United States
Environmental Protection
Agency

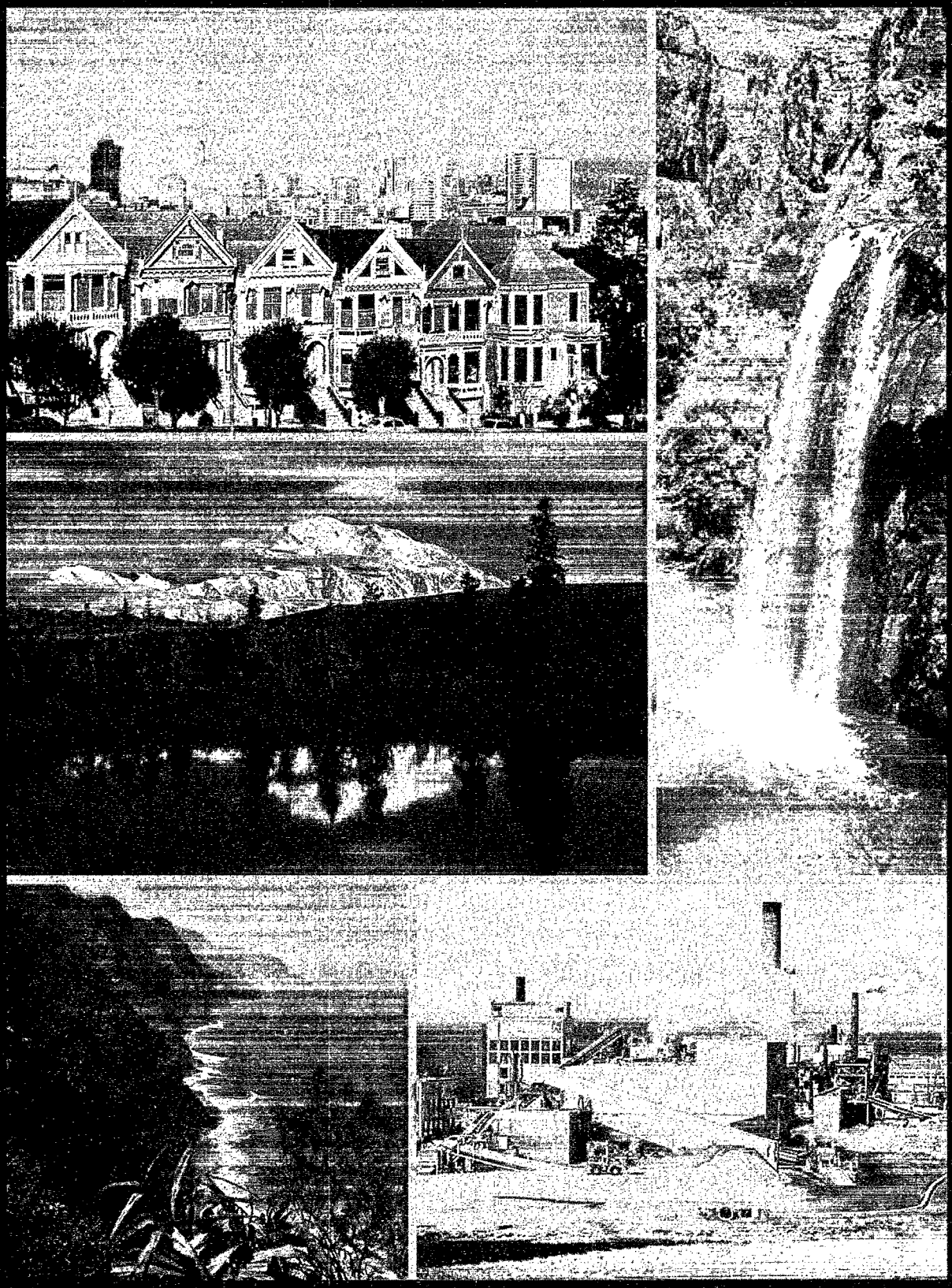
Office of Pollution
Prevention and Toxics
(7408)

EPA 745-R-96-002
June 1996

EPA

1994 Toxics Release Inventory

Public Data Release



PUBLIC ACCESS TO THE TOXICS RELEASE INVENTORY

TRI Reports and Data Products

Product		Supplier	Contact Information	Order Information
1994 TRI Executive Summary		U.S. EPA EPCRA Hotline	(800) 535-0202 Fax Document Requests Only: (703) 412-3333	EPA 745/S-96-001 (**Free**)
1994 TRI Public Data Release (annual report)				EPA 745/R-96-002 (**Free**)
1994 State Fact Sheets				EPA 745/F-96-001 (**Free**)
1987-1993 TRI CD-ROM		U.S. GPO	(202) 512-1800	S/N 055-000-00508-7 ($38)
		NTIS	(703) 487-4650	PB 95503793 ($45)
1994 State Data Files	dBASE Lotus	U.S. GPO	(202) 512-1530	$15-$17 / state Up to 67 disks for all states
1994 Federal Facilities Disk	dBASE Lotus	U.S. GPO	(202) 512-1530	$15-17. Call for quote.
TRI Information Kit		NCEPI	(513) 489-8180 Fax: (513) 489-8190	EPA 749-F-94-002 (**Free**)

Note: The 1987-1994 CD-ROM, containing the latest available data, will be published in August 1996.

Accessing TRI Data Online

Data from Online Providers	Internet Address	Special Notes
Right to Know Network (RTKNET) – Provides public access to TRI and related environmental data bases to community groups concerned about toxics. For more information, call (202) 797-7200.	ftp://ftp.rtknet.org gopher://gopher.rtknet.org http://www.rtk.net	Set computer parameters to 8,N,1 and log in as "public." No charge for Internet access. Direct access by modem at (202) 234-8570; phone charge may apply.
National Library of Medicine (NLM) – Offers state of the art, user friendly searching of complete TRI data base. For more information, call (301) 496-6531.	toxnet.nlm.nih.gov	$18-$20 per hour charge. Password required.
U.S. EPA Internet Server – Access a variety of reports, data files, and TRI information from EPA. For more information, call TRI-US at (202) 260-1531.	ftp://ftp.epa.gov gopher://gopher.epa.gov http://www.epa.gov	\pub\gopher\TRI_Chem EPA/OPPTS/TS/TRI

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Washington, DC 20460

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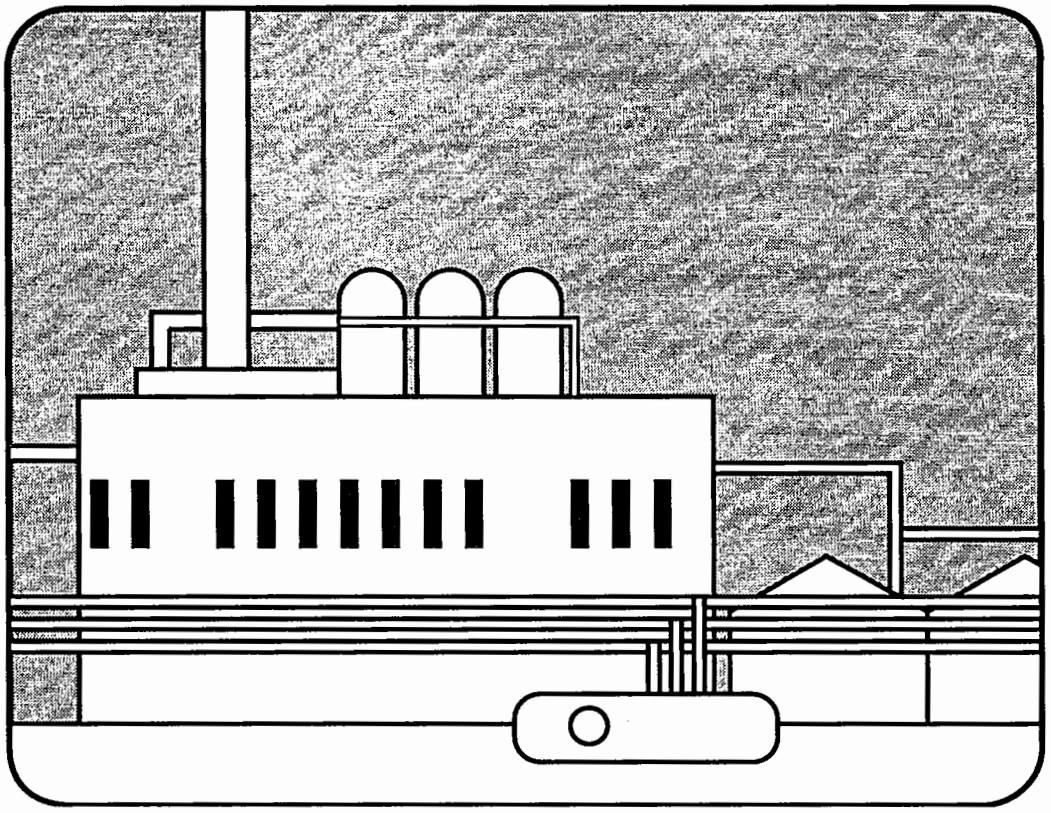
Introduction



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1994 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE:

INTRODUCTION

WHAT IS THE TOXICS RELEASE INVENTORY?

The Toxics Release Inventory, or TRI, is a publicly available database that contains specific toxic chemical release and transfer information from manufacturing facilities throughout the United States. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), which Congress passed to promote planning for chemical emergencies and to provide information to the public about the presence and release of toxic and hazardous chemicals in their communities.

Following passage of the Pollution Prevention Act of 1990, the TRI was expanded to include mandatory reporting of additional waste management and pollution prevention activities. The information collected under these laws can be used by the public to identify facilities and chemical release patterns that warrant further study and analysis. Combined with hazard and exposure information, TRI has proven to be an invaluable tool for risk identification.

Each year, manufacturing facilities meeting certain thresholds must report their estimated releases and transfers of listed toxic chemicals to the U.S. Environmental Protection Agency and to the state or tribal entity in whose jurisdiction the facility is located. The TRI list for 1994 included 343 chemicals and 22 chemical categories. A separate report, called a Form R, is required for each chemical the facility has manufactured, processed, or otherwise used in amounts exceeding the thresholds.

Reports for each calendar year are due by July 1 of the following year. After completion of data entry and data quality assurance activities, EPA makes the data available to the public in printed reports, in a computer database, and through a variety of other information products. States also make available to the public copies of the forms filed by facilities in their jurisdiction.

This document summarizes data collected for calendar year 1994. Industry reporting forms for 1994 were due to EPA and the states by July 1, 1995. This document also provides basic data for the two preceding years (1992 and 1993) and for the baseline year (1988) for comparison purposes. Although the first data were collected for calendar year 1987, 1988 has been selected as the baseline year because of concerns about the data quality of industry's first-year submissions. The on-line computer database and the CD-ROM version of the database contain the data collected for all years, including years not summarized in this report.

WHO MUST REPORT?

Manufacturing facilities that have the equivalent of 10 or more full-time employees and meet the established thresholds for manufacturing, processing, or otherwise using listed chemicals must report their releases and transfers. Manufacturing facilities are defined as facilities in Standard Industrial Classification primary codes 20-39, which include, among others: chemicals, petroleum refining, primary metals, fabricated metals, paper, plastics, and transportation equipment. Thresholds for manufacturing and processing are currently 25,000 pounds for each listed chemical, while the threshold for otherwise using is 10,000 pounds per chemical. Beginning with the 1995 reporting year, certain facilities will be able to take advantage of an alternate reporting threshold.

WHAT MUST BE REPORTED?

Each year, facilities report to TRI the amounts of toxic chemicals released to the air, water and land and the amounts of chemicals transferred off-site for treatment and disposal. Facilities provide extensive identifying information, such as name, location, type of business, contact names, name of parent company, and environmental permit numbers. They also provide information about the manufacture, process, and use of the listed chemical at the facility and the maximum amount of the chemical on-site during the year. Facilities also provide information about methods used to treat waste at the site and the efficiencies of those treatment methods. In addition to information about the amount of toxic chemicals sent off-site, facilities also must specify the destinations of those transfers.

Beginning with the 1991 reports, facilities were required to provide additional information about source reduction activities and about waste management activities such as recycling. Companies must also provide a production index that can help relate changes in reported quantities of toxic chemicals in waste to changes in production. These additional data elements facilitate tracking of industry progress in reducing waste generation and moving towards safer management alternatives. While not an absolute measure of pollution prevention, the additional data provide new insight into the complete toxics cycle.

WHAT ARE THE BENEFITS AND USES OF THE DATA?

The TRI program gives the public unprecedented direct access to toxic chemical release and transfer data at the local, state, regional, and national level. Responsible use of this information can allow the public to identify potential concerns, gain a better understanding of potential risks, and work with industry and government to reduce toxic chemical releases and the risks associated with them. When combined with hazard and exposure data, this information can allow informed environmental priority setting at the local level.

Federal, state, and local governments can use the data to compare facilities or geographic areas, to identify hotspots, to evaluate existing environmental programs, to more effectively set regulatory priorities, and to track pollution control and waste reduction progress. TRI data, in conjunction with demographic data, can help governments and the public identify potential environmental justice concerns.

Industry can use the data to obtain an overview of use and release of toxic chemicals, to identify and reduce costs associated with toxic waste, to identify promising areas of pollution prevention, to establish reduction targets, and to measure and document progress toward reduction goals. The public availability of the data has prompted many facilities to work with their communities

to develop effective strategies for reducing environmental and human health risks posed by toxic chemical releases.

WHAT ARE THE LIMITATIONS OF THE DATA?

While the TRI includes more than 75,000 reports from about 23,000 facilities each year, it captures only a portion of all toxic chemical releases nationwide. Facilities with fewer than 10 employees and facilities that do not meet chemical thresholds are not required to file TRI reports. Non-manufacturing facilities currently are not required to report, although EPA is examining industry groups for possible addition to the reporting requirements. TRI does not account for toxic emissions from automobiles and many other non-industrial sources. Not all toxic chemicals are listed under TRI, although chemical coverage was greatly expanded for the 1995 reporting year.

TRI requires the reporting of estimated data and does not mandate that facilities monitor their releases. Various estimation techniques are used where monitoring data are not available, and EPA has published estimation guidance for the regulated community. Variations between facilities can result from the use of different estimation methodologies. Some facilities may not be fully complying with the reporting requirements. These factors should be taken into account when considering data accuracy and completeness.

As discussed above, the TRI data summarized in this report reflect chemical releases, transfers, and waste management activities that occurred in the 1994 calendar year. Release and transfer patterns can change dramatically from one year to the next, so it is important to recognize that current facility activities may be different than those reported for 1994.

TRI reports reflect releases of chemicals, not exposures of the public to those chemicals. Release estimates alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment. Although additional information is necessary to assess exposure and risk, TRI data can be used to identify areas of potential concern.

PROGRAM ACCOMPLISHMENTS AND FUTURE DIRECTIONS

EPA faced considerable challenges to the TRI program in 1995. Budget uncertainties and two separate Federal government shutdowns resulted in significant delays for many program efforts. The TRI program faced more specific challenges in 1995 in the form of proposed legislation and multiple lawsuits which, if successful, would have resulted in the deletion of a significant number of EPCRA section 313 chemicals. Four separate industry lawsuits were filed in 1995 challenging various portions of the 1994 rule which added 286 chemicals and chemical categories to the EPCRA section 313 toxic chemical list. On April 30, 1996, the four lawsuits were defeated on all counts.

On August 8, 1995, President Clinton, Vice President Gore, and Administrator Browner traveled to Baltimore to announce the signing of Executive Order 12969 on Federal Acquisition and Community Right-to-Know. This Executive Order requires Federal contractors whose facilities are currently covered under EPCRA section 313 to continue to file TRI reporting forms for the life of their contracts. The President also signed a directive to the Administrator to expedite two major initiatives: consideration of the rulemaking for adding to the list of currently covered facilities, and development and implementation of an expedited, open, and transparent process for considering reporting of chemical use information.

Both of these efforts have been high priorities for EPA, and the President's emphasis heightened efforts to move these two projects forward. Throughout 1995, EPA continued its industry expansion effort by refining its analysis of new industries under consideration for addition to the reporting requirements. EPA also continued to conduct a dialogue with interested parties, including a public meeting in May, and numerous meetings with industry representatives and environmental, community, and labor organizations. EPA is focused on operations within mining, oil and gas exploration and production, electric utilities, waste management, bulk terminals, solvent recovery, and other industries which manufacture, process, or otherwise use TRI chemicals. EPA remains committed to this dialogue, and is moving forward with a proposed rulemaking in 1996.

Phase III Expansion, the effort where EPA is considering adding chemical use information to TRI, does not yet have a schedule for developing a proposed rulemaking. A report to the President was submitted in early October laying out issues involved in this effort, and two public meetings have been held (one in 1994) to solicit views from industry and other members of the public. EPA is currently examining the comments received on a second issues paper, and will be looking further at the experience of state programs which collect chemical use information. Continued dialogue with industry and other interested parties is anticipated in 1996, as EPA weighs the value and benefits of this type of data for TRI.

EPA also continued to look for ways to further reduce TRI's burden on industry. An evaluation of each of the original chemicals on the TRI list against the statutory listing criteria will be completed in 1996. This analysis will potentially result in the removal of chemicals from the section 313 list which do not meet the listing criteria. EPA also deleted or modified three chemicals and chemical categories on the section 313 list in 1995, and more petition actions are likely in 1996.

EPA anticipates developing regulatory definitions and guidance to implement the Pollution Prevention Act of 1990. The regulated community has reported on waste quantities managed since 1991. EPA will now provide definitions and a standard method for performing the waste calculations necessary for completing the Form R. This effort will greatly improve the utility of the currently collected data.

HOW CAN I OBTAIN ADDITIONAL TRI INFORMATION?

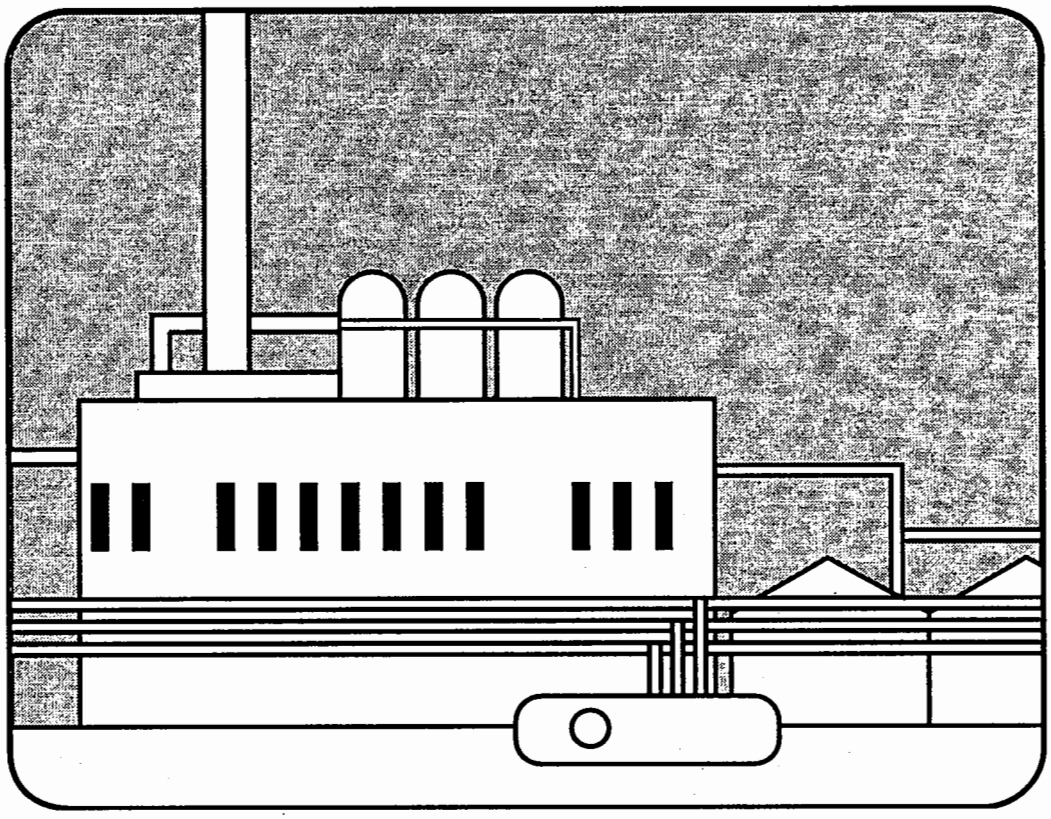
This report contains 1994 TRI data and limited comparison data for 1988, 1992 and 1993. The TRI data are available in an on-line computer database and in a variety of common computer and hard copy formats, to ensure that everyone can easily use the information. Information about accessing the TRI database is provided on the inside front cover of this book, as well as in Appendix B. The TRI User Support Service (202-260-1531) can provide assistance in accessing and using the TRI data.

To request copies of TRI and EPCRA documents or to obtain further information about the program, contact the toll-free Emergency Planning and Community Right-to-Know Information Hotline at 1-800-535-0202.

Other potential sources of TRI information include the state EPCRA section 313 contact, the EPA Regional Office, or the facility itself. Information about EPA Regional and state EPCRA section 313 contacts is found in Appendix G.

Chapter 1

1994 TRI Releases and Transfers



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1994 TRI RELEASES AND TRANSFERS

INTRODUCTION

This chapter provides information reported by facilities for calendar year 1994 on releases of toxic chemicals at the facility and transfers of chemicals in waste to off-site locations for further processing or disposal. This chapter begins with an overview of the 1994 national TRI release and transfer data and then provides more detailed analysis broken down by state, by industry, and by chemical. Comparisons of the 1994 data to data from previous years are provided in Chapter 3 of this report. Data reported by federal government facilities are examined in more detail in Chapter 5 of this report.

Figure 1-1 illustrates the media to which on-site releases can occur and the types of off-site transfers for waste management that are reportable to TRI. Box 1-1 is a description of the on-site releases reportable to TRI and the types of activities that may contribute releases to various media. Box 1-2 is a listing of those off-site transfers for waste management or further processing that are reportable to TRI and are covered in this chapter.

WHAT TO CONSIDER WHEN USING TRI DATA

Users of TRI information should be aware that the TRI data reflect releases and transfers of chemicals, not exposures of the public to those chemicals. The TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and transfers of toxic chemicals. The evaluation of exposures to these chemicals is one factor in determining potential risks. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical after it is released, and the human or other populations which are exposed to the chemical after its release. The following are some of the factors that should be considered when reviewing TRI data:

Toxicity of the Chemical

The TRI list consists of chemicals that vary widely in their ability to produce toxic effects.

- Some high-volume releases of less toxic chemicals may appear to be a more serious problem than lower-volume releases of highly toxic chemicals, when just the opposite may be true.

- For example, phosgene is toxic in smaller quantities than methanol, and a comparison between these two chemicals for setting hazard priorities or estimating potential health concerns may be misleading on the basis of volume released alone.

Exposure Considerations

- Potential degradation or persistence of the chemical in the environment.

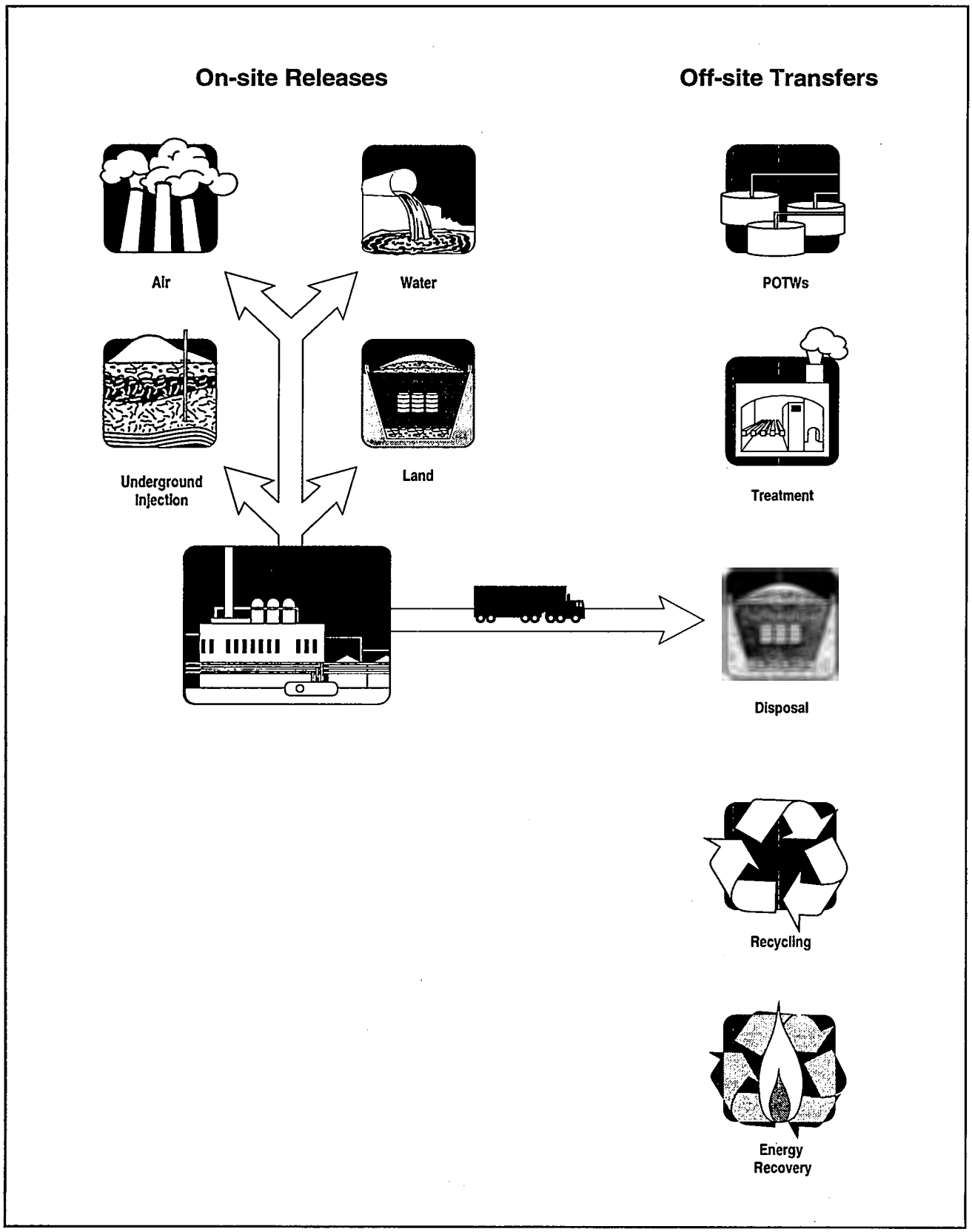

Figure 1-1. On-site Releases and Off-site Transfers Reported to TRI.

An Explanation of Releases

Releases. A release is an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells. Releases are reported to TRI by media type. The left side of Figure 1-1 illustrates these release types.

Releases to Air. Releases to air are reported either as stack or fugitive emissions. Stack emissions are releases to air that occur through confined air streams, such as stacks, vents, ducts, or pipes. Fugitive emissions are all releases to air that are not released through a confined air stream. Fugitive emissions include equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems.

Releases to Water. Releases to water include discharges to streams, rivers, lakes, oceans, and other bodies of water. This includes releases from contained sources, such as industrial process outflow pipes, or open trenches. Releases due to runoff, including stormwater runoff, are also reportable to TRI.

Underground Injection. Underground injection is a contained release of a fluid into a subsurface well for the purpose of waste disposal. Wastes containing TRI chemicals are injected into either Class I wells or Class V wells. Class I wells are used to inject liquid hazardous wastes or dispose of industrial and municipal waste-waters beneath the lowermost underground source of drinking water. Class V wells are generally used to inject non-hazardous fluid into or above an underground source of drinking water. Currently, TRI reporting does not distinguish between these two types of wells, although there are important differences in environmental impact between these two methods of injection.

Releases to Land. Releases to land occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals in landfills (in which wastes are buried), land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal methods (such as spills, leaks, or waste piles).

Box 1-1. An Explanation of Releases.

Exposure to a chemical is dependent upon the chemical being available. The potential for exposure is greater the longer the chemical remains unchanged in the environment. Sunlight, heat, or microorganisms may or may not decompose the chemical.

- For example, microorganisms readily degrade some chemicals, such as methanol, into less toxic chemicals; volatile organic chemicals, such as ethylene and propylene, react in the atmosphere, contributing to the formation of smog; metals are persistent and will not degrade upon release to the environment.
- As a result, smaller releases of a persistent highly toxic chemical may create a more serious problem than larger releases of a chemical that is rapidly converted to a less toxic form.

◆ Bioconcentration of the chemical in the food chain.

As a chemical becomes incorporated in the food chain, it may concentrate or disperse as it moves up the food chain.

- Some chemicals, such as mercury, will accumulate as they move up the food chain.

An Explanation of Transfers

Off-site Transfers. An off-site transfer is a transfer of toxic chemicals in wastes to a facility that is geographically or physically separate from the facility reporting under TRI. Chemicals reported to TRI as transferred are sent to off-site facilities for the purposes of recycling, energy recovery, treatment, or disposal. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment. The right side of Figure 1-1 illustrates transfer types reportable to TRI.

Transfers to Publicly Owned Treatment Works (POTWs). A POTW is a wastewater treatment facility that is owned by a state or municipality. Wastewaters from facilities reporting under TRI are transferred through pipes or sewers to a POTW. Treatment or removal of a chemical from the wastewater depends upon the nature of the chemical, as well as the treatment methods present at the POTW. In general, chemicals that are easily utilized as nutrients by microorganisms, or have a low solubility in water, are likely to be removed to some extent. Chemicals that are volatile and have a low solubility in water may evaporate into the atmosphere. Not all TRI chemicals can be treated or removed by a POTW. Some chemicals, such as metals, may be removed, but are not destroyed and may be disposed of in landfills or discharged to receiving waters.

Transfers Off-site for Recycling. Toxic chemicals in wastes that are sent off-site for the purposes of recycling are generally recovered or regenerated by a variety of recycling methods, including solvent recovery, metals recovery, and acid regeneration. The choice of the recycling method depends on the toxic chemical being sent for recycling. Once they have been recycled, these chemicals may be returned to the originating facility for further processing or made available for use in commerce.

Transfers Off-site for Energy Recovery. Toxic chemicals in wastes sent off-site for purposes of energy recovery are combusted off-site in industrial furnaces (including kilns) or boilers that generate heat or energy for use at that location. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers Off-site for Treatment. Toxic chemicals in wastes that are transferred off-site may be treated through a variety of methods, including biological treatment, neutralization, incineration, and physical separation. These methods typically result in varying degrees of destruction of the toxic chemical. In some cases (such as stabilization or solidification), the chemical is not destroyed but is prepared for further waste management, such as contained disposal.

Transfers Off-site for Disposal. Toxic chemicals in wastes that are transferred to a facility for disposal generally are either released to land (see Box 1-1 above) at an off-site facility or are injected underground.

Other Off-site Transfers. In this report, toxic chemicals in wastes that were reported as transferred off-site but for which the off-site activity (i.e., treatment, disposal, energy recovery, or recycling) was not specified or was not an accepted code have been classified as "other off-site transfers."

Box 1-2. An Explanation of Transfers.

- Small releases of a chemical that bioaccumulates may result in significant exposures to consumers.

◆ The environmental medium (air, water, land, or underground injection) to which the toxic chemical has been released.

Chemical exposure of a population depends on the environmental medium to which a chemical is released. The medium also affects the types of exposures possible, such as inhalation, dermal exposure, or ingestion.

- Releases of a chemical to the air can result in exposures to organisms living near and downwind from facilities releasing toxic chemicals to the atmosphere. Persistent chemicals may fall or be rained out of air onto land or into water bodies, resulting in exposures via these environmental media.

- Exposures that may result from releases to water bodies (streams, lakes, etc.) depend in part on the downstream uses of the water, including drinking, cooking, and bathing.

- Injection of toxic chemicals into properly designed and constructed Class I wells will result in substantially lower exposure potential than direct forms of environmental release. These wells are designed to entomb liquid wastes for at least 10,000 years.

◆ The type of off-site facility receiving the chemical and the efficiency of its waste management practices.

The amount of a toxic chemical that ultimately enters the environment depends upon how the chemical was handled during disposal, treatment, energy recovery, or recycling activities. Several factors to keep in mind when considering amounts sent off-site are presented below.

- The efficiency of recycling operations varies depending upon the method of recycling and the chemical being recycled.

- Use of a combustible toxic chemical for energy recovery typically results in the destruction of 95% to 99% or more of the toxic chemical. The remaining quantity may be either released to air or disposed of in ash to land.

- The efficiency of the treatment of toxic chemicals in waste sent to sewage treatment plants varies depending on the chemical and the sewage plant. Some high-volume pollutants such as methanol are readily degraded by most sewage treatment plants. Other high-volume chemicals such as ammonia are not readily treated by most sewage treatment plants and will pass through the plant into the aquatic environment. The efficiency of other treatment methods, such as incineration, also depends upon the specifications of the treatment facility and the nature of the chemical.

- Toxic chemicals in waste sent off-site for disposal are typically released to land or injected underground.

Further information on the use of TRI data in determining potential risks can be found in "Toxic Chemical Risk Screening Guide" (EPA 560/2-89-002), July 1989.

1994 Releases	Pounds
Total Releases	2,260,210,725
Fugitive Air	407,515,304
Point Source Air	1,148,492,781
Surface Water	66,083,288
Underground Injection	348,968,226
On-site Land Releases	289,151,126

Table 1-1. TRI Releases, 1994.

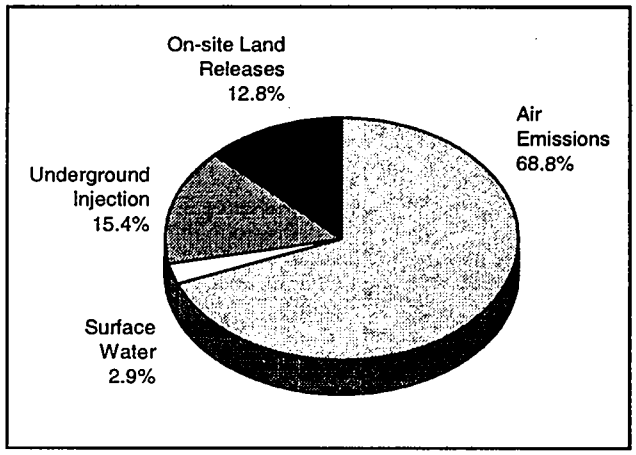

Figure 1-2. Distribution of TRI Releases, 1994.

1994 NATIONAL OVERVIEW

In 1994, 22,744 facilities filed 75,332 TRI reporting forms. These facilities reported releasing approximately 2.26 billion pounds of toxic chemicals into the environment (see Table 1-1). This includes amounts released directly to the air, water, or land, as well as disposal of toxic chemicals on-site in landfills, impoundments, wastepiles, and underground injection wells.

Air emissions totalled 1.56 billion pounds, or 68.8% of all releases in 1994 (see Figure 1-2). Facilities report their air releases as either point source (stack) emissions or as fugitive (non-point source) emissions. Nearly three-quarters (73.8%) of air releases reported to TRI in 1994 were point source emissions.

Facilities discharged 66.1 million pounds of toxic chemicals into the nation's rivers, lakes, bays, and other bodies of water in 1994. This represents 2.9% of all releases in 1994. Nearly 349.0 million pounds (15.4%) of toxic chemicals were injected into underground wells, and 289.2 million pounds (12.8%) were released to land.

Facilities sent nearly 3.80 billion pounds of toxic chemicals to off-site locations for treatment, disposal, energy recovery, and recycling in 1994 (see Table 1-2). The great majority of these off-site transfers (2.46 billion pounds, or 64.7%) was sent off-site to be recycled (see Figure 1-3). About 464.2 million pounds (12.2%) of toxic chemicals were sent off-site to be burned for energy recovery. Transfers to Publicly Owned Treatment Works (POTWs, or sewage treatment plants) totalled 254.7 million pounds, or 6.7%, while transfers to other locations for treatment totalled 318.8 million pounds, or 8.4%. Transfers of toxic chemicals off-site for disposal totalled 297.6 million pounds, or 7.8%. An additional 3.6 million pounds of toxic chemicals which were reported as transferred off-site were reported with no waste management codes or invalid codes and are listed as "Other Off-site Transfers."

1994 TRI DATA BY STATE

Releases and Transfers

Figure 1-4 illustrates the distribution of TRI releases by state. Figure 1-5 shows the distribution of transfers by the state of origin of the transfers. Tables 1-3 and 1-4 present TRI releases and transfers by type, arranged alphabetically by state. No reports were received in 1994 for Guam or the Northern Mariana Islands.

1994 Transfers	Pounds
Total Transfers	3,795,029,488
Transfers to Recycling	2,456,120,948
Transfers to Energy Recovery	464,206,483
Transfers to Treatment	318,810,333
Transfers to POTWs	254,688,836
Transfers to Disposal	297,600,462
Other Off-site Transfers❶	3,602,426

Table 1-2. TRI Transfers, 1994.

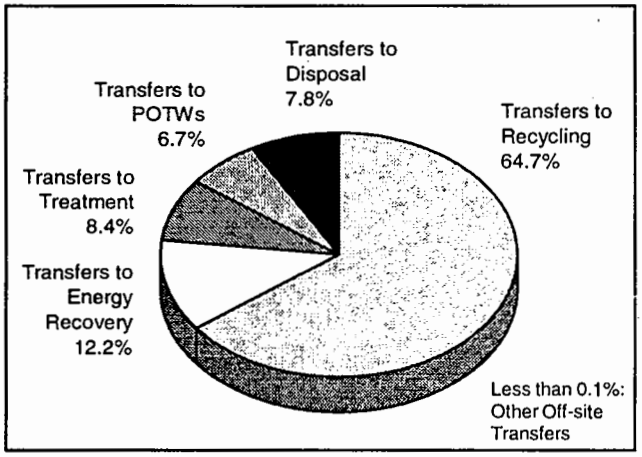

Figure 1-3. Distribution of TRI Transfers, 1994.

Table 1-5 ranks states by the sum of TRI on-site releases to air, water, and land only (excluding underground injection of waste). The top five states for total air/water/land releases for 1994 reporting were Texas (143.7 million pounds), Louisiana (110.7 million pounds), Ohio (102.7 million pounds), Tennessee (99.8 million pounds), and Alabama (95.4 million pounds). Third-ranked Ohio had the largest number of reporting facilities (1,685) and forms filed (5,665) in 1994. California, the state with the second largest number of reporting facilities (1,632) and the fourth largest number of forms (4,512), ranked 19th for air/water/land releases. In contrast, Louisiana had 325 reporting facilities, about one-fifth the number of facilities reporting in California, yet ranked second for air/water/land releases.

Table 1-6 ranks states by the sum of their total TRI releases, including amounts of waste injected underground. In this ranking, Texas also ranked first, but Tennessee ranked second, Louisiana ranked third, and Ohio dropped to fifth. Mississippi, which ranked 12th for air/water/land releases, ranked fourth for total releases because of large quantities of chemicals injected underground.

EPA has offered these alternative state rankings because questions have been raised concerning whether waste disposed of in Class I injection wells should be viewed as a direct environmental release. Properly designed and constructed Class I injection wells have a substantially lower exposure potential than direct forms of release. EPA believes that it is appropriate to include rankings both with and without underground injection in order to help the public to consider potential exposure when focusing on areas of concern.

The top three states for air emissions of TRI chemicals in 1994 were Texas (127.0 million pounds), Tennessee (92.3 million pounds), and Alabama (88.8 million pounds). Louisiana ranked first for surface water discharges, with 22.5 million pounds, followed by California (4.3 million pounds) and Georgia (3.7 million pounds). Facilities in Texas reported the largest quantity of waste injected underground (106.4 million pounds), followed by Mississippi (57.0 million pounds) and Tennessee (56.1 million pounds). The top three states for releases of TRI chemicals to land were Florida (45.2 million pounds), Montana (43.5 million pounds), and Arizona (25.1 million pounds).

❶ Transfers reported without valid waste management codes.

