establishing baselines from which to assess the results of new policy initiatives which impact environmental conditions. The reader is cautioned to consider the trends and aggregates reported here as general indicators rather than as accurate and precise measurements of toxic chemical quantities, for reasons discussed in Chapter 2 of this report. Moreover, the information reported here may provide a general starting point for assessing hazards to health and environmental safety; but this report does not consider the relative toxicities of various toxic chemicals, nor does it consider environmental pathways in detail.

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APPENDIX

Contents

Table A.1 SIC Codes Used in the Border Area

20 FOOD AND KINDRED PRODUCTS

- 201 Meat Products
  - 2011 Meat packing plants
  - 2013 Sausages and other prepared meats
  - 2015 Poultry slaughtering and processing
- 202 Dairy Products
  - 2021 Creamery butter
  - 2022 Cheese, natural and processed
  - 2023 Dry, condensed, evaporated products
  - 2024 Ice cream and frozen desserts
  - 2026 Fluid milk
- 203 Preserved Fruits and Vegetables
  - 2032 Canned specialties
  - 2033 Canned fruits and vegetables
  - 2034 Dehydrated fruits, vegetables, soups
  - 2035 Pickles, sauces, and salad dressings
  - 2037 Frozen fruits and vegetables
  - 2038 Frozen specialties, nec
- 204 Grain Mill Products
  - 2041 Flour and other grain mill products
  - 2043 Cereal breakfast foods
  - 2044 Rice milling
  - 2045 Prepared flour mixes and doughs
  - 2046 Wet corn milling
  - 2047 Dog and cat food
  - 2048 Prepared feeds, nec
- 205 Bakery Products
  - 2051 Bread, cake, and related products
  - 2052 Cookies and crackers
  - 2053 Frozen bakery products, except bread
- 206 Sugar and Confectionery Products
  - 2061 Raw cane sugar
  - 2062 Cane sugar refining
  - 2063 Beet sugar
  - 2064 Candy & other confectionery products
  - 2066 Chocolate and cocoa products
  - 2067 Chewing gum
  - 2068 Salted and roasted nuts and seeds
- 207 Fats and Oils
  - 2074 Cottonseed oil mills
  - 2075 Soybean oil mills
  - 2076 Vegetable oil mills, nec
  - 2077 Animal and marine fats and oils
  - 2079 Edible fats and oils, nec
- 208 Beverages
  - 2082 Malt beverages
  - 2083 Malt
  - 2084 Wines, brandy, and brandy spirits
  - 2085 Distilled and blended liquors
  - 2086 Bottled and canned soft drinks
  - 2087 Flavoring extracts and syrups, nec

209 Misc. Food and Kindred Products
- 2091 Canned and cured fish and seafoods
- 2092 Fresh or frozen prepared fish
- 2095 Roasted coffee
- 2096 Potato chips and similar snacks
- 2097 Manufactured ice
- 2098 Macaroni and spaghetti
- 2099 Food preparations, nec

21 TOBACCO PRODUCTS

211 Cigarettes
- 2111 Cigarettes

212 Cigars
- 2121 Cigars

213 Chewing and Smoking Tobacco
- 2131 Chewing and smoking tobacco

214 Tobacco Stemming and Redrying
- 2141 Tobacco stemming and redrying

22 TEXTILE MILL PRODUCTS

221 Broadwoven Fabric Mills, Cotton
- 2211 Broadwoven fabric mills, cotton

222 Broadwoven Fabric Mills, Manmade
- 2221 Broadwoven fabric mills, manmade

223 Broadwoven Fabric Mills, Wool
- 2231 Broadwoven fabric mills, wool

224 Narrow Fabric Mills
- 2241 Narrow fabric mills

225 Knitting Mills
- 2251 Women's hosiery, except socks
- 2252 Hosiery, nec
- 2253 Knit outerwear mills
- 2254 Knit underwear mills
- 2257 Weft knit fabric mills
- 2258 Lace & warp knit fabric mills
- 2259 Knitting mills, nec

226 Textile Finishing, Except Wool
- 2261 Finishing plants, cotton
- 2262 Finishing plants, manmade
- 2269 Finishing plants, nec

227 Carpets and Rugs
- 2273 Carpets and rugs

228 Yarn and Thread Mills
- 2281 Yarn spinning mills
- 2282 Throwing and winding mills
- 2284 Thread mills

229 Miscellaneous Textile Goods
- 2295 Coated fabrics, not rubberized
- 2296 Tire cord and fabrics
- 2297 Nonwoven fabrics
- 2298 Cordage and twine
- 2299 Textile goods, nec

23 APPAREL AND OTHER TEXTILE PRODUCTS

- 231 Men's and Boys' Suits and Coats
  - 2311 Men's and boys' suits and coats
- 232 Men's and Boys' Furnishings
  - 2321 Men's and boys' shirts
  - 2322 Men's & boys' underwear + nightwear
  - 2323 Men's and boys' neckwear
  - 2325 Men's and boys' trousers and slacks
  - 2326 Men's and boys' work clothing
  - 2329 Men's and boys' clothing, nec
- 233 Women's and Misses' Outerwear
  - 2331 Women's & misses' blouses & shirts
  - 2335 Women's, junior's, & misses' dresses
  - 2337 Women's and misses' suits and coats
  - 2339 Women's and misses' outerwear, nec
- 234 Women's and Children's Undergarments
  - 2341 Women's and children's underwear
  - 2342 Bras, girdles, and allied garments
- 235 Hats, Caps, and Millinery
  - 2353 Hats, caps, and millinery
- 236 Girls' and Children's Outerwear
  - 2361 Girls' & children's dresses, blouses
  - 2369 Girls' and children's outerwear, nec
- 237 Fur Goods
  - 2371 Fur goods
- 238 Miscellaneous Apparel and Accessories
  - 2381 Fabric dress and work gloves
  - 2384 Robes and dressing gowns
  - 2385 Waterproof outerwear
  - 2386 Leather and sheep-lined clothing
  - 2387 Apparel belts
  - 2389 Apparel and accessories, nec
- 239 Misc. Fabricated Textile Products
  - 2391 Curtains and draperies
  - 2392 Housefurnishings, nec
  - 2393 Textile bags
  - 2394 Canvas and related products
  - 2395 Pleating and stitching
  - 2396 Automotive and apparel trimmings
  - 2397 Schiffli machine embroideries
  - 2399 Fabricated textile products, nec