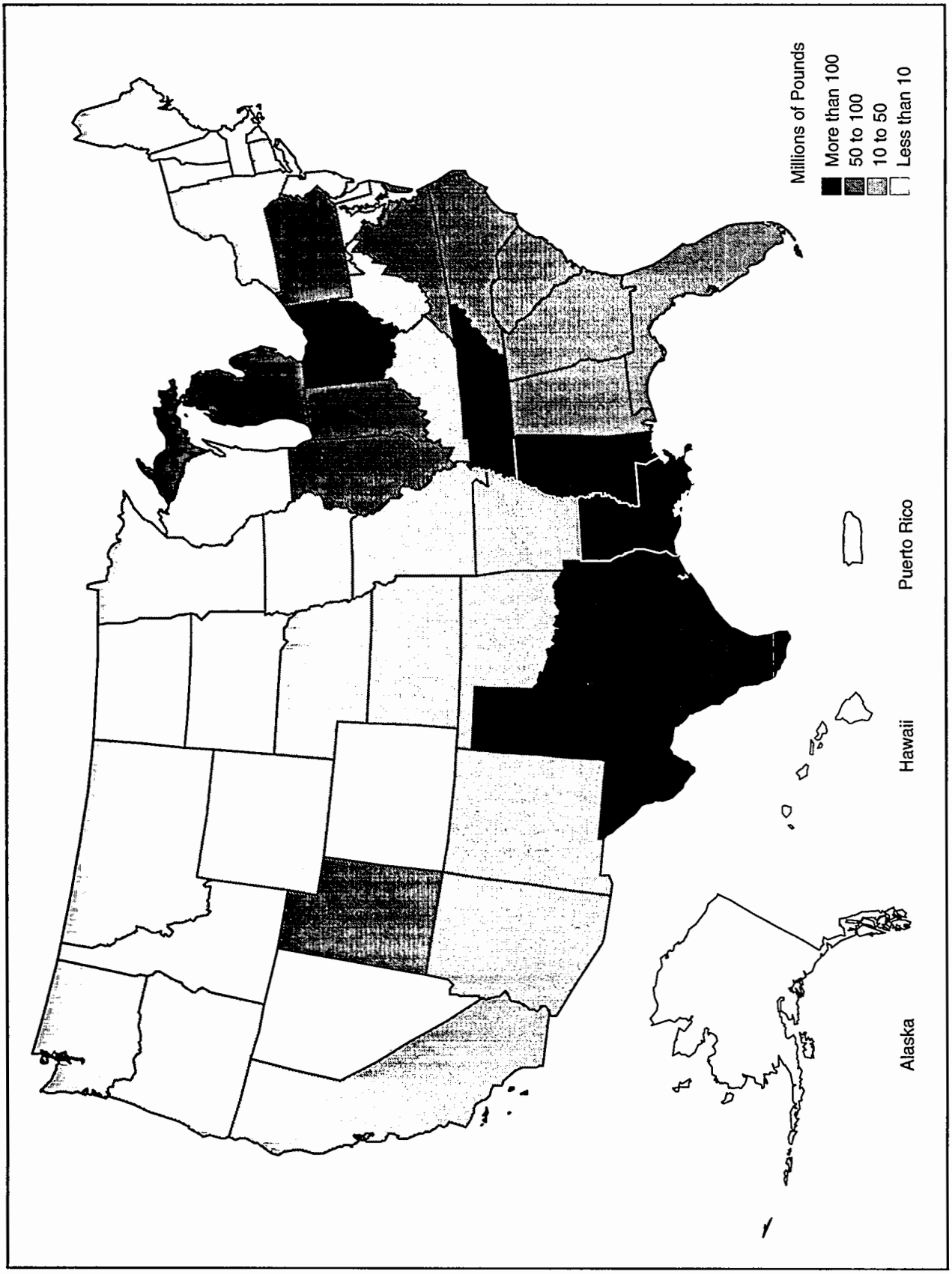

Figure 1-4. TRI Releases by State, 1994.

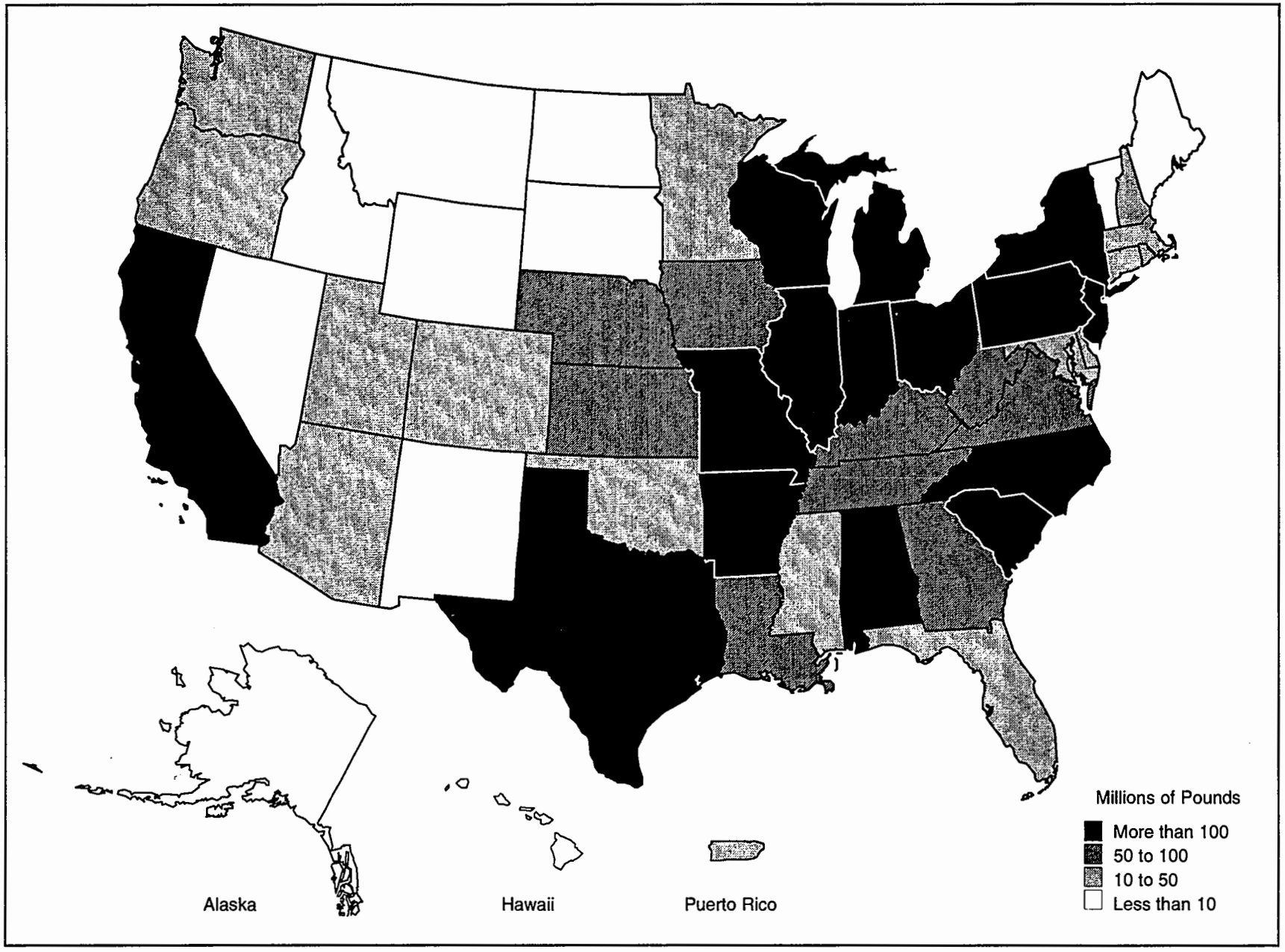

Figure 1-5. TRI Transfers by State, 1994.

Table 1-3. TRI Releases by State, 1994 (Alphabetically Ordered).

State	Facilities Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Alabama	526	1,930	88,789,209	2,270,311	251	4,360,697	95,420,468
Alaska	14	64	5,477,555	1,155,030	190	47,816	6,680,591
American Samoa	2	3	12,255	0	0	0	12,255
Arizona	185	479	6,314,661	39	11	25,148,267	31,462,978
Arkansas	394	1,279	28,683,461	1,029,055	9,175,393	2,058,594	40,946,503
California	1,632	4,512	39,287,993	4,258,256	498,761	1,580,609	45,625,619
Colorado	189	532	3,879,703	80,687	0	214,743	4,175,133
Connecticut	359	996	8,901,064	2,227,758	0	1,535	11,130,357
Delaware	71	246	4,104,072	92,564	0	157,635	4,354,271
District of Columbia	5	8	4,891	1,600	0	17,300	23,791
Florida	510	1,357	32,025,146	772,177	15,893,185	45,221,983	93,912,491
Georgia	729	2,311	50,441,198	3,683,579	0	1,539,051	55,663,828
Hawaii	17	63	522,810	2,300	188,210	2,505	715,825
Idaho	67	175	4,158,936	112,582	0	2,011,120	6,282,638
Illinois	1,367	4,687	63,087,484	3,147,040	10,163,497	21,279,269	97,677,290
Indiana	1,042	3,466	71,389,508	558,373	4,526,906	2,378,832	78,853,619
Iowa	414	1,227	28,255,287	872,629	0	1,364,952	30,492,868
Kansas	281	944	20,494,045	382,843	3,924,162	1,043,156	25,844,206
Kentucky	423	1,600	35,066,527	403,292	0	805,192	36,275,011
Louisiana	325	2,008	84,123,511	22,548,999	42,382,121	3,986,851	153,041,482
Maine	105	337	8,963,087	489,924	0	642,187	10,095,198
Maryland	205	635	10,441,005	668,293	22,500	2,367,939	13,499,737
Massachusetts	541	1,466	9,152,293	11,995	0	18,960	9,183,248
Michigan	956	3,501	64,937,744	1,000,017	6,962,868	9,719,406	82,620,035
Minnesota	502	1,386	20,514,894	292,663	0	982,389	21,789,946
Mississippi	329	1,100	58,563,371	1,103,212	57,032,511	4,908,350	121,607,444
Missouri	578	1,866	30,505,758	1,308,166	0	16,631,294	48,445,218
Montana	24	138	3,604,684	110,397	0	43,511,944	47,227,025
Nebraska	163	474	9,365,559	470,293	0	829,641	10,665,493
Nevada	41	98	1,013,014	0	0	2,301,924	3,314,938
New Hampshire	108	292	2,974,738	76,305	5	11,248	3,062,296
New Jersey	673	2,336	14,466,697	789,245	5	274,650	15,530,597
New Mexico	45	164	2,096,830	2,918	0	15,943,260	18,043,008
New York	768	2,329	32,798,392	865,703	760	1,737,375	35,402,230
North Carolina	906	2,733	70,669,752	991,084	0	17,449,478	89,110,314
North Dakota	34	93	1,555,637	43,312	0	1,265	1,600,214
Ohio	1,685	5,665	79,097,065	1,311,012	14,504,001	22,310,025	117,222,103
Oklahoma	275	862	18,371,896	280,617	1,135,650	487,234	20,275,397
Oregon	260	740	16,725,457	511,905	0	528,612	17,765,974
Pennsylvania	1,231	4,003	50,047,846	1,406,313	0	1,846,691	53,300,850
Puerto Rico	171	510	9,333,897	8,501	4	4,526	9,346,928
Rhode Island	150	390	2,970,797	104,808	0	70	3,075,675
South Carolina	486	1,839	49,408,149	866,527	0	769,192	51,043,868
South Dakota	66	123	1,875,502	5,105	0	180,099	2,060,706
Tennessee	672	2,174	92,272,213	2,146,373	56,071,774	5,333,683	155,824,043
Texas	1,215	5,620	127,035,162	2,719,512	106,410,443	13,960,174	250,125,291
Utah	159	543	61,994,550	34,108	0	9,668,663	71,697,321
Vermont	37	88	658,301	500	0	260	659,061
Virgin Islands	3	27	912,201	203,608	0	58,504	1,174,313
Virginia	462	1,499	50,136,954	1,543,416	0	1,093,559	52,773,929
Washington	301	954	23,677,196	1,418,012	0	117,894	25,213,102
West Virginia	151	688	20,602,475	1,247,684	1,493	617,298	22,468,950
Wisconsin	863	2,639	31,636,243	408,857	1	1,571,117	33,616,218
Wyoming	27	133	2,609,410	43,789	20,073,524	52,108	22,778,831
Total	22,744	75,332	1,556,008,085	66,083,288	348,968,226	289,151,126	2,260,210,725

Table 1-4. TRI Transfers by State, 1994 (Alphabetically Ordered).

State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers❷ Pounds	Total Transfers Pounds
Alabama	36,780,983	13,756,205	39,457,940	566,101	13,347,553	12,054	103,920,836
Alaska	353,880	0	112,330	39,115	0	1,450	506,775
American Samoa	0	0	0	0	0	0	0
Arizona	36,910,529	655,103	2,419,408	455,924	283,651	0	40,724,615
Arkansas	130,108,977	5,628,806	1,385,985	349,401	2,070,377	400	139,543,946
California	68,028,042	7,552,684	6,551,523	17,367,170	8,522,971	53,045	108,075,435
Colorado	10,881,343	3,542,793	1,690,697	540,696	318,372	14,082	16,987,983
Connecticut	25,712,774	2,033,601	5,845,703	1,131,894	922,298	710	35,646,980
Delaware	13,276,673	2,288,616	789,087	2,926,069	454,131	0	19,734,576
District of Columbia	66,611	0	0	113,832	30,012	0	210,455
Florida	18,615,925	2,086,476	3,437,117	3,785,648	1,067,260	212,822	29,205,248
Georgia	48,875,740	7,878,981	2,807,352	2,876,944	4,037,293	323	66,476,633
Hawaii	45,146	6,220	4,820	50,000	17,371	5,000	128,557
Idaho	641,770	56,534	103,918	1,280,801	21,250	0	2,104,273
Illinois	136,646,086	30,568,350	16,050,329	29,962,872	17,993,558	87,538	231,308,733
Indiana	195,414,443	13,230,176	28,191,587	3,526,723	16,675,627	254	257,038,810
Iowa	42,211,793	5,200,713	2,252,872	9,250,650	2,817,587	7,817	61,741,432
Kansas	46,889,095	2,448,810	3,431,272	2,100,061	6,108,721	0	60,977,959
Kentucky	54,026,287	6,847,990	7,308,602	1,842,497	2,964,331	46,965	73,036,672
Louisiana	61,079,601	6,742,790	6,014,439	341,364	3,750,983	0	77,929,177
Maine	2,802,353	470,955	312,710	354,625	811,920	0	4,752,563
Maryland	35,407,091	1,072,056	1,567,766	2,983,171	952,138	206,000	42,188,222
Massachusetts	26,880,612	6,210,078	5,345,931	4,179,207	1,380,467	2,710	43,999,005
Michigan	147,923,773	78,181,294	19,158,734	10,430,274	30,441,174	425,984	286,561,233
Minnesota	17,964,529	2,637,559	2,077,310	6,249,591	1,138,711	0	30,067,700
Mississippi	33,270,121	3,511,589	1,981,631	922,517	1,820,885	5,772	41,512,515
Missouri	64,544,618	16,720,004	15,137,623	20,076,933	5,229,319	52,936	121,761,433
Montana	2,406,947	43,958	8,076	7,433	111,243	0	2,577,657
Nebraska	44,837,589	679,798	3,108,100	766,012	5,778,305	0	55,169,804
Nevada	378,351	5,950	7,989	9,299	67,453	0	469,042
New Hampshire	9,982,073	323,433	403,986	187,724	141,394	12,168	11,050,778
New Jersey	58,848,809	28,587,392	11,906,194	33,192,402	1,865,409	250	134,400,456
New Mexico	195,476	147,786	89,484	371,677	98,770	11,000	914,193
New York	83,253,331	8,271,539	7,368,157	6,248,714	8,215,203	500	113,357,444
North Carolina	97,275,514	7,673,880	13,206,901	3,461,714	2,710,113	7,091	124,335,213
North Dakota	404,050	10,140	93,975	203,743	11,281	0	723,189
Ohio	223,558,885	37,112,098	21,637,795	9,587,101	31,094,104	34,731	323,024,714
Oklahoma	22,155,876	2,141,268	1,084,379	151,253	5,897,593	250	31,430,619
Oregon	22,490,373	623,720	640,231	10,106,104	2,780,502	0	36,640,930
Pennsylvania	179,479,250	18,256,414	19,307,452	8,280,700	53,126,669	2,266,855	280,717,340
Puerto Rico	10,166,282	9,577,157	5,439,606	3,900,605	325,300	0	29,408,950
Rhode Island	15,433,236	490,836	496,358	1,472,321	3,748,276	0	21,641,027
South Carolina	89,748,125	10,025,405	7,068,024	3,664,172	4,819,842	0	115,325,568
South Dakota	637,674	99,166	44,262	299,356	86,118	0	1,166,576
Tennessee	54,407,934	8,060,609	2,499,385	6,967,362	18,007,921	750	89,943,961
Texas	128,829,186	75,022,132	30,429,423	21,026,621	17,824,532	132,339	273,264,233
Utah	9,768,351	129,217	858,926	333,750	1,506,520	250	12,597,014
Vermont	1,240,337	120,690	307,431	4,461	21,234	0	1,694,153
Virgin Islands	42,563	47,629	414,075	0	77	0	504,344
Virginia	29,272,281	8,828,124	1,696,017	15,226,844	1,900,933	250	56,924,449
Washington	11,685,540	812,179	646,474	700,304	728,814	120	14,573,431
West Virginia	45,293,917	10,709,432	4,345,522	1,684,091	2,917,835	0	64,950,797
Wisconsin	58,905,835	17,076,025	12,261,335	3,126,475	10,631,776	10	102,001,456
Wyoming	64,368	2,123	4,090	4,518	5,285	0	80,384
Total	2,456,120,948	464,206,483	318,810,333	254,688,836	297,600,462	3,602,426	3,795,029,488

❷ Transfers reported without valid waste management codes.

Table 1-5. TRI Releases to Air, Water, and Land by State, 1994 (Ordered by Total Air/Water/Land Release).

State	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/Water/Land Releases Pounds
Texas	127,035,162	2,719,512	13,960,174	143,714,848
Louisiana	84,123,511	22,548,999	3,986,851	110,659,361
Ohio	79,097,065	1,311,012	22,310,025	102,718,102
Tennessee	92,272,213	2,146,373	5,333,683	99,752,269
Alabama	88,789,209	2,270,311	4,360,697	95,420,217
North Carolina	70,669,752	991,084	17,449,478	89,110,314
Illinois	63,087,484	3,147,040	21,279,269	87,513,793
Florida	32,025,146	772,177	45,221,983	78,019,306
Michigan	64,937,744	1,000,017	9,719,406	75,657,167
Indiana	71,389,508	558,373	2,378,832	74,326,713
Utah	61,994,550	34,108	9,668,663	71,697,321
Mississippi	58,563,371	1,103,212	4,908,350	64,574,933
Georgia	50,441,198	3,683,579	1,539,051	55,663,828
Pennsylvania	50,047,846	1,406,313	1,846,691	53,300,850
Virginia	50,136,954	1,543,416	1,093,559	52,773,929
South Carolina	49,408,149	866,527	769,192	51,043,868
Missouri	30,505,758	1,308,166	16,631,294	48,445,218
Montana	3,604,684	110,397	43,511,944	47,227,025
California	39,287,993	4,258,256	1,580,609	45,126,858
Kentucky	35,066,527	403,292	805,192	36,275,011
New York	32,798,392	865,703	1,737,375	35,401,470
Wisconsin	31,636,243	408,857	1,571,117	33,616,217
Arkansas	28,683,461	1,029,055	2,058,594	31,771,110
Arizona	6,314,661	39	25,148,267	31,462,967
Iowa	28,255,287	872,629	1,364,952	30,492,868
Washington	23,677,196	1,418,012	117,894	25,213,102
West Virginia	20,602,475	1,247,684	617,298	22,467,457
Kansas	20,494,045	382,843	1,043,156	21,920,044
Minnesota	20,514,894	292,663	982,389	21,789,946
Oklahoma	18,371,896	280,617	487,234	19,139,747
New Mexico	2,096,830	2,918	15,943,260	18,043,008
Oregon	16,725,457	511,905	528,612	17,765,974
New Jersey	14,466,697	789,245	274,650	15,530,592
Maryland	10,441,005	668,293	2,367,939	13,477,237
Connecticut	8,901,064	2,227,758	1,535	11,130,357
Nebraska	9,365,559	470,293	829,641	10,665,493
Maine	8,963,087	489,924	642,187	10,095,198
Puerto Rico	9,333,897	8,501	4,526	9,346,924
Massachusetts	9,152,293	11,995	18,960	9,183,248
Alaska	5,477,555	1,155,030	47,816	6,680,401
Idaho	4,158,936	112,582	2,011,120	6,282,638
Delaware	4,104,072	92,564	157,635	4,354,271
Colorado	3,879,703	80,687	214,743	4,175,133
Nevada	1,013,014	0	2,301,924	3,314,938
Rhode Island	2,970,797	104,808	70	3,075,675
New Hampshire	2,974,738	76,305	11,248	3,062,291
Wyoming	2,609,410	43,789	52,108	2,705,307
South Dakota	1,875,502	5,105	180,099	2,060,706
North Dakota	1,555,637	43,312	1,265	1,600,214
Virgin Islands	912,201	203,608	58,504	1,174,313
Vermont	658,301	500	260	659,061
Hawaii	522,810	2,300	2,505	527,615
District of Columbia	4,891	1,600	17,300	23,791
American Samoa	12,255	0	0	12,255
Total	1,556,008,085	66,083,288	289,151,126	1,911,242,499

Table 1-6. TRI Releases by State, 1994 (Ordered by Total Release).

State	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Texas	127,035,162	2,719,512	106,410,443	13,960,174	250,125,291
Tennessee	92,272,213	2,146,373	56,071,774	5,333,683	155,824,043
Louisiana	84,123,511	22,548,999	42,382,121	3,986,851	153,041,482
Mississippi	58,563,371	1,103,212	57,032,511	4,908,350	121,607,444
Ohio	79,097,065	1,311,012	14,504,001	22,310,025	117,222,103
Illinois	63,087,484	3,147,040	10,163,497	21,279,269	97,677,290
Alabama	88,789,209	2,270,311	251	4,360,697	95,420,468
Florida	32,025,146	772,177	15,893,185	45,221,983	93,912,491
North Carolina	70,669,752	991,084	0	17,449,478	89,110,314
Michigan	64,937,744	1,000,017	6,962,868	9,719,406	82,620,035
Indiana	71,389,508	558,373	4,526,906	2,378,832	78,853,619
Utah	61,994,550	34,108	0	9,668,663	71,697,321
Georgia	50,441,198	3,683,579	0	1,539,051	55,663,828
Pennsylvania	50,047,846	1,406,313	0	1,846,691	53,300,850
Virginia	50,136,954	1,543,416	0	1,093,559	52,773,929
South Carolina	49,408,149	866,527	0	769,192	51,043,868
Missouri	30,505,758	1,308,166	0	16,631,294	48,445,218
Montana	3,604,684	110,397	0	43,511,944	47,227,025
California	39,287,993	4,258,256	498,761	1,580,609	45,625,619
Arkansas	28,683,461	1,029,055	9,175,393	2,058,594	40,946,503
Kentucky	35,066,527	403,292	0	805,192	36,275,011
New York	32,798,392	865,703	760	1,737,375	35,402,230
Wisconsin	31,636,243	408,857	1	1,571,117	33,616,218
Arizona	6,314,661	39	11	25,148,267	31,462,978
Iowa	28,255,287	872,629	0	1,364,952	30,492,868
Kansas	20,494,045	382,843	3,924,162	1,043,156	25,844,206
Washington	23,677,196	1,418,012	0	117,894	25,213,102
Wyoming	2,609,410	43,789	20,073,524	52,108	22,778,831
West Virginia	20,602,475	1,247,684	1,493	617,298	22,468,950
Minnesota	20,514,894	292,663	0	982,389	21,789,946
Oklahoma	18,371,896	280,617	1,135,650	487,234	20,275,397
New Mexico	2,096,830	2,918	0	15,943,260	18,043,008
Oregon	16,725,457	511,905	0	528,612	17,765,974
New Jersey	14,466,697	789,245	5	274,650	15,530,597
Maryland	10,441,005	668,293	22,500	2,367,939	13,499,737
Connecticut	8,901,064	2,227,758	0	1,535	11,130,357
Nebraska	9,365,559	470,293	0	829,641	10,665,493
Maine	8,963,087	489,924	0	642,187	10,095,198
Puerto Rico	9,333,897	8,501	4	4,526	9,346,928
Massachusetts	9,152,293	11,995	0	18,960	9,183,248
Alaska	5,477,555	1,155,030	190	47,816	6,680,591
Idaho	4,158,936	112,582	0	2,011,120	6,282,638
Delaware	4,104,072	92,564	0	157,635	4,354,271
Colorado	3,879,703	80,687	0	214,743	4,175,133
Nevada	1,013,014	0	0	2,301,924	3,314,938
Rhode Island	2,970,797	104,808	0	70	3,075,675
New Hampshire	2,974,738	76,305	5	11,248	3,062,296
South Dakota	1,875,502	5,105	0	180,099	2,060,706
North Dakota	1,555,637	43,312	0	1,265	1,600,214
Virgin Islands	912,201	203,608	0	58,504	1,174,313
Hawaii	522,810	2,300	188,210	2,505	715,825
Vermont	658,301	500	0	260	659,061
District of Columbia	4,891	1,600	0	17,300	23,791
American Samoa	12,255	0	0	0	12,255
Total	1,556,008,085	66,083,288	348,968,226	289,151,126	2,260,210,725

Movement of Transfers Among States

Facilities reporting to TRI must report the quantities of toxic chemicals shipped off-site for waste management, treatment, and disposal. In addition to reporting the quantities of those chemicals, facilities also must report the location to which the chemicals are being shipped. This recipient location information is also available in the TRI database. Tables 1-7 through 1-12 illustrate the movement of off-site transfers of waste within and between states.

Transfers to POTWs are not included in these tables. This is because it is not possible to determine how much waste is sent to which location in instances when a facility reports sending waste to more than one POTW. This problem arises from how the data for POTW transfers are reported on the Form R and is not a problem for other types of transfers.

Table 1-7 presents transfers from one location to another within the same state. These transfers constitute about 43.5% of all transfers reported in 1994.

Table 1-8 presents transfers received at locations in each state from TRI facilities located outside that state (imports of waste into the state). Table 1-9 adds the quantities in Tables 1-7 and 1-8, to give the total quantity of transfers received at locations within a state, regardless of whether those transfers originated at a TRI facility in that state or in another state.

Table 1-10 presents TRI transfers from facilities in a state to locations outside that state (exports of waste from that state to other states). These transfers make up nearly 56.5% of all transfers reported to TRI in 1994.

Many states, such as Ohio, Illinois, Indiana, and Pennsylvania, rank high both for receipt of chemicals from out of state and for transfers of chemicals to other states.

Table 1-11 presents the states that are net importers of TRI chemicals in waste. These states receive more transfers of TRI chemicals in waste from other states than they send to other states. These states are ranked in descending order by total net quantity imported. In this table, a negative number in a particular transfer category (for example, transfers to recycling) indicates that the state is a net exporter in that category, although the state is a net importer for the sum of all types of transfers.

Table 1-12 presents the states that are net exporters of TRI chemicals in waste. These states transfer more TRI chemicals in waste to locations in other states than they receive from other states. These states are ranked in descending order by total net quantity exported. In this table, a negative number in a transfer category indicates that the state is a net importer in that category, even though it is a net exporter overall.

Table 1-7. Transfers of TRI Chemicals in Waste Within a State, 1994 (Ordered by Total Transferred).

State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to Disposal Pounds	Other Off-site Transfers❸ Pounds	Total Transfers Within State Pounds
Pennsylvania	105,123,189	511,586	7,381,554	47,374,083	2,266,573	162,656,985
Michigan	87,245,077	37,135,143	9,968,476	26,109,218	425,984	160,883,898
Ohio	93,001,121	25,802,568	15,037,335	22,025,529	34,731	155,901,284
Texas	45,920,272	70,792,699	22,932,376	13,755,908	131,329	153,532,584
Indiana	95,838,664	4,543,119	25,421,139	12,967,892	254	138,771,068
California	52,216,443	6,363,045	3,697,017	4,746,857	52,790	67,076,152
Illinois	31,609,449	10,899,929	6,203,622	16,329,506	87,288	65,129,794
Alabama	10,808,445	7,342,089	35,904,145	7,071,982	0	61,126,661
Wisconsin	28,970,828	1,252,957	9,379,641	9,741,280	10	49,344,716
Louisiana	34,827,005	3,621,961	3,809,328	1,537,937	0	43,796,231
West Virginia	38,446,941	1,230,329	171,300	1,646,423	0	41,494,993
Tennessee	21,804,506	1,697,960	923,181	16,329,149	0	40,754,796
South Carolina	27,932,211	5,735,626	2,401,788	4,266,382	0	40,336,007
Missouri	21,259,464	12,022,770	1,013,251	2,275,541	50,626	36,621,652
New Jersey	11,589,048	14,022,592	6,811,678	713,168	0	33,136,486
New York	26,899,492	1,294,608	907,194	3,547,164	0	32,648,458
Kentucky	15,681,887	850,489	1,913,125	2,157,946	46,465	20,649,912
Arkansas	17,898,889	625,111	318,245	775,472	400	19,618,117
Puerto Rico	8,162,513	6,490,134	2,276,686	257,083	0	17,186,416
Georgia	13,803,680	1,348,221	277,375	1,312,041	321	16,741,638
Kansas	6,699,489	557,044	2,693,589	5,909,461	0	15,859,583
Nebraska	12,276,403	11,270	2,877,552	672,783	0	15,838,008
Massachusetts	9,945,177	2,813,080	1,692,807	801,076	0	15,252,140
Connecticut	12,956,211	111,125	572,856	535,196	710	14,176,098
North Carolina	7,856,209	2,206,295	2,049,942	1,736,125	250	13,848,821
Maryland	12,124,288	35,898	37,633	631,342	0	12,829,161
Oregon	9,529,796	23,238	271,728	2,774,260	0	12,599,022
Arizona	9,928,903	238,951	1,620,021	169,091	0	11,956,966
Minnesota	7,482,460	612,783	1,655,395	866,547	0	10,617,185
Utah	5,605,726	257	684,126	1,491,186	0	7,781,295
Oklahoma	6,080,513	235,582	121,520	1,038,422	250	7,476,287
Virginia	3,220,012	2,177,509	49,530	1,653,513	0	7,100,564
Iowa	3,522,215	133,773	856,506	2,187,688	1,250	6,701,432
Mississippi	4,560,955	298,183	85,689	945,307	0	5,890,134
Florida	4,020,428	557,467	548,788	403,239	129,787	5,659,709
Rhode Island	1,482,129	7,800	50,793	3,488,665	0	5,029,387
Colorado	2,041,703	988,879	945,590	282,513	14,082	4,272,767
Delaware	3,727,635	1,124	31,513	70,460	0	3,830,732
Washington	1,322,314	261,042	409,737	479,670	120	2,472,883
New Hampshire	2,172,609	0	44,160	15,484	0	2,232,253
Maine	1,069,692	500	3,982	594,725	0	1,668,899
South Dakota	327,375	0	3,329	85,618	0	416,322
North Dakota	403,000	2,670	0	1,513	0	407,183
Idaho	229,038	0	41,597	3,256	0	273,891
Nevada	3,521	0	4,133	67,445	0	75,099
New Mexico	9,710	0	0	65,375	0	75,085
Vermont	23,817	1,986	0	2,408	0	28,211
Montana	21,000	0	0	18	0	21,018
Hawaii	6,625	0	20	3,471	5,000	15,116
Wyoming	550	0	167	780	0	1,497
Alaska	0	0	0	0	1,450	1,450
American Samoa	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0
Total	917,688,627	224,859,392	174,101,159	221,917,198	3,249,670	1,541,816,046

❸ Transfers reported without valid waste management codes.

Table 1-8. Receipt of TRI Chemicals in Waste from Out of State, 1994 (Ordered by Total Received).

Receiving State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to Disposal Pounds	Other Off-site Transfers❹ Pounds	Total Transfers Received Pounds
Pennsylvania	229,338,515	487,219	5,432,118	6,888,250	10,815	242,156,917
Indiana	147,334,241	24,507,806	8,652,637	2,736,885	9,354	183,240,923
Ohio	107,841,710	36,050,818	21,976,589	11,090,782	250	176,960,149
Illinois	123,283,005	15,833,810	6,964,249	5,156,066	15,925	151,253,055
Louisiana	72,242,972	6,136,360	12,414,512	5,517,290	3,200	96,314,334
New York	81,268,084	2,976,972	1,870,785	5,885,197	250	92,001,288
Michigan	67,345,180	9,996,460	9,789,650	4,588,364	12,418	91,732,072
Missouri	57,080,938	22,149,591	1,127,719	61,157	250	80,419,655
Texas	59,949,400	6,164,978	6,208,625	7,082,589	0	79,405,592
New Jersey	26,873,995	11,228,984	21,040,132	389,218	28,368	59,560,697
South Carolina	39,533,678	13,937,033	3,286,327	2,068,218	7,462	58,832,718
Alabama	33,649,682	14,330,061	4,472,166	3,115,306	13,942	55,581,157
Tennessee	36,427,990	10,321,912	2,624,663	651,187	1,512	50,027,264
California	37,365,876	727,860	454,705	60,422	0	38,608,863
Connecticut	36,284,752	469,280	1,263,479	172,213	36,942	38,226,666
Montana	34,363,779	0	0	2,072,590	0	36,436,369
North Carolina	26,948,696	1,470,699	2,167,348	507,393	0	31,094,136
Georgia	25,755,026	2,593,615	890,638	414,290	202,579	29,856,148
Kentucky	8,010,079	10,483,112	9,407,217	1,178,057	250	29,078,715
West Virginia	28,068,285	0	32,483	364,364	0	28,465,132
Virginia	12,380,852	12,907,989	734,133	3,427	0	26,026,401
Wisconsin	16,222,006	2,132,216	3,749,408	502,952	1,642	22,608,224
District of Columbia	17,444,020	0	450,213	0	0	17,894,233
Kansas	580,893	13,577,840	402,366	87,136	0	14,648,235
Arkansas	1,811,311	7,272,580	5,428,217	94,331	1,055	14,607,494
Minnesota	5,665,135	3,707,065	3,597,142	9,670	0	12,979,012
Massachusetts	8,563,048	788,451	1,204,283	461,399	0	11,017,181
Virgin Islands	10,566,541	0	0	0	0	10,566,541
Oklahoma	5,155,659	2,078,683	468,186	2,716,514	0	10,419,042
Arizona	8,912,519	123,498	140,320	64,490	0	9,240,827
Florida	6,047,616	1,942,383	390,565	96,661	0	8,477,225
Washington	7,392,904	304,601	205,181	10,271	0	7,912,957
Maryland	1,385,441	3,510,073	1,701,882	297,369	282	6,895,047
Iowa	6,485,376	25,541	75,714	133,121	0	6,719,752
Utah	51,394	919,620	1,382,119	3,575,827	0	5,928,960
Nebraska	3,196,015	53,537	153,066	5,818	0	3,408,436
Rhode Island	2,809,265	17,453	182,685	235,522	0	3,244,925
Nevada	149,206	0	63,149	2,830,042	0	3,042,397
Colorado	452,793	21,724	124,349	1,639,740	0	2,238,606
North Dakota	148,666	21,950	40,512	1,409,690	0	1,620,818
Idaho	864,345	0	79,271	450,038	0	1,393,654
Mississippi	979,450	9,688	46,760	276,112	0	1,312,010
Alaska	1,054,431	18,976	81,492	3,137	0	1,158,036
Delaware	281	23,034	954,061	2,254	0	979,630
Oregon	486,797	3,408	16,633	239,925	0	746,763
New Mexico	199,266	0	0	3,000	0	202,266
New Hampshire	20,151	0	1,410	143,262	10	164,833
Vermont	703	0	20,494	5,506	0	26,703
Maine	14,450	1,958	1,751	0	0	18,159
American Samoa	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0
Other❺	140,425,904	18,253	2,937,770	386,212	6,250	143,774,389
Total	1,538,432,321	239,347,091	144,709,174	75,683,264	352,756	1,998,524,606

❹ Transfers reported without valid waste management codes.

❺ Includes waste sent to other countries and to sites not identified by state.

Table 1-9. Total Transfers of TRI Chemicals Received, Including Intrastate Transfers and Transfers into the State, 1994 (Ordered by Total Received).

Receiving State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to Disposal Pounds	Other Off-site Transfers❻ Pounds	Total Transfers Received Pounds
Pennsylvania	334,461,704	998,805	12,813,672	54,262,333	2,277,388	404,813,902
Ohio	200,842,831	61,853,386	37,013,924	33,116,311	34,981	332,861,433
Indiana	243,172,905	29,050,925	34,073,776	15,704,777	9,608	322,011,991
Michigan	154,590,257	47,131,603	19,758,126	30,697,582	438,402	252,615,970
Texas	105,869,672	76,957,677	29,141,001	20,838,497	131,329	232,938,176
Illinois	154,892,454	26,733,739	13,167,871	21,485,572	103,213	216,382,849
Louisiana	107,069,977	9,758,321	16,223,840	7,055,227	3,200	140,110,565
New York	108,167,576	4,271,580	2,777,979	9,432,361	250	124,649,746
Missouri	78,340,402	34,172,361	2,140,970	2,336,698	50,876	117,041,307
Alabama	44,458,127	21,672,150	40,376,311	10,187,288	13,942	116,707,818
California	89,582,319	7,090,905	4,151,722	4,807,279	52,790	105,685,015
South Carolina	67,465,889	19,672,659	5,688,115	6,334,600	7,462	99,168,725
New Jersey	38,463,043	25,251,576	27,851,810	1,102,386	28,368	92,697,183
Tennessee	58,232,496	12,019,872	3,547,844	16,980,336	1,512	90,782,060
Wisconsin	45,192,834	3,385,173	13,129,049	10,244,232	1,652	71,952,940
West Virginia	66,515,226	1,230,329	203,783	2,010,787	0	69,960,125
Connecticut	49,240,963	580,405	1,836,335	707,409	37,652	52,402,764
Kentucky	23,691,966	11,333,601	11,320,342	3,336,003	46,715	49,728,627
Georgia	39,558,706	3,941,836	1,168,013	1,726,331	202,900	46,597,786
North Carolina	34,804,905	3,676,994	4,217,290	2,243,518	250	44,942,957
Montana	34,384,779	0	0	2,072,608	0	36,457,387
Arkansas	19,710,200	7,897,691	5,746,462	869,803	1,455	34,225,611
Virginia	15,600,864	15,085,498	783,663	1,656,940	0	33,126,965
Kansas	7,280,382	14,134,884	3,095,955	5,996,597	0	30,507,818
Massachusetts	18,508,225	3,601,531	2,897,090	1,262,475	0	26,269,321
Minnesota	13,147,595	4,319,848	5,252,537	876,217	0	23,596,197
Arizona	18,841,422	362,449	1,760,341	233,581	0	21,197,793
Maryland	13,509,729	3,545,971	1,739,515	928,711	282	19,724,208
Nebraska	15,472,418	64,807	3,030,618	678,601	0	19,246,444
Oklahoma	11,236,172	2,314,265	589,706	3,754,936	250	17,895,329
District of Columbia	17,444,020	0	450,213	0	0	17,894,233
Puerto Rico	8,162,513	6,490,134	2,276,686	257,083	0	17,186,416
Florida	10,068,044	2,499,850	939,353	499,900	129,787	14,136,934
Utah	5,657,120	919,877	2,066,245	5,067,013	0	13,710,255
Iowa	10,007,591	159,314	932,220	2,320,809	1,250	13,421,184
Oregon	10,016,593	26,646	288,361	3,014,185	0	13,345,785
Virgin Islands	10,566,541	0	0	0	0	10,566,541
Washington	8,715,218	565,643	614,918	489,941	120	10,385,840
Rhode Island	4,291,394	25,253	233,478	3,724,187	0	8,274,312
Mississippi	5,540,405	307,871	132,449	1,221,419	0	7,202,144
Colorado	2,494,496	1,010,603	1,069,939	1,922,253	14,082	6,511,373
Delaware	3,727,916	24,158	985,574	72,714	0	4,810,362
Nevada	152,727	0	67,282	2,897,487	0	3,117,496
New Hampshire	2,192,760	0	45,570	158,746	10	2,397,086
North Dakota	551,666	24,620	40,512	1,411,203	0	2,028,001
Maine	1,084,142	2,458	5,733	594,725	0	1,687,058
Idaho	1,093,383	0	120,868	453,294	0	1,667,545
Alaska	1,054,431	18,976	81,492	3,137	1,450	1,159,486
South Dakota	327,375	0	3,329	85,618	0	416,322
New Mexico	208,976	0	0	68,375	0	277,351
Vermont	24,520	1,986	20,494	7,914	0	54,914
Hawaii	6,625	0	20	3,471	5,000	15,116
Wyoming	550	0	167	780	0	1,497
American Samoa	0	0	0	0	0	0
Other❼	140,425,904	18,253	2,937,770	386,212	6,250	143,774,389
Total	2,456,120,948	464,206,483	318,810,333	297,600,462	3,602,426	3,540,340,652

❻ Transfers reported without valid waste management codes.