24 LUMBER AND WOOD PRODUCTS

- 241 Logging
  - 2411 Logging
- 242 Sawmills and Planing Mills
  - 2421 Sawmills and planing mills, general
  - 2426 Hardwood dimension & flooring mills
  - 2429 Special product sawmills, nec
- 243 Millwork, Plywood & Structural Members
  - 2431 Millwork
  - 2434 Wood kitchen cabinets
  - 2435 Hardwood veneer and plywood
  - 2436 Softwood veneer and plywood
  - 2439 Structural wood members, nec

244 Wood Containers
- 2441 Nailed wood boxes and shook
- 2448 Wood pallets and skids
- 2449 Wood containers, nec

245 Wood Buildings and Mobile Homes
- 2451 Mobile homes
- 2452 Prefabricated wood buildings

249 Miscellaneous Wood Products
- 2491 Wood preserving
- 2493 Reconstituted wood products
- 2499 Wood products, nec

25 FURNITURE AND FIXTURES

251 Household Furniture
- 2511 Wood household furniture
- 2512 Upholstered household furniture
- 2514 Metal household furniture
- 2515 Mattresses and bedsprings
- 2517 Wood TV and radio cabinets
- 2519 Household furniture, nec

252 Office Furniture
- 2521 Wood office furniture
- 2522 Office furniture, except wood

253 Public Building & Related Furniture
- 2531 Public building & related furniture

254 Partitions and Fixtures
- 2541 Wood partitions and fixtures
- 2542 Partitions and fixtures, except wood

259 Miscellaneous Furniture and Fixtures
- 2591 Drapery hardware & blinds & shades
- 2599 Furniture and fixtures, nec

26 PAPER AND ALLIED PRODUCTS

261 Pulp Mills
- 2611 Pulp mills

262 Paper Mills
- 2621 Paper mills

263 Paperboard Mills
- 2631 Paperboard mills

265 Paperboard Containers and Boxes
- 2652 Setup paperboard boxes
- 2653 Corrugated and solid fiber boxes
- 2655 Fiber cans, drums & similar products
- 2656 Sanitary food containers
- 2657 Folding paperboard boxes

267 Misc. Converted Paper Products
- 2671 Paper coated & laminated, packaging
- 2672 Paper coated and laminated, nec
- 2673 Bags: plastics, laminated, & coated
- 2674 Bags: uncoated paper & multiwall
- 2675 Die-cut paper and board
- 2676 Sanitary paper products
- 2677 Envelopes
- 2678 Stationery products
- 2679 Converted paper products, nec

27 PRINTING AND PUBLISHING

271 Newspapers
- 2711 Newspapers

272 Periodicals
- 2721 Periodicals

273 Books
- 2731 Book publishing
- 2732 Book printing

274 Miscellaneous Publishing
- 2741 Miscellaneous publishing

275 Commercial Printing
- 2752 Commercial printing, lithographic
- 2754 Commercial printing, gravure
- 2759 Commercial printing, nec

276 Manifold Business Forms
- 2761 Manifold business forms

277 Greeting Cards
- 2771 Greeting cards

278 Blankbooks and Bookbinding
- 2782 Blankbooks and looseleaf binders
- 2789 Bookbinding and related work

279 Printing Trade Services
- 2791 Typesetting
- 2796 Platemaking services

28 CHEMICALS AND ALLIED PRODUCTS

281 Industrial Inorganic Chemicals
- 2812 Alkalies and chlorine
- 2813 Industrial gases
- 2816 Inorganic pigments
- 2819 Industrial inorganic chemicals, nec

282 Plastics Materials and Synthetics
- 2821 Plastics materials and resins
- 2822 Synthetic rubber
- 2823 Cellulosic manmade fibers
- 2824 Organic fibers, noncellulosic

283 Drugs
- 2833 Medicinals and botanicals
- 2834 Pharmaceutical preparations
- 2835 Diagnostic substances
- 2836 Biological products exc. diagnostic

284 Soap, Cleaners, and Toilet Goods
- 2841 Soap and other detergents
- 2842 Polishes and sanitation goods
- 2843 Surface active agents
- 2844 Toilet preparations

285 Paints and Allied Products
- 2851 Paints and allied products

286 Industrial Organic Chemicals
- 2861 Gum and wood chemicals
- 2865 Cyclic crudes and intermediates
- 2869 Industrial organic chemicals, nec

287 Agricultural Chemicals
- 2873 Nitrogenous fertilizers
- 2874 Phosphatic fertilizers
- 2875 Fertilizers, mixing only
- 2879 Agricultural chemicals, nec

289 Miscellaneous Chemical Products
- 2891 Adhesives and sealants
- 2892 Explosives
- 2893 Printing ink
- 2895 Carbon black
- 2899 Chemical preparations, nec

29 PETROLEUM AND COAL PRODUCTS

291 Petroleum Refining
- 2911 Petroleum refining

295 Asphalt Paving and Roofing Materials
- 2951 Asphalt paving mixtures and blocks
- 2952 Asphalt felts and coatings

299 Misc. Petroleum and Coal Products
- 2992 Lubricating oils and greases
- 2999 Petroleum and coal products, nec

30 RUBBER AND MISC. PLASTICS PRODUCTS

301 Tires and Inner Tubes
- 3011 Tires and inner tubes

302 Rubber and Plastics Footwear
- 3021 Rubber and plastics footwear

304 Rubber and Misc. Plastics Products

305 Hose & Belting & Gaskets & Packing
- 3052 Rubber & plastics hose & belting
- 3053 Gaskets, packing and sealing devices

306 Fabricated Rubber Products, NEC
- 3061 Mechanical rubber goods
- 3069 Fabricated rubber products, nec

308 Miscellaneous Plastics Products, NEC
- 3081 Unsupported plastics film & sheet
- 3082 Unsupported plastics profile shapes
- 3083 Laminated plastics plate & sheet
- 3084 Plastics pipe
- 3085 Plastics bottles
- 3086 Plastics foam products
- 3087 Custom compound purchased resins
- 3088 Plastics plumbing fixtures
- 3089 Plastics products, nec

31 LEATHER AND LEATHER PRODUCTS

311 Leather Tanning and Finishing
- 3111 Leather tanning and finishing

313 Footwear Cut Stock
- 3131 Footwear cut stock

314 Footwear, Except Rubber
- 3142 House slippers
- 3143 Men's footwear, except athletic
- 3144 Women's footwear, except athletic
- 3149 Footwear, except rubber, nec

315 Leather Gloves and Mittens
- 3151. Leather gloves and mittens

316 Luggage
- 3161 Luggage

317 Handbags and Personal Leather Goods
- 3171 Women's handbags and purses
- 3172 Personal leather goods, nec

319 Leather Goods, NEC
- 3199 Leather goods, nec

32 STONE, CLAY, AND GLASS PRODUCTS

321 Flat Glass
- 3211 Flat glass

322 Glass and Glassware, Pressed or Blown
- 3221 Glass containers
- 3229 Pressed and blown glass, nec

323 Products of Purchased Glass
- 3231 Products of purchased glass

324 Cement, Hydraulic
- 3241 Cement, hydraulic

325 Structural Clay Products
- 3251 Brick and structural clay tile
- 3253 Ceramic wall and floor tile
- 3255 Clay refractories
- 3259 Structural clay products, nec

326 Pottery and Related Products
- 3261 Vitreous plumbing fixtures
- 3262 Vitreous china table & kitchenware
- 3263 Semivitreous table & kitchenware
- 3264 Porcelain electrical supplies
- 3269 Pottery products, nec

327 Concrete, Gypsum, and Plaster Products
- 3271 Concrete block and brick
- 3272 Concrete products, nec
- 3273 Ready-mixed concrete
- 3274 Lime
- 3275 Gypsum products

328 Cut Stone and Stone Products
- 3281 Cut stone and stone products

329 Misc. Nonmetallic Mineral Products
- 3291 Abrasive products
- 3292 Asbestos products
- 3295 Minerals, ground or treated
- 3296 Mineral wool
- 3297 Nonclay refractories
- 3299 Nonmetallic mineral products, nec

33 PRIMARY METAL INDUSTRIES

331 Blast Furnace and Basic Steel Products
- 3312 Blast furnaces and steel mills
- 3313 Electrometallurgical products
- 3315 Steel wire and related products
- 3316 Cold finishing of steel shapes
- 3317 Steel pipe and tubes

332 Iron and Steel Foundries
- 3321 Gray and ductile iron foundries
- 3322 Malleable iron foundries
- 3324 Steel investment foundries
- 3325 Steel foundries, nec

333 Primary Nonferrous Metals
- 3331 Primary copper
- 3334 Primary aluminum
- 3339 Primary nonferrous metals, nec

334 Secondary Nonferrous Metals
- 3341 Secondary nonferrous metals

335 Nonferrous Rolling and Drawing
- 3351 Copper rolling and drawing
- 3353 Aluminum sheet, plate, and foil
- 3354 Aluminum extruded products
- 3355 Aluminum rolling and drawing, nec
- 3356 Nonferrous rolling and drawing, nec
- 3357 Nonferrous wiredrawing & insulating

336 Nonferrous Foundries (Castings)
- 3363 Aluminum die-castings
- 3364 Nonferrous die-casting exc. aluminum
- 3365 Aluminum foundries
- 3366 Copper foundries
- 3369 Nonferrous foundries, nec

339 Miscellaneous Primary Metal Products
- 3398 Metal heat treating
- 3399 Primary metal products, nec

34 FABRICATED METAL PRODUCTS

341 Metal Cans and Shipping Containers
- 3411 Metal cans
- 3412 Metal barrels, drums, and pails

342 Cutlery, Handtools, and Hardware
- 3421 Cutlery
- 3423 Hand and edge tools, nec
- 3425 Saw blades and handsaws
- 3429 Hardware, nec

343 Plumbing and Heating, Except Electric
- 3431 Metal sanitary ware
- 3432 Plumbing fixture fittings and trim
- 3433 Heating equipment, except electric

344 Fabricated Structural Metal Products
- 3441 Fabricated structural metal
- 3442 Metal doors, sash, and trim
- 3443 Fabricated plate work (boiler shops)
- 3444 Sheet metalwork

3446 Architectural metal work
3448 Prefabricated metal buildings
3449 Miscellaneous metal work
345 Screw Machine Products, Bolts, Etc.
3451 Screw machine products
3452 Bolts, nuts, rivets, and washers
346 Metal Forgings and Stampings
3462 Iron and steel forgings
3463 Nonferrous forgings
3465 Automotive stampings
3466 Crowns and closures
3469 Metal stampings, nec
347 Metal Services, NEC
3471 Plating and polishing
3479 Metal coating and allied services
348 Ordnance and Accessories, NEC
3482 Small arms ammunition
3483 Ammunition, exc. for small arms, nec
3484 Small arms
3489 Ordnance and accessories, nec
349 Misc. Fabricated Metal Products
3491 Industrial valves
3492 Fluid power valves & hose fittings
3493 Steel springs, except wire
3494 Valves and pipe fittings, nec
3495 Wire springs
3496 Misc. fabricated wire products
3497 Metal foil and leaf
3498 Fabricated pipe and fittings
3499 Fabricated metal products, nec

35 INDUSTRIAL MACHINERY AND EQUIPMENT
351 Engines and Turbines
3511 Turbines and turbine generator sets
3519 Internal combustion engines, nec
352 Farm and Garden Machinery
3523 Farm machinery and equipment
3524 Lawn and garden equipment
353 Construction and Related Machinery
3531 Construction machinery
3532 Mining machinery
3533 Oil and gas field machinery
3534 Elevators and moving stairways
3535 Conveyors and conveying equipment
3536 Hoists, cranes, and monorails
3537 Industrial trucks and tractors
354 Metalworking Machinery
3541 Machine tools, metal cutting types
3542 Machine tools, metal forming types
3543 Industrial patterns
3544 Special dies, tools, jigs & fixtures
3545 Machine tool accessories
3546 Power-driven handtools
3547 Rolling mill machinery
3548 Welding apparatus
3549 Metalworking machinery, nec

355 Special Industry Machinery
- 3552 Textile machinery
- 3553 Woodworking machinery
- 3554 Paper industries machinery
- 3555 Printing trades machinery
- 3556 Food products machinery
- 3559 Special industry machinery, nec

356 General Industrial Machinery
- 3561 Pumps and pumping equipment
- 3562 Ball and roller bearings
- 3563 Air and gas compressors
- 3564 Blowers and fans
- 3565 Packaging machinery
- 3566 Speed changers, drives, and gears
- 3567 Industrial furnaces and ovens
- 3568 Power transmission equipment, nec
- 3569 General industrial machinery, nec