❼ Includes waste sent to other countries and to sites not identified by state.

Table 1-10. Transfers of TRI Chemicals in Waste Out of State, 1994 (Ordered by Total Transferred).

Transferring State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to Disposal Pounds	Other Off-site Transfers❽ Pounds	Total Transfers Out of State Pounds
Ohio	130,557,764	11,309,530	6,600,460	9,068,575	0	157,536,329
Illinois	105,036,637	19,668,421	9,846,707	1,664,052	250	136,216,067
Arkansas	112,210,088	5,003,695	1,067,740	1,294,905	0	119,576,428
Michigan	60,678,696	41,046,151	9,190,258	4,331,956	0	115,247,061
Indiana	99,575,779	8,687,057	2,770,448	3,707,735	0	114,741,019
Pennsylvania	74,356,061	17,744,828	11,925,898	5,752,586	282	109,779,655
North Carolina	89,419,305	5,467,585	11,156,959	973,988	6,841	107,024,678
Texas	82,908,914	4,229,433	7,497,047	4,068,624	1,010	98,705,028
New York	56,353,839	6,976,931	6,460,963	4,668,039	500	74,460,272
South Carolina	61,815,914	4,289,779	4,666,236	553,460	0	71,325,389
New Jersey	47,259,761	14,564,800	5,094,516	1,152,241	250	68,071,568
Missouri	43,285,154	4,697,234	14,124,372	2,953,778	2,310	65,062,848
Kentucky	38,344,400	5,997,501	5,395,477	806,385	500	50,544,263
Wisconsin	29,935,007	15,823,068	2,881,694	890,496	0	49,530,265
Georgia	35,072,060	6,530,760	2,529,977	2,725,252	2	46,858,051
Iowa	38,689,578	5,066,940	1,396,366	629,899	6,567	45,789,350
Kansas	40,189,606	1,891,766	737,683	199,260	0	43,018,315
Alabama	25,972,538	6,414,116	3,553,795	6,275,571	12,054	42,228,074
Tennessee	32,603,428	6,362,649	1,576,204	1,678,772	750	42,221,803
Nebraska	32,561,186	668,528	230,548	5,105,522	0	38,565,784
Mississippi	28,709,166	3,213,406	1,895,942	875,578	5,772	34,699,864
Virginia	26,052,269	6,650,615	1,646,487	247,420	250	34,597,041
Louisiana	26,252,596	3,120,829	2,205,111	2,213,046	0	33,791,582
Arizona	26,981,626	416,152	799,387	114,560	0	28,311,725
Maryland	23,282,803	1,036,158	1,530,133	320,796	206,000	26,375,890
Massachusetts	16,935,435	3,396,998	3,653,124	579,391	2,710	24,567,658
Oklahoma	16,075,363	1,905,686	962,859	4,859,171	0	23,803,079
California	15,811,599	1,189,639	2,854,506	3,776,114	255	23,632,113
West Virginia	6,846,976	9,479,103	4,174,222	1,271,412	0	21,771,713
Connecticut	12,756,563	1,922,476	5,272,847	387,102	0	20,338,988
Florida	14,595,497	1,529,009	2,888,329	664,021	83,035	19,759,891
Rhode Island	13,951,107	483,036	445,565	259,611	0	15,139,319
Oregon	12,960,577	600,482	368,503	6,242	0	13,935,804
Minnesota	10,482,069	2,024,776	421,915	272,164	0	13,200,924
Delaware	9,549,038	2,287,492	757,574	383,671	0	12,977,775
Colorado	8,839,640	2,553,914	745,107	35,859	0	12,174,520
Washington	10,363,226	551,137	236,737	249,144	0	11,400,244
New Hampshire	7,809,464	323,433	359,826	125,910	12,168	8,630,801
Puerto Rico	2,003,769	3,087,023	3,162,920	68,217	0	8,321,929
Utah	4,162,625	128,960	174,800	15,334	250	4,481,969
Maine	1,732,661	470,455	308,728	217,195	0	2,729,039
Montana	2,385,947	43,958	8,076	111,225	0	2,549,206
Vermont	1,216,520	118,704	307,431	18,826	0	1,661,481
Idaho	412,732	56,534	62,321	17,994	0	549,581
Virgin Islands	42,563	47,629	414,075	77	0	504,344
New Mexico	185,766	147,786	89,484	33,395	11,000	467,431
Alaska	353,880	0	112,330	0	0	466,210
South Dakota	310,299	99,166	40,933	500	0	450,898
Nevada	374,830	5,950	3,856	8	0	384,644
North Dakota	1,050	7,470	93,975	9,768	0	112,263
District of Columbia	66,611	0	0	30,012	0	96,623
Wyoming	63,818	2,123	3,923	4,505	0	74,369
Hawaii	38,521	6,220	4,800	13,900	0	63,441
American Samoa	0	0	0	0	0	0
Total	1,538,432,321	239,347,091	144,709,174	75,683,264	352,756	1,998,524,606

❽ Transfers reported without valid waste management codes.

Table 1-11. States with Net Imports of TRI Chemicals in Waste (Transfers Received from Out of State Minus Transfers Sent Out of State), 1994 (Ordered by Net Imports).

State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[9] Pounds	Net Imports Pounds
Pennsylvania	154,982,454	-17,257,609	-6,493,780	1,135,664	10,533	132,377,262
Alabama	7,677,144	7,915,945	918,371	-3,160,265	1,888	68,934,240
Indiana	47,758,462	15,820,749	5,882,189	-970,850	9,354	68,499,904
Louisiana	45,990,376	3,015,531	10,209,401	3,304,244	3,200	62,522,752
Montana	31,977,832	-43,958	-8,076	1,961,365	0	33,887,163
Ohio	-22,716,054	24,741,288	15,376,129	2,022,207	250	19,423,820
Connecticut	23,528,189	-1,453,196	-4,009,368	-214,889	36,942	17,887,678
District of Columbia	17,377,409	0	450,213	-30,012	0	17,797,610
New York	24,914,245	-3,999,959	-4,590,178	1,217,158	-250	17,541,016
Missouri	13,795,784	17,452,357	-12,996,653	-2,892,621	-2,060	15,356,807
Illinois	18,246,368	-3,834,611	-2,882,458	3,492,014	15,675	15,036,988
California	21,554,277	-461,779	-2,399,801	-3,715,692	-255	14,976,750
Virgin Islands	10,523,978	-47,629	-414,075	-77	0	10,062,197
Tennessee	3,824,562	3,959,263	1,048,459	-1,027,585	762	7,805,461
West Virginia	21,221,309	-9,479,103	-4,141,739	-907,048	0	6,693,419
Nevada	-225,624	-5,950	59,293	2,830,034	0	2,657,753
North Dakota	147,616	14,480	-53,463	1,399,922	0	1,508,555
Utah	-4,111,231	790,660	1,207,319	3,560,493	-250	1,446,991
Idaho	451,613	-56,534	16,950	432,044	0	844,073
Alaska	700,551	18,976	-30,838	3,137	0	691,826
Total	417,619,260	37,088,921	-2,852,105	8,439,243	75,789	515,952,265

RELEASES BY COUNTY

Figure 1-6 is a map depicting the counties that rank in the top 10% nationally based on total releases to air, land, and water as reported in 1994. This represents 230 counties out of the 2,300 counties with at least one facility reporting under TRI in 1994. A total of 8,599 facilities in these counties filed TRI reports, representing 37.8% of all facilities reporting in the U.S. These counties account for 67.8% of the total releases to air, land, and water for the nation as a whole.

Table 1-13 lists the top 50 counties for total air/water/land releases. These top 50 counties account for nearly 713 million pounds, or about 37.3% of the releases to air/water/land reported to TRI nationally in 1994.

Releases can vary widely within a given county. Some counties have multiple sources that contribute TRI releases, such as Harris County, TX, with 272 facilities, while other counties, such as Tooele, UT, have the vast majority of their TRI-reported releases from a single facility. The numbers of reporting facilities in each county are included in Table 1-13. Within a given county, TRI reporting facilities can be located in relatively concentrated urban centers or in sparsely populated rural areas.

Facilities report their city and county location information to EPA on their Form Rs. EPA enters this facility identification information as reported by facilities. The county table and map include certain independent cities which are not part of any county (for example, Hopewell City, VA). Some facilities, particularly those located in or near independent cities or on county borders, may misreport their county location. Such misreporting could affect the totals and rankings in this table.

[9] Transfers reported without valid waste management codes.

Table 1-12. States with Net Exports of TRI Chemicals in Waste (Transfers Sent Out of State Minus Transfers Received from Out of State), 1994 (Ordered by Net Exports).

State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to Disposal Pounds	Other Off-site Transfers⑩ Pounds	Net Exports Pounds
Arkansas	110,398,777	-2,268,885	-4,360,477	1,200,574	-1,055	104,968,934
North Carolina	62,470,609	3,996,886	8,989,611	466,595	6,841	75,930,542
Iowa	32,204,202	5,041,399	1,320,652	496,778	6,567	39,069,598
Nebraska	29,365,171	614,991	77,482	5,099,704	0	35,157,348
Mississippi	27,729,716	3,203,718	1,849,182	599,466	5,772	33,387,854
Kansas	39,608,713	-11,686,074	335,317	112,124	0	28,370,080
Wisconsin	13,713,001	13,690,852	-867,714	387,544	-1,642	26,922,041
Michigan	-6,666,484	31,049,691	-599,392	-256,408	-12,418	23,514,989
Kentucky	30,334,321	-4,485,611	-4,011,740	-371,672	250	21,465,548
Maryland	21,897,362	-2,473,915	-171,749	23,427	205,718	19,480,843
Texas	22,959,514	-1,935,545	1,288,422	-3,013,965	1,010	19,299,436
Arizona	18,069,107	292,654	659,067	50,070	0	19,070,898
Georgia	9,317,034	3,937,145	1,639,339	2,310,962	-202,577	17,001,903
Massachusetts	8,372,387	2,608,547	2,448,841	117,992	2,710	13,550,477
Oklahoma	10,919,704	-172,997	494,673	2,142,657	0	13,384,037
Oregon	12,473,780	597,074	351,870	-233,683	0	13,189,041
South Carolina	22,282,236	-9,647,254	1,379,909	-1,514,758	-7,462	12,492,671
Delaware	9,548,757	2,264,458	-196,487	381,417	0	11,998,145
Rhode Island	11,141,842	465,583	262,880	24,089	0	11,894,394
Florida	8,547,881	-413,374	2,497,764	567,360	83,035	11,282,666
Colorado	8,386,847	2,532,190	620,758	-1,603,881	0	9,935,914
Virginia	13,671,417	-6,257,374	912,354	243,993	250	8,570,640
New Jersey	20,385,766	3,335,816	-15,945,616	763,023	-28,118	8,510,871
New Hampshire	7,789,313	323,433	358,416	-17,352	12,158	8,465,968
Puerto Rico	2,003,769	3,087,023	3,162,920	68,217	0	8,321,929
Washington	2,970,322	246,536	31,556	238,873	0	3,487,287
Maine	1,718,211	468,497	306,977	217,195	0	2,710,880
Vermont	1,215,817	118,704	286,937	13,320	0	1,634,778
South Dakota	310,299	99,166	40,933	500	0	450,898
New Mexico	-13,500	147,786	89,484	30,395	11,000	265,165
Minnesota	4,816,934	-1,682,289	-3,175,227	262,494	0	221,912
Wyoming	63,818	2,123	3,923	4,505	0	74,369
Hawaii	38,521	6,220	4,800	13,900	0	63,441
Total	558,045,164	37,107,174	85,665	8,825,455	82,039	604,145,497

Release information alone from TRI does not provide an adequate basis for assessing potential exposure or risk. While the counties in this table and map have large releases relative to other counties, these cannot be assumed to be "hot spots" or areas of significant risk. Human exposure potential depends on many factors in addition to magnitude of release, such as release medium, environmental and chemical fate characteristics, proximity to population centers, and demographic or human activity characteristics as previously discussed. This map primarily provides a sense of the geographic distribution of TRI total releases and shows where the largest volumes of such releases occur.

1994 TRI DATA BY INDUSTRY

The following section presents the TRI data by industry group. Industry categories are based on the Standard Industrial Classification (SIC) code(s) reported by the facility on its Form R. Facilities report their SIC codes at the four-digit

⑩ Transfers reported without valid waste management codes.

level—for example, SIC code 2873, Nitrogenous Fertilizers. These specific industries are grouped into broader categories at the three-digit and two-digit SIC code levels; for example, Nitrogenous Fertilizers falls into the Agricultural Chemicals group at the three-digit level (SIC code 287) and the Chemicals and Allied Products major group (28). Most data tables in this section present the data aggregated by two-digit major groups.

Only manufacturing facilities in SIC major groups 20 through 39 are required by law to report to TRI. In addition, federal facilities are now required to report to TRI under the terms of a presidential executive order. Federal facilities may fall in a variety of SIC code groupings, both within and outside of the manufacturing SIC code range. Federal facility data are included in these tables under the SIC code reported or under the "multiple codes" or "no codes" categories, explained below. Federal facility data are also presented separately in Chapter 5 of this book.

Tables 1-14 and 1-15 present TRI releases and transfers, respectively, by industry in SIC code order. Figure 1-7 illustrates the levels of TRI total releases and transfers reported across industry sectors. The TRI reporting Form R allows facilities to report more than one SIC code as the facility determines to be appropriate in characterizing its operations. Facilities that reported two or more two-digit SIC codes (major groups) within the manufacturing range of 20-39 [for example, petroleum (29) and chemicals (28)] are assigned to a "multiple codes" category. Facilities reporting no SIC code or SIC codes outside the 20-39 range are assigned to a "no codes" category.

The industry categories with the largest quantity of on-site TRI releases in 1994 were chemicals (850.9 million pounds), primary metals (313.3 million pounds), and paper (246.1 million pounds).

The chemical industry accounted for 17.7% of all facilities reporting to TRI, 28.1% of all forms filed, and 37.6% of all releases. Facilities in this industry filed an average of 5.3 forms, compared with 3.3 forms per facility for all industries. Chemical manufacturing facilities report an average of 211,339 pounds of releases, the second-highest rate for all industry groups. This industry accounts for nearly all of the reported underground injection of waste (96.0%) and 60.8% of surface water discharges reported in 1994. Table 1-16 lists the releases of the individual industry segments making up the chemical manufacturing industry.

The primary metals industry accounted for 8.2% of facilities, 8.9% of forms filed, and 13.9% of all releases reported in 1994. This industry reported the third-highest rate of releases per facility (167,359 pounds). This industry accounted for 59.4% of all land releases reported in 1994.

Facilities in the paper industry reported releasing an average of 457,457 pounds of TRI chemicals in 1994, the highest rate of all industries. This industry accounted for just 2.4% of all facilities and 3.2% of all forms, yet reported 10.9% of all releases in 1994. Nearly all (93.3%) of this industry's releases in 1994 were in the form of air emissions.

Other industries with high levels of releases per facility include petroleum (138,658 pounds per facility), printing (118,628 pounds per facility), facilities reporting multiple SIC codes (106,310 pounds per facility), and tobacco (102,730 pounds per facility). In contrast, facilities in the food, machinery, electrical equipment, and fabricated metals industries all reported average releases of less than 30,000 pounds.

The industries with the largest quantities of transfers of TRI chemicals in 1994 were primary metals (1,142.1 million pounds), chemicals

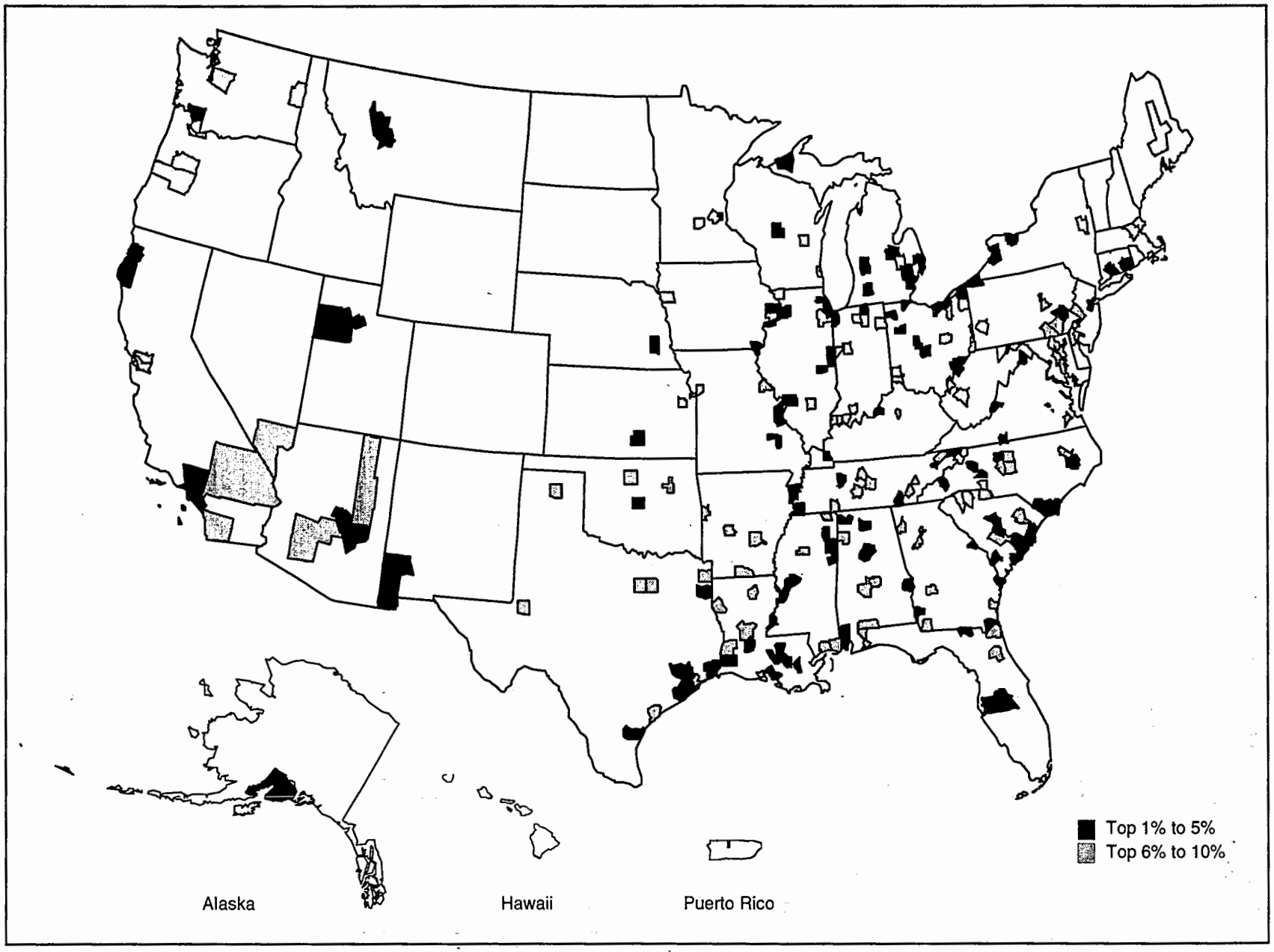

Figure 1-6. Top 10% of U.S. Counties for Total Air/Water/Land Releases, 1994.

Table 1-13. Top 50 U.S. Counties for TRI Total Air/Water/Land Releases, 1994 (Ordered by Total Air/Water/Land Release).

County	State	Facilities Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
Tooele	UT	5	56,061,683	760	4,838	56,067,281
Lewis and Clark	MT	3	144,962	0	43,482,219	43,627,181
Mobile	AL	51	39,913,547	557,984	456,882	40,928,413
Harris	TX	272	37,389,537	1,811,335	972,475	40,173,347
Polk	FL	47	3,157,288	430	35,833,233	38,990,951
Ascension	LA	19	15,792,952	11,697,284	442,894	27,933,130
Gila	AZ	2	960,221	0	24,705,434	25,665,655
Hamblen	TN	22	23,602,103	20,815	136,600	23,759,518
Cook	IL	573	19,955,414	18,279	13,731	19,987,424
Washington	OH	16	7,736,676	558,232	10,808,000	19,102,908
St. James	LA	10	6,739,267	9,237,183	919,862	16,896,312
Warren	MS	7	15,126,633	199,174	0	15,325,807
Whiteside	IL	15	287,144	1,510	14,600,000	14,888,654
Jefferson	TX	37	14,427,591	145,223	123,221	14,696,035
Beaufort	NC	6	3,941,301	2,752	10,172,700	14,116,753
Nueces	TX	14	2,643,641	87,806	10,036,046	12,767,493
Los Angeles	CA	594	12,538,675	206,306	4,817	12,749,798
Salt Lake	UT	66	3,296,245	13,838	9,271,698	12,581,781
Wayne	MI	161	12,116,249	367,265	2,057	12,485,571
Jefferson	MO	15	2,720,055	140,574	8,982,266	11,842,895
Brazoria	TX	29	11,175,923	297,014	247,333	11,720,270
St. Mary	LA	8	10,644,510	10	0	10,644,520
Jefferson	KY	83	10,446,219	1,099	13,250	10,460,568
Lake	IN	50	9,085,373	303,385	977,330	10,366,088
Humphreys	TN	5	3,389,474	1,440,549	4,780,080	9,610,103
Hidalgo	NM	1	530,687	0	9,071,770	9,602,457
New Hanover	NC	15	2,618,348	48,721	6,926,898	9,593,967
Shelby	TN	78	9,561,246	13,620	506	9,575,372
Monroe	NY	52	8,614,255	324,498	1,852	8,940,605
Ontonagon	MI	2	4,745,878	160	3,942,000	8,688,038
East Baton Rouge	LA	27	7,840,077	82,408	206,292	8,128,777
Kent	MI	94	7,881,836	577	20,726	7,903,139
Orange	TX	14	7,216,107	55,842	427,120	7,699,069
Madison	IL	31	2,401,880	115,485	5,040,766	7,558,131
Calcasieu	LA	21	5,557,720	290,075	1,681,932	7,529,727
Grant	NM	2	525,334	0	6,859,255	7,384,589
Iron	MO	2	234,198	340	7,068,912	7,303,450
Chatham	GA	26	4,849,307	2,012,134	433,800	7,295,241
Sullivan	TN	15	6,790,642	445,793	53,523	7,289,958
Defiance	OH	8	1,782,187	9,244	5,451,472	7,242,903
Elkhart	IN	103	7,184,488	20,810	20,795	7,226,093
Morgan	AL	26	6,424,496	382,802	48,736	6,856,034
Hamilton	FL	1	510,020	1,820	6,200,250	6,712,090
Cuyahoga	OH	235	4,419,104	13,730	2,029,499	6,462,333
Clinton	IA	13	5,927,882	380,456	14,040	6,322,378
Oakland	MI	71	6,207,382	603	265	6,208,250
Hopewell City	VA	7	4,829,590	1,287,360	237	6,117,187
Catawba	NC	60	6,097,772	1	0	6,097,773
Saginaw	MI	14	782,242	10,950	5,034,047	5,827,239
Wood	WI	18	5,671,908	126,435	21,006	5,819,349
Subtotal		3,045	442,497,268	32,732,671	237,542,665	712,772,604
Total		22,744	1,556,008,085	66,083,288	289,151,126	1,911,242,499

Table 1-14. TRI Releases by Industry, 1994.

SIC Code	Industry	Facilities⓫ Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
20	Food	2,033	3,676	26,005,508	1,193,304	190,347	5,005,989	32,395,148
21	Tobacco	14	27	1,427,988	10,227	0	0	1,438,215
22	Textiles	404	834	17,458,655	171,693	4	16,446	17,646,798
23	Apparel	35	64	1,380,507	3	0	25	1,380,535
24	Lumber	743	1,953	33,856,456	103,663	0	12,012	33,972,131
25	Furniture	535	1,595	50,511,989	10,597	0	74,879	50,597,465
26	Paper	538	2,421	229,543,443	11,819,622	0	4,748,673	246,111,738
27	Printing	289	570	34,281,257	843	0	1,370	34,283,470
28	Chemicals	4,026	21,200	410,156,718	40,192,804	334,939,603	65,562,226	850,851,351
29	Petroleum	401	3,087	51,102,015	1,680,211	2,032,615	787,073	55,601,914
30	Plastics	1,871	3,881	118,166,398	91,480	5	257,442	118,515,325
31	Leather	109	279	3,866,308	136,794	0	16,436	4,019,538
32	Stone/Clay/Glass	628	1,538	17,760,279	151,559	58,000	1,521,031	19,490,869
33	Primary Metals	1,872	6,694	126,859,506	3,887,963	10,701,065	171,847,781	313,296,315
34	Fabr. Metals	3,116	8,574	87,133,771	74,383	2,754	713,868	87,924,776
35	Machinery	1,055	2,854	25,185,738	125,620	0	157,126	25,468,484
36	Electrical Equip.	1,336	3,641	33,803,599	137,364	540	167,193	34,108,696
37	Transportation Equip.	1,262	4,498	121,191,221	73,242	5	245,859	121,510,327
38	Measure./Photo.	320	812	17,586,696	336,487	0	8,085	17,931,268
39	Miscellaneous	368	801	13,969,632	1,367	0	7,032	13,978,031
	Multiple codes 20-39⓬	1,515	5,429	122,692,723	5,266,352	597,751	32,502,952	161,059,778
	No codes 20-39⓭	274	904	12,067,678	617,710	445,537	5,497,628	18,628,553
	Total	22,744	75,332	1,556,008,085	66,083,288	348,968,226	289,151,126	2,260,210,725

(989.2 million pounds), and electrical equipment (392.2 million pounds). Most of the transfers reported by the primary metals and electrical equipment industries were transfers to recycling (79.4% and 90.9%, respectively). In contrast, only 29.2% of the chemical industry's transfers went to recycling; an additional 35.3% were sent for energy recovery. The chemical industry accounted for 75.3% of all transfers to energy recovery.

Multiple SIC Codes

TRI facilities submitted 5,429 Form Rs that indicated multiple SIC code combinations. These forms contained information on 161.1 million pounds of total releases, the fourth-largest quantity for any industry group. Table 1-17 shows the releases attributable to the 25 multiple SIC code combinations with the largest releases in 1994. These combinations account for 75.1% of the total releases associated with multiple SIC code combinations. Many of the same industries that rank high in releases assigned specifically to that industry, such as chemicals, paper, primary metals, and plastics, also appear dominant in the multiple list. The chemical industry appears in 12 of the 25 combinations.

SIC code combinations listed in Table 1-17 are ranked in the order reported. Within this list, some SIC code combinations repeat in a

⓫ Facilities have been assigned to the "multiple" category according to all the SIC codes they reported. Forms and amounts in pounds have been assigned to single-category SIC codes if only one SIC code was reported for an individual chemical form from the facility.

⓬ Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

⓭ Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

Table 1-15. TRI Transfers by Industry, 1994.

SIC Code	Industry	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[14] Pounds	Total Transfers Pounds
20	Food	1,614,495	145,090	3,158,345	24,379,638	1,120,552	5,504	30,423,624
21	Tobacco	0	0	5	70,078	1,963	0	72,046
22	Textiles	719,188	1,286,396	610,181	5,465,073	757,544	0	8,838,382
23	Apparel	88,230	125,515	121,699	21,736	69,673	0	426,853
24	Lumber	628,621	2,590,799	312,475	55,947	5,143,312	250	8,731,404
25	Furniture	4,203,844	6,351,652	1,741,963	144,461	283,715	12,613	12,738,248
26	Paper	1,777,955	8,858,060	8,885,222	42,045,891	2,864,589	20	64,431,737
27	Printing	6,227,974	3,301,701	532,339	230,359	61,595	22,740	10,376,708
28	Chemicals	288,959,374	349,323,954	176,170,382	140,192,126	34,051,254	475,389	989,172,479
29	Petroleum	138,146,538	1,394,025	1,282,517	4,864,698	3,513,539	0	149,201,317
30	Plastics	21,437,129	8,181,095	3,426,836	1,965,510	12,421,402	1,628	47,433,600
31	Leather	519,020	265,177	21,770	2,427,582	1,474,536	0	4,708.085
32	Stone/Clay/Glass	2,934,320	4,326,037	2,373,324	795,617	5,964,808	5	16,394,111
33	Primary Metals	906,355,211	12,330,449	47,453,454	5,571,990	169,927,921	431,544	1,142,070,569
34	Fabr. Metals	274,675,734	13,520,686	17,792,338	2,987,498	18,755,239	314,792	328,046,287
35	Machinery	58,564,992	2,965,746	1,849,394	1,431,242	3,269,838	21,252	68,102,464
36	Electrical Equip.	356,622,030	9,407,366	11,892,539	6,207,584	8,030,829	13,832	392,174,180
37	Transportation Equip.	158,589,083	16,381,143	7,905,930	3,272,571	9,324,006	2,261,013	197,733,746
38	Measure./Photo.	14,030,539	3,059,143	4,317,789	759,439	824,507	0	22,991,417
39	Miscellaneous	18,792,735	2,742,912	853,393	551,065	1,344,760	19,357	24,304,222
	Multiple codes 20-39[15]	196,884,828	16,760,874	25,780,587	10,690,885	16,619,988	20,287	266,757,449
	No codes 20-39[16]	4,349,108	888,663	2,327,851	557,846	1,774,892	2,200	9,900,560
	Total	2,456,120,948	464,206,483	318,810,333	254,688,836	297,600,462	3,602,426	3,795,029,488

different order (30 and 28 also appear as 28 and 30). These similar combinations were not presented in aggregate in order to preserve the sequence in which they were reported. TRI reporting guidance directs facilities to report the SIC code that represents their primary economic activity first. While it is unknown whether facilities follow this guidance, the original order may reflect the facilities' primary activity by the leading codes.

Top 50 Facilities

Table 1-18 lists the top 50 facilities based on the sum of amounts released to air, water, and land. Figure 1-8 illustrates the approximate location of the top 25 facilities for total air/water/land releases. The size of the triangle designating the facility's location is proportional to the quantity of releases from that facility. While the top 50 facilities represent just 0.2% of all facilities reporting to TRI, they accounted for 26.1% of all the TRI releases to air, water, and land reported in 1994. These facilities submitted an average of 14.9 reports per facility, well above the national average of 3.3 reports per facility.

Table 1-19 presents the top 50 facilities for total TRI releases, including underground injection of waste. These 50 facilities accounted for 32.4% of TRI total releases, including underground injection. Figure 1-9 displays the top 25 facilities for TRI total releases, including underground injection.

[14] Transfers reported without valid waste management codes.
[15] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
[16] Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

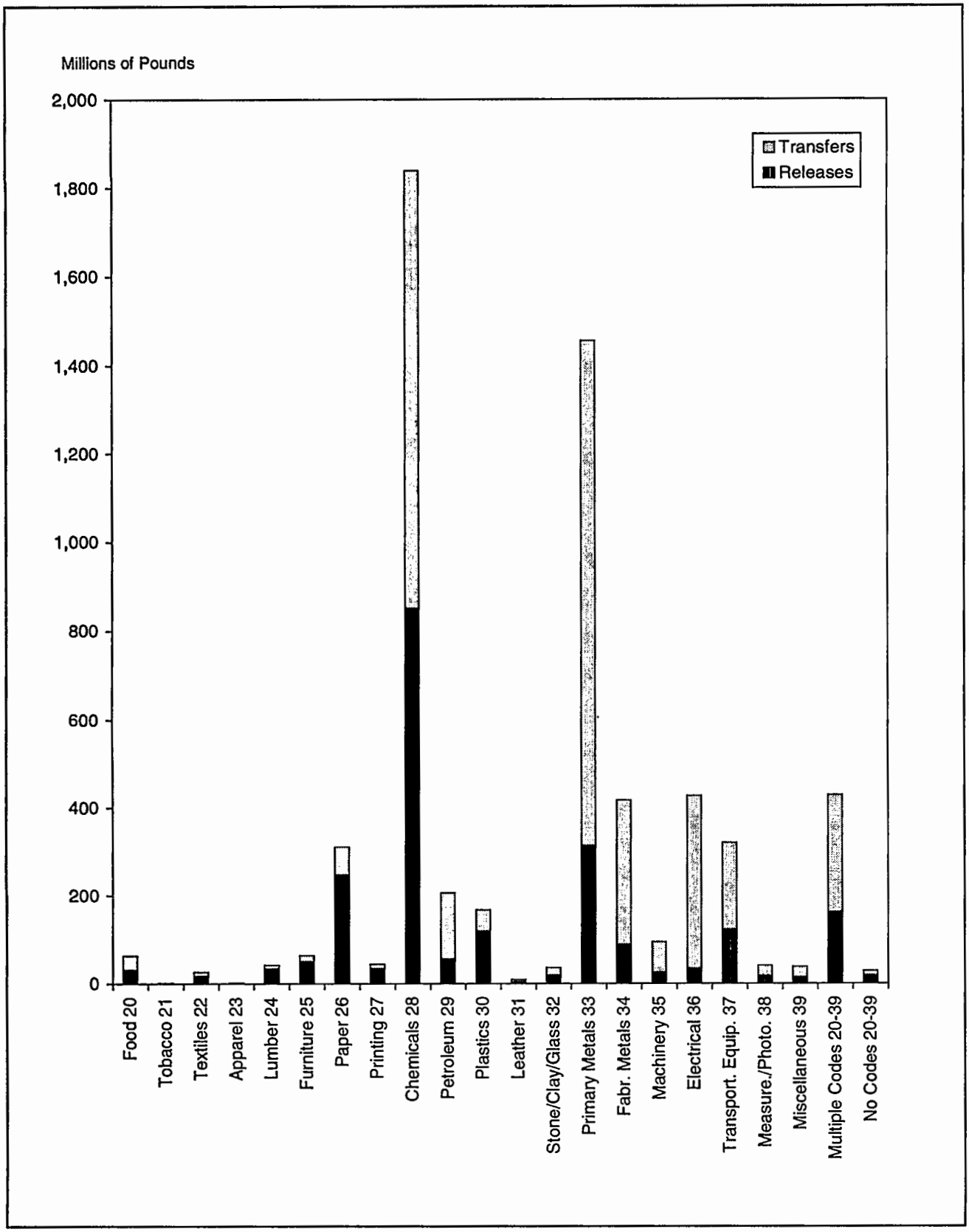

Figure 1-7. TRI Releases and Transfers by Industry, 1994.

Table 1-16. TRI Releases in Chemical Manufacturing Industry (SIC 28), by Three-Digit SIC Code, 1994.

SIC Code	Industry	Facilities Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
281	Industrial inorganic chemicals	504	1,544	24,159,333	1,304,722	127,349,069	27,804,465	180,617,589
282	Plastics materials and synthetics	372	2,098	63,759,447	1,102,272	84,050	215,496	65,161,265
283	Drugs	213	734	13,673,069	916,855	6,826,250	175,904	21,592,078
284	Soap and cleaners	430	1,359	1,902,618	3,586	15,431	36,577	1,958,212
285	Paints and allied products	586	3,174	9,886,422	3,828	0	14,909	9,905,159
286	Industrial organic chemicals	438	3,305	55,032,905	1,035,922	55,736,382	1,149,863	112,955,072
287	Agricultural chemicals	258	1,130	58,247,865	5,882,521	2,391,290	21,709,958	88,231,634
289	Miscellaneous chemical products	680	2,295	25,926,316	243,042	0	282,321	26,451,679
	Multiple within SIC 28 [17]	540	5,548	157,538,112	29,700,056	142,537,131	14,172,733	343,948,032
	Unknown/invalid SIC code	5	13	30,631	0	0	0	30,631
	Total	4,026	21,200	410,156,718	40,192,804	334,939,603	65,562,226	850,851,351

Table 1-17. Top 25 Combinations of Multiple Two-Digit SIC Codes 20-39 for TRI Releases, 1994.[18]

SIC Codes			Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
28	20		50	1,653,282	1,626	0	25,100,000	26,754,908
29	28		360	14,995,587	199,036	424,000	388,714	16,007,337
26	28		84	10,331,850	507,624	0	23,020	10,862,494
26	24		52	8,078,569	157,891	0	780,055	9,016,515
28	30		242	5,961,858	24,289	0	1,055	5,987,202
28	33		19	297,152	45,400	0	4,629,900	4,972,452
33	28		77	4,129,754	35,568	0	23,256	4,188,578
33	34		432	4,100,136	30,130	0	57,623	4,187,889
30	22		34	3,622,113	0	0	0	3,622,113
30	28		98	3,415,632	4,572	0	41,199	3,461,403
26	28	24	16	3,041,422	394,433	0	0	3,435,855
20	31		24	220,080	2,520,500	173,500	83,850	2,997,930
37	34		184	2,672,747	2,708	0	347	2,675,802
28	22		39	2,558,052	10,047	0	10	2,568,109
37	36		49	2,472,957	1,020	0	0	2,473,977
36	26		15	2,274,537	0	0	0	2,274,537
22	26	28	4	2,252,566	0	0	0	2,252,566
28	38		66	1,923,221	98,870	0	23,631	2,045,722
32	35		52	1,978,284	20	0	0	1,978,304
35	33		54	1,908,736	6	0	0	1,908,742
30	34		102	1,659,571	750	0	275	1,660,596
30	26	22	9	1,517,940	0	0	0	1,517,940
37	32		18	1,496,280	4,760	0	0	1,501,040
30	22	28	11	1,435,128	0	0	0	1,435,128
22	30		19	1,245,089	70	0	0	1,245,159
Subtotal			2,110	85,242,543	4,039,320	597,500	31,152,935	121,032,298
Total			5,429	122,692,723	5,266,352	597,751	32,502,952	161,059,778

[17] Facilities have been assigned to the "multiple" category according to all the SIC codes they reported. Forms and amounts in pounds have been assigned to single-category SIC codes if only one SIC code was reported for a particular chemical form from the facility.

[18] These combinations are taken in order reported on the TRI Form R. Facilities are asked to report their primary SIC code first. Therefore, a combination of "28 30" would be different from "30 28" in that the primary manufacturing operations at the facility fall under SIC code 28 (chemical manufacturing) in the first instance, but under 30 (plastics) in the second instance.

Table 1-18. Top 50 TRI Facilities with the Largest Air/Water/Land Releases, 1994.