357 Computer and Office Equipment
- 3571 Electronic computers
- 3572 Computer storage devices
- 3575 Computer terminals
- 3577 Computer peripheral equipment, nec
- 3578 Calculating and accounting equipment
- 3579 Office machines, nec

358 Refrigeration and Service Machinery
- 3581 Automatic vending machines
- 3582 Commercial laundry equipment
- 3585 Refrigeration and heating equipment
- 3586 Measuring and dispensing pumps
- 3589 Service industry machinery, nec

359 Industrial Machinery, NEC
- 3592 Carburetors, pistons, rings, valves
- 3593 Fluid power cylinders & actuators
- 3594 Fluid power pumps and motors
- 3596 Scales and balances, exc. laboratory
- 3599 Industrial machinery, nec

36 ELECTRONIC & OTHER ELECTRIC EQUIPMENT

361 Electric Distribution Equipment
- 3612 Transformers, except electronic
- 3613 Switchgear and switchboard apparatus

362 Electrical Industrial Apparatus
- 3621 Motors and generators
- 3624 Carbon and graphite products
- 3625 Relays and industrial controls
- 3629 Electrical industrial apparatus, nec

363 Household Appliances
- 3631 Household cooking equipment
- 3632 Household refrigerators and freezers
- 3633 Household laundry equipment
- 3634 Electric housewares and fans
- 3635 Household vacuum cleaners
- 3639 Household appliances, nec

364 Electric Lighting and Wiring Equipment
- 3641 Electric lamps
- 3643 Current-carrying wiring devices

3644 Noncurrent-carrying wiring devices
3645 Residential lighting fixtures
3646 Commercial lighting fixtures
3647 Vehicular lighting equipment
3648 Lighting equipment, nec
365 Household Audio and Video Equipment
3651 Household audio and video equipment
3652 Prerecorded records and tapes
366 Communications Equipment
3661 Telephone and telegraph apparatus
3663 Radio & TV communications equipment
3669 Communications equipment, nec
367 Electronic Components and Accessories
3671 Electron tubes
3672 Printed circuit boards
3674 Semiconductors and related devices
3675 Electronic capacitors
3676 Electronic resistors
3677 Electronic coils and transformers
3678 Electronic connectors
3679 Electronic components, nec
369 Misc. Electrical Equipment & Supplies
3691 Storage batteries
3692 Primary batteries, dry and wet
3694 Engine electrical equipment
3695 Magnetic and optical recording media
3699 Electrical equipment & supplies, nec

37 TRANSPORTATION EQUIPMENT

371 Motor Vehicles and Equipment
3711 Motor vehicles and car bodies
3713 Truck and bus bodies
3714 Motor vehicle parts and accessories
3715 Truck trailers
3716 Motor homes
372 Aircraft and Parts
3721 Aircraft
3724 Aircraft engines and engine parts
3728 Aircraft parts and equipment, nec
373 Ship and Boat Building and Repairing
3731 Ship building and repairing
3732 Boat building and repairing
374 Railroad Equipment
3743 Railroad equipment
375 Motorcycles, Bicycles, and Parts
3751 Motorcycles, bicycles, and parts
376 Guided Missiles, Space Vehicles, Parts
3761 Guided missiles and space vehicles
3764 Space propulsion units and parts
3769 Space vehicle equipment, nec
379 Miscellaneous Transportation Equipment
3792 Travel trailers and campers
3795 Tanks and tank components
3799 Transportation equipment, nec

38 INSTRUMENTS AND RELATED PRODUCTS

381 Search and Navigation Equipment
- 3812 Search and navigation equipment

382 Measuring and Controlling Devices
- 3821 Laboratory apparatus and furniture
- 3822 Environmental controls
- 3823 Process control instruments
- 3824 Fluid meters and counting devices
- 3825 Instruments to measure electricity
- 3826 Analytical instruments
- 3827 Optical instruments and lenses
- 3829 Measuring & controlling devices, nec

384 Medical Instruments and Supplies
- 3841 Surgical and medical instruments
- 3842 Surgical appliances and supplies
- 3843 Dental equipment and supplies
- 3844 X-ray apparatus and tubes
- 3845 Electromedical equipment

385 Ophthalmic Goods
- 3851 Ophthalmic goods

386 Photographic Equipment and Supplies
- 3861 Photographic equipment and supplies

387 Watches, Clocks, Watchcases & Parts
- 3873 Watches, clocks, watchcases & parts

39 MISCELLANEOUS MANUFACTURING INDUSTRIES

391 Jewelry, Silverware, and Plated Ware
- 3911 Jewelry, precious metal
- 3914 Silverware and plated ware
- 3915 Jewelers' materials & lapidary work

393 Musical Instruments
- 3931 Musical instruments

394 Toys and Sporting Goods
- 3942 Dolls and stuffed toys
- 3944 Games, toys, and children's vehicles
- 3949 Sporting and athletic goods, nec

395 Pens, Pencils, Office, & Art Supplies
- 3951 Pens and mechanical pencils
- 3952 Lead pencils and art goods
- 3953 Marking devices
- 3955 Carbon paper and inked ribbons

396 Costume Jewelry and Notions
- 3961 Costume jewelry
- 3965 Fasteners, buttons, needles, & pins

399 Miscellaneous Manufactures
- 3991 Brooms and brushes
- 3993 Signs and advertising specialities
- 3995 Burial caskets
- 3996 Hard surface floor coverings, nec
- 3999 Manufacturing industries, nec

Table A.2 Chemical Releases and Transfers by Species and by Release to Media in the Border Area by Year, 1988-1992.