Facility Name	City	State	SIC Code[19]	Forms[20] Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
Magnesium Corp. of America	Rowley	UT	33	7	55,776,250	0	0	55,776,250
ASARCO Inc.	East Helena	MT	33	10	133,312	0	43,482,219	43,615,531
Courtaulds Fibers Inc.	Axis	AL	28	7	32,923,505	62,500	452,500	33,438,505
IMC-Agrico Co.	Mulberry	FL	Mult.	4	689,100	0	25,100,000	25,789,100
Lenzing Fibers Corp.	Lowland	TN	28	7	21,400,765	19,600	0	21,420,365
ASARCO Inc.	Hayden	AZ	33	9	827,521	0	17,081,434	17,908,955
Elkem Metals Co.	Marietta	OH	33	8	5,106,676	544,000	10,808,000	16,458,676
Northwestern Steel & Wire Co.	Sterling	IL	33	8	140,660	1,510	14,600,000	14,742,170
International Paper	Redwood	MS	26	10	14,265,850	2,690	0	14,268,540
PCS Phosphate Co. Inc.	Aurora	NC	28	7	3,565,879	0	10,172,700	13,738,579
Arcadian Fertilizer L.P.	Geismar	LA	28	14	1,537,306	11,363,925	442,894	13,344,125
IMC-Agrico Co.	St. James	LA	28	8	5,975,029	6,404,977	531,091	12,911,097
American Chrome & Chemicals	Corpus Christi	TX	28	5	91,120	21,900	9,900,000	10,013,020
Kennecott Utah Copper	Magna	UT	33	13	427,005	4,550	9,254,820	9,686,375
Phelps Dodge Hidalgo Inc.	Playas	NM	33	3	530,687	0	9,071,770	9,602,457
Doe Run Co.	Herculaneum	MO	33	9	256,355	1,107	8,981,911	9,239,373
Eastman Kodak Co.	Rochester	NY	38	65	7,557,431	312,477	652	7,870,560
Cyprus Miami Mining Corp.	Claypool	AZ	33	6	132,700	0	7,624,000	7,756,700
Chino Mines Co.	Hurley	NM	33	2	525,334	0	6,859,005	7,384,339
ASARCO Inc.	Annapolis	MO	33	6	232,845	340	7,068,912	7,302,097
Occidental Chemical Corp.	Castle Hayne	NC	28	4	4,847	30	6,900,610	6,905,487
Occidental Chemical Corp.	White Springs	FL	28	6	510,020	1,820	6,200,250	6,712,090
Tennessee Eastman	Kingsport	TN	28	71	5,982,030	440,296	52,423	6,474,749
U.S. Steel	Gary	IN	33	26	5,817,169	26,730	477,740	6,321,639
Dow Chemical Co.	Freeport	TX	28	88	5,938,140	195,530	68,080	6,201,750
GM Powertrain Defiance	Defiance	OH	33	22	659,071	9,244	5,384,450	6,052,765
CF Ind. Inc.	Donaldsonville	LA	28	10	5,564,199	208,805	0	5,773,004
Mississippi Chemical Corp.	Yazoo City	MS	28	5	4,631,163	737,591	0	5,368,754
GMC Powertrain	Saginaw	MI	33	20	289,008	0	5,001,117	5,290,125
Cabot Corp.	Ville Platte	LA	28	4	5,245,700	0	0	5,245,700
Granite City Steel	Granite City	IL	33	31	388,972	70,467	4,607,064	5,066,503
Chemetals Inc.	New Johnsonville	TN	28	5	233,738	791	4,776,180	5,010,709
Champion Intl. Corp.	Canton	NC	26	16	4,672,417	283,743	0	4,956,160
Unocal Agricultural Prods.	Kenai	AK	28	10	4,619,512	217,755	509	4,837,776
Kerr-McGee Chemical Corp.	Hamilton	MS	Mult.	8	161,806	45,400	4,626,000	4,833,206
Westvaco Corp.	Covington	VA	26	14	4,616,046	33,700	17,429	4,667,175
Cabot Corp.	Franklin	LA	28	4	4,415,000	0	0	4,415,000
Westinghouse Electric Corp.	Hampton	SC	30	11	4,389,840	41	0	4,389,881
Louisiana-Pacific Corp.	Samoa	CA	26	9	453,270	3,732,800	0	4,186,070
Westvaco Corp.	North Charleston	SC	26	12	4,053,000	47,472	0	4,100,472
Quantum Chemical Co.	Clinton	IA	28	13	4,085,460	0	0	4,085,460
Arcadian Fertilizer L.P.	Millington	TN	28	10	4,049,242	12,555	0	4,061,797
Arcadian Ohio L.P.	Lima	OH	28	9	3,987,100	36,910	0	4,024,010
IMC-Agrico Co.	Mulberry	FL	28	3	72,450	0	3,900,000	3,972,450
DuPont	Leland	NC	28	23	3,797,152	48,322	70,976	3,916,450
Eastman Chemical Co.	Longview	TX	28	41	3,889,960	7,300	9,620	3,906,880
Teepak Inc.	Danville	IL	30	4	3,829,736	0	0	3,829,736
American Tape Co.	Marysville	MI	26	2	3,788,464	0	0	3,788,464
Cabot Corp.	Tuscola	IL	28	2	3,698,763	0	0	3,698,763
Shell Oil Co.	Deer Park	TX	Mult.	54	3,287,992	15,660	330,643	3,634,295
Subtotal				745	249,226,597	24,912,538	223,854,999	497,994,134
Total for All TRI Facilities				75,322	1,556,008,085	66,083,288	289,151,126	1,911,242,499

[19] Mult. (multiple) means more than one SIC code reported in the range 20 through 39.

[20] Number of forms is all chemical forms reported by the facility regardless of whether or not air, water, or land releases were reported for a particular chemical.

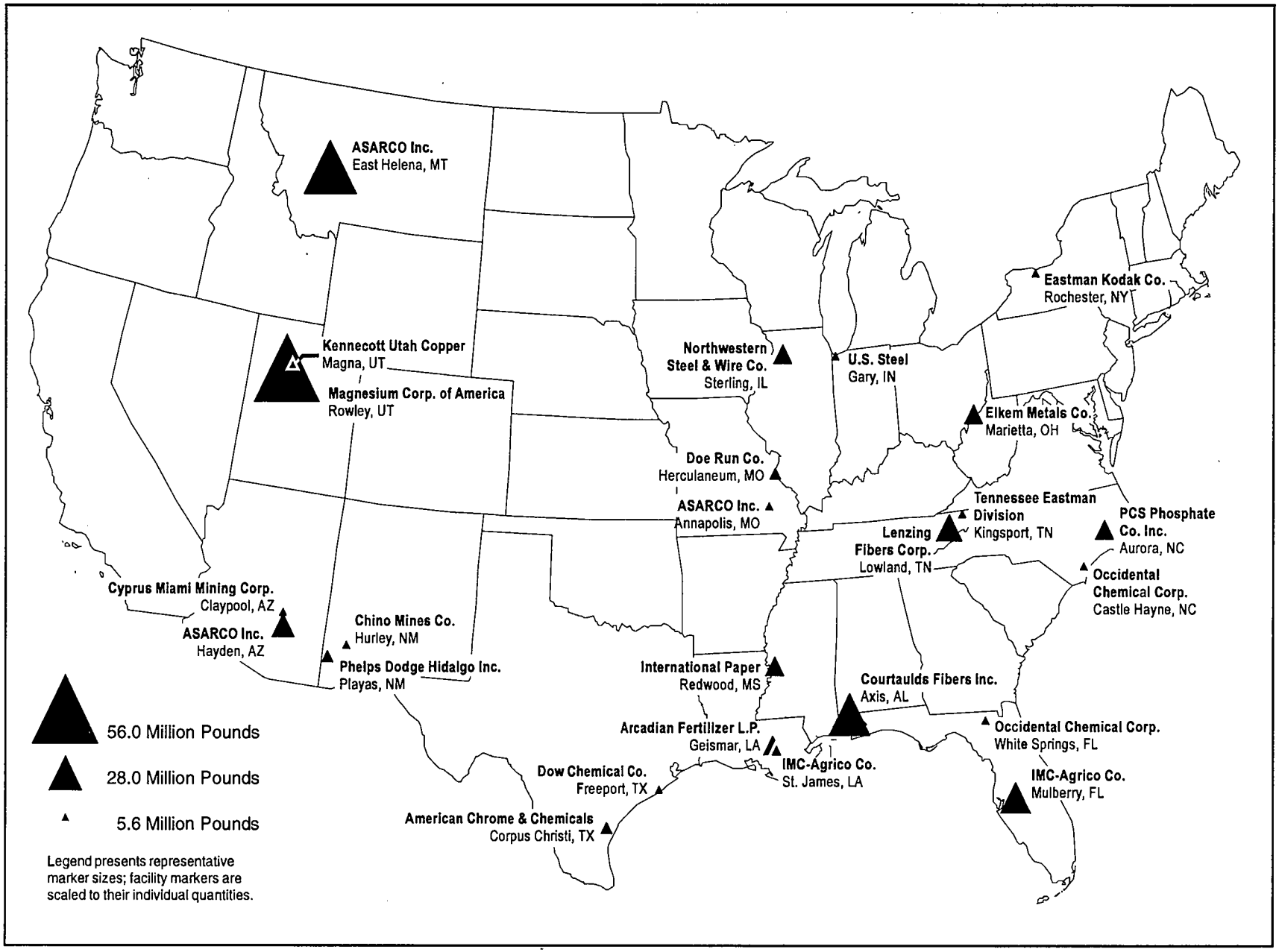

Figure 1-8. Top 25 TRI Facilities with the Largest Air/Water/Land Releases, 1994.

Table 1-19. Top 50 TRI Facilities with the Largest Total Releases, 1994.

Facility Name	City	State	SIC Code[21]	Forms[22] Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
DuPont	Pass Christian	MS	28	7	2,925,987	0	57,000,000	160	59,926,147
DuPont	New Johnsonville	TN	28	7	2,018,625	3,500	55,000,000	0	57,022,125
Magnesium Corp. of America	Rowley	UT	33	7	55,776,250	0	0	0	55,776,250
ASARCO Inc.	East Helena	MT	33	10	133,312	0	0	43,482,219	43,615,531
Courtaulds Fibers Inc.	Axis	AL	28	7	32,923,505	62,500	0	452,500	33,438,505
DuPont	Beaumont	TX	28	36	859,437	22,698	31,987,660	0	32,869,795
IMC-Agrico Co.	Mulberry	FL	Mult.	4	689,100	0	0	25,100,000	25,789,100
Coastal Chem Inc.	Cheyenne	WY	28	14	1,420,491	0	20,073,000	0	21,493,491
Lenzing Fibers Corp.	Lowland	TN	28	7	21,400,765	19,600	0	0	21,420,365
DuPont	Victoria	TX	28	33	562,154	1,849	20,514,642	24,085	21,102,730
Cytec Ind. Inc.	Westwego	LA	28	23	510,882	40,468	19,962,750	0	20,514,100
ASARCO Inc.	Hayden	AZ	33	9	827,521	0	0	17,081,434	17,908,955
Elkem Metals Co.	Marietta	OH	33	8	5,106,676	544,000	0	10,808,000	16,458,676
Northwestern Steel & Wire Co.	Sterling	IL	33	8	140,660	1,510	0	14,600,000	14,742,170
International Paper	Redwood	MS	26	10	14,265,850	2,690	0	0	14,268,540
PCS Phosphate Co. Inc.	Aurora	NC	28	7	3,565,879	0	0	10,172,700	13,738,579
Arcadian Fertilizer L.P.	Geismar	LA	28	14	1,537,306	11,363,925	0	442,894	13,344,125
IMC-Agrico Co.	St. James	LA	28	8	5,975,029	6,404,977	0	531,091	12,911,097
Cabot Corp.	Tuscola	IL	28	2	3,698,763	0	8,259,080	0	11,957,843
BP Chemicals Inc.	Port Lavaca	TX	28	19	124,238	850	11,247,640	29,321	11,402,049
Monsanto Co.	Cantonment	FL	28	24	93,130	799	10,022,144	0	10,116,073
American Chrome & Chemicals	Corpus Christi	TX	28	5	91,120	21,900	0	9,900,000	10,013,020
Kennecott Utah Copper	Magna	UT	33	13	427,005	4,550	0	9,254,820	9,686,375
Phelps Dodge Hidalgo Inc.	Playas	NM	33	3	530,687	0	0	9,071,770	9,602,457
BP Chemicals Inc.	Lima	OH	28	26	401,740	0	9,190,100	0	9,591,840
Doe Run Co.	Herculaneum	MO	33	9	256,355	1,107	0	8,981,911	9,239,373
Monsanto Co.	Alvin	TX	28	25	240,586	0	7,934,434	139,000	8,314,020
Sterling Chemicals Inc.	Texas City	TX	28	39	1,301,555	17,439	6,908,817	0	8,227,811
Eastman Kodak Co.	Rochester	NY	38	65	7,557,431	312,477	0	652	7,870,560
Cyprus Miami Mining Corp.	Claypool	AZ	33	6	132,700	0	0	7,624,000	7,756,700
Hoechst Celanese Chemical	Pasadena	TX	28	35	2,982,890	0	4,463,350	0	7,446,240
Chino Mines Co.	Hurley	NM	33	2	525,334	0	0	6,859,005	7,384,339
ASARCO Inc.	Annapolis	MO	33	6	232,845	340	0	7,068,912	7,302,097
Occidental Chemical Corp.	Castle Hayne	NC	28	4	4,847	30	0	6,900,610	6,905,487
Upjohn Co.	Portage	MI	28	27	2,576,876	401,455	3,797,750	0	6,776,081
Occidental Chemical Corp.	White Springs	FL	28	6	510,020	1,820	0	6,200,250	6,712,090
Tennessee Eastman Div.	Kingsport	TN	28	71	5,982,030	440,296	0	52,423	6,474,749
U.S. Steel	Gary	IN	33	26	5,817,169	26,730	0	477,740	6,321,639
Dow Chemical Co.	Freeport	TX	28	88	5,938,140	195,530	0	68,080	6,201,750
Great Lakes Chemical Corp.	El Dorado	AR	28	17	166,652	0	6,011,918	0	6,178,570
GM Powertrain Defiance	Defiance	OH	33	22	659,071	9,244	0	5,384,450	6,052,765
Angus Chemical Co.	Sterlington	LA	28	11	212,620	9,826	5,601,352	0	5,823,798
CF Ind. Inc.	Donaldsonville	LA	28	10	5,564,199	208,805	0	0	5,773,004
Kaiser Aluminum & Chemical	Mulberry	FL	28	1	0	0	5,482,541	0	5,482,541
Mississippi Chemical Corp.	Yazoo City	MS	28	5	4,631,163	737,591	0	0	5,368,754
AK Steel Corp.	Middletown	OH	33	16	476,205	17,230	4,110,000	761,030	5,364,465
GMC Powertrain	Saginaw	MI	33	20	289,008	0	0	5,001,117	5,290,125
Cabot Corp.	Ville Platte	LA	28	4	5,245,700	0	0	0	5,245,700
Granite City Steel	Granite City	IL	33	31	388,972	70,467	0	4,607,064	5,066,503
Monsanto Co.	Luling	LA	28	15	207,413	22,930	4,818,300	0	5,048,643
Subtotal				872	207,905,893	20,969,133	292,385,478	211,077,238	732,337,742
Total for All TRI Facilities				75,322	1,556,008,085	66,083,288	348,968,226	289,151,126	2,260,210,725

[21] Mult. (multiple) means more than one SIC code reported in the range 20 through 39.

[22] Number of forms is all chemical forms reported by the facility regardless of whether or not releases were reported for a particular chemical.

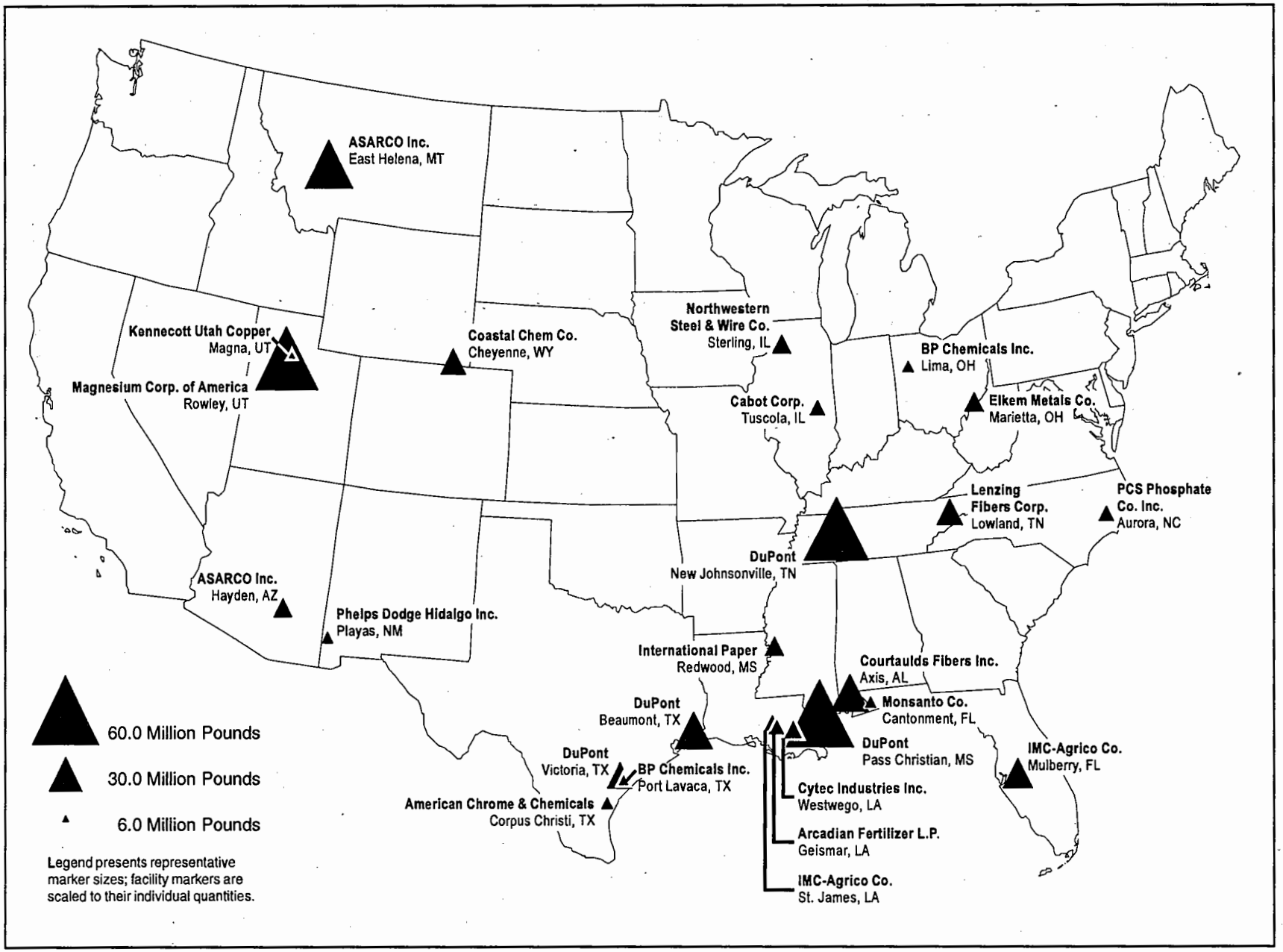

Figure 1-9. Top 25 TRI Facilities with the Largest Total Releases, 1994.

Table 1-20. Top 10 TRI Parent Companies with the Largest Air/Water/Land Releases, 1994.

Company Name	Facilities Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
ASARCO Inc.	11	91	1,535,675	11,767	67,648,452	69,195,894
Renco Group Inc.	12	52	56,515,642	7,988	9,560,691	66,084,321
IMC Global Inc.	13	60	7,846,007	9,277,722	30,623,077	47,746,806
International Paper	71	351	42,672,755	359,594	79,538	43,111,887
General Motors Corporation	112	874	25,835,142	35,382	10,971,222	36,841,746
Courtaulds United States Inc.	9	53	34,006,923	62,500	452,500	34,521,923
DuPont	70	751	32,420,732	927,694	333,289	33,681,715
Arcadian Partners LP	8	72	12,697,381	13,239,845	458,387	26,395,613
Georgia-Pacific Corporation	90	422	23,713,462	668,400	1,827,214	26,209,076
Ford Motor Company	50	543	25,732,230	42,795	250	25,775,275
Subtotal	446	3,269	262,975,949	24,633,687	121,954,620	409,564,256
Total for All TRI Facilities	22,744	75,332	1,556,008,085	66,083,288	289,151,126	1,911,242,499

Top 10 Parent Companies

This section summarizes TRI data by the parent companies of reporting facilities. Each facility is required to report the name of its parent company (if applicable) on the TRI Form R. The parent company is the company that owns or controls the facility. For TRI purposes, the parent company of a facility is defined as the highest-level company located in the United States that directly owns at least 50% of the voting stock of the company of which the facility is a part. In some cases, this information is omitted or the facility reports a company that is not the highest-level parent. For the purpose of this analysis, in cases where the ultimate parent was not identified, a parent company was assigned through a search of the most recent Dun and Bradstreet data using the facility-level information provided on the Form R.

Table 1-20 presents releases and number of forms and facilities attributable to the top 10 parent companies based on the sum of amounts released to air, water, and land. These parent companies accounted for only 2.0% of all facilities and 4.3% of all forms, yet they accounted for 21.4% of TRI releases to air, water, and land.

Table 1-21 presents releases and numbers of forms and facilities attributable to the top 10 parent companies for total TRI releases, including underground injection. Again, these parent companies accounted for only 1.9% of all facilities and 4.0% of all forms, yet they accounted for 25.7% of total TRI releases, including underground injection.

Table 1-21. Top 10 TRI Parent Companies with the Largest Total Releases, 1994.

Company Name	Facilities Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
DuPont	70	751	32,420,732	927,694	169,887,689	333,289	203,569,404
ASARCO Inc.	11	91	1,535,675	11,767	159,870	67,648,452	69,355,764
Renco Group Inc.	12	52	56,515,642	7,988	0	9,560,691	66,084,321
IMC Global Inc.	13	60	7,846,007	9,277,722	0	30,623,077	47,746,806
International Paper Company	71	351	42,672,755	359,594	0	79,538	43,111,887
General Motors Corporation	112	874	25,835,142	35,382	0	10,971,222	36,841,746
Courtaulds United States Inc.	9	53	34,006,923	62,500	0	452,500	34,521,923
Monsanto Company	27	264	3,941,932	455,721	22,774,878	218,560	27,391,091
Arcadian Partners LP	8	72	12,697,381	13,239,845	0	458,387	26,395,613
Georgia-Pacific Corporation	90	422	23,713,462	668,400	0	1,827,214	26,209,076
Subtotal	423	2,990	241,185,651	25,046,613	192,822,437	122,172,930	581,227,631
Total for All TRI Facilities	22,744	75,332	1,556,008,085	66,083,288	348,968,226	289,151,126	2,260,210,725

1994 TRI DATA BY CHEMICAL

This section presents chemical-specific TRI data for 1994, as well as data for certain groups of TRI chemicals, such as metals and ozone-depleting chemicals. Also included is information about the uses, toxicity, and environmental fate of the highest-volume TRI chemicals. The section concludes with a table which presents the summary release and transfer data for all TRI chemicals for which 1994 reports were received.

Ammonia Reporting

Significant changes recently were made to the reporting requirements for ammonia and ammonium compounds. Because of these changes, data users must convert reported quantities of aqueous ammonia to total aqueous ammonia values when analyzing the data. Box 1-3 explains the changes in reporting requirements for ammonia, ammonium sulfate (solution), and ammonium nitrate (solution) in detail. Table 1-22 illustrates these adjustment calculations at the national level. Note that, because the reporting requirement changes were made close to the deadline for 1994 reporting, facilities were allowed to report under either the old or the new requirements. Therefore, ammonium sulfate (solution) remains in the database for 1994, and ammonia values in the database may or may not represent 10% of total aqueous ammonia.

Use, Toxicity, and Environmental Fate Information

TRI chemicals exhibit a variety of adverse health and environmental effects. Box 1-4 shows the potential effects of the top 25 TRI chemicals for largest air/water/land releases.

Acute Toxicity: Toxicity that results from a single exposure to a chemical.

Carcinogenicity: The ability of a chemical to produce cancer.

Chronic Toxicity: Toxicity that often results from a repeated long-term exposure to a chemical, although chronic effects may result from short-term exposures. The adverse effects are produced on the thyroid, liver, kidney, spleen, gastrointestinal tract, and/or respiratory system.

An Explanation of the Modification to the Reporting Requirements for Aqueous Ammonia and the Delisting of Ammonium Sulfate (Solution) and Ammonium Nitrate (Solution)

On June 30, 1995 EPA finalized four actions in response to a petition to delete ammonium sulfate (solution) from the list of toxic chemicals subject to reporting under EPCRA Section 313. The four actions taken are summarized as follows: (1) deleted the sulfate portion of ammonium sulfate (solution) from the list of toxic chemicals and made the ammonia portion reportable under the ammonia listing, (2) required that threshold and release determinations for aqueous ammonia be based on 10% of the total aqueous ammonia present in aqueous solutions of ammonia, (3) modified the ammonia listing by adding the following qualifier: ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10% of total aqueous ammonia is reportable under this listing), and (4) removed the specific listing for ammonium nitrate (solution) although the ammonia portion is still reportable under the ammonia listing and as discussed below, ammonium nitrate is also reportable under the nitrate compounds category. All actions were effective for the 1994 reporting year for reports due July 1, 1995, with the exception of the deletion of the specific listing for ammonium nitrate (solution), which is effective for the 1995 reporting year for reports due July 1, 1996.

In previous reporting years there was a great deal of confusion as to what should be reported under the ammonia listing. The confusion was over the sources of aqueous ammonia that must be included and how aqueous ammonia should be reported. Modifying the ammonia listing by adding the above qualifier should result in more consistent and accurate reporting under this listing since it clarifies what is reportable. The requirement to only report 10% of total aqueous ammonia under the ammonia listing takes into account the fact that one form of ammonia is relatively more toxic to aquatic organisms and that under many environmental conditions this form makes up no more than 10% of total aqueous ammonia. The 10% reporting limit for aqueous ammonia means that some facilities will no longer meet reporting thresholds and that the pounds of aqueous ammonia reported as released and transferred from the facilities that do report may be lower. It is important to remember that the 10% reporting limit only applies to aqueous ammonia, anhydrous ammonia is still 100% reportable.

Although the listing for ammonium sulfate (solution) has been deleted from the list, the aqueous ammonia from this chemical is still reportable under the ammonia listing. Since this deletion came late in the reporting year a number of reports were filed for this chemical. Therefore, ammonium sulfate (solution) is still included in this data release in order to include the aqueous ammonia from this chemical. In order to determine the amount of aqueous ammonia from ammonium sulfate (solution) that should be added to the aqueous ammonia totals, the amount of ammonium sulfate (solution) is multiplied by 0.026. This represents 10% of the total aqueous ammonia present in ammonium sulfate (solution) since ammonia (as NH_3) makes up 26% of ammonium sulfate.

The removal of the ammonium nitrate (solution) listing will be reflected in next years data release. Like ammonium sulfate (solution), the aqueous ammonia from ammonium nitrate (solution) will still be reportable under the ammonia listing. In order to determine the amount of aqueous ammonia from ammonium nitrate (solution) that should be added to the aqueous ammonia totals, the amount of ammonium nitrate (solution) is multiplied by 0.021. This represents 10% of the total aqueous ammonia present in ammonium nitrate (solution) since ammonia (as NH_3) makes up 21% of ammonium nitrate. In addition, ammonium nitrate is also reportable under the nitrate compounds category which was added for the 1995 reporting year. Although this chemical is reportable under two listings, no double reporting of releases or transfers will occur since under the nitrate compounds category only the weight of the nitrate ion is included in calculations of releases and transfers.

In order to determine the quantity of total aqueous ammonia released to surface water, land, or underground injection, data users must multiply the reported quantity by 10. For example, to make use of the quantities reported for aqueous ammonia in any analysis of releases to surface waters, the reported amounts must be converted to total aqueous ammonia values. This is necessary in order to take into account site specific conditions of pH and temperature which determine the amount of total ammonia that will be present in the more aquatically toxic form. To convert the reported aqueous ammonia values to total ammonia, simply multiply amounts by 10. Table 1-22 shows aqueous ammonia totals recalculated to include aqueous ammonia from reports received on ammonium sulfate (solution) and ammonium nitrate (solution) plus the aqueous ammonia totals recalculated in terms of total aqueous ammonia.

Box 1-3. An Explanation of the Modification to the Reporting Requirements for Aqueous Ammonia and the Delisting of Ammonium Sulfate (Solution) and Ammonium Nitrate (Solution)

Table 1-22. Adjusted Ammonia Releases, 1994.

Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Ammonium nitrate (solution)	92,657	715,856	6,978,376	51,190,858	1,568,145	60,545,892
Ammonium sulfate (solution)	4,348	150,580	4,196,377	130,044	73,117	4,554,466
Ammonia	39,855,072	116,131,189	14,613,475	29,059,299	6,142,040	205,801,075
Re-calculated Ammonia[23]	39,857,131	116,150,137	14,869,127	30,137,688	6,176,872	207,190,955
Total Ammonia[24]	39,857,131	116,150,137	148,691,270	301,376,880	61,768,720	667,844,138

Developmental Toxicity: Any detrimental effect produced by exposure to the chemical during embryonic stages of development. These effects include structural abnormalities, functional abnormalities, growth retardation, or death of the fetus.

Reproductive Toxicity: Adverse effects on the reproductive system that may result from exposure to a chemical. These may include alterations in sexual behavior, fertility, pregnancy outcomes, or modifications in hormonal functions that are dependent on the integrity of this system.

Neurotoxicity: Adverse effects on the nervous system following exposure to a chemical.

Other Effects: Toxic effects can be caused by the degradation products of the parent compound.

Environmental Effects: Adverse effects on aquatic and terrestrial organisms, such as reduction in agricultural productivity, fish kills, and death of birds. Some chemicals can cause adverse effects by ozone depletion and eutrophication. (Eutrophication is a result of the overgrowth of algae whose death and decay may lead to depletion of dissolved oxygen in the water. Low levels of dissolved oxygen limit the type of aquatic organisms that can survive in the water, possibly resulting in fish kills.)

The following information on use, toxicity, and environmental fate is provided for the top 10 chemicals with the largest releases in 1994.

Methanol

Uses. Methanol is used as a solvent, as a raw material in the synthesis of organic chemicals, as a fuel, as a de-icing agent, and to denature ethanol.

Toxicity. Methanol is readily absorbed from the gastrointestinal tract and the respiratory tract, and is toxic to humans in moderate to high doses. In the body, methanol is converted into formaldehyde and formic acid. Observed toxic effects at high dose levels include central nervous system damage and blindness. Inhalation of methanol at relatively high doses affects the liver and blood in animals.

Methanol is expected to have low toxicity to aquatic organisms and is not likely to persist in water or to bioaccumulate in aquatic life.

[23] Includes aqueous ammonia from ammonium sulfate (solution) and ammonium nitrate (solution).

[24] Aqueous ammonia releases multiplied by a factor of 10 (applies only to surface water discharges, underground injection, and releases to land).

CAS Number[25]	Chemical	Health Effects	Acute	Cancer[26]	Chronic	Developmental	Reproductive	Neurotoxicity	Other[27]	Environmental Effects	Ecotoxicity	Smog Formation	Ozone Depletion
67-56-1	Methanol				✓				✓				
7664-41-7	Ammonia		✓								✓		
108-88-3	Toluene							✓				✓[28]	
1330-20-7	Xylene (mixed isomers)											✓[28]	
75-15-0	Carbon disulfide				✓	✓	✓	✓					
—	Zinc compounds		✓		✓	✓					✓		
78-93-3	Methyl ethyl ketone											✓	
7664-38-2	Phosphoric acid										✓		
7647-01-0	Hydrochloric acid		✓[29]		✓[30]								
75-09-2	Dichloromethane			✓	✓			✓					
7782-50-5	Chlorine		✓								✓		
—	Glycol ethers		✓		✓	✓	✓						
—	Copper compounds		✓		✓						✓		
—	Manganese compounds		✓		✓			✓			✓		
100-42-5	Styrene			✓				✓					
71-55-6	1,1,1-Trichloroethane												✓
74-85-1	Ethylene								✓			✓	
79-01-6	Trichloroethylene			✓									
71-36-3	n-Butyl alcohol				✓								
108-10-1	Methyl isobutyl ketone				✓				✓			✓	
7664-93-9	Sulfuric acid (acid aerosols)				✓						✓		
—	Chromium compounds		✓	✓[31]	✓	✓	✓				✓		
115-07-1	Propylene											✓	
463-58-1	Carbonyl sulfide		✓						✓				
—	Lead compounds		✓	✓[32]	✓	✓	✓	✓			✓		

Box 1-4. Potential Adverse Human Health and Environmental Effects of the Top 25 TRI Chemicals with the Largest Air/Water/Land Releases, 1994.[33]

[25] Compound categories do not have CAS numbers (—).
[26] Distinctions among cancer classifications are discussed in the OSHA carcinogen section of this chapter.
[27] Toxicity resulting from the metabolite or degradation product of the parent compound.
[28] Contributes to ozone formation in the lower atmosphere; however, the extent of contribution to smog formation is unknown.
[29] Concentrated solutions are corrosive.
[30] Aerosol forms.
[31] Chromium VI is carcinogenic.
[32] Inorganic compounds.
[33] Sources: Integrated Risk Management System, Hazardous Substances Data Bank, OPPT's Background Documents for Chemical Fact Sheets, EPCRA Section 313 Responses to Petitions, Agency for Toxic Substances and Disease Registry's *Toxicological Profiles,* and *Environmental Health Perspective,* Vol. 37, 1984.

Environmental Fate. Methanol reacts in air to produce formaldehyde, which contributes to formation of air pollutants. In the atmosphere, it can react with other chemicals or be washed out by rain. Methanol is readily degraded by microorganisms in soils and surface waters.

Ammonia

Uses. Ammonia is used in the manufacture of nitrogen compounds, including chemicals used as fertilizers or in making nylon and plastics. It is also used in refrigeration, paper and pulp production, explosives, cleaners, and metal-treating operations.

Toxicity. Anhydrous ammonia is a corrosive and severely irritating gas with a pungent odor; it is irritating to the skin, eyes, nose, throat, and upper respiratory system.

Aqueous ammonia is moderately toxic to aquatic organisms. Because it is a source of nitrogen, an essential element for aquatic plant growth, ammonia may contribute to eutrophication of standing or slow-moving surface water, particularly in nitrogen-limited waters, such as the Chesapeake Bay.

Environmental Fate. Ammonia combines with sulfate ions in the atmosphere and is washed out by rainfall, resulting in rapid return of ammonia to the soil and surface waters. Ammonia is a central compound in the environmental cycling of nitrogen. Ammonia in lakes, rivers, and streams is converted to nitrate.

Toluene

Uses. Toluene is a flammable liquid used in the manufacture of organic chemicals, as a solvent for paint, gums, and resins, and as an additive for gasoline.

Toxicity. Inhalation or ingestion of toluene can cause headaches, confusion, weakness, and memory loss. Toluene may also affect the way the kidneys and liver function. Some studies have shown that unborn animals were harmed when high levels of toluene were inhaled by their mothers, although the same effects were not seen when the mothers were fed large quantities of toluene.

Reactions of toluene in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Environmental Fate. As a volatile organic chemical, toluene will react with other atmospheric components in the lower atmosphere, contributing to the formation of ozone and other air pollutants. The majority of releases to land and water will evaporate. Toluene may also be degraded by microorganisms.

Xylenes

Uses. Xylenes are used in the manufacture of organic chemicals as a raw material and as a solvent. They are also used as solvents for paints, coatings, adhesives, and rubbers.

Toxicity. Xylenes are rapidly absorbed into the body after inhalation, ingestion, or skin contact. Short-term exposure to high levels of xylenes can cause irritation of the skin, eyes, nose, and throat, difficulty in breathing, impaired lung function, impaired memory, and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations can cause headaches, dizziness, confusion, and lack of muscle coordination. Reactions of xylenes in the atmosphere contribute to the formation of ozone in the lower atmosphere.

Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Environmental Fate. The majority of releases to land and water will quickly evaporate, although some degradation by microorganisms will occur. Xylenes are moderately mobile in soils and may leach into groundwater, where they may persist for several years. As volatile organic chemical, xylenes will react with other atmospheric components in the lower atmosphere, contributing to the formation of ozone and other air pollutants.

Carbon Disulfide

Uses. Carbon disulfide is a flammable liquid used in the manufacture of rayon and organic chemicals such as carbon tetrachloride, as a fumigant, as a corrosion inhibitor, and in metal treating and plating.

Toxicity. Breathing large amounts of carbon disulfide can irritate the eyes, throat, and respiratory system and cause tremors, convulsions, and coma. Exposure to low levels may increase blood pressure and can cause coronary heart disease. Studies indicate that carbon disulfide can adversely affect the developing fetus.

Environmental Fate. Carbon disulfide is a volatile liquid. The majority of releases to land and water will evaporate into the atmosphere. Releases to land may leach into the ground, where the carbon disulfide may be degraded by microorganisms. In the atmosphere, carbon disulfide will react with oxygen and other chemicals to form atmospheric pollutants.

Zinc Compounds

Uses. Zinc is used as a coating on iron and steel and in making brass metal alloys. Zinc compounds are widely used in industry to make paint, rubber, dye, wood preservatives, and ointments.

Toxicity. Zinc compounds are listed on TRI primarily due to concerns for the toxicity of the parent metal, zinc. EPA has categorized zinc as a Group D carcinogen, meaning that sufficient evidence is not available to classify zinc as to its cancer-causing potential. EPA has established an oral reference dose (RfD) of 0.3 mg/kg/day for soluble zinc salts. Zinc has been shown to damage the developing fetus at doses as low as 100 mg/kg/day in animal studies.

Environmental Fate. Many zinc salts are highly soluble in water. Zinc and its salts are highly toxic to aquatic organisms. Zinc is likely to persist in water. Its concentration in aquatic tissue is expected to be significantly higher than its concentration in surrounding water.

Methyl Ethyl Ketone

Uses. Methyl ethyl ketone (MEK) is used as a solvent in protective coatings, adhesives, printing inks, and paint removers, in the production of magnetic tapes, and for dewaxing lubricating oils. It is also used as a chemical intermediate in numerous chemical reactions.

Toxicity. Breathing moderate amounts of MEK for short periods of time can cause adverse effects on the nervous system ranging from headaches, dizziness, nausea, and numbness in the fingers and toes to unconsciousness. Its vapors are irritating to the skin, eyes, nose, and throat and can damage the eyes. Repeated exposure to moderate to high amounts may cause liver and kidney effects.

Environmental Fate. MEK is a flammable liquid. Most of the MEK released to the environment will end up in air. MEK can contribute to the formation of air pollutants in the lower atmosphere. It can be degraded by microorganisms living in water and soil.

Phosphoric Acid

Uses. Phosphoric acid is used to make phosphate fertilizers and agricultural chemicals. It is also used in foods such as soft drinks, as a catalyst, and in treating metal surfaces.

Toxicity. Because it is a source of phosphorus, an essential element for aquatic plant growth, phosphoric acid may contribute to eutrophication of standing or slow-moving surface water, particularly in phosphorus-limited waters such as the Great Lakes.

Environmental Fate. The acidity of phosphoric acid may be reduced readily by natural water-hardness minerals. The phosphate will persist until used by plants as a nutrient.

Hydrochloric Acid

Uses. Hydrochloric acid has various uses, including neutralization of waste streams/pH adjustment of process waters, in the manufacture of chemicals, and in the cleaning and preparation of metals for coatings.

Toxicity. Concentrated hydrochloric acid is corrosive. However, hydrochloric acid is primarily a concern in its aerosol form. Acid aerosols have been implicated in causing and exacerbating a variety of respiratory ailments.

Accidental releases of solution forms of hydrochloric acid may adversely affect aquatic life by inducing a transient lowering of the pH (i.e., increasing the acidity) of a surface water.

Environmental Fate. Releases of hydrochloric acid to surface waters and soils will be neutralized to an extent due to the buffering capacities of both systems. The extent of these reactions will depend on the characteristics of the specific environment.

Dichloromethane

Uses. Dichloromethane is used as a solvent for cellulose acetate, in degreasing, and as a cleaning fluid. It is also used as a solvent in food processing and as a pharmaceutic aid.

Toxicity. Exposure to dichloromethane may result in adverse liver and kidney effects. It is classified as a Group B2 chemical, or probable human carcinogen. It has been shown to cause cancer in animals in both oral and inhalation exposure studies.

Environmental Fate. Dichloromethane is likely to evaporate when exposed to air. It is expected to react in the lower atmosphere, but not expected to stay in the air long enough to reach the stratosphere (the upper layer of the atmosphere). Therefore, it is not considered a source of ozone-destroying chlorine atoms. Dichloromethane is not expected to persist in water or to bioaccumulate in aquatic life.

Chemical-Specific Data Tables

The following tables provide the 1994 TRI data by chemical. Table 1-23 lists the top 50 TRI chemicals with largest air, water, and land releases. Table 1-24 lists the top 50 TRI chemicals with the largest total releases, including underground injection.

Tables 1-25 to 1-33 provide the top 15 chemicals released to each medium and transferred off-site for each waste management activity.

Table 1-23. Top 50 TRI Chemicals with the Largest Air/Water/Land Releases, 1994.