(Amounts in pounds)

Chemical	Media	1988	1989	1990	1991	1992
Unspecified	Air	5200	0	605	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	500	0	6359	0	0
1,1,1-Trichloroethane	Air	2730010	3005179	2302373	1917712	2147568
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	4000	3489	8473	550	1075
	POWT	11774	8402	6935	10	17
	Other	98926	78677	138899	86834	40649
1,1,2-Trichloroethane	Air	4500	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	750	0	0	0	0
	Other	1000	0	0	0	0
1,2,4-Trimethylbenzene	Air	7450	17250	5753	6540	13076
	Water	0	0	0	0	0
	UnderG'd	0	0	0	19	19
	Land	1250	750	750	1061	1160
	POWT	5400	1500	7048	7650	750
	Other	0	250	5311	535	550
1,2-Dibromoethane	Air	0	500	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
1,2-Dichlorobenzene	Air	0	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	1000	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
1,2-Dichloroethane	Air	250	500	260	69	319
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	250	250	250	22	22

Chemical	Media	1988	1989	1990	1991	1992
	Other	0	0	0	0	6400
1,3-Butadiene	Air	1000	500	500	790	510
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
1,4-Dichlorobenzene	Air	0	0	10	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
1,4-Dioxane	Air	38669	32262	17614	8317	11580
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	125113	183193	123877	192547	204024
	Other	217	296	483	0	854
2-Ethoxyethanol	Air	22828	16589	10	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	18431	250	0	0	0
2-Methoxyethanol	Air	500	500	510	0	10
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	250	0	0
	POWT	0	0	5	0	5
	Other	0	0	0	0	0
Acetone	Air	352044	348740	470359	378118	335742
	Water	0	0	0	6575	0
	UnderG'd	0	0	0	0	0
	Land	0	1500	0	0	0
	POWT	45282	74049	80011	104187	106704
	Other	13265	18409	24299	10643	13975
Acrylamide	Air	0	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	250	0	0	0	0
Aluminum (Fume Or Dust)	Air	250	0	0	2000	0
	Water	0	0	0	0	0

Chemical	Media	1988	1989	1990	1991	1992
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Ammonia	Air	288050	303861	710168	580712	558188
	Water	20	25	5	0	0
	UnderG'd	20	25	5	0	0
	Land	23175	465	8670	8255	7645
	POWT	57669	103858	284304	120220	91401
	Other	310	91	3565	6168	177384
Ammonium Nitrate (Solution)	Air	0	0	0	250	255
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	250	750	2600	4800	6900
	POWT	0	0	0	45000	55000
	Other	0	0	0	0	0
Ammonium Sulfate (Solution)	Air	500	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	250	0	0	0	0
	POWT	153377	173588	172223	174100	100787
	Other	0	0	0	0	0
Antimony	Air	0	16750	14750	11250	11165
	Water	0	250	250	5	5
	UnderG'd	0	0	0	0	0
	Land	0	250	250	5	0
	POWT	0	0	0	0	0
	Other	250	250	0	0	750
Antimony Compounds	Air	4500	5235	5	5	5
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	500	500	0	0	0
	POWT	1700	1700	0	0	0
	Other	0	0	0	0	0
Arsenic	Air	0	50000	0	255	250
	Water	0	0	0	5	5
	UnderG'd	0	0	0	0	0
	Land	0	750	0	0	0
	POWT	0	750	0	0	0
	Other	0	0	0	0	356
Arsenic Compounds	Air	46300	0	47400	47400	55500
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0

Chemical	Media	1988	1989	1990	1991	1992
	Land	1000	0	500	500	500
	POWT	750	0	750	750	5
	Other	0	0	0	0	0
Asbestos (Friable)	Air	0	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	12000	0	0	0	0
	POWT	0	0	0	0	0
	Other	12000	0	0	0	0
Barium	Air	250	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	564000	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Barium Compounds	Air	1367	4350	2452	1500	250
	Water	250	250	250	250	0
	UnderG'd	0	0	0	0	0
	Land	133700	876249	1558000	749780	895763
	POWT	0	0	10	62	250
	Other	0	500	144142	134933	16582
Benzene	Air	35835	48835	26660	18115	21790
	Water	0	0	0	0	0
	UnderG'd	0	0	0	19	19
	Land	1250	1000	750	945	606
	POWT	6150	6350	9198	7650	1250
	Other	250	1000	3500	551	44
Beryllium Compounds	Air	1	1	1	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	3	1	1	0	0
	Other	6933	4270	470	2001	3920
Bromomethane	Air	44578	49525	44100	30000	43000
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
C,I, Solvent Yellow 3	Air	0	0	0	0	0
	Water	0	0	5	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	5	0	0
	Other	0	0	0	0	0

Chemical	Media	1988	1989	1990	1991	1992
C.I.Food Red 15	Air	0	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	2	0
Cadmium	Air	0	9000	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	1000	0	0	0
	POWT	0	250	0	0	0
	Other	0	0	0	0	0
Cadmium Compounds	Air	8500	0	8500	11700	11100
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	1000	0	1000	1000	1000
	POWT	250	0	250	250	5
	Other	0	0	0	620000	6000
Captan	Air	0	0	6	1	5
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Carbon Disulfide	Air	0	0	10	255	1507
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	5	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Carbonyl Sulfide	Air	0	0	26000	26000	26000
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Chlorine	Air	90537	29053	26600	16355	3130
	Water	8496	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	26460	0	5	5	750
	POWT	92	805	5	35	65
	Other	0	0	0	0	0
Chlorine Dioxide	Air	500	500	510	500	500
	Water	0	0	5	0	0
	UnderG'd	0	0	5	0	0

Chemical	Media	1988	1989	1990	1991	1992
	Land	0	0	5	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Chloroform	Air	5450	8282	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	1400	0	0	0	0
Chlorothalonil	Air	0	0	0	34	250
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Chromium	Air	1026	1028	762	741	470
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	12735	0	0	144	109
	POWT	1268	639	1468	767	6
	Other	12790	17128	63415	65821	8054
Chromium Compounds	Air	2530	2000	15	560	508
	Water	0	0	0	1	0
	UnderG'd	0	0	0	0	0
	Land	6274	6800	4700	3189	0
	POWT	250	250	425	192	269
	Other	69132	180661	132820	137912	187007
Cobalt	Air	0	0	10	255	255
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	1300	474	82
Copper	Air	3500	3790	2602	303672	421964
	Water	250	500	10	15	0
	UnderG'd	0	0	0	0	0
	Land	500	750	250	0	0
	POWT	500	1440	520	783	1252
	Other	666349	1250	12107	66866	304414
Copper Compounds	Air	531725	558950	549100	476756	528842
	Water	0	250	0	751	5
	UnderG'd	0	0	0	0	0
	Land	15990425	16986177	20682460	20931973	17513127
	POWT	1227	250	801	1494	1326
	Other	750	3009	2773	3629	392463

Chemical	Media	1988	1989	1990	1991	1992
Cresol (Mixed Isomers)	Air	0	0	3204	7980	3843
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	2460	8668	321
Cumene	Air	0	0	0	0	160
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Cyanide Compounds	Air	0	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	163	105	30	35	0
	Other	0	0	0	18	0
Cyclohexane	Air	7900	14000	4610	4180	5840
	Water	0	0	0	0	0
	UnderG'd	0	0	0	8	8
	Land	500	750	500	355	176
	POWT	5400	1500	6700	6900	0
	Other	250	250	250	185	40
Decabromodiphenyl Oxide	Air	0	0	0	250	250
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	1200
Di(2-Ethylhexyl) Phthalate	Air	0	750	1300	750	1497
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Di(2-Ethylhexyl) Phthalate	Air	1780	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Dibutyl Phthalate	Air	0	0	10	251	250
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0

Chemical	Media	1988	1989	1990	1991	1992
	Land	0	30	0	0	0
	POWT	0	0	5	0	0
	Other	0	60	0	3	3
Dichlorodifluoromethane (Cfc-12)	Air	0	0	0	177808	178445
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Dichloromethane	Air	1156906	1141952	925615	443004	221173
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	1489	0	0	0	0
	POWT	250	250	0	0	0
	Other	50282	54924	46155	172719	31851
Dicofol	Air	0	0	0	1	5
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	4400	0	0	0	0
Diethanolamine	Air	1000	1000	755	1205	235
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	500	500	255	1205	18
	POWT	500	500	255	500	500
	Other	0	99591	44	13000	90080
Ethyl Chloroformate	Air	0	0	0	7	931
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Ethylbenzene	Air	19049	21609	11191	15616	8580
	Water	0	0	0	0	0
	UnderG'd	0	0	0	16	16
	Land	1000	1000	750	758	999
	POWT	7550	9840	9348	10050	789
	Other	250	1000	7391	4656	298
Ethylene	Air	31000	22000	17700	13800	11600
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0

Chemical	Media	1988	1989	1990	1991	1992
	Other	0	0	0	0	0
Ethylene Glycol	Air	2500	1750	4010	1000	5
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	750	750	12000	5
	Other	20850	0	0	5600	7475
Ethylene Oxide	Air	49906	48028	30328	4338	2840
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Formaldehyde	Air	1072	26690	265	250	130005
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	13114	11672	7778	1470	1924
	Other	0	0	0	0	0
Freon 113	Air	982066	1041042	901505	824181	573124
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	8970	3170
	POWT	11587	7435	5	0	0
	Other	52049	32159	38841	565	7589
Glycol Ethers	Air	57500	63713	61377	43794	19278
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	474	736	805
	Other	0	58	815	3020	3284
Hydrochloric Acid	Air	10418	12386	25867	33270	18320
	Water	0	0	10	0	1
	UnderG'd	0	0	5	0	0
	Land	40000	0	27	6100	3600
	POWT	71524	3104	7800	1510	260
	Other	0	3201	4200	14888	6585
Hydrogen Fluoride	Air	13959	4045	3058	13303	2327
	Water	0	0	5	2	2
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	11837	22367	5320	5	5
	Other	31739	87303	0	0	13750
Isopropyl Alcohol	Air	0	1561	1000	2401	2835
	Water	0	0	0	0	0

Chemical	Media	1988	1989	1990	1991	1992
	UnderG'd	0	0	0	0	0
	Land	0	0	0	51	330
	POWT	0	0	0	0	0
	Other	0	0	0	0	1630
Lead	Air	2000	48300	1028	1275	1557
	Water	0	0	0	10	5
	UnderG'd	0	0	0	0	0
	Land	932	5150	550	0	0
	POWT	750	2074	77	40	0
	Other	7863	31729	5355	43304	28788
Lead Compounds	Air	49020	0	42410	42630	41180
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	1064530	854	1350	1540	3654
	POWT	2001	290	1748	1771	34
	Other	51402	10417	232628	355589	181451
Maleic Anhydride	Air	0	250	5	10	10
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Manganese	Air	0	750	101	250	1230
	Water	0	0	0	10	0
	UnderG'd	0	0	0	0	0
	Land	0	500	0	0	0
	POWT	0	1400	0	0	0
	Other	0	0	0	0	39
Manganese Compounds	Air	510	10	10	5	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	500	0	0	0	0
	POWT	11400	39113	6455	500	0
	Other	4510	19556	12909	10000	0
Methanol	Air	237854	122417	99726	175836	89223
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	87794	150081	193587	46322	35968
	Other	3150	7924	3900	0	0
Methyl Ethyl Ketone	Air	210375	182688	131107	126878	125726
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	1186	0	0	0	0
	POWT	0	0	0	0	0