CAS Number[34]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
67-56-1	Methanol	32,088,254	185,724,754	11,007,879	2,602,696	231,423,583
7664-41-7	Ammonia	39,855,072	116,131,189	14,613,475	6,142,040	176,741,776
108-88-3	Toluene	57,656,473	110,561,812	82,751	161,205	168,462,241
1330-20-7	Xylene (mixed isomers)	24,902,804	83,430,835	43,961	244,726	108,622,326
75-15-0	Carbon disulfide	3,735,747	79,582,068	62,529	80	83,380,424
—	Zinc compounds	1,891,457	3,063,796	1,438,199	75,174,770	81,568,222
78-93-3	Methyl ethyl ketone	27,184,737	51,440,202	108,385	51,794	78,785,118
7664-38-2	Phosphoric acid	282,950	751,694	20,900,384	56,785,731	78,720,759
7647-01-0	Hydrochloric acid	3,489,997	69,181,592	25,991	263,737	72,961,317
75-09-2	Dichloromethane	25,022,843	37,687,647	52,289	50,845	62,813,624
7782-50-5	Chlorine	1,276,642	58,502,168	516,005	63,098	60,357,913
—	Glycol ethers	10,455,326	38,065,248	292,472	50,785	48,863,831
—	Copper compounds	3,236,400	2,131,573	83,187	41,449,920	46,901,080
—	Manganese compounds	1,125,401	1,842,932	733,537	37,796,986	41,498,856
100-42-5	Styrene	13,761,915	25,587,630	75,579	480,863	39,905,987
71-55-6	1,1,1-Trichloroethane	20,070,741	17,981,336	1,980	2,732	38,056,789
74-85-1	Ethylene	14,668,769	20,601,567	27,438	0	35,297,774
79-01-6	Trichloroethylene	14,788,788	15,083,085	1,671	4,417	29,877,961
71-36-3	n-Butyl alcohol	6,412,269	21,838,819	50,681	2,161	28,303,930
108-10-1	Methyl isobutyl ketone	6,847,214	18,429,655	80,177	12,925	25,369,971
7664-93-9	Sulfuric acid (acid aerosols)	1,444,190	22,514,638	212,138	515,147	24,686,113
—	Chromium compounds	174,722	332,632	158,795	20,636,107	21,302,256
115-07-1	Propylene	12,361,218	8,090,630	4,584	0	20,456,432
463-58-1	Carbonyl sulfide	77,490	17,068,681	0	0	17,146,171
—	Lead compounds	507,374	894,106	53,431	14,656,876	16,111,787
75-07-0	Acetaldehyde	1,277,627	10,869,272	282,750	20,352	12,450,001
100-41-4	Ethylbenzene	3,258,605	8,844,428	10,978	54,286	12,168,297
50-00-0	Formaldehyde	1,803,777	9,674,746	388,750	149,116	12,016,389
107-21-1	Ethylene glycol	5,300,772	4,354,999	784,402	1,051,939	11,492,112
67-66-3	Chloroform	3,450,479	7,472,557	362,812	11,667	11,297,515
127-18-4	Tetrachloroethylene	4,671,751	5,530,378	3,872	4,349	10,210,350
7440-66-6	Zinc (fume or dust)	767,882	896,245	28,373	8,462,944	10,155,444
71-43-2	Benzene	5,266,338	4,226,037	22,256	25,371	9,540,002
6484-52-2	Ammonium nitrate (solution)	92,657	715,856	6,978,376	1,568,145	9,355,034
7439-96-5	Manganese	551,291	229,593	88,895	8,484,764	9,354,543
110-82-7	Cyclohexane	3,532,751	5,145,330	31,695	18,138	8,727,914
108-95-2	Phenol	2,506,650	5,919,567	121,450	172,458	8,720,125
75-45-6	Chlorodifluoromethane (HCFC-22)	4,174,501	3,806,425	2,340	1,637	7,984,903
95-63-6	1,2,4-Trimethylbenzene	2,618,939	5,122,541	9,163	14,957	7,765,600
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	4,399,218	3,243,616	270	49,744	7,692,848
7664-39-3	Hydrogen fluoride	2,720,617	4,661,457	28,129	27,643	7,437,846
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	556,247	5,095,881	330	0	5,652,458
74-87-3	Chloromethane	949,731	4,115,002	59,463	34	5,124,230
76-13-1	Freon 113	3,337,957	1,738,081	1,504	0	5,077,542
75-71-8	Dichlorodifluoromethane (CFC-12)	3,004,180	1,867,929	431	0	4,872,540
7783-20-2	Ammonium sulfate (solution)	4,348	150,580	4,196,377	73,117	4,424,422
108-05-4	Vinyl acetate	1,397,331	2,629,552	1,386	1,775	4,030,044
106-42-3	p-Xylene	808,400	2,612,682	9,690	587	3,431,359
1634-04-4	Methyl tert-butyl ether	898,970	2,202,805	90,240	2,225	3,194,240
91-20-3	Naphthalene	1,744,636	1,322,113	28,179	47,014	3,141,942
	Subtotal	382,414,448	1,108,967,961	64,159,629	277,391,903	1,832,933,941
	Total for All TRI Chemicals	407,515,304	1,148,492,781	66,083,288	289,151,126	1,911,242,499

[34] Compound categories do not have CAS numbers (—).

Table 1-24. Top 50 TRI Chemicals with the Largest Total Releases, 1994.

CAS Number[35]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
67-56-1	Methanol	32,088,254	185,724,754	11,007,879	24,343,351	2,602,696	255,766,934
7647-01-0	Hydrochloric acid	3,489,997	69,181,592	25,991	141,990,565	263,737	214,951,882
7664-41-7	Ammonia	39,855,072	116,131,189	14,613,475	29,059,299	6,142,040	205,801,075
108-88-3	Toluene	57,656,473	110,561,812	82,751	496,440	161,205	168,958,681
1330-20-7	Xylene (mixed isomers)	24,902,804	83,430,835	43,961	313,711	244,726	108,936,037
75-15-0	Carbon disulfide	3,735,747	79,582,068	62,529	4,305	80	83,384,729
—	Zinc compounds	1,891,457	3,063,796	1,438,199	196,498	75,174,770	81,764,720
78-93-3	Methyl ethyl ketone	27,184,737	51,440,202	108,385	575,848	51,794	79,360,966
7664-38-2	Phosphoric acid	282,950	751,694	20,900,384	45,616	56,785,731	78,766,375
75-09-2	Dichloromethane	25,022,843	37,687,647	52,289	960,942	50,845	63,774,566
6484-52-2	Ammonium nitrate (solution)	92,657	715,856	6,978,376	51,190,858	1,568,145	60,545,892
7782-50-5	Chlorine	1,276,642	58,502,168	516,005	74,311	63,098	60,432,224
—	Glycol ethers	10,455,326	38,065,248	292,472	128,096	50,785	48,991,927
—	Copper compounds	3,236,400	2,131,573	83,187	214,308	41,449,920	47,115,388
—	Manganese compounds	1,125,401	1,842,932	733,537	5,930	37,796,986	41,504,786
100-42-5	Styrene	13,761,915	25,587,630	75,579	250,861	480,863	40,156,848
71-55-6	1,1,1-Trichloroethane	20,070,741	17,981,336	1,980	102	2,732	38,056,891
74-85-1	Ethylene	14,668,769	20,601,567	27,438	0	0	35,297,774
71-36-3	n-Butyl alcohol	6,412,269	21,838,819	50,681	1,777,216	2,161	30,081,146
79-01-6	Trichloroethylene	14,788,788	15,083,085	1,671	288	4,417	29,878,249
7664-93-9	Sulfuric acid (acid aerosols)	1,444,190	22,514,638	212,138	1,521,851	515,147	26,207,964
108-10-1	Methyl isobutyl ketone	6,847,214	18,429,655	80,177	131,600	12,925	25,501,571
7697-37-2	Nitric acid	686,983	1,846,305	167,499	18,269,660	395,050	21,365,497
—	Chromium compounds	174,722	332,632	158,795	38,061	20,636,107	21,340,317
115-07-1	Propylene	12,361,218	8,090,630	4,584	0	0	20,456,432
50-00-0	Formaldehyde	1,803,777	9,674,746	388,750	7,739,510	149,116	19,755,899
75-05-8	Acetonitrile	786,855	353,711	14,580	17,105,679	3,229	18,264,054
463-58-1	Carbonyl sulfide	77,490	17,068,681	0	0	0	17,146,171
107-21-1	Ethylene glycol	5,300,772	4,354,999	784,402	4,958,550	1,051,939	16,450,662
—	Lead compounds	507,374	894,106	53,431	1,263	14,656,876	16,113,050
75-07-0	Acetaldehyde	1,277,627	10,869,272	282,750	602,167	20,352	13,052,168
100-41-4	Ethylbenzene	3,258,605	8,844,428	10,978	633,842	54,286	12,802,139
108-95-2	Phenol	2,506,650	5,919,567	121,450	3,224,053	172,458	11,944,178
67-66-3	Chloroform	3,450,479	7,472,557	362,812	80,002	11,667	11,377,517
64-18-6	Formic acid	262,222	318,837	11,674	10,671,734	3,105	11,267,572
127-18-4	Tetrachloroethylene	4,671,751	5,530,378	3,872	4,051	4,349	10,214,401
7440-66-6	Zinc (fume or dust)	767,882	896,245	28,373	5	8,462,944	10,155,449
71-43-2	Benzene	5,266,338	4,226,037	22,256	223,103	25,371	9,763,105
7439-96-5	Manganese	551,291	229,593	88,895	10	8,484,764	9,354,553
110-82-7	Cyclohexane	3,532,751	5,145,330	31,695	192,409	18,138	8,920,323
75-45-6	Chlorodifluoromethane (HCFC-22)	4,174,501	3,806,425	2,340	0	1,637	7,984,903
95-63-6	1,2,4-Trimethylbenzene	2,618,939	5,122,541	9,163	187	14,957	7,765,787
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	4,399,218	3,243,616	270	0	49,744	7,692,848
7664-39-3	Hydrogen fluoride	2,720,617	4,661,457	28,129	2,924	27,643	7,440,770
79-10-7	Acrylic acid	254,532	222,593	1,928	6,436,000	113	6,915,166
107-13-1	Acrylonitrile	333,620	1,131,099	20,377	4,894,487	278	6,379,861
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	556,247	5,095,881	330	0	0	5,652,458
79-06-1	Acrylamide	8,815	7,164	2,677	5,198,814	155	5,217,625
74-87-3	Chloromethane	949,731	4,115,002	59,463	50,707	34	5,174,937
76-13-1	Freon 113	3,337,957	1,738,081	1,504	0	0	5,077,542
	Subtotal	376,889,610	1,102,062,009	60,052,061	333,609,214	277,669,115	2,150,282,009
	Total for All TRI Chemicals	407,515,304	1,148,492,781	66,083,288	348,968,226	289,151,126	2,260,210,725

[35] Compound categories do not have CAS numbers (—).

Table 1-25. Top 15 TRI Chemicals with the Largest Emissions to Air, 1994.

CAS Number[36]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Total Air Emissions Pounds
67-56-1	Methanol	32,088,254	185,724,754	217,813,008
108-88-3	Toluene	57,656,473	110,561,812	168,218,285
7664-41-7	Ammonia	39,855,072	116,131,189	155,986,261
1330-20-7	Xylene (mixed isomers)	24,902,804	83,430,835	108,333,639
75-15-0	Carbon disulfide	3,735,747	79,582,068	83,317,815
78-93-3	Methyl ethyl ketone	27,184,737	51,440,202	78,624,939
7647-01-0	Hydrochloric acid	3,489,997	69,181,592	72,671,589
75-09-2	Dichloromethane	25,022,843	37,687,647	62,710,490
7782-50-5	Chlorine	1,276,642	58,502,168	59,778,810
—	Glycol ethers	10,455,326	38,065,248	48,520,574
100-42-5	Styrene	13,761,915	25,587,630	39,349,545
71-55-6	1,1,1-Trichloroethane	20,070,741	17,981,336	38,052,077
74-85-1	Ethylene	14,668,769	20,601,567	35,270,336
79-01-6	Trichloroethylene	14,788,788	15,083,085	29,871,873
71-36-3	n-Butyl alcohol	6,412,269	21,838,819	28,251,088
	Subtotal	295,370,377	931,399,952	1,226,770,329
	Total for All TRI Chemicals	407,515,304	1,148,492,781	1,556,008,085

Table 1-26. Top 15 TRI Chemicals with the Largest Discharges to Surface Water, 1994.

CAS Number[36]	Chemical	Amount Not in Stormwater Pounds	Amount in Stormwater Pounds	Total Surface Water Discharges Pounds
7664-38-2	Phosphoric acid	13,152,284	7,748,100	20,900,384
7664-41-7	Ammonia	14,215,953	397,522	14,613,475
67-56-1	Methanol	10,992,432	15,447	11,007,879
6484-52-2	Ammonium nitrate (solution)	5,612,780	1,365,596	6,978,376
7783-20-2	Ammonium sulfate (solution)	4,195,156	1,221	4,196,377
—	Zinc compounds	947,229	490,970	1,438,199
107-21-1	Ethylene glycol	778,203	6,199	784,402
—	Manganese compounds	695,364	38,173	733,537
7782-50-5	Chlorine	515,781	224	516,005
50-00-0	Formaldehyde	382,836	5,914	388,750
67-66-3	Chloroform	362,212	600	362,812
123-91-1	1,4-Dioxane	305,771	0	305,771
—	Glycol ethers	292,175	297	292,472
75-07-0	Acetaldehyde	282,516	234	282,750
111-42-2	Diethanolamine	220,167	870	221,037
	Subtotal	52,950,859	10,071,367	63,022,226
	Total for All TRI Chemicals	55,814,451	10,268,837	66,083,288

[36] Compound categories do not have CAS numbers (—).

Table 1-27. Top 15 TRI Chemicals with the Largest On-site Underground Injection, 1994.

CAS Number[37]	Chemical	Underground Injection Pounds
7647-01-0	Hydrochloric acid	141,990,565
6484-52-2	Ammonium nitrate (solution)	51,190,858
7664-41-7	Ammonia	29,059,299
67-56-1	Methanol	24,343,351
7697-37-2	Nitric acid	18,269,660
75-05-8	Acetonitrile	17,105,679
64-18-6	Formic acid	10,671,734
50-00-0	Formaldehyde	7,739,510
79-10-7	Acrylic acid	6,436,000
79-06-1	Acrylamide	5,198,814
107-21-1	Ethylene glycol	4,958,550
107-13-1	Acrylonitrile	4,894,487
—	Cyanide compounds	3,239,418
108-95-2	Phenol	3,224,053
71-36-3	n-Butyl alcohol	1,777,216
	Subtotal	330,099,194
	Total for All TRI Chemicals	348,968,226

Table 1-28. Top 15 TRI Chemicals with the Largest On-site Releases to Land, 1994.

CAS Number[37]	Chemical	Releases to On-site Landfills Pounds	Releases to On-site Land Treatment Pounds	Releases to On-site Surface Impoundments Pounds	Other On-site Land Disposal Pounds	Total Releases to Land Pounds
—	Zinc compounds	16,431,905	65,273	5,245,216	53,432,376	75,174,770
7664-38-2	Phosphoric acid	8,292,486	213,669	11,696,724	36,582,852	56,785,731
—	Copper compounds	12,907,246	70,797	4,464,774	24,007,103	41,449,920
—	Manganese compounds	19,589,872	418,142	15,364,652	2,424,320	37,796,986
—	Chromium compounds	2,272,592	90,332	18,228,131	45,052	20,636,107
—	Lead compounds	2,668,217	5,225	1,384,297	10,599,137	14,656,876
7439-96-5	Manganese	7,622,120	40,500	119,543	702,601	8,484,764
7440-66-6	Zinc (fume or dust)	7,658,169	250	743,480	61,045	8,462,944
7664-41-7	Ammonia	166,659	4,697,975	1,162,920	114,486	6,142,040
67-56-1	Methanol	1,082,580	193,176	983,998	342,942	2,602,696
6484-52-2	Ammonium nitrate (solution)	200	654,878	516,696	396,371	1,568,145
—	Arsenic compounds	52,721	5	804,181	687,017	1,543,924
—	Nickel compounds	286,160	26,231	731,003	259,021	1,302,415
—	Antimony compounds	124,861	8,719	31,527	1,101,620	1,266,727
7440-47-3	Chromium	898,424	20	147,267	102,780	1,148,491
	Subtotal	80,054,212	6,485,192	61,624,409	130,858,723	279,022,536
	Total for All TRI Chemicals	85,964,064	7,346,237	63,045,007	132,795,818	289,151,126

[37] Compound categories do not have CAS numbers (—).

Table 1-29. Top 15 TRI Chemicals with the Largest Off-site Transfers for Recycling, 1994.

CAS Number[38]	Chemical	Solvents/ Organics[39] Recovery Pounds	Metals[40] Recovery Pounds	Other Reuse or Recovery Pounds	Acid[41] Regeneration Pounds	Transfer to Waste Broker-Recycling Pounds	Total Transfers to Recycling Pounds
7440-50-8	Copper	294,151	412,515,963	16,758,538	250	90,274,401	519,843,303
—	Lead compounds	20,532	282,822,929	9,616,096	0	1,101,556	293,561,113
—	Zinc compounds	49,219	195,508,623	44,823,243	12,282	7,026,890	247,420,257
7664-93-9	Sulfuric acid (acid aerosols)	59,285	217,153	53,841,595	152,442,041	1,459,666	208,019,740
—	Copper compounds	790	98,586,923	14,159,263	33,005	34,259,805	147,039,786
107-21-1	Ethylene glycol	104,211,725	0	14,813,744	0	1,205,615	120,231,084
7440-47-3	Chromium	387,550	73,445,898	2,696,600	0	30,458,688	106,988,736
7439-96-5	Manganese	1,400,326	38,494,326	31,407,072	0	15,971,788	87,273,512
7440-66-6	Zinc (fume or dust)	10,400	72,089,399	9,849,977	0	665,601	82,615,377
7440-02-0	Nickel	260,269	52,075,610	2,067,738	750	19,243,149	73,647,516
7647-01-0	Hydrochloric acid	23	2,412,614	33,035,377	13,920,749	8,425,710	57,794,473
7439-92-1	Lead	110,014	49,769,966	1,873,342	0	4,019,148	55,772,470
—	Manganese compounds	151	28,347,797	19,777,186	0	4,595,383	52,720,517
—	Chromium compounds	6,819	25,399,719	10,466,429	10,010	3,860,342	39,743,319
1330-20-7	Xylene (mixed isomers)	36,773,777	4,312	2,051,454	0	820,396	39,649,939
	Subtotal	143,585,031	1,331,691,232	267,237,654	166,419,087	223,388,138	2,132,321,142
	Total for All TRI Chemicals	315,592,959	1,408,777,556	317,174,397	168,687,889	245,888,147	2,456,120,948

Table 1-30. Top 15 TRI Chemicals with the Largest Off-site Transfers for Energy Recovery, 1994.

CAS Number[38]	Chemical	Energy Recovery Pounds	Transfers to Waste Broker-Energy Recovery Pounds	Total Transfers to Energy Recovery Pounds
108-88-3	Toluene	55,060,516	25,053,147	80,113,663
67-56-1	Methanol	64,150,227	12,372,609	76,522,836
1330-20-7	Xylene (mixed isomers)	55,604,208	20,355,567	75,959,775
78-93-3	Methyl ethyl ketone	34,040,082	12,260,915	46,300,997
75-65-0	tert-Butyl alcohol	29,565,056	289,012	29,854,068
108-10-1	Methyl isobutyl ketone	8,574,002	10,280,223	18,854,225
—	Glycol ethers	10,455,586	4,015,931	14,471,517
74-85-1	Ethylene	9,815,050	146,585	9,961,635
100-41-4	Ethylbenzene	6,750,227	2,306,923	9,057,150
7647-01-0	Hydrochloric acid	2,710	8,664,955	8,667,665
108-05-4	Vinyl acetate	6,596,464	1,258,927	7,855,391
71-36-3	n-Butyl alcohol	5,892,821	1,872,982	7,765,803
107-21-1	Ethylene glycol	6,535,421	1,147,891	7,683,312
75-05-8	Acetonitrile	5,345,324	204,350	5,549,674
100-42-5	Styrene	4,623,522	741,589	5,365,111
	Subtotal	303,011,216	100,971,606	403,982,822
	Total for All TRI Chemicals	352,197,372	112,009,111	464,206,483

[38] Compound categories do not have CAS numbers (—).
[39] Many of these quantities appear to be misreported, as a number of these chemicals are not solvents or organics.
[40] Many of these quantities appear to be misreported, as a number of these chemicals are not metals.
[41] Many of these quantities appear to be misreported, as a number of these chemicals are not acids.

Table 1-31. Top 15 TRI Chemicals with the Largest Off-site Transfers for Treatment, 1994.

CAS Number[42]	Chemical	Solidification/ Stabilization Pounds	Incineration/ Thermal Treatment Pounds	Incineration/ Insignificant Fuel Value Pounds	Wastewater Treatment Excluding POTW Pounds	Other Waste Treatment Pounds	Transfer to Waste Broker- Waste Treatment Pounds	Total Transfers to Treatment Pounds
7647-01-0	Hydrochloric acid	1,503,733	176,998	54,950	14,536,683	9,617,243	17,980,377	43,869,984
67-56-1	Methanol	8,206	17,208,125	3,476,313	10,155,162	526,702	885,722	32,260,230
120-82-1	1,2,4-Trichlorobenzene	0	429,259	30,089	28,981,490	0	750	29,441,588
108-88-3	Toluene	12,514	19,309,941	1,173,385	473,795	407,967	402,956	21,780,558
107-21-1	Ethylene glycol	495,301	9,493,858	450,594	4,837,238	115,921	651,358	16,044,270
7664-93-9	Sulfuric acid (acid aerosols)	1,446,315	1,588,381	17,639	6,533,597	3,454,007	970,015	14,009,954
75-09-2	Dichloromethane	4,428	4,555,231	5,044,672	260,799	50,956	1,542,657	11,458,743
7697-37-2	Nitric acid	493,912	26,197	16,365	4,623,515	4,261,147	1,073,410	10,494,546
—	Zinc compounds	7,494,476	253,896	675,267	753,177	951,385	168,342	10,296,543
1330-20-7	Xylene (mixed isomers)	53,369	6,239,312	979,405	392,045	493,829	418,543	8,576,503
7664-41-7	Ammonia	32,103	280,910	29,466	7,030,165	238,790	112,761	7,724,195
78-93-3	Methyl ethyl ketone	3,453	4,824,203	676,386	74,092	199,317	369,719	6,147,170
—	Lead compounds	4,268,269	753,938	51,214	230,276	40,004	25,524	5,369,225
—	Chromium compounds	3,767,525	202,364	239,444	171,063	475,835	48,072	4,904,303
79-00-5	1,1,2-Trichloroethane	0	4,377,796	317,480	11,000	250	50	4,706,576
	Subtotal	19,583,604	69,720,409	13,232,669	79,064,097	20,833,353	24,650,256	227,084,388
	Total for All TRI Chemicals	28,159,785	118,436,280	22,438,009	94,145,221	27,860,281	27,770,757	318,810,333

Table 1-32. Top 15 TRI Chemicals with the Largest Off-site Transfers to Publicly Owned Treatment Works (POTWs), 1994.

CAS Number[42]	Chemical	Transfers to POTWs Pounds
67-56-1	Methanol	92,593,278
7664-41-7	Ammonia	54,573,874
7647-01-0	Hydrochloric acid	19,241,520
107-21-1	Ethylene glycol	16,326,235
—	Glycol ethers	11,140,741
7783-20-2	Ammonium sulfate (solution)	10,824,126
7664-93-9	Sulfuric acid (acid aerosols)	6,514,351
6484-52-2	Ammonium nitrate (solution)	4,546,684
7664-38-2	Phosphoric acid	3,869,033
7697-37-2	Nitric acid	3,423,791
108-95-2	Phenol	2,811,469
50-00-0	Formaldehyde	2,698,561
64-18-6	Formic acid	1,899,062
71-36-3	n-Butyl alcohol	1,818,779
106-44-5	p-Cresol	1,723,189
	Subtotal	234,004,693
	Total for All TRI Chemicals	254,688,836

[42] Compound categories do not have CAS numbers (—).

Table 1-33. Top 15 TRI Chemicals with the Largest Off-site Transfers for Disposal, 1994.

CAS Number[43]	Chemical	Storage Only Pounds	Underground Injection Pounds	Landfill/ Surface Impoundment Pounds	Land Treatment Pounds
—	Zinc compounds	195,311	1,663,456	86,851,118	38,690
—	Manganese compounds	19,451	3,237	22,197,290	3,403
—	Lead compounds	32,385	4,372	19,578,051	2,700
7440-50-8	Copper	1,155,075	9,148	4,988,516	4,608
7439-96-5	Manganese	4,995	4,389	11,297,180	3,815
7429-90-5	Aluminum (fume or dust)	3,352	0	11,768,137	0
7647-01-0	Hydrochloric acid	1,430	10,138,099	309,222	7,000
—	Chromium compounds	57,352	392,710	9,964,362	9,730
—	Copper compounds	312,750	2,233	9,178,689	22,962
7664-93-9	Sulfuric acid (acid aerosols)	79,185	7,310,720	474,131	29,880
—	Barium compounds	60,490	18,260	4,542,721	3,782
7440-47-3	Chromium	51,910	51,771	4,133,196	22,374
—	Nickel compounds	25,379	52,278	4,566,215	4,603
8001-58-9	Creosote	29,500	5	4,056,089	0
100-42-5	Styrene	715	14,248	4,342,489	0
	Subtotal	2,029,280	19,664,926	198,247,406	153,547
	Total for All TRI Chemicals	3,067,971	29,070,858	234,368,369	5,755,841

Table 1-33.

Chemical	Other Land Disposal Pounds	Other Off-site Management Pounds	Transfers to Waste Broker-Disposal Pounds	Unknown Pounds	Total Transfers for Disposal Pounds
Zinc compounds	2,207,519	616,381	998,999	290,755	92,862,229
Manganese compounds	9,675	33,610	392,233	8,351	22,667,250
Lead compounds	400,750	16,924	453,062	53,926	20,542,170
Copper	94,305	7,203,734	391,087	26,731	13,873,204
Manganese	1,561,061	31,619	59,323	3,181	12,965,563
Aluminum (fume or dust)	440	250	615,284	6,901	12,394,364
Hydrochloric acid	10,080	1,204	1,762,308	8,696	12,238,039
Chromium compounds	127,736	26,584	345,968	14,827	10,939,269
Copper compounds	9,781	35,166	230,640	47,164	9,839,385
Sulfuric acid (acid aerosols)	64,846	55,695	201,986	26,069	8,242,512
Barium compounds	114,166	106,737	222,754	19,146	5,088,056
Chromium	273,517	70,880	173,249	31,908	4,808,805
Nickel compounds	53,845	12,639	23,082	6,179	4,744,220
Creosote	635,341	0	2,023	750	4,723,708
Styrene	7,395	4,118	34,954	4,397	4,408,316
Subtotal	5,570,457	8,215,541	5,906,952	548,981	240,337,090
Total for All TRI Chemicals	6,597,898	9,122,804	7,791,377	1,825,344	297,600,462

43 Compound categories do not have CAS numbers (—).

Metals and Metal Compounds

Both metals and their metal compounds are listed on TRI. The potential adverse human health and/or environmental effects associated with the metals and metal compounds reportable to TRI are listed in Box 1-5.

Under EPCRA section 313, facilities that manufacture, process, or otherwise use metal compounds report releases and/or transfers of only the metal portion of the metal compound. For example, a facility that releases a copper compound, such as copper sulfate, would report as a release only the weight of the copper, not the weight of the entire copper compound. This is done to capture information on the targeted portion of each member of the category, so that releases and transfers of a metal can be traced through the environment and can be compared from facility to facility.

Metals (including the metal portion of metal compounds) are different from other TRI chemicals because they do not degrade and are not destroyed. Other TRI-listed chemicals can be destroyed by sunlight, heat, microorganisms, or other chemicals. Although metals cannot be destroyed, they may be converted to a less toxic form. For example, many facilities convert hexavalent chromium (a known carcinogen) to the less toxic trivalent form before releasing or transferring it to off-site locations. Other metal waste may be treated before disposal so that the metal will be less likely to be transported through soils. Although such treatment may limit the availability of the metal to the environment, it does not destroy the metal.

Table 1-34 shows the releases of TRI metals and metal compounds in 1994. Note that a few other metals [for example, aluminum (fume or dust) and certain metal-containing pesticides] are also reportable to TRI but are not included in this table because they do not have associated compound categories. The large majority (89.5%) of releases of metals and metal compounds are land releases.

Table 1-35 shows the transfers of TRI metals and metal compounds in 1994. More than 2.02 billion pounds of metals and metal compounds were reported transferred off-site in 1994. This represents 53.3% of all transfers reported to TRI in 1994. Transfers of metals and metal compounds to recycling totalled 1.76 billion pounds, which represents 87.2% of all transfers of metals and metal compounds and nearly 78.0% of total releases and transfers of metals and metal compounds.

The metal recycling shown in Table 1-35 consists only of off-site recycling. Amounts of metals recaptured from waste by on-site recycling activities can be found in tables presented in Chapter 2.

Some facilities reported transfers of metals in waste off-site for treatment by POTWs. Treatment processes employed at POTWs may remove the metal from a waste stream or convert the metal into a less toxic form, but they do not destroy the metal. For example, public sewage treatment plants will remove some fraction of the metals during treatment of the waste stream when removing solid materials. The amounts removed are then generally sent to a landfill for disposal. The metal waste that is not removed remains in the wastewater and will pass through the treatment plant and into the aquatic environment.

Table 1-36 presents releases of metals and metal compounds to air, water, and land by state. These data are illustrated by Figure 1-10. Table 1-37 presents releases of metals and metal compounds to air, water, and land by industry. Figure 1-11 shows the industries releasing the largest quantities of metals and metal compounds. As one might expect, the primary metals industry accounts for the majority of metal releases to air/water/land, about 76.3%.

Chemical	Health Effects	Acute	Cancer	Chronic	Developmental	Reproductive	Neurotoxicity[44]	Environmental Effects	Ecotoxicity
Antimony and antimony compounds		✓	✓	✓	✓	✓			✓
Arsenic and arsenic compounds		✓	inorganic compounds[45]	✓	✓	✓	✓		
Barium and barium compounds		✓		✓					
Beryllium and beryllium compounds		✓	✓	✓					✓
Cadmium and cadmium compounds		✓	✓	✓	✓	✓	✓		✓
Chromium and chromium compounds		✓	hexavalent compounds	✓	✓	✓			✓
Cobalt and cobalt compounds		✓		✓	✓	✓[46]	✓		✓
Copper and copper compounds		✓		✓					✓
Lead and lead compounds		✓	inorganic compounds	✓	✓	✓	✓		✓
Manganese and manganese compounds		✓		✓	✓		✓		✓
Mercury and mercury compounds		✓		✓	✓[47]		✓		✓
Nickel and nickel compounds		✓[48]	✓	✓	✓	✓			✓
Selenium and selenium compounds		✓	✓[49]	✓					✓
Silver and silver compounds		✓		✓					✓
Thallium and thallium compounds		✓		✓	✓	✓			✓
Zinc and zinc compounds		✓		✓	✓				✓

Box 1-5. Potential Adverse Human Health and Environmental Effects of TRI Metals and Metal Compounds.

44 ATSDR *Toxicological Profiles.*
45 Organic compounds, however, can also cause this effect if they dissociate to give arsenic ion.
46 Cobalt chloride and cobalt sulfate; ATSDR *Toxicological Profile,* 1991.
47 Hazardous Substances Data Bank; Developmental and Reproductive Toxicology Database.
48 Primarily nickel carbonyl.
49 Selenium sulfide classified as B2 by EPA.

Table 1-34. TRI Releases of Metals and Metal Compounds, 1994.

Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Antimony and antimony compounds	45,045	67,815	144,148	40,224	1,276,953	1,574,185
Arsenic and arsenic compounds	21,557	75,702	8,492	60,400	1,548,807	1,714,958
Barium and barium compounds	178,040	222,300	59,270	250	590,301	1,050,161
Beryllium and beryllium compounds	1	1,508	38	0	39,860	41,407
Cadmium and cadmium compounds	8,941	50,628	2,029	170	58,472	120,240
Chromium and chromium	647,070	495,886	179,281	38,109	21,784,598	23,144,944
Cobalt and cobalt compounds	31,706	45,532	113,293	1,750	168,632	360,913
Copper and copper compounds	3,644,278	2,860,474	139,654	234,252	42,440,762	49,319,420
Lead and lead compounds	604,678	1,211,976	65,699	1,263	15,159,116	17,042,732
Manganese and manganese compounds	1,676,692	2,072,525	822,432	5,940	46,281,750	50,859,339
Mercury and mercury compounds	9,757	3,563	321	7	1,351	14,999
Nickel and nickel compounds	534,093	273,464	98,323	62,941	1,685,462	2,654,283
Selenium and selenium compounds	3,607	60,232	2,583	3,410	120,093	189,925
Silver and silver compounds	9,779	19,015	7,001	390	27,013	63,198
Thallium and thallium compounds	5	286	0	0	755	1,046
Zinc and zinc compounds(50)	2,659,339	3,960,041	1,466,572	196,503	83,637,714	91,920,169
Total	10,074,588	11,420,947	3,109,136	645,609	214,821,639	240,071,919

(50) Only fume and dust forms of zinc metal are reportable.

Table 1-35. TRI Transfers of Metals and Metal Compounds, 1994.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[51] Pounds	Total Transfers Pounds
Antimony and antimony compounds	6,903,600	35,139	575,554	137,638	4,374,853	951	12,027,735
Arsenic and arsenic compounds	1,132,763	3	1,055,344	487	1,750,099	0	3,938,696
Barium and barium compounds	1,801,316	96,852	1,516,664	210,931	5,310,814	11,332	8,947,909
Beryllium and beryllium compounds	326,368	0	1,079	1	11,467	0	338,915
Cadmium and cadmium compounds	3,078,180	2,717	170,555	3,013	1,922,889	0	5,177,354
Chromium and chromium	146,732,055	94,815	5,407,321	427,776	15,748,074	86,213	168,496,254
Cobalt and cobalt compounds	10,917,985	1,893	961,343	29,783	550,093	250	12,461,347
Copper and copper compounds	666,883,089	103,030	3,212,120	279,005	23,712,589	208,038	694,397,871
Lead and lead compounds	349,333,583	84,961	6,074,354	89,717	22,189,707	200,250	377,972,572
Manganese and manganese compounds	139,994,029	45,952	4,418,135	454,121	35,632,813	2,293,474	182,838,524
Mercury and mercury compounds	24,908	0	3,862	15	38,711	0	67,496
Nickel and nickel compounds	104,330,489	4,086	2,675,043	216,870	8,024,978	15,930	115,267,396
Selenium and selenium compounds	165,181	255	32,692	322	25,236	0	223,686
Silver and silver compounds	2,359,359	0	42,642	3,399	14,402	16,232	2,436,034
Thallium and thallium compounds	5,040	0	250	5	0	0	5,295
Zinc and zinc compounds[52]	330,035,634	547,937	10,986,023	511,232	95,846,553	73,060	438,000,439
Total	1,764,023,579	1,017,640	37,132,981	2,364,315	215,153,278	2,905,730	2,022,597,523

[51] Transfers reported without valid waste management codes.
[52] Only fume and dust forms of zinc metal are reportable.

Table 1-36. TRI Releases to Air, Water, and Land of Metals and Metal Compounds, by State, 1994.

State	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
Alabama	1,138,434	368,458	3,577,944	5,084,836
Alaska	68	0	4	72
American Samoa	0	0	0	0
Arizona	861,331	39	24,719,437	25,580,807
Arkansas	496,070	73,101	1,583,371	2,152,542
California	207,377	27,336	405,213	639,926
Colorado	73,024	1,124	76,750	150,898
Connecticut	65,207	27,508	1,080	93,795
Delaware	42,842	31,969	97,902	172,713
District of Columbia	0	0	17,300	17,300
Florida	116,218	3,570	262,759	382,547
Georgia	390,299	95,939	1,133,081	1,619,319
Hawaii	0	0	0	0
Idaho	24,726	5,900	507,630	538,256
Illinois	1,232,124	71,748	20,279,507	21,583,379
Indiana	1,813,319	121,270	1,862,017	3,796,606
Iowa	294,483	7,570	1,297,296	1,599,349
Kansas	125,215	4,447	268,147	397,809
Kentucky	243,184	39,404	214,678	497,266
Louisiana	121,263	112,633	2,087,113	2,321,009
Maine	30,632	19,974	611,878	662,484
Maryland	115,641	349,230	2,139,361	2,604,232
Massachusetts	91,005	2,474	14,600	108,079
Michigan	4,494,281	195,279	8,990,522	13,680,082
Minnesota	117,799	8,627	946,657	1,073,083
Mississippi	54,732	49,403	4,562,305	4,666,440
Missouri	950,457	8,244	16,284,147	17,242,848
Montana	129,007	76	43,482,272	43,611,355
Nebraska	245,933	15,931	236,382	498,246
Nevada	79,969	0	2,301,028	2,380,997
New Hampshire	17,227	97	2,413	19,737
New Jersey	212,337	12,571	133,536	358,444
New Mexico	185,351	1,003	15,931,055	16,117,409
New York	324,243	134,403	1,687,542	2,146,188
North Carolina	121,313	25,106	7,035,954	7,182,373
North Dakota	26,849	23	512	27,384
Ohio	1,992,765	176,469	21,596,234	23,765,468
Oklahoma	75,545	7,243	178,098	260,886
Oregon	112,302	17,248	391,669	521,219
Pennsylvania	1,544,865	137,338	1,536,125	3,218,328
Puerto Rico	10,799	1,840	1	12,640
Rhode Island	13,000	399	0	13,399
South Carolina	252,159	101,083	505,192	858,434
South Dakota	9,931	5	267	10,203
Tennessee	819,122	64,939	5,130,565	6,014,626
Texas	901,461	528,542	11,441,019	12,871,022
Utah	536,077	6,179	9,446,739	9,988,995
Vermont	884	0	260	1,144
Virgin Islands	0	47	1,601	1,648
Virginia	194,860	15,966	923,709	1,134,535
Washington	55,950	44,249	52,754	152,953
West Virginia	268,648	164,889	304,498	738,035
Wisconsin	263,582	28,243	560,397	852,222
Wyoming	1,625	0	1,118	2,743
Total	21,495,535	3,109,136	214,821,639	239,426,310

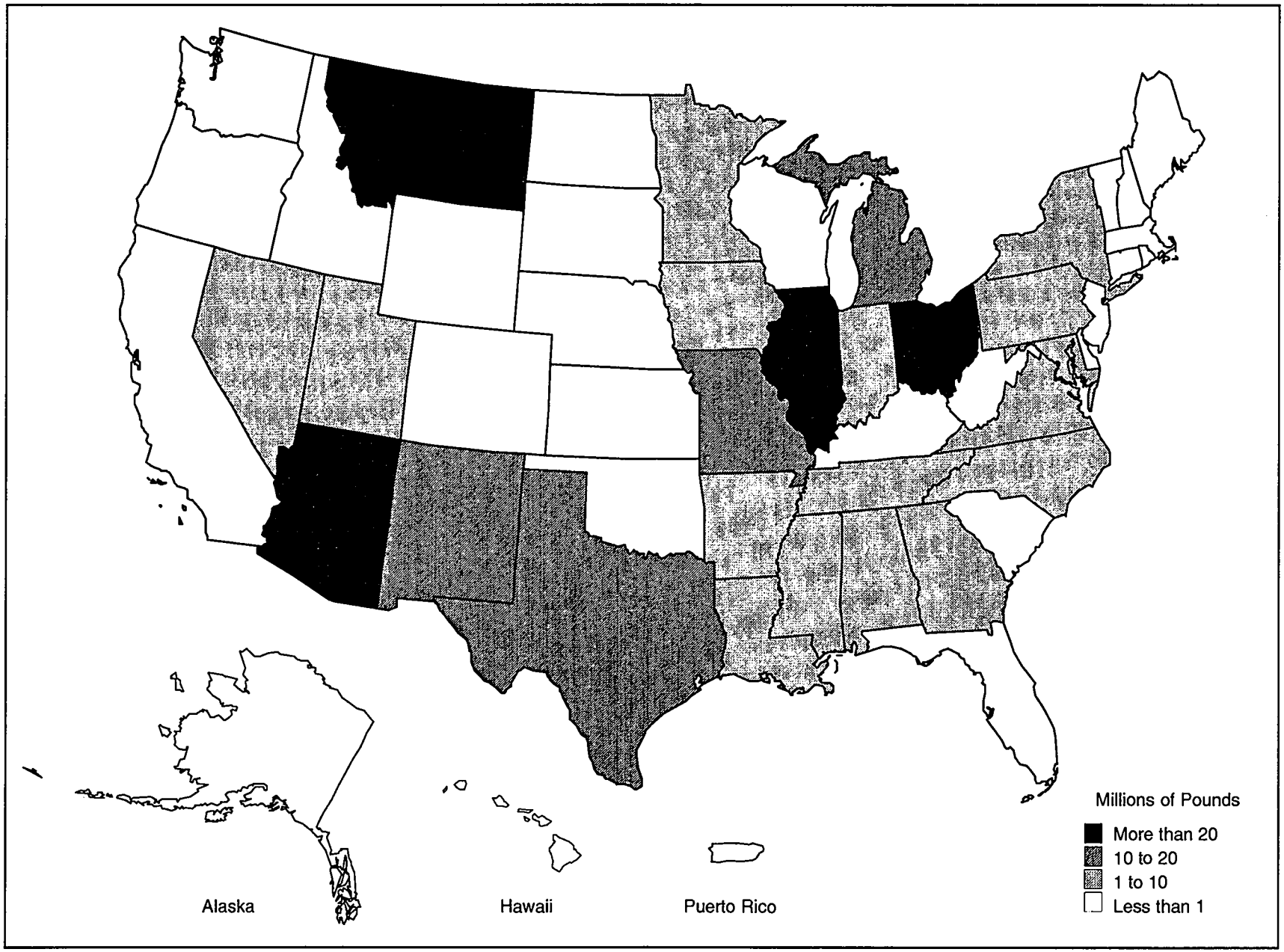

Figure 1-10. TRI Total Air/Water/Land Releases of Metals and Metal Compounds by State, 1994.