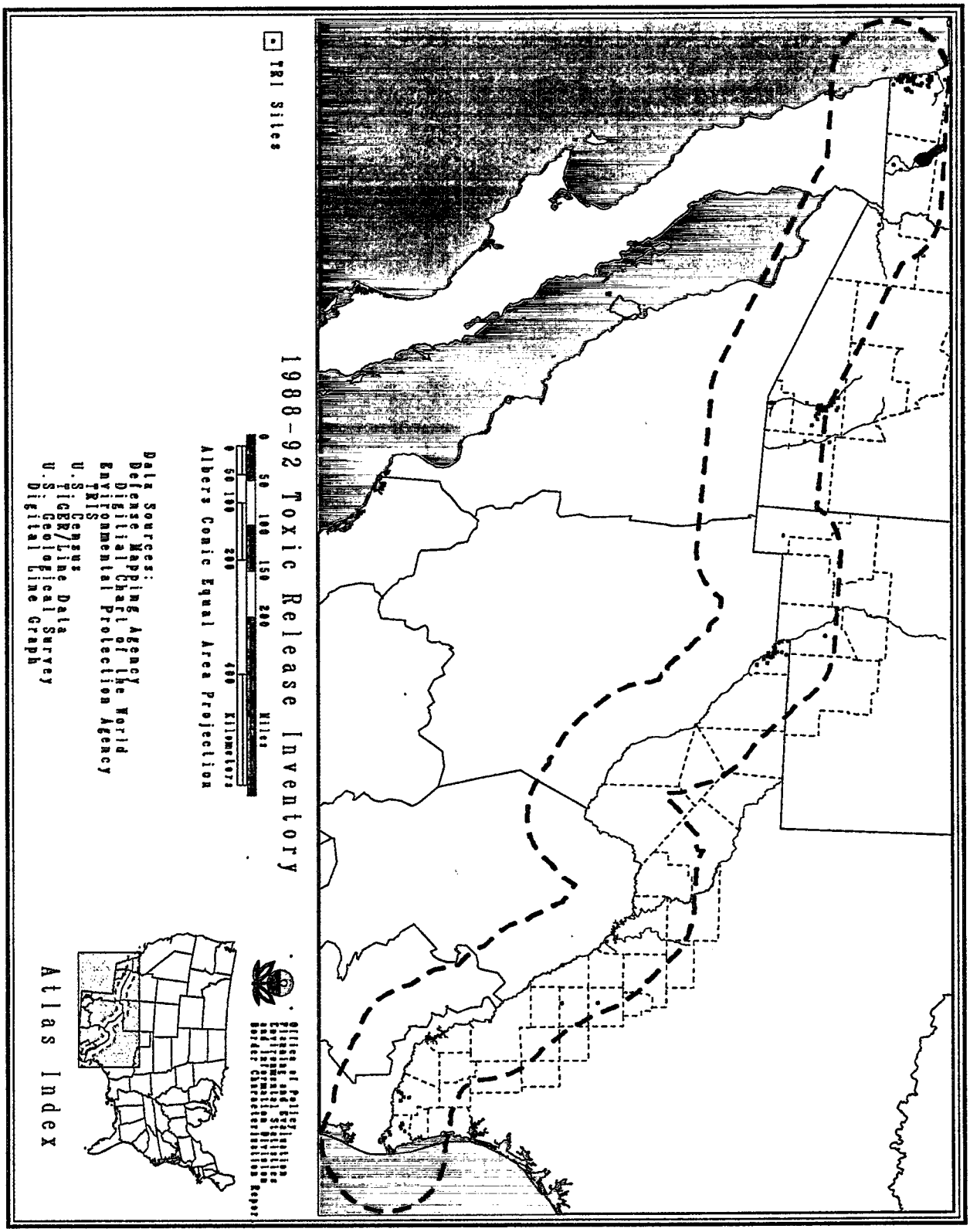
Chemical	Media	1988	1989	1990	1991	1992
	Other	33904	87860	12129	11898	2616
Methyl Isobutyl Ketone	Air	97988	109127	88717	63173	48262
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	14	500	5	5
	Other	251	41292	54924	50925	6600
Methyl Methacrylate	Air	0	0	10	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Methyl Tert-Butyl Ether	Air	0	1250	3000	2400	3000
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	250	250	1500	250
	POWT	0	250	192	250	250
	Other	0	0	0	0	0
Methylenebis (Phenylisocyanate)	Air	0	250	0	5051	60
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
N-Butyl Alcohol	Air	33252	90862	78853	53724	46524
	Water	0	250	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	250	0	12	0
	POWT	0	0	0	0	0
	Other	250	0	250	750	20000
Naphthalene	Air	3700	11250	2550	2362	2124
	Water	0	0	0	0	0
	UnderG'd	0	0	0	3	3
	Land	1250	3400	1000	249	47
	POWT	250	750	250	620	70
	Other	250	250	250	652	89
Nickel	Air	0	1250	1007	1055	442
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	500	0	47	36
	POWT	250	250	0	21	271
	Other	250	5600	15270	10703	1243

Chemical	Media	1988	1989	1990	1991	1992
Nickel Compounds	Air	500	0	502	507	1006
	Water	0	0	0	1	0
	UnderG'd	0	0	0	0	0
	Land	500	0	3055	500	500
	POWT	567	695	906	840	495
	Other	0	250	500	11278	20801
Nitric Acid	Air	25998	9922	53259	51462	26216
	Water	0	0	5	2	2
	UnderG'd	0	0	5	0	0
	Land	159903	750	320	1500	18970
	POWT	104715	256	74907	22010	260
	Other	33226	46333	130224	190622	82546
O-Xylene	Air	0	0	26	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Parathion	Air	0	0	21	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	1300	0	0	0	0
Phenol	Air	0	250	6024	9817	9671
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	250	250	250	0
	POWT	0	40000	32671	40000	45000
	Other	0	0	7611	18706	263
Phosphoric Acid	Air	264	1000	270	5	10
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	29944	19146	6037	2104	1204
	Other	3296	0	35331	0	0
Polychlorinated Biphenyls	Air	0	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	79020	7762	0	0	0
Propylene	Air	47000	69000	39400	27400	13200
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0

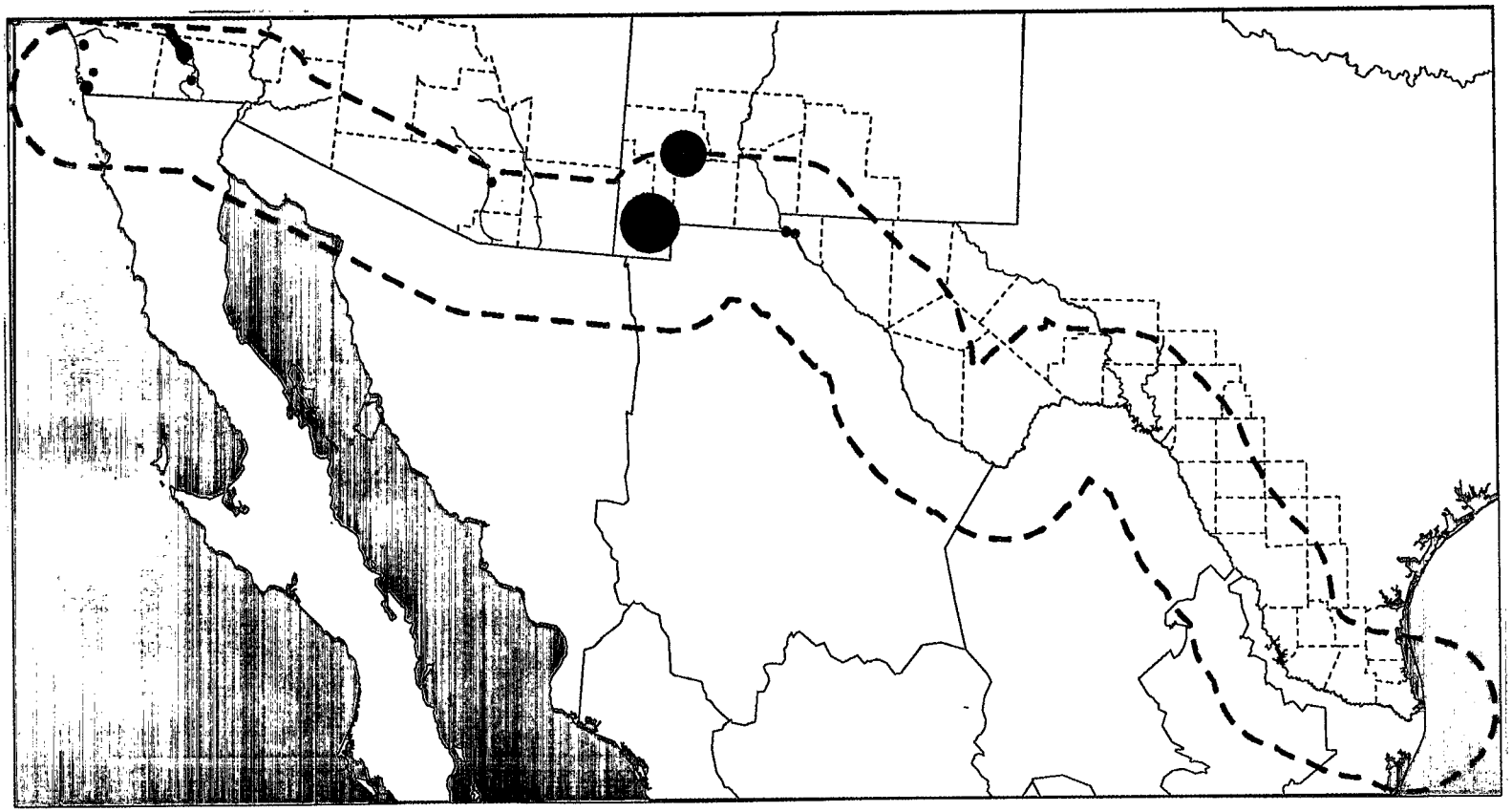
Chemical	Media	1988	1989	1990	1991	1992
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Propylene Oxide	Air	814800	572000	30786	33680	81403
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Sec-Butyl Alcohol	Air	0	0	5850	250	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Selenium	Air	0	1950	0	74	56
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	500	0	0	0
	POWT	0	250	0	0	0
	Other	0	0	0	0	0
Styrene	Air	206442	141216	127202	35226	35254
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	750	1950	857	32	731
Sulfuric Acid	Air	645796	575336	773952	791547	699028
	Water	7350	0	5	0	0
	UnderG'd	0	0	0	0	0
	Land	11775	1500	44100	17805	12920
	POWT	326311	56637	128350	12273	5104
	Other	15904	28786	3837973	12779319	11597885
Tert-Butyl Alcohol	Air	0	0	0	250	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Tetrachloroethylene	Air	552098	170869	234108	163044	87227
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	2000	0	1839

Chemical	Media	1988	1989	1990	1991	1992
Thallium	Air	0	500	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	500	0	0	0
	POWT	0	250	0	0	0
	Other	0	0	0	0	0
Thallium Compounds	Air	0	0	255	255	255
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	255	255	255
	POWT	0	0	5	5	5
	Other	0	0	0	0	11600
Thiourea	Air	4	3	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	864	635	0	0	0
	Other	0	0	0	0	0
Toluene	Air	468581	326862	289667	201982	146332
	Water	0	250	0	0	0
	UnderG'd	0	0	0	81	81
	Land	2550	1251	1700	2540	2920
	POWT	8350	28710	11130	11800	2990
	Other	20256	6601	12655	2263	416
Toluene Diisocyanate	Air	0	0	89	327	336
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Toluene-2,4-Diisocyanate	Air	264	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Toluene-2,6-Diisocyanate	Air	253	0	0	0	0
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Trichloroethylene	Air	297079	342628	125975	156370	88000
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0

Chemical	Media	1988	1989	1990	1991	1992
	Land	0	0	0	0	0
	POWT	0	4	5	0	0
	Other	22789	38674	17834	20656	10246
Trichlorofluoromethane (Cfc-11)	Air	0	0	0	256100	176253
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	0	0	0	0
Trifluralin	Air	0	0	37	62	250
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	0	0	0	0
	Other	0	1849	0	0	0
Xylene (Mixed Isomers)	Air	189901	229220	211241	105035	143023
	Water	0	250	0	0	0
	UnderG'd	0	0	0	69	69
	Land	1500	1250	1250	1590	3004
	POWT	4150	22880	5930	6800	3290
	Other	27118	3985	27324	16927	3104
Zinc (Fume Or Dust)	Air	4100	250	250	4949	4811
	Water	0	0	0	0	0
	UnderG'd	0	0	0	0	0
	Land	0	0	0	0	0
	POWT	0	640	0	0	0
	Other	3900	37102	0	0	14000
Zinc Compounds	Air	62415	66000	81785	80912	44940
	Water	0	0	0	5	250
	UnderG'd	0	0	0	0	0
	Land	11008900	9727500	7908500	8064012	5600
	POWT	2853	2800	2897	2862	283
	Other	11733	0	56086	80979	69143



Map 13. All TRI Facility Locations from 1988-1992



Map 14. 1992 Top Ten Reporting Facilities

Facility	City/State	Amount (lbs)	%Total	% Cum.
Phelps Dodge Mining Co.	Playas, NM	11,792,355	45.75	45.75
Chino Mines Co.	Hurley, NM	7,478,832	29.01	74.76
Rohr Inc.	Chula Vista, CA	694,968	2.70	77.46
Asarco Inc.	El Paso, TX	485,215	1.89	79.34
Phelps Dodge Refining Corp.	El Paso, TX	420,056	1.63	80.97
USAF Plant No. 44	Tuscon, AZ	396,805	1.54	82.51
Signet Armorlite Inc	San Marcos, CA	384,548	1.49	84.00
Holly Sugar Corp.	Brawlet, CA	384,005	1.49	85.49
Chevron Corp. El Paso	El Paso, TX	350,300	1.36	86.85
Pilkington Barnes Hind	San Diego, CA	302,300	1.17	88.02
Remainder		3,088,081	11.98	100.00
Total		25,777,465	100.00	100.00

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