Table 1-37. TRI Releases to Air, Water, and Land of Metals and Metal Compounds, by Industry, 1994.

SIC Code	Industry	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
20	Food	88,989	2,219	434,636	525,844
21	Tobacco	0	0	0	0
22	Textiles	8,889	11,219	10,405	30,513
23	Apparel	923	3	25	951
24	Lumber	4,177	15,481	15	19,673
25	Furniture	126,751	210	798	127,759
26	Paper	353,607	266,567	3,123,308	3,743,482
27	Printing	12,166	170	270	12,606
28	Chemicals	1,006,200	790,476	29,779,235	31,575,911
29	Petroleum	123,371	114,509	221,560	459,440
30	Plastics	219,042	19,175	75,991	314,208
31	Leather	2,235	1,949	16,054	20,238
32	Stone/Clay/Glass	507,634	41,083	957,511	1,506,228
33	Primary Metals	11,264,293	1,448,326	169,859,597	182,572,216
34	Fabr. Metals	1,509,838	37,574	559,657	2,107,069
35	Machinery	278,615	8,980	68,847	356,442
36	Electrical Equip.	339,549	19,350	95,732	454,631
37	Transportation Equip.	713,931	28,107	64,413	806,451
38	Measure./Photo.	51,438	86,668	5,790	143,896
39	Miscellaneous	44,502	1,176	754	46,432
	Multiple codes 20-39 (53)	961,545	209,095	5,587,491	6,758,131
	No codes 20-39 (54)	3,877,840	6,799	3,959,550	7,844,189
	Total	21,495,535	3,109,136	214,821,639	239,426,310

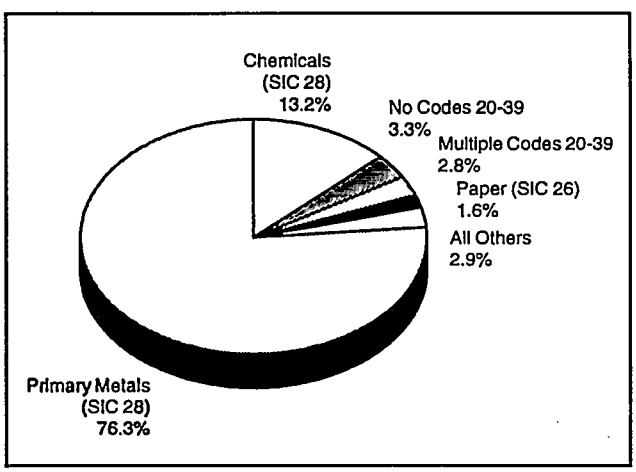

Figure 1-11. Top Industries for TRI Total Air/Water/Land Releases of Metals and Metal Compounds, 1994.

(53) Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
(54) Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

Ozone Depleters

Ozone depleters, such as chlorofluorocarbons (CFCs), halons, 1,1,1-trichloroethane (methyl chloroform), carbon tetrachloride, and bromomethane (methyl bromide), are known to release chlorine or bromine in the stratosphere (earth's upper atmosphere). Chlorine and bromine act as catalysts in the conversion of ozone to oxygen, thus reducing the amount of stratospheric ozone. Stratospheric ozone is important because it shields the earth from ultraviolet-B radiation. As the ozone layer diminishes, the amount of this harmful radiation reaching the earth's surface increases. These ozone depleters remain in the stratosphere for many decades; thus, emissions today will influence ozone levels far into the future.

Ultraviolet-B radiation has been shown to cause various adverse human health and environmental effects as described below.

Health Effects

Skin Cancer. Exposure to ultraviolet-B radiation has been implicated in two types of nonmelanoma skin cancer: squamous cell cancer and basal cell cancer. In addition, experimental evidence suggests that ultraviolet-B radiation plays an important role in causing malignant melanoma skin cancer. Recent studies predict that for each 1% change in ultraviolet-B radiation intensity, the incidence of melanoma could increase from 0.5% to 1%.

Other Health Effects. Results from some studies have demonstrated that ultraviolet-B radiation can suppress the immune response system in animals and possibly in humans.

The incidence of cataracts and adverse effects on the retina are likely to increase with ultraviolet-B radiation exposure.

Other studies have shown that increased penetration of ultraviolet-B radiation could increase the rate of tropospheric ozone formation. Data suggest that ozone exposure may lead to chronic health effects, including morphological changes to, and impaired functioning of, the lungs.

Environmental Effects

Aquatic organisms, particularly phytoplankton, zooplankton, and the larvae of many fishes, appear to be susceptible to harm from ultraviolet-B radiation because they spend at least part of their time at or near the surface of the waters they inhabit.

Plants have also been shown to be adversely affected by increased ultraviolet-B radiation. Possible effects include yield reductions and altering the balance of competition between plants.

Phase-out of Ozone Depleters

On September 16, 1987, the United States, along with 23 other nations and the European Economic Community, signed the "Montreal Protocol on Substances that Deplete the Ozone Layer." As a result of this protocol and newer scientific evidence, Congress mandated in the Clean Air Act Amendments that the production of CFCs and halons be phased out by the year 2000. The production of many Class I ozone depleters was banned as of January 1, 1996, based on findings by the National Aeronautics and Space Administration (NASA) that ozone depletion in the previous decade was more severe than had been predicted.

Interim substitutes, such as hydrochlorofluorocarbons (HCFCs), have also been found to decrease ozone in the stratosphere, but these chemicals have much lower ozone-depletion

Table 1-38. TRI Releases of Ozone Depleters, 1994.

CAS Number	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
353-59-3	Bromochlorodifluoromethane (Halon 1211)	965	5	0	0	0	970
74-83-9	Bromomethane	472,663	2,197,112	13	0	0	2,669,788
75-63-8	Bromotrifluoromethane (Halon 1301)	22,335	0	0	0	0	22,335
56-23-5	Carbon tetrachloride	226,057	392,870	1,223	12,654	0	632,804
75-45-6	Chlorodifluoromethane (HCFC-22)	4,174,501	3,806,425	2,340	0	1,637	7,984,903
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	556,247	5,095,881	330	0	0	5,652,458
63938-10-3	Chlorotetrafluoroethane	0	0	0	0	0	0
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	923	481,410	0	0	0	482,333
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	325,829	508,593	1,556	0	0	835,978
124-73-2	Dibromotetrafluoroethane (Halon 2402)	0	0	0	0	0	0
75-71-8	Dichlorodifluoromethane (CFC-12)	3,004,180	1,867,929	431	54	0	4,872,594
1717-00-6	1,1,-Dichloro-1-fluoroethane (HCFC-141b)	4,399,218	3,243,616	270	0	49,744	7,692,848
76-14-2	Dichlorotetrafluoroethane (CFC-114)	1,176,003	186,601	6,190	0	0	1,368,794
34077-87-7	Dichlorotrifluoroethane	250	5	0	0	0	255
90454-18-5	Dichloro-1,1,2-trifluoroethane	0	0	0	0	0	0
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	0	0	0	0	0	0
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	0	0	0	0	0	0
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	107,774	23,660	253	0	0	131,687
76-13-1	Freon 113	3,337,957	1,738,081	1,504	0	0	5,077,542
76-15-3	Monochloropentafluoroethane (CFC-115)	305,170	19,536	3,458	0	0	328,164
71-55-6	1,1,1-Trichloroethane	20,070,741	17,981,336	1,980	102	2,732	38,056,891
75-69-4	Trichlorofluoromethane (CFC-11)	835,924	2,157,087	1,452	11	0	2,994,474
	Total	39,016,737	39,700,147	21,000	12,821	54,113	78,804,818

potentials than CFCs. The HCFCs will serve as first-generation substitutes, but will themselves be phased out. On November 30, 1993, EPA added 11 HCFCs to the TRI list of reportable chemicals. The first TRI reports for these chemicals were submitted for the 1994 reporting year. (See Chemical List questions in Appendix A).

Releases and Transfers of Ozone Depleters

Table 1-38 shows the TRI releases of ozone-depleting chemicals in 1994. Table 1-39 shows the TRI transfers of ozone depleters in 1994.

Table 1-40 lists the amounts of ozone depleters released to air by state. The top five states for air releases of ozone depleters were California (14.6 million pounds), Kentucky (5.7 million pounds), Ohio (4.9 million pounds), Texas (4.3 million pounds), and Indiana (3.4 million pounds). Figure 1-12 maps this information for all states.

Table 1-41 presents air releases of ozone depleters by industry. The industries reporting the largest air releases of ozone depleters were

Table 1-39. TRI Transfers of Ozone Depleters, 1994.

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[55] Pounds	Total Transfers Pounds
353-59-3	Bromochlorodifluoromethane (Halon 1211)	0	0	0	0	0	0	0
74-83-9	Bromomethane	0	100	750	0	0	0	850
75-63-8	Bromotrifluoromethane (Halon 1301)	0	0	0	0	0	0	0
56-23-5	Carbon tetrachloride	850,623	17,314	1,172,726	574	50,710	0	2,091,947
75-45-6	Chlorodifluoromethane (HCFC-22)	259,501	128,936	70,225	10	130,235	0	588,907
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	0	0	6,720	0	0	0	6,720
63938-10-3	Chlorotetrafluoroethane	0	0	0	0	0	0	0
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	0	0	0	0	0	0	0
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	142,400	0	21,637	0	0	0	164,037
124-73-2	Dibromotetrafluoroethane (Halon 2402)	0	0	0	0	0	0	0
75-71-8	Dichlorodifluoromethane (CFC-12)	196,821	536	163,077	3,366	1,058	0	364,858
1717-00-6	1,1,-Dichloro-1-fluoroethane (HCFC-141b)	267,060	110,328	1,128,638	1,649	150,606	250	1,658,531
76-14-2	Dichlorotetrafluoroethane (CFC-114)	20,995	0	33,638	0	173	0	54,806
34077-87-7	Dichlorotrifluoroethane	0	0	0	0	0	0	0
90454-18-5	Dichloro-1,1,2-trifluoroethane	0	0	0	0	0	0	0
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	0	0	0	0	0	0	0
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	0	0	0	0	0	0	0
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	750	0	53,420	5	0	0	54,175
76-13-1	Freon 113	1,943,928	163,558	960,119	39,023	42,431	0	3,149,059
76-15-3	Monochloropentafluoroethane (CFC-115)	0	0	561	5	8	0	574
71-55-6	1,1,1-Trichloroethane	6,983,705	1,845,839	2,323,066	6,439	162,877	72,131	11,394,057
75-69-4	Trichlorofluoromethane (CFC-11)	146,379	197,690	250,798	43	24,676	0	619,586
	Total	10,812,162	2,464,301	6,185,375	51,114	562,774	72,381	20,148,107

chemicals (18.6 million pounds), plastics (12.9 million pounds), and transportation equipment (11.6 million pounds).

Uses of Ozone Depleters

CFCs and halons have various uses. A summary of the major uses follows:

- CFCs are used as refrigerants, with applications in household refrigerators and freezers, cold storage warehouses, refrigerated transport systems, and air conditioning.
- Some CFCs are used as blowing agents in the manufacture of foam plastics. The CFCs are used to create bubbles, or cells, in the plastic foam structure.
- 1,1,1-Trichloroethane and Freon 113 are used as industrial solvents in cleaning operations. The three major cleaning

[55] Transfers reported without valid waste management codes.

Table 1-40. TRI Releases to Air of Ozone Depleters, by State, 1994.

State	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Total Air Emissions Pounds
Alabama	507,300	1,273,071	1,780,371
Alaska	0	0	0
American Samoa	0	0	0
Arizona	275,016	467,167	742,183
Arkansas	693,936	732,353	1,426,289
California	8,102,929	6,500,365	14,603,294
Colorado	516,307	88,810	605,117
Connecticut	695,248	1,303,516	1,998,764
Delaware	1,825	9,400	11,225
District of Columbia	0	0	0
Florida	517,919	523,780	1,041,699
Georgia	759,412	822,319	1,581,731
Hawaii	0	0	0
Idaho	0	0	0
Illinois	1,035,794	1,446,963	2,482,757
Indiana	1,275,885	2,103,586	3,379,471
Iowa	530,483	183,391	713,874
Kansas	477,192	620,303	1,097,495
Kentucky	1,868,172	3,793,577	5,661,749
Louisiana	958,066	1,277,489	2,235,555
Maine	88,685	307,747	396,432
Maryland	181,508	100,398	281,906
Massachusetts	523,258	227,372	750,630
Michigan	1,036,990	718,076	1,755,066
Minnesota	616,004	319,807	935,811
Mississippi	922,387	166,402	1,088,789
Missouri	1,048,632	1,149,301	2,197,933
Montana	0	0	0
Nebraska	51,256	223,156	274,412
Nevada	49,956	7,918	57,874
New Hampshire	25,169	133,707	158,876
New Jersey	1,548,464	504,288	2,052,752
New Mexico	47,295	19,022	66,317
New York	990,550	642,631	1,633,181
North Carolina	1,620,399	1,584,545	3,204,944
North Dakota	2,375	34,005	36,380
Ohio	1,547,295	3,311,541	4,858,836
Oklahoma	162,671	103,746	266,417
Oregon	108,658	112,272	220,930
Pennsylvania	954,876	824,497	1,779,373
Puerto Rico	443,225	310,784	754,009
Rhode Island	132,623	1,071	133,694
South Carolina	1,503,073	1,100,731	2,603,804
South Dakota	26,784	51,936	78,720
Tennessee	1,251,629	1,660,205	2,911,834
Texas	2,737,229	1,518,786	4,256,015
Utah	763,133	981,963	1,745,096
Vermont	3,324	9,881	13,205
Virgin Islands	14,973	0	14,973
Virginia	1,218,732	744,565	1,963,297
Washington	516,777	113,116	629,893
West Virginia	232,434	1,244,098	1,476,532
Wisconsin	430,884	326,490	757,374
Wyoming	5	0	5
Total	39,016,737	39,700,147	78,716,884

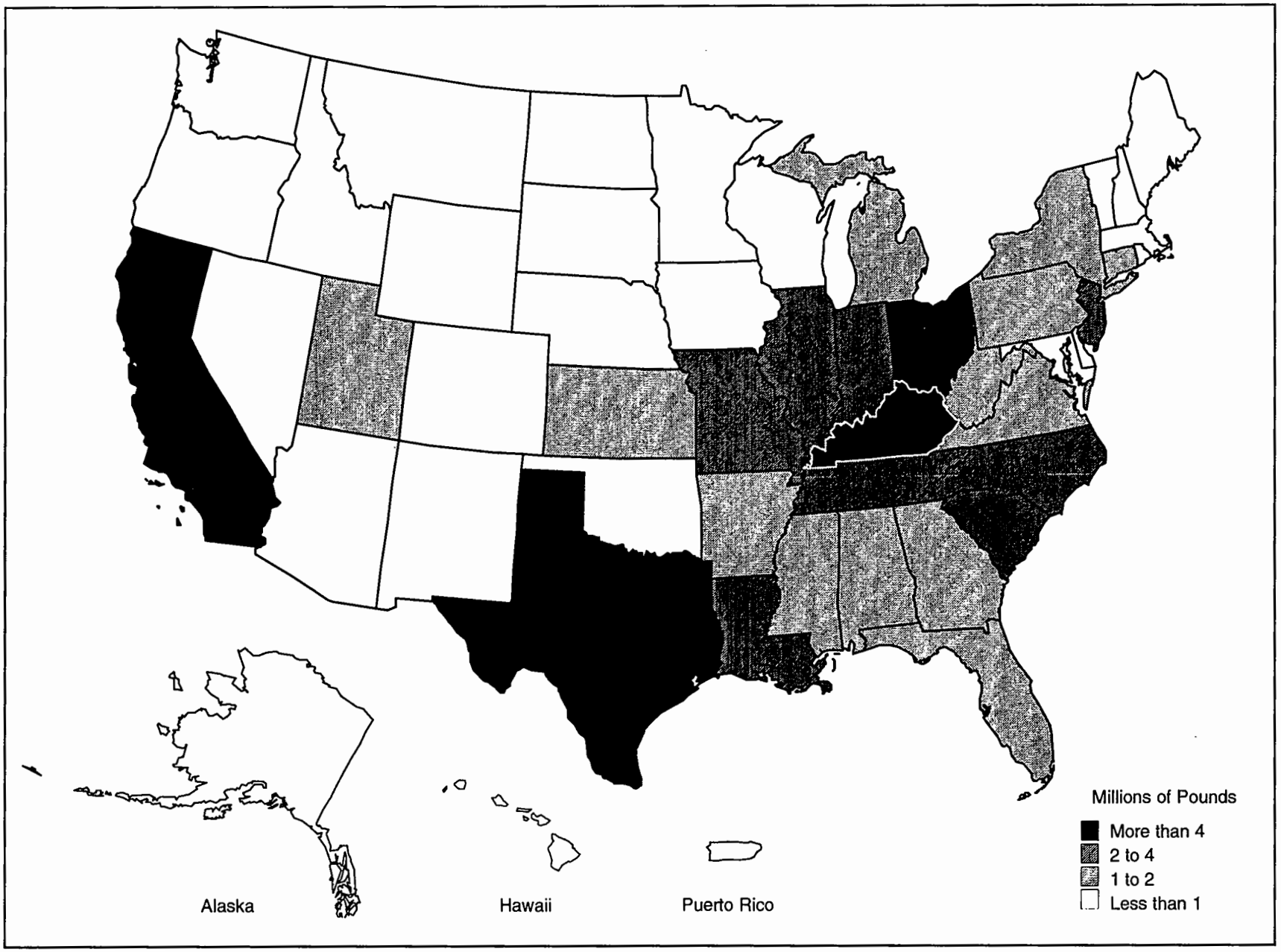

Figure 1-12. TRI Releases to Air of Ozone Depleters, by State, 1994.

Table 1-41. TRI Releases to Air of Ozone Depleters, by Industry, 1994.

SIC Code	Industry	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Total Air Emissions Pounds
20	Food	696,395	48,200	744,595
21	Tobacco	22,650	0	22,650
22	Textiles	435,081	34,139	469,220
23	Apparel	54,513	238,503	293,016
24	Lumber	137,098	71,436	208,534
25	Furniture	177,904	690,539	868,443
26	Paper	120,825	161,625	282,450
27	Printing	626,069	45,250	671,319
28	Chemicals	7,812,805	10,794,251	18,607,056
29	Petroleum	547,432	8,826	556,258
30	Plastics	6,165,769	6,743,413	12,909,182
31	Leather	17,851	20,047	37,898
32	Stone/Clay/Glass	108,295	132,411	240,706
33	Primary Metals	1,635,988	326,189	1,962,177
34	Fabr. Metals	2,642,470	2,200,658	4,843,128
35	Machinery	2,561,656	1,179,185	3,740,841
36	Electrical Equip.	1,868,126	3,878,922	5,747,048
37	Transportation Equip.	7,047,195	4,549,582	11,596,777
38	Measure./Photo.	1,718,972	2,142,070	3,861,042
39	Miscellaneous	310,749	414,879	725,628
	Multiple codes 20-39[56]	3,831,112	5,715,478	9,546,590
	No codes 20-39[57]	477,782	304,544	782,326
	Total	39,016,737	39,700,147	78,716,884

applications are metal cleaning, electronics cleaning, and precision cleaning.

- Halons, such as halon 1301 and halon 1211, are used in fire extinguishers, including portable systems used by military and commercial "crash/rescue" teams at airports, and in explosion protection devices.

- CFC-12 is widely used in combination with ethylene oxide to sterilize medical equipment and devices, in pharmaceutical production, and in spice fumigation.

- CFC-11 is used to puff leaves of tobacco to increase the volume of the tobacco used in cigarette production.

- 1,1,1-Trichloroethane is used as a solvent in adhesives, inks, and coatings, such as wood coatings, metal coatings, and aerospace coatings.

OSHA Carcinogens

Some chemicals on the TRI are listed because they are either known human carcinogens or suspect carcinogens. Known human carcinogens are those that have been shown to cause cancer in humans. Suspect carcinogens are those chemicals that have been shown to cause cancer in animals. Known and suspect carcinogens are highlighted on the TRI list because reportable *de minimis* concentration values are based on whether the chemical is considered to be an "OSHA Carcinogen" (see below). These known

[56] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
[57] Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

or suspect carcinogens are featured in this public data release package because these chemicals are specifically identified on the EPCRA section 313 toxic chemical list.

Clarification of the Basis for Carcinogen Listings on the EPCRA Section 313 List of Toxic Chemicals

Under section 313, a chemical does not have to be counted towards threshold and release calculations if it is present in a mixture below a certain concentration. This is known as the section 313 "*de minimis*" concentration in mixture. When the section 313 rule was developed, EPA adopted the *de minimis* percentages from the Occupational Safety and Health Administration's (OSHA) Hazard Communication Standards (29 CFR 1910.1200), because much of the information that industry would have relating to chemicals in mixtures would most likely be from the material safety data sheet (MSDS) on that mixture. The OSHA *de minimis* limitation is 0.1% if the chemical is a known or suspect carcinogen by virtue of appearing in one of three sources:

1. National Toxicology Program (NTP), "Annual Report on Carcinogens" (Latest Edition);

2. International Agency for Research on Cancer (IARC) "Monographs" (Latest Editions); or

3. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

The *de minimis* limitation is 1.0% for chemicals that do not meet the above OSHA carcinogen criteria. The carcinogen designation in the list of chemicals relates to any chemical that the Agency determined met the above OSHA criteria for the 0.1% *de minimis* limitation. Box 1-6 shows the specific bases for which the individual chemical was designated as a known or suspect carcinogen.

Certain metal compound categories have two *de minimis* limitations. For example, hexavalent chromium compounds and inorganic arsenic compounds meet the OSHA carcinogen criteria, while trivalent chromium compounds and organic arsenic do not meet the OSHA criteria. As release and transfer information on these groups are not reported separately, they were not included in Tables 1-42, 1-43, and 1-44 and Figures 1-13 and 1-14.

Table 1-42 provides the releases to air, water, and land for known or suspect carcinogens reported to TRI. Table 1-43 is a list of total releases of known or suspect carcinogens to air, water, and land by state, and Figure 1-13 is the corresponding map illustrating reporting by state. The states reporting the largest releases of carcinogens in 1994 were Texas (17.9 million pounds), Indiana (12.9 million pounds), and North Carolina (9.7 million pounds).

Table 1-44 presents total releases to air, water, and land of known or suspect carcinogens by industry. The plastics industry accounted for the largest quantity of carcinogen releases to air, water, and land, nearly 43.5 million pounds. The plastics industry accounted for only 6.2% of air/water/land releases of all chemicals, yet 24.5% of air/water/land releases of carcinogens. The chemicals industry ranked second, with 38.9 million pounds, or 21.9%. The paper industry was third, with 18.1 million pounds, while the transportation equipment industry was just behind, with 17.6 million pounds. Figure 1-14 shows the top 10 industries for releases of known or suspect carcinogens to air, water, and land.

Chemical	IARC[58]	NTP[59]	OSHA[60]
Acetaldehyde	2B	P	--
Acetamide	2B	--	--
2-Acetylaminofluorene	--	P	Z
Acrylamide	2B	P	--
Acrylonitrile	2A	P	Z
2-Aminoanthraquinone	--	P	--
4-Aminoazobenzene	2B	--	--
4-Aminobiphenyl	1	K	Z
1-Amino-2-methylanthraquinone	--	P	--
o-Anisidine	2B	--	--
o-Anisidine hydrochloride	--	P	--
Arsenic and inorganic arsenic compounds	1	K	Z
Asbestos (friable)	1	K	Z
Benzene	1	K	--
Benzidine	1	K	Z
Benzoic trichloride	2B	P	--
Beryllium	2A	P	--
Bis(chloromethyl)ether	1	K	Z
1,3-Butadiene	2B	P	--
C.I. Direct Black 38	2A	P	--
C.I. Direct Blue 6	2A	P	--
C.I. Direct Brown 95	2A	--	--
C.I. Food Red 5	2B	--	--
C.I. Solvent Yellow 34 (Auramine)	2B	--	--
Cadmium	2A	P	--
Carbon tetrachloride	2B	P	--
Chloroform	2B	P	--
Chloromethyl methyl ether	1	K	Z
Chlorophenols	2B	--	--
Chromium (VI) compounds	1	K	--
Creosote	2A	--	--
p-Cresidine	2B	P	--
Cupferron	--	P	--
2,4-Diaminoanisole	2B	--	--
2,4-Diaminoanisole sulfate	--	P	--
4,4'-Diaminodiphenyl ether	2B	--	--
Diaminotoluene (mixed isomers)	2B	P	--
2,4-Diaminotoluene	2B	P	--
1,2-Dibromo-3-chloropropane	2B	P	Z
1,2-Dibromoethane	2A	P	--
Dichlorobenzene (mixed isomers)	2B	P	--
1,4-Dichlorobenzene	2B	P	--
3,3'-Dichlorobenzidene	2B	P	Z
1,2-Dichloroethane	2B	P	--
Dichloromethane	2B	P	--
1,3-Dichloropropylene	2B	P	--
Diepoxybutane	2B	P	--
Di-(2-ethylhexyl)phthalate	2B	P	--
Diethyl sulfate	2A	P	--
3,3'-Dimethoxybenzidine	2B	P	--
4-Dimethylaminoazobenzene	2B	P	Z
3,3'-Dimethylbenzidine	2B	P	--
Dimethylcarbamyl chloride	2A	P	--
1,1-Dimethylhydrazine	2B	P	--
Dimethyl sulfate	2A	P	--
1,4-Dioxane	2B	P	--
1,2-Diphenylhydrazine	--	P	--
Epichlorohydrin	2A	P	--
Ethyl acrylate	2B	P	--
Ethyleneimine	--	--	Z
Ethylene oxide	2A	P	Z
Ethylene thiourea	2B	P	--
Formaldehyde	2A	P	--

Box 1-6. Basis of OSHA Carcinogen Listing for Individual Chemicals.

Chemical	IARC[58]	NTP[59]	OSHA[60]
Hexachlorobenzene	2B	P	--
Hexamethylphosphoramide	2B	P	--
Hydrazine	2B	P	--
Hydrazine sulfate	--	P	--
Lead and inorganic lead compounds	2B	--	Z
Lindane	2B	P	--
4,4-Methylenebis (2-chloroaniline)	2A	P	--
4,4'-Methylenebis (N,N-dimethyl) benzeneamine	2B	P	--
4,4'-Methylenedianiline	2B	P	--
Michler's ketone	--	P	--
Mustard gas	1	K	--
alpha-Naphthylamine	--	--	Z
beta-Naphthylamine	1	K	Z
Nickel	2B	P	--
Nickel compounds	1	P[61]	--
Nitrilotriacetic acid	--	P	--
4-Nitrobiphenyl	--	--	Z
Nitrofen	2B	P	--
Nitrogen mustard	2A	--	--
2-Nitropropane	2B	P	--
N-Nitrosodi-n-butylamine	2B	P	--
N-Nitrosodiethylamine	2A	P	--
N-Nitrosodimethylamine	2A	P	Z
N-Nitrosodi-n-propylamine	2B	P	--
N-Nitrosomethylvinylamine	2B	P	--
N-Nitrosomorpholine	2B	P	--
N-Nitroso-N-ethylurea	2A	P	--
N-Nitroso-N-methylurea	2A	P	--
N-Nitrosonornicotine	2B	P	--
N-Nitrosopiperidine	2B	P	--
Polybrominated biphenyls (PBBs)	2B	P	--
Polychlorinated biphenyls (PCBs)	2A	P	--
Propane sultone	2B	P	--
beta-Propiolactone	2B	P	Z
Propyleneimine	2B	P	--
Propylene oxide	2A	P	--
Saccharin (manufacturing)	2B	P	--
Safrole	2B	P	--
Styrene	2B	--	--
Styrene oxide	2A	--	--
Tetrachloroethylene	2B	P	--
Thioacetamide	2B	P	--
4,4'-Thiodianiline	2B	P	--
Thiourea	2B	P	--
Toluene-2,4-diisocyanate	2B	P	--
Toluene-2,6-diisocyanate	2B	P	--
Toluene diisocyanate (mixed isomers)	2B	P	--
o-Toluidine	2B	P	--
o-Toluidine hydrochloride	--	P	--
Toxaphene	2B	P	--
2,4,6-Trichlorophenol	2B	P	--
Tris(2,3-dibromopropyl)phosphate	2A	P	--
Urethane	2B	P	--
Vinyl bromide	2A	--	--
Vinyl chloride	1	K	Z

Box 1-6. Basis of OSHA Carcinogen Listing for Individual Chemicals, Cont.

[58] 1: The chemical is carcinogenic to humans; 2A: The chemical is probably carcinogenic to humans; 2B: The chemical is possibly carcinogenic to humans.

[59] K: The chemical is known to be carcinogenic; P: The chemical may reasonably be anticipated to be carcinogenic.

[60] Z: The chemical appears at 29 CFR Part 1910 Subpart Z.

[61] Certain nickel compounds.

Table 1-42. TRI Releases to Air, Water, and Land of OSHA Carcinogens, 1994 (Alphabetically Ordered).

CAS Number[52]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
75-07-0	Acetaldehyde	1,277,627	10,869,272	282,750	20,352	12,450,001
60-35-5	Acetamide	8	19	1	0	28
79-06-1	Acrylamide	8,815	7,164	2,677	155	18,811
107-13-1	Acrylonitrile	333,620	1,131,099	20,377	278	1,485,374
60-09-3	4-Aminoazobenzene	0	1	0	0	1
92-67-1	4-Aminobiphenyl	0	0	0	0	0
90-04-0	o-Anisidine	891	63	80	30	1,064
7440-38-2	Arsenic	9,272	7,937	890	4,883	22,982
1332-21-4	Asbestos (friable)	3,080	2,882	260	288,146	294,368
71-43-2	Benzene	5,266,338	4,226,037	22,256	25,371	9,540,002
92-87-5	Benzidine	31,606	0	0	0	31,606
98-07-7	Benzoic trichloride	2,832	36	0	0	2,868
7440-41-7	Beryllium	1	898	36	22,860	23,795
542-88-1	Bis(chloromethyl) ether	5	250	0	0	255
106-99-0	1,3-Butadiene	1,614,141	1,089,632	7,118	396	2,711,287
7440-43-9	Cadmium	2,651	7,412	1,264	4,146	15,473
56-23-5	Carbon tetrachloride	226,057	392,870	1,223	0	620,150
67-66-3	Chloroform	3,450,479	7,472,557	362,812	11,667	11,297,515
107-30-2	Chloromethyl methyl ether	11	2,728	5	0	2,744
—	Chlorophenols	1,991	6,630	39	1	8,661
7440-47-3	Chromium	472,348	163,254	20,486	1,148,491	1,804,579
8001-58-9	Creosote	569,696	780,506	5,444	660	1,356,306
120-71-8	p-Cresidine	881	130	81	50	1,142
135-20-6	Cupferron	2	9	0	0	11
101-80-4	4,4'-Diaminodiphenyl ether	14	102	1,653	12	1,781
25376-45-8	Diaminotoluene (mixed isomers)	15,213	6,500	3,666	57	25,436
95-80-7	2,4-Diaminotoluene	250	1,767	0	0	2,017
106-93-4	1,2-Dibromoethane	11,417	3,995	2,788	325	18,525
25321-22-6	Dichlorobenzene (mixed isomers)	316	3,726	0	0	4,042
106-46-7	1,4-Dichlorobenzene	114,912	142,276	1,595	1,100	259,883
91-94-1	3,3'-Dichlorobenzidine	5	5	0	0	10
107-06-2	1,2-Dichloroethane	660,811	1,210,095	7,446	15	1,878,367
75-09-2	Dichloromethane	25,022,843	37,687,647	52,289	50,845	62,813,624
542-75-6	1,3-Dichloropropylene	21,509	3,161	86	0	24,756
117-81-7	Di-(2-ethylhexyl) phthalate	124,650	330,957	962	103,756	560,325
64-67-5	Diethyl sulfate	6,305	622	10	5	6,942
94-58-6	Dihydrosafrole	52	500	0	0	552
119-90-4	3,3'-Dimethoxybenzidine	3	0	5	0	8
57-14-7	1,1-Dimethyl hydrazine	721	26	0	0	747
77-78-1	Dimethyl sulfate	5,351	1,416	300	0	7,067
123-91-1	1,4-Dioxane	121,132	109,760	305,771	2,266	538,929

Table 1-42. TRI Releases to Air, Water, and Land of OSHA Carcinogens, 1994 (Alphabetically Ordered), Cont.

CAS Number[62]	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
106-89-8	Epichlorohydrin	263,624	223,103	3,486	754	490,967
140-88-5	Ethyl acrylate	85,517	87,567	253	18	173,355
151-56-4	Ethyleneimine	0	0	0	0	0
75-21-8	Ethylene oxide	393,005	321,950	2,088	785	717,828
96-45-7	Ethylene thiourea	5	524	0	0	529
50-00-0	Formaldehyde	1,803,777	9,674,746	388,750	149,116	12,016,389
118-74-1	Hexachlorobenzene	323	112	269	0	704
302-01-2	Hydrazine	11,539	4,846	292	29	16,706
10034-93-2	Hydrazine sulfate	0	2	0	0	2
7439-92-1	Lead	97,304	317,870	12,268	502,240	929,682
58-89-9	Lindane	280	299	5	5	589
101-14-4	4,4'-Methylenebis (2-chloroaniline)	10	10	0	0	20
101-77-9	4,4'-Methylenedianiline	6,669	3,073	725	0	10,467
90-94-8	Michler's ketone	0	814	0	0	814
134-32-7	alpha-Naphthylamine	5	5	0	0	10
7440-02-0	Nickel	426,442	140,557	31,342	383,047	981,388
—	Nickel compounds	107,651	132,907	66,981	1,302,415	1,609,954
139-13-9	Nitrilotriacetic acid	8	5	2,748	0	2,761
79-46-9	2-Nitropropane	22,842	14,381	3,300	0	40,523
—	Polybrominated biphenyls	0	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	0	0	0	0	0
1120-71-4	Propane sultone	0	0	0	0	0
75-55-8	Propyleneimine	216	265	0	0	481
75-56-9	Propylene oxide	357,416	678,422	12,695	6,151	1,054,684
81-07-2	Saccharin (manufacturing)	60	20	0	0	80
100-42-5	Styrene	13,761,915	25,587,630	75,579	480,863	39,905,987
96-09-3	Styrene oxide	1	60	0	0	61
127-18-4	Tetrachloroethylene	4,671,751	5,530,378	3,872	4,349	10,210,350
62-56-6	Thiourea	1,155	2,017	3,539	250	6,961
584-84-9	Toluene-2,4-diisocyanate	9,705	25,736	0	0	35,441
91-08-7	Toluene-2,6-diisocyanate	3,019	5,484	0	0	8,503
26471-62-5	Toluenediisocyanate (mixed isomers)	15,288	35,157	0	250	50,695
95-53-4	o-Toluidine	9,770	2,365	534	6	12,675
88-06-2	2,4,6-Trichlorophenol	116	83	65	0	264
51-79-6	Urethane	11,050	0	0	0	11,050
593-60-2	Vinyl bromide	220	2,400	0	0	2,620
75-01-4	Vinyl chloride	340,426	725,809	377	6	1,066,618
	Subtotal	61,778,965	109,182,538	1,713,538	4,516,151	177,191,192
	Total for All TRI Chemicals	407,515,304	1,148,492,781	66,083,288	289,151,126	1,911,242,499

[62] Compound categories do not have CAS numbers (—).

Table 1-43. TRI Releases to Air, Water, and Land of OSHA Carcinogens, by State, 1994.

State	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
Alabama	7,136,547	98,986	45,013	7,280,546
Alaska	57,779	41,685	505	99,969
American Samoa	0	0	0	0
Arizona	860,550	1	96,332	956,883
Arkansas	2,479,739	34,184	700,241	3,214,164
California	5,257,276	125,382	7,292	5,389,950
Colorado	374,086	489	1,960	376,535
Connecticut	2,611,946	227,574	1,035	2,840,555
Delaware	539,444	851	33,927	574,222
District of Columbia	0	0	0	0
Florida	5,373,340	12,629	840	5,386,809
Georgia	6,919,312	26,964	44,847	6,991,123
Hawaii	36,855	0	255	37,110
Idaho	314,788	5,250	2,804	322,842
Illinois	6,285,711	12,887	215,298	6,513,896
Indiana	12,492,605	8,396	384,193	12,885,194
Iowa	1,853,029	2,081	49,796	1,904,906
Kansas	2,311,501	249	15,417	2,327,167
Kentucky	2,990,809	26,839	23,751	3,041,399
Louisiana	4,744,054	120,310	575,175	5,439,539
Maine	815,318	16,672	68	832,058
Maryland	1,028,375	5,688	29,843	1,063,906
Massachusetts	1,076,385	360	4,240	1,080,985
Michigan	5,354,499	16,415	248,103	5,619,017
Minnesota	2,945,904	8,608	28,988	2,983,500
Mississippi	8,111,440	22,475	17,198	8,151,113
Missouri	2,991,897	3,146	33,150	3,028,193
Montana	279,691	1,186	29,152	310,029
Nebraska	432,230	1,005	7,635	440,870
Nevada	53,985	0	0	53,985
New Hampshire	246,271	3,679	6,980	256,930
New Jersey	1,423,657	10,233	40,596	1,474,486
New Mexico	126,067	2	955	127,024
New York	4,253,179	149,030	19,926	4,422,135
North Carolina	9,615,740	40,312	5,292	9,661,344
North Dakota	171,200	18	1	171,219
Ohio	8,090,197	57,814	413,691	8,561,702
Oklahoma	2,355,823	1,628	13,288	2,370,739
Oregon	3,067,303	19,529	122,401	3,209,233
Pennsylvania	6,898,996	28,169	593,024	7,520,189
Puerto Rico	4,185,911	600	5	4,186,516
Rhode Island	131,237	10	0	131,247
South Carolina	5,817,414	99,405	47,049	5,963,868
South Dakota	115,138	0	264	115,402
Tennessee	6,834,657	103,372	17,138	6,955,167
Texas	17,478,697	80,348	348,110	17,907,155
Utah	890,889	0	18,748	909,637
Vermont	23,000	250	255	23,505
Virgin Islands	62,690	211	873	63,774
Virginia	4,530,768	16,637	12,457	4,559,862
Washington	3,274,907	237,365	1,897	3,514,169
West Virginia	2,445,428	17,520	73,029	2,535,977
Wisconsin	3,131,848	26,339	182,288	3,340,475
Wyoming	61,391	755	826	62,972
Total	170,961,503	1,713,538	4,516,151	177,191,192

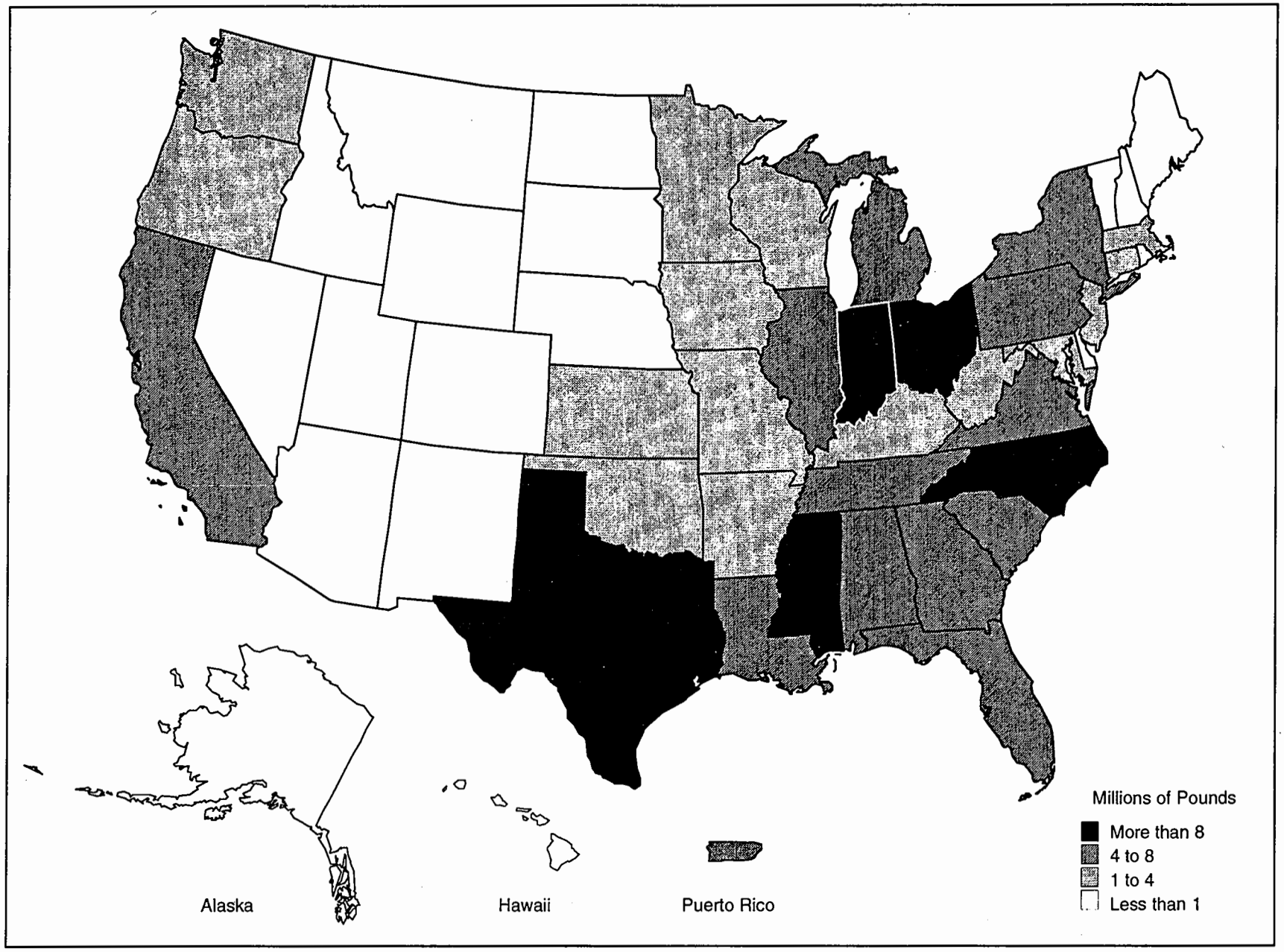

Figure 1-13. TRI Total Air/Water/Land Releases of OSHA Carcinogens by State, 1994.

Table 1-44. TRI Releases to Air, Water, and Land of OSHA Carcinogens, by Industry, 1994.

SIC Code	Industry	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
20	Food	449,336	325	24,543	474,204
21	Tobacco	0	0	0	0
22	Textiles	976,873	409	1	977,283
23	Apparel	74,807	0	0	74,807
24	Lumber	6,195,088	11,440	2,955	6,209,483
25	Furniture	1,356,325	210	13	1,356,548
26	Paper	17,606,790	505,284	37,092	18,149,166
27	Printing	324,043	0	250	324,293
28	Chemicals	37,334,864	691,909	842,337	38,869,110
29	Petroleum	3,930,843	25,286	37,573	3,993,702
30	Plastics	43,325,464	711	139,290	43,465,465
31	Leather	69,646	250	10,874	80,770
32	Stone/Clay/Glass	3,096,377	1,132	348,101	3,445,610
33	Primary Metals	3,971,388	64,137	2,563,538	6,599,063
34	Fabr. Metals	6,179,791	9,396	77,162	6,266,349
35	Machinery	1,972,927	2,283	49,028	2,024,238
36	Electrical Equip.	2,791,506	2,394	4,289	2,798,189
37	Transportation Equip.	17,601,535	7,699	17,793	17,627,027
38	Measure./Photo.	4,201,780	139,306	1,025	4,342,111
39	Miscellaneous	2,045,598	394	4,340	2,050,332
	Multiple codes 20-39 (63)	14,942,191	248,775	355,661	15,546,627
	No codes 20-39 (64)	2,514,331	2,198	286	2,516,815
	Total	170,961,503	1,713,538	4,516,151	177,191,192

RELEASES AND TRANSFERS OF ALL TRI CHEMICALS

The last table provided in this chapter (Table 1-45) is an alphabetical listing of all of the TRI chemicals reported in 1994 and their associated releases and transfers.

(63) Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
(64) Facilities/forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

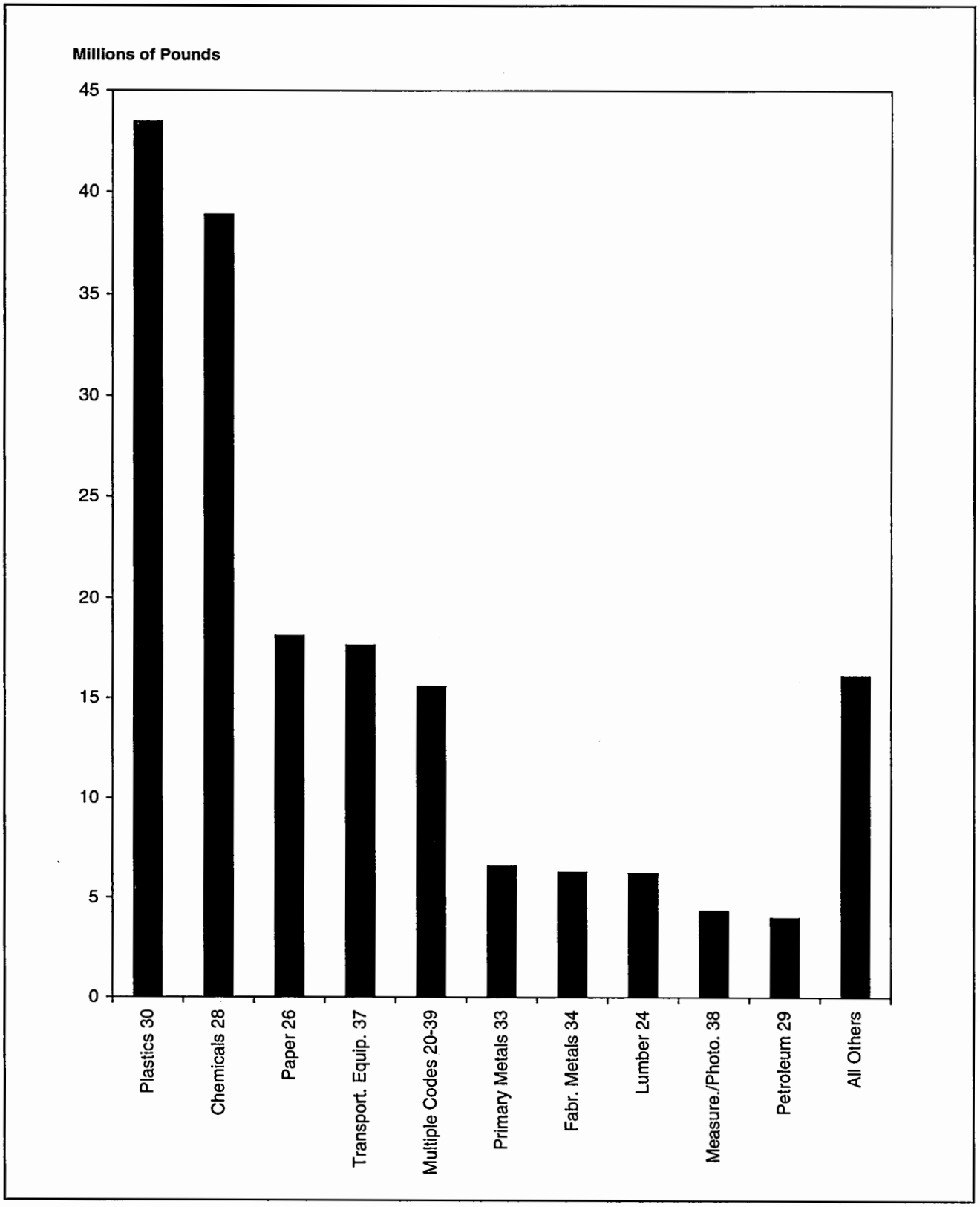

Figure 1-14. Top 10 Industries for TRI Total Air/Water/Land Releases of OSHA Carcinogens, 1994.

Table 1-45. Releases and Transfers of All TRI Chemicals, 1994 (Alphabetically Ordered).

CAS Number(65)	Chemical	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
75-07-0	Acetaldehyde	227	1,277,627	10,869,272	282,750	602,167	20,352	13,052,168
60-35-5	Acetamide	4	8	19	1	466,000	0	466,028
75-05-8	Acetonitrile	86	786,855	353,711	14,580	17,105,679	3,229	18,264,054
98-86-2	Acetophenone	35	168,984	113,646	584	413,881	1,967	699,062
107-02-8	Acrolein	17	6,342	55,306	440	107,999	0	170,087
79-06-1	Acrylamide	76	8,815	7,164	2,677	5,198,814	155	5,217,625
79-10-7	Acrylic acid	185	254,532	222,593	1,928	6,436,000	113	6,915,166
107-13-1	Acrylonitrile	114	333,620	1,131,099	20,377	4,894,487	278	6,379,861
107-18-6	Allyl alcohol	26	43,045	12,765	7,685	148,388	80	211,963
107-05-1	Allyl chloride	20	149,565	51,919	7	0	2	201,493
7429-90-5	Aluminum (fume or dust)	297	375,561	1,549,068	24,574	301	1,143,448	3,092,952
1344-28-1	Aluminum oxide (fibrous forms)	47	88,299	31,390	1,543	0	257	121,489
60-09-3	4-Aminoazobenzene	1	0	1	0	350	0	351
92-67-1	4-Aminobiphenyl	1	0	0	0	5	0	5
7664-41-7	Ammonia	2,978	39,855,072	116,131,189	14,613,475	29,059,299	6,142,040	205,801,075
6484-52-2	Ammonium nitrate (solution)	227	92,657	715,856	6,978,376	51,190,858	1,568,145	60,545,892
7783-20-2	Ammonium sulfate (solution)	173	4,348	150,580	4,196,377	130,044	73,117	4,554,466
62-53-3	Aniline	67	148,063	153,841	8,835	1,664,033	1,554	1,976,326
90-04-0	o-Anisidine	7	891	63	80	0	30	1,064
104-94-9	p-Anisidine	2	0	10	5	0	0	15
120-12-7	Anthracene	68	31,565	49,038	341	0	5,864	86,808
7440-36-0	Antimony	120	3,760	16,211	98,466	0	10,226	128,663
—	Antimony compounds	520	41,285	51,604	45,682	40,224	1,266,727	1,445,522
7440-38-2	Arsenic	89	9,272	7,937	890	0	4,883	22,982
—	Arsenic compounds	294	12,285	67,765	7,602	60,400	1,543,924	1,691,976
1332-21-4	Asbestos (friable)	85	3,080	2,882	260	0	288,146	294,368
7440-39-3	Barium	57	76,327	5,845	6,064	0	267,704	355,940
—	Barium compounds	618	101,713	216,455	53,206	250	322,597	694,221
98-87-3	Benzal chloride	3	163	12	0	0	0	175
71-43-2	Benzene	491	5,266,338	4,226,037	22,256	223,103	25,371	9,763,105
92-87-5	Benzidine(65)	1	31,606	0	0	0	0	31,606
98-07-7	Benzoic trichloride	5	2,832	36	0	0	0	2,868
98-88-4	Benzoyl chloride	20	11,719	1,972	0	0	0	13,691
94-36-0	Benzoyl peroxide	62	946	1,021	5	0	3,635	5,607
100-44-7	Benzyl chloride	48	16,851	6,282	49	23	126	23,331
7440-41-7	Beryllium	10	1	898	36	0	22,860	23,795
—	Beryllium compounds	8	0	610	2	0	17,000	17,612
92-52-4	Biphenyl	131	535,976	79,414	3,733	48,302	5,198	672,623
111-91-1	Bis(2-chloroethoxy) methane	1	12,260	250	0	0	0	12,510
111-44-4	Bis(2-chloroethyl) ether	11	2,835	395	7	0	0	3,237
542-88-1	Bis(chloromethyl) ether	2	5	250	0	0	0	255
108-60-1	Bis(2-chloro-1-methyl-ethyl) ether	2	1,800	3,090	3,026	0	1	7,917
103-23-1	Bis(2-ethylhexyl) adipate	148	204,494	491,309	1,226	0	147,565	844,594
353-59-3	Bromochlorodifluoro-methane (Halon 1211)	4	965	5	0	0	0	970
74-83-9	Bromomethane	48	472,663	2,197,112	13	0	0	2,669,788
75-63-8	Bromotrifluoromethane (Halon 1301)	5	22,335	0	0	0	0	22,335
106-99-0	1,3-Butadiene	177	1,614,141	1,089,632	7,118	0	396	2,711,287
141-32-2	Butyl acrylate	166	124,645	139,080	218	0	52	263,995
71-36-3	n-Butyl alcohol	1,145	6,412,269	21,838,819	50,681	1,777,216	2,161	30,081,146
78-92-2	sec-Butyl alcohol	112	485,968	508,969	5,902	143,443	5	1,144,287
75-65-0	tert-Butyl alcohol	81	632,095	377,091	179,786	690,183	111	1,879,266
106-88-7	1,2-Butylene oxide	15	5,341	4,702	210	0	0	10,253
123-72-8	Butyraldehyde	28	133,044	146,824	875	87,047	0	367,790
569-64-2	C.I. Basic Green 4	1	0	10	0	0	0	10

Table 1-45.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[67] Pounds	Total Transfers Pounds
Acetaldehyde	28,005	260,259	432,543	444,126	992	0	1,165,925
Acetamide	0	0	846	0	0	0	846
Acetonitrile	1,741,949	5,549,674	3,841,987	1,046,438	66,890	0	12,246,938
Acetophenone	8,766	542,741	37,749	15,433	19,138	0	623,827
Acrolein	0	11,893	3,857	0	0	0	15,750
Acrylamide	0	41,953	50,620	82,086	3,891	0	178,550
Acrylic acid	71,070	5,351,737	485,395	37,103	57,642	0	6,002,947
Acrylonitrile	100	425,040	835,031	169,644	8,738	0	1,438,553
Allyl alcohol	0	98,237	90,132	248,954	34,590	0	471,913
Allyl chloride	0	15,149	462,055	14	37	0	477,255
Aluminum (fume or dust)	27,911,571	245,466	147,542	9,167	12,394,364	0	40,708,110
Aluminum oxide (fibrous forms)	420,800	7,900	91,047	2,295	1,504,133	0	2,026,175
4-Aminoazobenzene	0	0	0	0	0	0	0
4-Aminobiphenyl	0	0	0	0	0	0	0
Ammonia	10,568,904	43,263	7,724,195	54,573,874	1,615,286	505	74,526,027
Ammonium nitrate (solution)	848,307	10,328	99,014	4,546,684	3,972,929	0	9,477,262
Ammonium sulfate (solution)	2,426,899	452	3,199,170	10,824,126	43,354	0	16,494,001
Aniline	0	1,124,207	592,205	1,542,912	126,195	0	3,385,519
o-Anisidine	0	0	0	2,171	1	0	2,172
p-Anisidine	0	0	0	5	0	0	5
Anthracene	38,652	65,121	9,487	630	60,186	0	174,076
Antimony	3,088,258	3,165	22,943	55,605	104,519	0	3,274,490
Antimony compounds	3,815,342	31,974	552,611	82,033	4,270,334	951	8,753,245
Arsenic	836,449	0	10,738	181	47,647	0	895,015
Arsenic compounds	296,314	3	1,044,606	306	1,702,452	0	3,043,681
Asbestos (friable)	0	0	260	2	3,979,953	0	3,980,215
Barium	127,098	19	6,050	5,925	222,758	0	361,850
Barium compounds	1,674,218	96,833	1,510,614	205,006	5,088,056	11,332	8,586,059
Benzal chloride	0	54,000	0	0	0	0	54,000
Benzene	555,346	1,657,785	2,142,148	210,714	203,939	250	4,770,182
Benzidine	0	0	0	0	0	0	0
Benzoic trichloride	0	12	0	0	0	0	12
Benzoyl chloride	0	0	496,694	75	250	0	497,019
Benzoyl peroxide	9,000	2,097	24,166	21,318	11,185	0	67,766
Benzyl chloride	0	401,125	538	6,342	246	0	408,251
Beryllium	13,751	0	19	0	9,617	0	23,387
Beryllium compounds	312,617	0	1,060	1	1,850	0	315,528
Biphenyl	161,084	309,207	389,864	296,466	29,060	0	1,185,681
Bis(2-chloroethoxy) methane	0	0	0	0	0	0	0
Bis(2-chloroethyl) ether	186,472	162,623	5,045	2,846	0	0	356,986
Bis(chloromethyl) ether	0	0	0	0	5	0	5
Bis(2-chloro-1-methyl-ethyl) ether	0	0	0	0	0	0	0
Bis(2-ethylhexyl) adipate	176,148	149,329	29,135	22,167	617,807	0	994,586
Bromochlorodifluoro-methane (Halon 1211)	0	0	0	0	0	0	0
Bromomethane	0	100	750	0	0	0	850
Bromotrifluoromethane (Halon 1301)	0	0	0	0	0	0	0
1,3-Butadiene	7,328,960	166,970	400,339	537	6,846	0	7,903,652
Butyl acrylate	107,082	182,031	85,812	107,496	74,565	0	556,986
n-Butyl alcohol	2,647,121	7,765,803	2,210,978	1,818,779	201,799	297	14,644,777
sec-Butyl alcohol	44,064	5,307,090	75,307	37,320	32,287	0	5,496,068
tert-Butyl alcohol	1,356	29,854,068	1,201,904	743,825	70,079	0	31,871,232
1,2-Butylene oxide	2,650	364,065	0	10	0	0	366,725
Butyraldehyde	0	17,281	6,555	203,094	1,038	0	227,968
C.I. Basic Green 4	0	0	499	0	0	0	499

Table 1-45. Releases and Transfers of All TRI Chemicals, 1994 (Alphabetically Ordered), Continued.

CAS Number(65)	Chemical	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
989-38-8	C.I. Basic Red 1	2	4	4	0	0	0	8
2832-40-8	C.I. Disperse Yellow 3	3	238	0	26	0	0	264
81-88-9	C.I. Food Red 15	1	0	0	0	0	0	0
3118-97-6	C.I. Solvent Orange 7	2	0	0	0	0	0	0
7440-43-9	Cadmium	45	2,651	7,412	1,264	0	4,146	15,473
—	Cadmium compounds	113	6,290	43,216	765	170	54,326	104,767
156-62-7	Calcium cyanamide	5	0	5	0	0	0	5
133-06-2	Captan	18	1,522	6,971	5	0	5	8,503
63-25-2	Carbaryl	24	2,668	4,749	10	0	255	7,682
75-15-0	Carbon disulfide	82	3,735,747	79,582,068	62,529	4,305	80	83,384,729
56-23-5	Carbon tetrachloride	69	226,057	392,870	1,223	12,654	0	632,804
463-58-1	Carbonyl sulfide	53	77,490	17,068,681	0	0	0	17,146,171
120-80-9	Catechol	117	1,169	1,877	28,005	0	1,331	32,382
57-74-9	Chlordane	1	1,300	0	13	0	0	1,313
7782-50-5	Chlorine	1,449	1,276,642	58,502,168	516,005	74,311	63,098	60,432,224
10049-04-4	Chlorine dioxide	125	16,909	1,484,132	0	0	0	1,501,041
79-11-8	Chloroacetic acid	32	5,983	710	10,178	0	950	17,821
108-90-7	Chlorobenzene	65	746,013	702,484	2,206	72,000	16	1,522,719
75-45-6	Chlorodifluoromethane (HCFC-22)	213	4,174,501	3,806,425	2,340	0	1,637	7,984,903
75-68-3	1-Chloro-1,1-difluoro-ethane (HCFC-142b)	25	556,247	5,095,881	330	0	0	5,652,458
75-00-3	Chloroethane	49	1,285,717	1,525,244	767	110	142	2,811,980
67-66-3	Chloroform	167	3,450,479	7,472,557	362,812	80,002	11,667	11,377,517
74-87-3	Chloromethane	109	949,731	4,115,002	59,463	50,707	34	5,174,937
107-30-2	Chloromethyl methyl ether	3	11	2,728	5	0	0	2,744
—	Chlorophenols	10	1,991	6,630	39	94,236	1	102,897
126-99-8	Chloroprene	14	125,385	968,771	2	59,600	3,997	1,157,755
354-25-6	1-Chloro-1,1,2,2-tetra-fluoroethane (HCFC-124a)	4	923	481,410	0	0	0	482,333
2837-89-0	2-Chloro-1,1,1,2-tetra-fluoroethane (HCFC-124)	8	325,829	508,593	1,556	0	0	835,978
1897-45-6	Chlorothalonil	22	1,472	2,668	21	0	250	4,411
7440-47-3	Chromium	1,766	472,348	163,254	20,486	48	1,148,491	1,804,627
—	Chromium compounds	1,416	174,722	332,632	158,795	38,061	20,636,107	21,340,317
7440-48-4	Cobalt	236	21,233	23,242	6,819	0	35,030	86,324
—	Cobalt compounds	218	10,473	22,290	106,474	1,750	133,602	274,589
7440-50-8	Copper	2,537	407,878	728,901	56,467	19,944	990,842	2,204,032
—	Copper compounds	1,412	3,236,400	2,131,573	83,187	214,308	41,449,920	47,115,388
8001-58-9	Creosote	89	569,696	780,506	5,444	0	660	1,356,306
120-71-8	p-Cresidine	5	881	130	81	0	50	1,142
1319-77-3	Cresol (mixed isomers)	155	358,770	1,433,980	11,607	808,900	4,828	2,618,085
108-39-4	m-Cresol	24	35,097	18,973	4,072	610,000	0	668,142
95-48-7	o-Cresol	25	12,085	3,359	1,990	660,000	0	677,434
106-44-5	p-Cresol	27	34,350	31,783	2,020	301,900	0	370,053
98-82-8	Cumene	237	831,912	1,209,112	6,363	8,940	942	2,057,269
80-15-9	Cumene hydroperoxide	41	78,787	57,791	176	280,000	2,500	419,254
135-20-6	Cupferron	2	2	9	0	0	0	11
—	Cyanide compounds	247	125,190	901,313	102,633	3,239,418	13,955	4,382,509
110-82-7	Cyclohexane	374	3,532,751	5,145,330	31,695	192,409	18,138	8,920,323
94-75-7	2,4-D (acetic acid)	29	5,797	3,772	133	250	300	10,252
1163-19-5	Decabromodiphenyl oxide	126	16,151	153,471	1,958	40	298,191	469,811
101-80-4	4,4'-Diaminodiphenyl ether	5	14	102	1,653	0	12	1,781
25376-45-8	Diaminotoluene (mixed isomers)	11	15,213	6,500	3,666	7,700	57	33,136
95-80-7	2,4-Diaminotoluene	4	250	1,767	0	0	0	2,017
132-64-9	Dibenzofuran	34	15,416	9,070	41	0	1,589	26,116
106-93-4	1,2-Dibromoethane	16	11,417	3,995	2,788	12	325	18,537
84-74-2	Dibutyl phthalate	126	26,767	43,349	2,327	280,000	750	353,193
25321-22-6	Dichlorobenzene (mixed isomers)	7	316	3,726	0	0	0	4,042

Table 1-45, Cont.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[67] Pounds	Total Transfers Pounds
C.I. Basic Red 1	0	114	132	274	668	0	1,188
C.I. Disperse Yellow 3	0	0	0	2,488	2,597	0	5,085
C.I. Food Red 15	0	0	0	0	0	0	0
C.I. Solvent Orange 7	0	0	0	284	350	0	634
Cadmium	773,739	0	9,628	599	59,259	0	843,225
Cadmium compounds	2,304,441	2,717	160,927	2,414	1,863,630	0	4,334,129
Calcium cyanamide	0	0	0	0	0	0	0
Captan	0	0	2,410	26	1,237	0	3,673
Carbaryl	0	0	5,222	1	16,491	0	21,714
Carbon disulfide	426	205,993	31,113	359,388	1,677	0	598,597
Carbon tetrachloride	850,623	17,314	1,172,726	574	50,710	0	2,091,947
Carbonyl sulfide	0	0	18,000	0	0	0	18,000
Catechol	0	9,318	2,805	83,355	1,568	0	97,046
Chlordane	0	0	6	100	0	0	106
Chlorine	2,833,114	4,310	345,447	883,757	15,133	5,005	4,086,766
Chlorine dioxide	0	0	0	296	2	0	298
Chloroacetic acid	0	250	5,406	1,015	603	0	7,274
Chlorobenzene	1,084,976	625,394	1,120,085	1,922	94,629	0	2,927,006
Chlorodifluoromethane (HCFC-22)	259,501	128,936	70,225	10	130,235	0	588,907
1-Chloro-1,1-difluoroethane (HCFC-142b)	0	0	6,720	0	0	0	6,720
Chloroethane	174,502	58,709	360,204	760	8	0	594,183
Chloroform	351,182	101,775	1,969,035	437,920	68,693	0	2,928,605
Chloromethane	0	7,239	358,585	2,242	1,565	0	369,631
Chloromethyl methyl ether	0	0	0	0	70	0	70
Chlorophenols	17,232	0	26,914	1,494	383	0	46,023
Chloroprene	1,155,305	96,000	50,800	16,571	6,391	0	1,325,067
1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	0	0	0	0	0	0	0
2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	142,400	0	21,637	0	0	0	164,037
Chlorothalonil	0	15	7,551	505	227,473	0	235,544
Chromium	106,988,736	26,279	503,018	71,283	4,808,805	86,213	112,484,334
Chromium compounds	39,743,319	68,536	4,904,303	356,493	10,939,269	0	56,011,920
Cobalt	8,928,654	0	848,427	21,592	142,241	0	9,940,914
Cobalt compounds	1,989,331	1,893	112,916	8,191	407,852	250	2,520,433
Copper	519,843,303	38,402	1,085,388	132,657	13,873,204	8,274	534,981,228
Copper compounds	147,039,786	64,628	2,126,732	146,348	9,839,385	199,764	159,416,643
Creosote	1,550	104,733	91,495	10,826	4,723,708	0	4,932,312
p-Cresidine	0	0	2,200	28,896	3,000	0	34,096
Cresol (mixed isomers)	337,998	577,126	253,925	62,226	71,546	0	1,302,821
m-Cresol	684,191	21,207	48,433	14,624	15,923	0	784,378
o-Cresol	4,178	11,520	27,062	99,457	8,335	0	150,552
p-Cresol	450,009	44,592	32,831	1,723,189	10,617	0	2,261,238
Cumene	96,410	621,205	193,873	24,194	25,761	0	961,443
Cumene hydroperoxide	0	738	2,353	768	71,597	0	75,456
Cupferron	0	17,811	0	78	0	0	17,889
Cyanide compounds	27,418	8,094	404,259	164,181	156,894	8,854	769,700
Cyclohexane	1,532,738	2,689,509	2,416,381	17,638	25,364	0	6,681,630
2,4-D (acetic acid)	0	0	45,410	38	96,785	0	142,233
Decabromodiphenyl oxide	159,003	30,860	24,923	394,637	951,231	0	1,560,654
4,4'-Diaminodiphenyl ether	0	0	9,574	10	122	0	9,706
Diaminotoluene (mixed isomers)	321	354,950	507,953	160,640	9,719	0	1,033,583
2,4-Diaminotoluene	0	480	64,350	0	0	0	64,830
Dibenzofuran	26,485	0	135	508	26,616	0	53,744
1,2-Dibromoethane	116	2	73,737	0	251	0	74,106
Dibutyl phthalate	23,901	237,232	159,616	3,978	68,507	0	493,234
Dichlorobenzene (mixed isomers)	0	2,566	211	0	9	0	2,786

Table 1-45. Releases and Transfers of All TRI Chemicals, 1994 (Alphabetically Ordered), Continued.

CAS Number(65)	Chemical	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
95-50-1	1,2-Dichlorobenzene	33	98,035	147,114	2,812	2,900	24,287	275,148
541-73-1	1,3-Dichlorobenzene	9	1,925	8,270	547	0	0	10,742
106-46-7	1,4-Dichlorobenzene	23	114,912	142,276	1,595	2,000	1,100	261,883
91-94-1	3,3'-Dichlorobenzidine	5	5	5	0	0	0	10
75-27-4	Dichlorobromomethane	1	0	0	0	0	0	0
764-41-0	1,4-Dichloro-2-butene	3	2,501	1,400	5	0	0	3,906
75-71-8	Dichlorodifluoromethane (CFC-12)	169	3,004,180	1,867,929	431	54	0	4,872,594
107-06-2	1,2-Dichloroethane	79	660,811	1,210,095	7,446	34,296	15	1,912,663
540-59-0	1,2-Dichloroethylene	9	7,796	7,813	23	0	0	15,632
1717-00-6	1,1,-Dichloro-1-fluoro-ethane (HCFC-141b)	252	4,399,218	3,243,616	270	0	49,744	7,692,848
75-09-2	Dichloromethane	1,030	25,022,843	37,687,647	52,289	960,942	50,845	63,774,566
120-83-2	2,4-Dichlorophenol	5	3,045	794	61	10,860	0	14,760
78-87-5	1,2-Dichloropropane	13	303,857	405,690	3,609	215	12	713,383
78-88-6	2,3-Dichloropropene	4	46,033	336	360	0	0	46,729
542-75-6	1,3-Dichloropropylene	11	21,509	3,161	86	0	0	24,756
76-14-2	Dichlorotetrafluoro-ethane (CFC-114)	21	1,176,003	186,601	6,190	0	0	1,368,794
34077-87-7	Dichlorotrifluoroethane	1	250	5	0	0	0	255
306-83-2	2,2-Dichloro-1,1,1-tri-fluoroethane (HCFC-123)	8	107,774	23,660	253	0	0	131,687
62-73-7	Dichlorvos	5	768	513	5	0	0	1,286
115-32-2	Dicofol	3	255	0	0	0	0	255
111-42-2	Diethanolamine	358	189,175	140,171	221,037	81,164	169,713	801,260
117-81-7	Di-(2-ethylhexyl) phthalate	307	124,650	330,957	962	0	103,756	560,325
84-66-2	Diethyl phthalate	63	24,803	133,712	752	0	803	160,070
64-67-5	Diethyl sulfate	33	6,305	622	10	0	5	6,942
94-58-6	Dihydrosafrole	1	52	500	0	0	0	552
119-90-4	3,3'-Dimethoxybenzidine	3	3	0	5	0	0	8
57-14-7	1,1-Dimethyl hydrazine	3	721	26	0	0	0	747
105-67-9	2,4-Dimethylphenol	21	17,252	40,496	704	64,000	250	122,702
131-11-3	Dimethyl phthalate	75	67,703	199,555	266	1,200	5	268,729
77-78-1	Dimethyl sulfate	37	5,351	1,416	300	0	0	7,067
99-65-0	m-Dinitrobenzene	2	70	476	5,087	0	95,086	100,719
528-29-0	o-Dinitrobenzene	3	4	61	651	0	11	727
100-25-4	p-Dinitrobenzene	1	1	16	177	0	3	197
534-52-1	4,6-Dinitro-o-cresol	6	6	84	5	0	0	95
51-28-5	2,4-Dinitrophenol	6	121	2	2,312	36,900	9	39,344
121-14-2	2,4-Dinitrotoluene	2	1,848	51	399	0	0	2,298
606-20-2	2,6-Dinitrotoluene	1	503	13	374	0	0	890
25321-14-6	Dinitrotoluene (mixed isomers)	6	4,980	10,950	10	28,000	0	43,940
123-91-1	1,4-Dioxane	55	121,132	109,760	305,771	0	2,266	538,929
106-89-8	Epichlorohydrin	68	263,624	223,103	3,486	0	754	490,967
110-80-5	2-Ethoxyethanol	40	77,973	149,612	104	0	2	227,691
140-88-5	Ethyl acrylate	107	85,517	87,567	253	0	18	173,355
100-41-4	Ethylbenzene	969	3,258,605	8,844,428	10,978	633,842	54,286	12,802,139
541-41-3	Ethyl chloroformate	5	3,106	435	5	0	5	3,551
74-85-1	Ethylene	276	14,668,769	20,601,567	27,438	0	0	35,297,774
107-21-1	Ethylene glycol	1,321	5,300,772	4,354,999	784,402	4,958,550	1,051,939	16,450,662
—	Ethylenebisdithiocarbamic acid, salts, and esters	6	755	500	0	0	0	1,255
151-56-4	Ethyleneimine	1	0	0	0	0	0	0
75-21-8	Ethylene oxide	155	393,005	321,950	2,088	8,100	785	725,928
96-45-7	Ethylene thiourea	10	5	524	0	0	0	529
75-34-3	Ethylidene dichloride	3	2,361	21,131	0	0	0	23,492
2164-17-2	Fluometuron	7	290	542	0	0	0	832
50-00-0	Formaldehyde	781	1,803,777	9,674,746	388,750	7,739,510	149,116	19,755,899
64-18-6	Formic acid	213	262,222	318,837	11,674	10,671,734	3,105	11,267,572
76-13-1	Freon 113	237	3,337,957	1,738,081	1,504	0	0	5,077,542
—	Glycol ethers	2,157	10,455,326	38,065,248	292,472	128,096	50,785	48,991,927

Table 1-45, Cont.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[67] Pounds	Total Transfers Pounds
1,2-Dichlorobenzene	2,518,203	777,347	2,153,033	20,607	38,095	0	5,507,285
1,3-Dichlorobenzene	7,632	0	1,858	1,800	0	0	11,290
1,4-Dichlorobenzene	7,531	2,730	272,689	3,303	0	0	286,253
3,3'-Dichlorobenzidine	0	12,000	14,500	260	1,255	0	28,015
Dichlorobromomethane	0	0	0	0	0	0	0
1,4-Dichloro-2-butene	0	120,014	120,000	0	0	0	240,014
Dichlorodifluoromethane (CFC-12)	196,821	536	163,077	3,366	1,058	0	364,858
1,2-Dichloroethane	15,625,934	636,747	1,178,962	11,853	75,392	0	17,528,888
1,2-Dichloroethylene	2,400	0	28	0	6	0	2,434
1,1,-Dichloro-1-fluoro-ethane (HCFC-141b)	267,060	110,328	1,128,638	1,649	150,606	250	1,658,531
Dichloromethane	20,785,487	3,755,198	11,458,743	835,117	296,536	9,517	37,140,598
2,4-Dichlorophenol	0	0	0	0	1,815	0	1,815
1,2-Dichloropropane	0	1	2,037	253	699	0	2,990
2,3-Dichloropropene	0	0	557,368	0	0	0	557,368
1,3-Dichloropropylene	5,007	1,703	11,934	0	0	0	18,644
Dichlorotetrafluoro-ethane (CFC-114)	20,995	0	33,638	0	173	0	54,806
Dichlorotrifluoroethane	0	0	0	0	0	0	0
2,2-Dichloro-1,1,1-tri-fluoroethane (HCFC-123)	750	0	53,420	5	0	0	54,175
Dichlorvos	0	250	755	0	7,037	0	8,042
Dicofol	0	0	250	0	0	0	250
Diethanolamine	268,541	88,600	295,008	1,503,177	349,362	0	2,504,688
Di-(2-ethylhexyl) phthalate	5,889,207	277,414	211,095	30,123	2,090,391	0	8,498,230
Diethyl phthalate	569,800	14,224	127,523	235,024	2,767	0	949,338
Diethyl sulfate	6,180,000	76	1,892	4,565	0	0	6,186,533
Dihydrosafrole	0	0	0	0	0	0	0
3,3'-Dimethoxybenzidine	0	0	0	33	0	0	33
1,1-Dimethyl hydrazine	46	0	3,308	0	5	0	3,359
2,4-Dimethylphenol	46,074	43,599	28,001	6,161	1,448	0	125,283
Dimethyl phthalate	5,276	87,747	14,290	95,851	3,802	0	206,966
Dimethyl sulfate	35,803	0	0	10	0	0	35,813
m-Dinitrobenzene	0	0	0	0	0	0	0
o-Dinitrobenzene	0	0	0	0	0	0	0
p-Dinitrobenzene	0	0	0	0	0	0	0
4,6-Dinitro-o-cresol	0	74	10,186	640	5,953	0	16,853
2,4-Dinitrophenol	0	0	12,375	0	70	0	12,445
2,4-Dinitrotoluene	0	1,187	0	0	255	0	1,442
2,6-Dinitrotoluene	0	156	0	0	0	0	156
Dinitrotoluene (mixed isomers)	0	250	456,960	130,000	567,615	0	1,154,825
1,4-Dioxane	23,697	619,260	75,177	311,650	16,115	0	1,045,899
Epichlorohydrin	0	183,888	880,789	38,615	183	0	1,103,475
2-Ethoxyethanol	304,696	310,524	34,027	355,198	0	0	1,004,445
Ethyl acrylate	46,359	1,613,608	49,894	26,959	20,056	0	1,756,876
Ethylbenzene	5,019,955	9,057,150	1,936,211	59,381	304,318	0	16,377,015
Ethyl chloroformate	0	10	761	0	0	0	771
Ethylene	0	9,961,635	25,854	563	17	0	9,988,069
Ethylene glycol	120,231,084	7,683,312	16,044,270	16,326,235	1,657,669	0	161,942,570
Ethylenebisdithiocarbamic acid, salts, and esters	0	0	20,780	4,122	162	0	25,064
Ethyleneimine	0	0	0	0	0	0	0
Ethylene oxide	6,177	1	6,630	103,723	5,421	0	121,952
Ethylene thiourea	780	0	8,240	5	2,819	0	11,844
Ethylidene dichloride	0	3,990	1	0	1	0	3,992
Fluometuron	0	0	2,009	255	2,335	0	4,599
Formaldehyde	49,281	283,343	707,840	2,698,561	266,426	0	4,005,451
Formic acid	15,000	40,125	131,988	1,899,062	1,236	0	2,087,411
Freon 113	1,943,928	163,558	960,119	39,023	42,431	0	3,149,059
Glycol ethers	4,280,494	14,471,517	4,222,175	11,140,741	703,449	14,682	34,833,058

Table 1-45. Releases and Transfers of All TRI Chemicals, 1994 (Alphabetically Ordered), Continued.

CAS Number(65)	Chemical	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
76-44-8	Heptachlor	1	830	0	3	0	0	833
118-74-1	Hexachlorobenzene	9	323	112	269	204	0	908
87-68-3	Hexachloro-1,3-butadiene	7	1,189	221	351	201	0	1,962
77-47-4	Hexachlorocyclo-pentadiene	4	7,675	1,248	1	250	0	9,174
67-72-1	Hexachloroethane	19	4,736	30,260	447	326	0	35,769
70-30-4	Hexachlorophene	2	0	0	0	0	0	0
302-01-2	Hydrazine	46	11,539	4,846	292	250	29	16,956
10034-93-2	Hydrazine sulfate	3	0	2	0	230,000	0	230,002
7647-01-0	Hydrochloric acid	3,300	3,489,997	69,181,592	25,991	141,990,565	263,737	214,951,882
74-90-8	Hydrogen cyanide	45	73,812	2,208,155	712	860,568	6	3,143,253
7664-39-3	Hydrogen fluoride	521	2,720,617	4,661,457	28,129	2,924	27,643	7,440,770
123-31-9	Hydroquinone	60	16,113	28,861	4,457	456,762	42	506,235
78-84-2	Isobutyraldehyde	20	167,790	207,317	472	72,553	0	448,132
67-63-0	Isopropyl alcohol (manufacturing)	85	287,148	708,275	0	0	250	995,673
80-05-7	4,4'-Isopropylidene-diphenol	114	136,826	100,086	18,265	99,184	394,032	748,393
7439-92-1	Lead	817	97,304	317,870	12,268	0	502,240	929,682
—	Lead compounds	845	507,374	894,106	53,431	1,263	14,656,876	16,113,050
58-89-9	Lindane	8	280	299	5	0	5	589
108-31-6	Maleic anhydride	212	76,903	171,186	312	5	2,288	250,694
109-77-3	Malononitrile	2	0	45	0	153,844	0	153,889
12427-38-2	Maneb	6	255	17	0	0	0	272
7439-96-5	Manganese	1,385	551,291	229,593	88,895	10	8,484,764	9,354,553
—	Manganese compounds	986	1,125,401	1,842,932	733,537	5,930	37,796,986	41,504,786
7439-97-6	Mercury	21	7,745	2,859	175	0	1,351	12,130
—	Mercury compounds	9	2,012	704	146	7	0	2,869
126-98-7	Methacrylonitrile	3	801	2	0	79,999	0	80,802
67-56-1	Methanol	2,439	32,088,254	185,724,754	11,007,879	24,343,351	2,602,696	255,766,934
72-43-5	Methoxychlor	3	5	5	0	0	0	10
109-86-4	2-Methoxyethanol	58	156,788	461,835	15,898	0	20	634,541
96-33-3	Methyl acrylate	68	93,969	165,346	480	95	89	259,979
79-22-1	Methyl chlorocarbonate	2	4,650	245	5	0	5	4,905
1634-04-4	Methyl tert-butyl ether	190	898,970	2,202,805	90,240	29,645	2,225	3,223,885
101-14-4	4,4'-Methylenebis (2-chloroaniline)	20	10	10	0	0	0	20
101-68-8	Methylenebis (phenylisocyanate)	879	248,941	259,178	15	0	338,804	846,938
74-95-3	Methylene bromide	6	30,565	41,280	0	5,700	0	77,545
101-77-9	4,4'-Methylenedianiline	27	6,669	3,073	725	26,064	0	36,531
78-93-3	Methyl ethyl ketone	2,389	27,184,737	51,440,202	108,385	575,848	51,794	79,360,966
60-34-4	Methyl hydrazine	2	250	250	0	0	0	500
74-88-4	Methyl iodide	4	30,383	11	0	0	0	30,394
108-10-1	Methyl isobutyl ketone	1,031	6,847,214	18,429,655	80,177	131,600	12,925	25,501,571
624-83-9	Methyl isocyanate	4	18,730	[illegible]	0	0	0	19,735
80-62-6	Methyl methacrylate	262	718,626	1,7[illegible],218	4,669	120,000	74	2,583,587
109-06-8	2-Methylpyridine	4	53,815	7,262	0	109,390	0	170,467
90-94-8	Michler's ketone	1	0	814	0	0	0	814
1313-27-5	Molybdenum trioxide	152	140,500	37,066	60,848	161,340	71,814	471,568
76-15-3	Monochloropentafluoro-ethane (CFC-115)	12	305,170	19,536	3,458	0	0	328,164
91-20-3	Naphthalene	527	1,744,636	1,322,113	28,179	88,200	47,014	3,230,142
134-32-7	alpha-Naphthylamine	2	5	5	0	0	0	10
7440-02-0	Nickel	1,739	426,442	140,557	31,342	7,080	383,047	988,468
—	Nickel compounds	834	107,651	132,907	66,981	55,861	1,302,415	1,665,815
7697-37-2	Nitric acid	1,827	686,983	1,846,305	167,499	18,269,660	395,050	21,365,497
139-13-9	Nitrilotriacetic acid	8	8	5	2,748	500	0	3,261
99-59-2	5-Nitro-o-anisidine	1	5	5	0	0	0	10
98-95-3	Nitrobenzene	14	33,963	6,759	1,999	815,285	226	858,232
55-63-0	Nitroglycerin	19	1,842	34,233	11,544	0	0	47,619
99-55-8	5-Nitro-o-toluidine	3	4	4	0	0	0	8

Table 1-45, Cont.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[67] Pounds	Total Transfers Pounds
Heptachlor	0	0	4,300	77	0	0	4,377
Hexachlorobenzene	1	0	64,568	250	940,478	0	1,005,297
Hexachloro-1,3-butadiene	0	0	60,084	6	430	0	60,520
Hexachlorocyclo-pentadiene	0	1,250	27,672	1,303	0	0	30,225
Hexachloroethane	0	61,000	18,745	0	352,309	0	432,054
Hexachlorophene	0	0	31,080	44	0	0	31,124
Hydrazine	46	0	3,661	4,960	4,600	0	13,267
Hydrazine sulfate	0	0	0	2,300	0	0	2,300
Hydrochloric acid	57,794,473	8,667,665	43,869,984	19,241,520	12,238,039	60,055	141,871,736
Hydrogen cyanide	0	250	770	7,033	802	0	8,855
Hydrogen fluoride	212,513	0	2,519,974	349,379	761,422	0	3,843,288
Hydroquinone	0	3,900	29,043	150,987	3,396	0	187,326
Isobutyraldehyde	1,696	626,772	53,037	45,433	69,306	0	796,244
Isopropyl alcohol (manufacturing)	39,579	313,270	30,670	1,570	1,550	0	386,639
4,4'-Isopropylidene-diphenol	297,938	54,939	100,729	19,360	672,051	0	1,145,017
Lead	55,772,470	12,540	705,129	28,528	1,647,537	200,000	58,366,204
Lead compounds	293,561,113	72,421	5,369,225	61,189	20,542,170	250	319,606,368
Lindane	0	0	2,462	5	42	0	2,509
Maleic anhydride	750	140,954	852,732	4,813	22,012	0	1,021,261
Malononitrile	0	0	245	0	0	0	245
Maneb	0	0	1,698	0	13,553	0	15,251
Manganese	87,273,512	900	480,396	52,786	12,965,563	2,293,469	103,066,626
Manganese compounds	52,720,517	45,052	3,937,739	401,335	22,667,250	5	79,771,898
Mercury	21,223	0	3,813	10	12,590	0	37,636
Mercury compounds	3,685	0	49	5	26,121	0	29,860
Methacrylonitrile	0	0	0	0	0	0	0
Methanol	16,126,765	76,522,836	32,260,230	92,593,278	2,255,577	6,841	219,765,527
Methoxychlor	0	0	5	0	0	0	5
2-Methoxyethanol	4,300	1,628,616	201,086	1,131,051	58,369	0	3,023,422
Methyl acrylate	25,098	358,071	98,412	3,260	6,318	0	491,159
Methyl chlorocarbonate	0	0	0	0	0	0	0
Methyl tert-butyl ether	17,184	924,149	548,449	95,945	117,753	0	1,703,480
4,4'-Methylenebis (2-chloroaniline)	0	5,848	1,069	5	1,300	0	8,222
Methylenebis (phenylisocyanate)	369,955	119,545	622,830	1,427	433,873	0	1,547,630
Methylene bromide	0	1,300	250	1,114	6,200	0	8,864
4,4'-Methylenedianiline	0	6,295	174,060	1,889	24,874	0	207,118
Methyl ethyl ketone	21,395,064	46,300,997	6,147,170	410,746	417,545	1,000	74,672,522
Methyl hydrazine	0	0	5	0	0	0	5
Methyl iodide	0	250	250	0	2,450	0	2,950
Methyl isobutyl ketone	17,951,007	18,854,225	1,626,682	488,749	68,442	4,022	38,993,127
Methyl isocyanate	0	0	0	0	0	0	0
Methyl methacrylate	22,185	1,337,112	734,077	285,518	710,303	0	3,089,195
2-Methylpyridine	0	2,102	858	19,000	417	0	22,377
Michler's ketone	0	145	0	0	0	0	145
Molybdenum trioxide	3,042,074	0	326,967	62,262	389,598	0	3,820,901
Monochloropentafluoro-ethane (CFC-115)	0	0	561	5	8	0	574
Naphthalene	436,139	1,201,671	559,827	15,615	496,506	0	2,709,758
alpha-Naphthylamine	0	0	0	0	0	0	0
Nickel	73,647,516	3,052	1,132,948	94,294	3,280,758	15,930	78,174,498
Nickel compounds	30,682,973	1,034	1,542,095	122,576	4,744,220	0	37,092,898
Nitric acid	3,238,193	3	10,494,546	3,423,791	3,537,114	0	20,693,647
Nitrilotriacetic acid	0	0	2,080	0	0	0	2,080
5-Nitro-o-anisidine	0	0	0	5	0	0	5
Nitrobenzene	3,603	24,351	459,182	289	2,290	0	489,715
Nitroglycerin	39,276	0	92,023	263	6	0	131,568
5-Nitro-o-toluidine	0	0	0	92	5	0	97

Table 1-45. Releases and Transfers of All TRI Chemicals, 1994 (Alphabetically Ordered), Continued.

CAS Number(65)	Chemical	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
88-75-5	2-Nitrophenol	4	0	18	67	0	0	85
100-02-7	4-Nitrophenol	5	920	81	0	0	0	1,001
79-46-9	2-Nitropropane	7	22,842	14,381	3,300	0	0	40,523
156-10-5	p-Nitrosodiphenylamine	2	24	0	0	0	0	24
121-69-7	N,N-Dimethylaniline	21	5,441	16,651	584	0	0	22,676
86-30-6	N-Nitrosodiphenylamine	1	0	0	0	0	0	0
123-63-7	Paraldehyde	3	7	10	0	0	0	17
56-38-2	Parathion	2	1,142	5	0	0	0	1,147
76-01-7	Pentachloroethane	3	928	195	0	0	0	1,123
87-86-5	Pentachlorophenol	35	4,511	17,112	1,458	0	250	23,331
79-21-0	Peracetic acid	20	26,364	4,024	15	0	270	30,673
108-95-2	Phenol	719	2,506,650	5,919,567	121,450	3,224,053	172,458	11,944,178
106-50-3	p-Phenylenediamine	10	2,845	2,098	1,260	0	2,624	8,827
90-43-7	2-Phenylphenol	18	7,784	35,223	15	0	2	43,024
75-44-5	Phosgene	29	2,826	6,050	0	5	0	8,881
7664-38-2	Phosphoric acid	2,710	282,950	751,694	20,900,384	45,616	56,785,731	78,766,375
7723-14-0	Phosphorus (yellow or white)	52	27,686	4,148	9,391	0	9,543	50,768
85-44-9	Phthalic anhydride	179	98,814	331,805	362	0	0	430,981
88-89-1	Picric acid	9	2	2	2	43,958	2	43,966
—	Polybrominated biphenyls	2	0	0	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	13	0	0	0	0	0	0
23950-58-5	Pronamide	1	5	250	0	0	0	255
1120-71-4	Propane sultone	1	0	0	0	0	0	0
123-38-6	Propionaldehyde	22	340,111	148,346	21	66,352	0	554,830
114-26-1	Propoxur	3	0	4	0	0	0	4
115-07-1	Propylene	343	12,361,218	8,090,630	4,584	0	0	20,456,432
75-55-8	Propyleneimine	7	216	265	0	0	0	481
75-56-9	Propylene oxide	118	357,416	678,422	12,695	22,195	6,151	1,076,879
110-86-1	Pyridine	35	67,605	42,298	1,409	358,200	0	469,512
91-22-5	Quinoline	21	7,665	19,757	35	63,000	571	91,028
106-51-4	Quinone	4	9,900	2,101	1,600	0	0	13,601
82-68-8	Quintozene	12	1,771	787	0	0	0	2,558
81-07-2	Saccharin (manufacturing)	2	60	20	0	0	0	80
7782-49-2	Selenium	12	88	367	113	0	7	575
—	Selenium compounds	40	3,519	59,865	2,470	3,410	120,086	189,350
7440-22-4	Silver	66	7,047	3,643	421	250	270	11,631
—	Silver compounds	60	2,732	15,372	6,580	140	26,743	51,567
100-42-5	Styrene	1,489	13,761,915	25,587,630	75,579	250,861	480,863	40,156,848
96-09-3	Styrene oxide	5	1	60	0	0	0	61
7664-93-9	Sulfuric acid (acid aerosols)	3,895	1,444,190	22,514,638	212,138	1,521,851	515,147	26,207,964
630-20-6	1,1,1,2-Tetrachloroethane	7	10,171	1,575	0	0	0	11,746
79-34-5	1,1,2,2-Tetrachloroethane	16	10,227	2,257	1,517	26	0	14,027
127-18-4	Tetrachloroethylene	459	4,671,751	5,530,378	3,872	4,051	4,349	10,214,401
961-11-5	Tetrachlorvinphos	5	10	258	5	0	0	273
7440-28-0	Thallium	1	5	250	0	0	755	1,010
—	Thallium compounds	1	0	36	0	0	0	36
62-56-6	Thiourea	27	1,155	2,017	3,539	5,000	250	11,961
137-26-8	Thiram	54	1,341	1,728	20	0	95	3,184
1314-20-1	Thorium dioxide	1	0	0	0	0	0	0
7550-45-0	Titanium tetrachloride	37	16,051	6,298	0	0	0	22,349
108-88-3	Toluene	3,566	57,656,473	110,561,812	82,751	496,440	161,205	168,958,681
584-84-9	Toluene-2,4-diisocyanate	76	9,705	25,736	0	0	0	35,441
91-08-7	Toluene-2,6-diisocyanate	47	3,019	5,484	0	0	0	8,503
26471-62-5	Toluenediisocyanate (mixed isomers)	181	15,288	35,157	0	0	250	50,695
95-53-4	o-Toluidine	23	9,770	2,365	534	30,300	6	42,975

Table 1-45, Cont.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[67] Pounds	Total Transfers Pounds
2-Nitrophenol	0	0	20,189	180	0	0	20,369
4-Nitrophenol	0	0	583,000	186	3	0	583,189
2-Nitropropane	3,300	1,779	29	0	0	0	5,108
p-Nitrosodiphenylamine	0	16,000	0	0	0	0	16,000
N,N-Dimethylaniline	0	640,609	73,839	145,372	0	0	859,820
N-Nitrosodiphenylamine	0	0	200,000	0	0	0	200,000
Paraldehyde	0	49	0	0	0	0	49
Parathion	0	0	1,035	0	15,027	0	16,062
Pentachloroethane	0	0	2,650	0	0	0	2,650
Pentachlorophenol	250	24,982	44,970	1,798	24,343	0	96,343
Peracetic acid	0	0	0	2,138	0	0	2,138
Phenol	494,671	3,381,500	2,912,978	2,811,469	1,604,425	500	11,205,543
p-Phenylenediamine	0	0	23,968	3,600	0	0	27,568
2-Phenylphenol	0	0	121	3,537	1,507	0	5,165
Phosgene	0	0	158	0	0	0	158
Phosphoric acid	9,473,740	45,269	2,183,118	3,869,033	2,603,266	505	18,174,931
Phosphorus (yellow or white)	183,411	0	55,407	258	14,017	0	253,093
Phthalic anhydride	2,781	4,342,281	243,593	9,483	105,929	0	4,704,067
Picric acid	0	13	836	0	0	0	849
Polybrominated biphenyls	0	0	0	0	250	0	250
Polychlorinated biphenyls (PCBs)	0	0	934,464	0	94,962	0	1,029,426
Pronamide	0	0	1,000	0	0	0	1,000
Propane sultone	0	0	0	0	0	0	0
Propionaldehyde	0	12,994	1	1,760	26,948	0	41,703
Propoxur	0	0	1,805	140	31	0	1,976
Propylene	0	2,159,280	280,113	5	269	0	2,439,667
Propyleneimine	0	0	0	0	0	0	0
Propylene oxide	66	5,164	6,148	374,821	48,801	4	435,004
Pyridine	4,178	129,674	176,387	350,839	1,201	0	662,279
Quinoline	4,178	7,500	38,602	260	5,054	0	55,594
Quinone	0	0	26,186	0	0	0	26,186
Quintozene	0	0	543,692	1,012	161	0	544,865
Saccharin (manufacturing)	0	0	0	10	1,400	0	1,410
Selenium	28,325	0	1,200	15	20	0	29,560
Selenium compounds	136,856	255	31,492	307	25,216	0	194,126
Silver	860,831	0	36,766	591	3,940	0	902,128
Silver compounds	1,498,528	0	5,876	2,808	10,462	16,232	1,533,906
Styrene	1,427,391	5,365,111	4,042,166	117,879	4,408,316	47,515	15,408,378
Styrene oxide	0	0	0	0	0	0	0
Sulfuric acid (acid aerosols)	208,019,740	69,952	14,009,954	6,514,351	8,242,512	74,368	236,930,877
1,1,1,2-Tetrachloroethane	0	0	117,255	0	15	0	117,270
1,1,2,2-Tetrachloroethane	2,227,120	0	40,807	0	52	0	2,267,979
Tetrachloroethylene	7,415,291	855,782	2,066,219	62,053	73,514	250	10,473,109
Tetrachlorvinphos	0	0	16,904	7	2,948	0	19,859
Thallium	5,040	0	250	5	0	0	5,295
Thallium compounds	0	0	0	0	0	0	0
Thiourea	0	0	1,821	1,860	2,572	0	6,253
Thiram	11,589	1,040	7,519	855	57,757	0	78,760
Thorium dioxide	0	0	0	0	0	0	0
Titanium tetrachloride	3,500	0	317,482	0	150	0	321,132
Toluene	23,471,806	80,113,663	21,780,558	940,281	936,839	4,020	127,247,167
Toluene-2,4-diisocyanate	59,100	26,282	30,181	0	3,523	0	119,086
Toluene-2,6-diisocyanate	8,922	6,232	1,489	0	935	0	17,578
Toluenediisocyanate (mixed isomers)	9,936	24,920	246,418	0	17,101	0	298,375
o-Toluidine	0	110,648	49,767	131,476	302	0	292,193

Table 1-45. Releases and Transfers of All TRI Chemicals, 1994 (Alphabetically Ordered), Continued.

CAS Number(65)	Chemical	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
52-68-6	Trichlorfon	3	5	2	9	0	0	16
120-82-1	1,2,4-Trichlorobenzene	33	30,090	137,190	970	15,200	830	184,280
71-55-6	1,1,1-Trichloroethane	1,207	20,070,741	17,981,336	1,980	102	2,732	38,056,891
79-00-5	1,1,2-Trichloroethane	23	41,184	268,938	914	0	0	311,036
79-01-6	Trichloroethylene	783	14,788,788	15,083,085	1,671	288	4,417	29,878,249
75-69-4	Trichlorofluoromethane (CFC-11)	82	835,924	2,157,087	1,452	11	0	2,994,474
88-06-2	2,4,6-Trichlorophenol	1	116	83	65	0	0	264
1582-09-8	Trifluralin	19	11,795	3,253	6	0	250	15,304
95-63-6	1,2,4-Trimethylbenzene	753	2,618,939	5,122,541	9,163	187	14,957	7,765,787
51-79-6	Urethane	4	11,050	0	0	0	0	11,050
7440-62-2	Vanadium (fume or dust)	12	902	5,421	3,000	0	31,700	41,023
108-05-4	Vinyl acetate	157	1,397,331	2,629,552	1,386	648,667	1,775	4,678,711
593-60-2	Vinyl bromide	1	220	2,400	0	0	0	2,620
75-01-4	Vinyl chloride	43	340,426	725,809	377	1	6	1,066,619
75-35-4	Vinylidene chloride	22	35,324	130,372	215	0	0	165,911
1330-20-7	Xylene (mixed isomers)	3,346	24,902,804	83,430,835	43,961	313,711	244,726	108,936,037
108-38-3	m-Xylene	56	691,694	270,742	893	250	2,708	966,287
95-47-6	o-Xylene	74	905,818	485,704	1,148	250	2,959	1,395,879
106-42-3	p-Xylene	41	808,400	2,612,682	9,690	250	587	3,431,609
87-62-7	2,6-Xylidine	5	59	122	66	0	0	247
7440-66-6	Zinc (fume or dust)	410	767,882	896,245	28,373	5	8,462,944	10,155,449
—	Zinc compounds	2,458	1,891,457	3,063,796	1,438,199	196,498	75,174,770	81,764,720
—	Mixtures and other trade name products	54	201,606	15,070	5	0	3,442	220,123
—	Trade secrets	19	630	34,860	0	0	0	35,490
	Total	75,332	407,515,304	1,148,492,781	66,083,288	348,968,226	289,151,126	2,260,210,725

Table 1-45, Cont.

Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[67] Pounds	Total Transfers Pounds
Trichlorfon	0	0	174	0	19	0	193
1,2,4-Trichlorobenzene	10,715	42,171	29,441,588	101,302	52,908	0	29,648,684
1,1,1-Trichloroethane	6,983,705	1,845,839	2,323,066	6,439	162,877	72,131	11,394,057
1,1,2-Trichloroethane	11,159,898	135,425	4,706,576	3,100	171	0	16,005,170
Trichloroethylene	8,304,071	1,183,610	2,369,771	50,325	86,465	363,668	12,357,910
Trichlorofluoromethane (CFC-11)	146,379	197,690	250,798	43	24,676	0	619,586
2,4,6-Trichlorophenol	0	0	0	0	0	0	0
Trifluralin	0	0	13,547	250	20,816	0	34,613
1,2,4-Trimethylbenzene	1,125,561	2,317,836	246,044	110,864	54,271	0	3,854,576
Urethane	0	0	0	6,939	4,274	0	11,213
Vanadium (fume or dust)	7,336	0	33,476	0	7,938	0	48,750
Vinyl acetate	253,854	7,855,391	1,165,477	218,412	111,072	0	9,604,206
Vinyl bromide	0	0	0	0	0	0	0
Vinyl chloride	68,273	14,301	158,536	326	20,740	0	262,176
Vinylidene chloride	140	250	223,917	287	2,031	0	226,625
Xylene (mixed isomers)	39,649,939	75,959,775	8,576,503	645,816	1,182,194	21,007	126,035,234
m-Xylene	30,573	45,869	8,847	3,331	150,720	0	239,340
o-Xylene	49,741	2,555,757	265,893	61,941	7,030	0	2,940,362
p-Xylene	1,991	19,608	3,669	1,457	3,295	0	30,020
2,6-Xylidine	0	0	459	263	0	0	722
Zinc (fume or dust)	82,615,377	137,918	689,480	38,613	2,984,324	250	86,465,962
Zinc compounds	247,420,257	410,019	10,296,543	472,619	92,862,229	72,810	351,534,477
Mixtures and other trade name products	16,656	29,231	259,163	2,006	11,748	1,450	320,254
Trade secrets	597,825	750	0	0	0	0	598,575
Total	2,456,120,948	464,206,483	318,810,333	254,688,836	297,600,462	3,602,426	3,795,029,488

65 Compound categories do not have CAS numbers (—).

66 The quantity of benzidine reported as released to air is a reporting error from one facility. The facility intends to revise this estimate to zero.

67 Transfers reported without valid waste management codes.

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Chapter 2

Prevention and Management of TRI Chemicals in Waste

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PREVENTION AND MANAGEMENT OF TRI CHEMICALS IN WASTE

INTRODUCTION

The Pollution Prevention Act of 1990 (PPA) requires facilities to report information about the quantities of TRI chemicals managed in waste, both on-site and off-site. The PPA also requires facilities to provide information about the efforts they have made to reduce or eliminate those quantities. Facilities began reporting this information for the 1991 reporting year. This chapter summarizes the PPA data provided by facilities in their 1994 TRI reports.

The PPA established as national policy that source reduction is the preferred approach to managing waste. Source reduction means preventing waste from being generated. The PPA also established as national policy a hierarchy of waste management options for situations where source reduction cannot be implemented feasibly. This hierarchy for making source reduction and waste management decisions is illustrated in Figure 2-1.

Although source reduction is the preferred method of reducing risk, environmentally sound recycling shares many of its advantages. Like source reduction, recycling reduces the need for treatment or disposal of waste and helps conserve energy and natural resources. Where source reduction and recycling are not feasible, waste can be treated. Release (including disposal) of a chemical is viewed as a last resort, to be employed only if the preferred methods of waste management cannot be implemented. The PPA did not specifically address the combustion of waste for energy recovery as a waste management option. However, because energy recovery shares aspects of recycling and treatment, EPA chose to list this activity separately in the waste management hierarchy.

Throughout this chapter, data tables present information in the order of the waste management hierarchy: recycling, energy recovery, treatment, and release/disposal.

The information required by the PPA can help facilities and the public assess progress in pollution prevention and in the management of TRI chemicals in waste. The data reported for 1991 provide a baseline for such assessments.

The data can be used to analyze trends in total quantities of TRI chemicals in waste to see if facilities are reducing the amount of waste

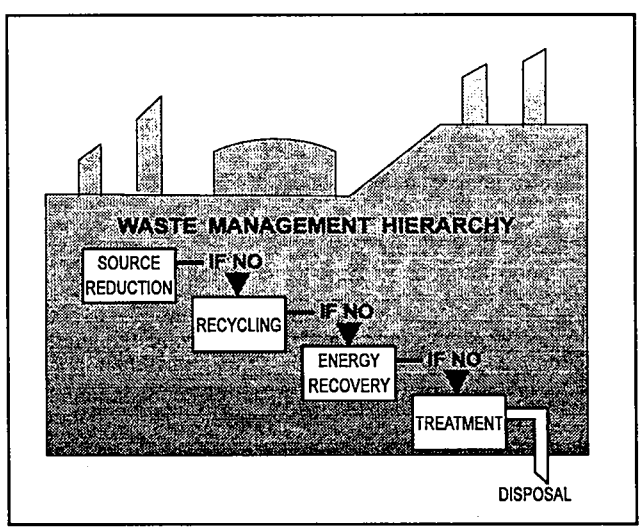


Figure 2-1. Waste Management Hierarchy.

generated. The data also can be used to examine trends in the quantities of TRI chemicals undergoing each waste management method, to see whether facilities are moving up the waste management hierarchy. The PPA data can help the public assess which industries and facilities are implementing source reduction, which types of source reduction activities they are implementing, and how they identified opportunities for source reduction. Information about how source reduction opportunities were identified can aid in determining the more successful routes of delivery for source reduction information and technology transfer. The PPA data do not allow for an accurate quantification of source reduction.

WHAT WASTE MANAGEMENT INFORMATION IS COLLECTED?

The waste management information required by the PPA is collected in Section 8 of the TRI reporting form (see EPA's Form R in Appendix F). It includes the following: quantity released to the environment at the facility and sent off-site for disposal; quantities used for energy recovery at the facility or sent off-site for energy recovery; quantities recycled at the facility or sent off-site for recycling; and quantities treated at the facility or sent off-site for treatment. These quantities are illustrated in Figure 2-2, and a description of what these quantities should represent is provided in Box 2-1.

Facilities report these quantities for the reporting year (1994), for the year prior to the reporting year (1993), and for the two years following the reporting year (1995 and 1996). The quantities reported for 1993 and 1994 are estimates of quantities already managed. The quantities reported for 1995 and 1996 are projections only. The PPA requires these projections to encourage facilities to consider future waste generation and source reduction of those quantities as well as movement up the waste management hierarchy. Future-year estimates are not commitments that facilities reporting under TRI are required to meet.

The individual quantities are mutually exclusive to avoid double-counting of TRI chemicals in waste. The sum of these quantities in a given year equals the total quantity of TRI chemicals in waste resulting from routine production operations at a facility during that year.

For the reporting year only, facilities also must report the quantity of waste released (including disposed of) as a result of activities other than routine production operations. This quantity is referred to in the data tables as "non-production related waste." It includes the amount of waste released to the environment at the facility or transferred off-site due to catastrophic events or to remedial (clean-up) actions occurring at the facility. Non-production related waste is considered less amenable to source reduction because such quantities cannot reasonably be anticipated by facilities.

QUANTITIES OF TRI CHEMICALS IN WASTE

National Overview

For 1994, facilities reported managing 26.5 billion pounds of TRI chemicals in production-related waste (see Table 2-1). These same facilities project that their production-related waste will increase to nearly 27.3 billion pounds by 1996, a projected increase of 2.8%.

Data for all years in Table 2-1 are taken from the 1994 Form Rs. A number of chemicals were added to the TRI list and were reportable to TRI for the first time in 1994. Because facilities may not have been aware in 1993 that these chemi-

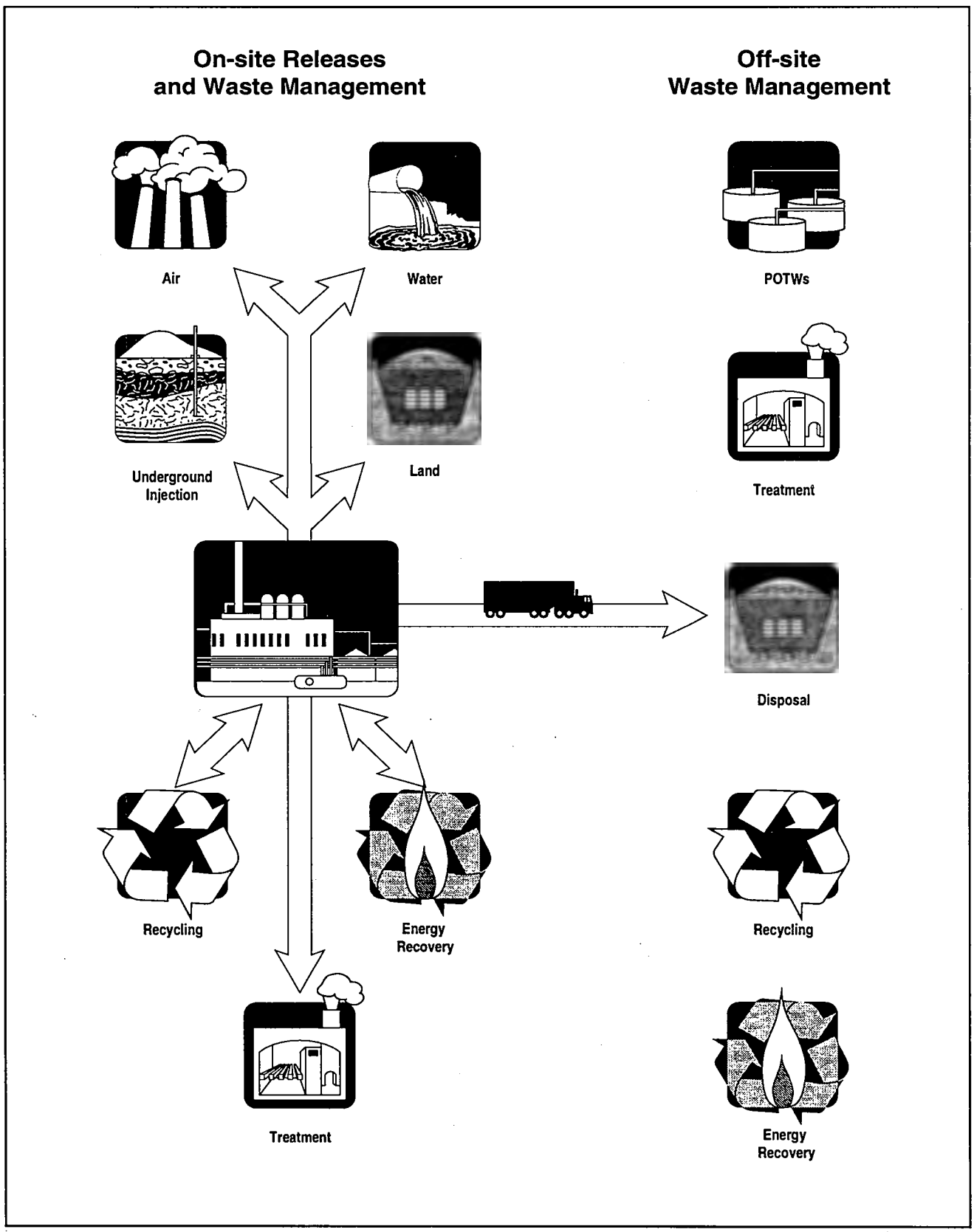


Figure 2-2. Waste Management Information Collected under TRI.

What Does This Waste Management Information Represent?

Quantity released (Section 8.1 of Form R). This is the total quantity of the toxic chemical that was released to the environment or disposed of at the facility (directly discharged to air, land, and water, and injected underground), or sent off-site for disposal. This quantity is the sum of the amounts reported in Sections 5 and 6 of Form R (transfers for disposal only) less any amount(s) associated with non-routine events.

Quantity used for energy recovery on-site (Section 8.2 of Form R). This is the quantity of the toxic chemical that was combusted in some form of energy recovery device, such as a furnace, including kilns, or a boiler. The toxic chemical should have a heating value high enough to sustain combustion. To avoid double-counting, the amount reported represents the amount destroyed in the combustion process, not the amount that entered the energy recovery unit. For example, 100,000 pounds of toluene entered a boiler that, on average, combusted 98% of the toluene. Any remaining toluene was discharged to air. A total of 98,000 pounds is reported as combusted for energy recovery (the remaining 2,000 pounds is reported as released).

Quantity used for energy recovery off-site (Section 8.3 of Form R). This is the quantity of the toxic chemical that left the facility boundary for energy recovery, not the amount combusted at the off-site location. The toxic chemical must have a significant heating value, and the off-site location must have some form of energy recovery unit in place. This quantity includes the amount(s) reported in Section 6 of Form R as transferred off-site for energy recovery, less any amount(s) associated with non-routine events.

Quantity recycled on-site (Section 8.4 of Form R). This is the quantity of the toxic chemical recovered at the facility and made available for further use. It is not the quantity that entered an on-site recycling or recovery operation.

Quantity recycled off-site (Section 8.5 of Form R). This is the quantity of the toxic chemical that left the facility boundary for recycling, not the amount recovered at the off-site location. This quantity includes the amount(s) reported in Section 6 of Form R as transferred off-site for recycling, less any amount(s) associated with non-routine events.

Quantity treated on-site (Section 8.6 of Form R). This is the quantity of the toxic chemical destroyed in on-site waste treatment operations, not the amount that entered any treatment operation. For example, if 100,000 pounds of benzene were combusted in an incinerator that destroyed 99% of the benzene, the facility would report 99,000 pounds as treated on-site (the remaining 1,000 pounds would be reported as released).

Quantity treated off-site (Section 8.7 of Form R). This is the quantity of the toxic chemical that left the facility boundary and was sent to POTWs or other off-site locations for treatment, not the amount that was destroyed at the off-site location(s). This quantity includes the amount(s) reported in Section 6 of Form R as transferred to POTWs or other off-site locations for treatment, less any amount(s) associated with non-routine events.

Quantity released to the environment due to one-time events (Section 8.8 of Form R). This amount is referred to as non-production related waste and is the quantity released to the environment or sent off-site for recycling, energy recovery, treatment, or disposal due to one-time events not associated with routine production practices. Such events include catastrophic events, such as accidental releases, as well as remedial actions (clean up). This quantity is separated from the quantities recycled, used for energy recovery, treated, and released, to allow for distinctions to be made between those quantities that are routinely associated with production operations and are more amenable to source reduction and those quantities that are not routinely associated with production processes and are not as amenable to source reduction because they are not readily anticipated. This separation of quantities is important in assessing progress in source reduction at facilities.

Box 2-1. What Does This Waste Management Information Represent?

Table 2-1. Actual and Projected Quantities of TRI Chemicals in Waste, 1993-1996 (as Reported on the 1994 Form R).❶

Management Activity	1993 Pounds	1994 Pounds	Projected 1995 Pounds	Projected 1996 Pounds
Recycled On-site	8,248,075,870	8,406,829,703	8,650,500,082	8,729,571,607
Recycled Off-site	2,392,157,669	2,516,993,374	2,512,531,447	2,519,762,846
Energy Recovery On-site	2,940,393,366	3,422,556,168	3,530,851,002	3,478,213,030
Energy Recovery Off-site	457,860,139	469,207,613	441,592,060	432,154,508
Treated On-site	8,762,004,485	8,659,057,321	9,046,871,111	9,085,340,115
Treated Off-site	561,590,216	557,327,180	551,813,485	513,418,308
Quantity Released/Disposed of	2,784,880,731	2,514,582,556	2,386,330,799	2,537,442,141
Total Production-related Waste	26,146,962,476	26,546,553,915	27,120,489,986	27,295,902,555

cals would be reportable in 1994, facilities may not have tracked their management of these chemicals in waste in 1993.

Figure 2-3 shows the distribution of the total production-related waste as reported by waste management activity. Approximately 41.1%, or 10.9 billion pounds, of production-related waste was recycled on- or off-site in 1994. About 14.7% of waste was burned for energy recovery, and 34.7% was treated. Just 9.5% of production-related waste was released (which includes disposal) to the environment by facilities in 1994.

The reported distribution of waste by waste management activity differed significantly in prior years of TRI reporting. For example, last year's TRI public data release reported that 49.3% of production-related waste was recycled. This apparent change in distribution is due largely to a change in the list of chemicals subject to TRI reporting and does not represent a real change in distribution. It largely results from the fact that facilities no longer have to report their management of non-aerosol forms of sulfuric acid in waste. On their 1993 TRI reports, facilities reported recycling 7.1 billion pounds of sulfuric acid, which represented 43.0% of all recycling that year. Because facilities were no longer required to report non-aerosol forms of sulfuric acid effective with the 1994 reporting year, much of this sulfuric acid

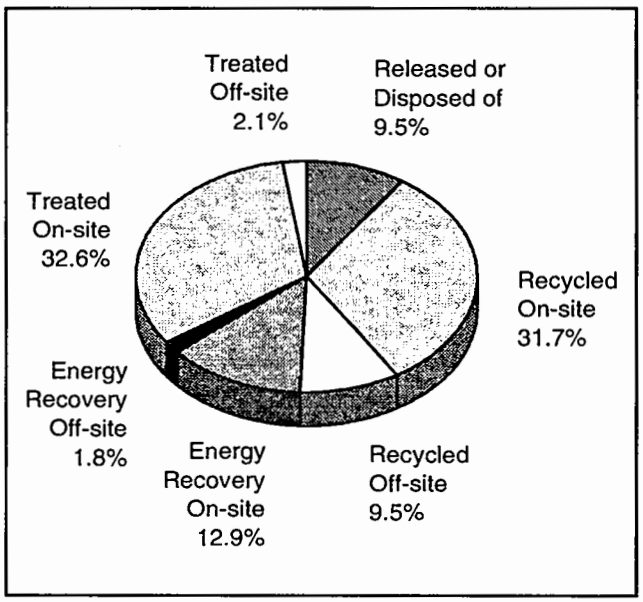


Figure 2-3. Management of TRI Chemicals in Waste, by Activity, 1994.

❶ Data for all years taken from 1994 Form R. Includes data for chemicals added in 1994 and for sulfuric acid (acid aerosols), ammonia, and ammonium sulfate (solution). Because these chemicals are excluded from Tables 2-2 and 2-3, amounts in this table do not match amounts in those tables.

Table 2-2. Quantities of TRI Chemicals in Waste, 1991-1994.❷

Management Activity	1991 Pounds	1992 Pounds	1993 Pounds	1994 Pounds
Recycled On-site	6,181,234,575	5,742,131,177	6,515,629,910	6,900,335,015
Recycled Off-site	1,807,283,961	2,154,305,577	2,127,363,889	2,258,734,855
Energy Recovery On-site	2,961,508,892	2,865,712,103	2,695,986,697	3,362,108,485
Energy Recovery Off-site	443,911,248	439,198,602	462,295,792	467,147,187
Treated On-site	6,088,621,955	6,502,928,670	6,339,532,960	6,489,547,578
Treated Off-site	501,093,181	479,299,106	443,669,385	447,983,815
Quantity Released/Disposed of	2,809,548,220	2,628,810,837	2,423,686,051	2,223,523,711
Total Production-related Waste	20,793,202,032	20,812,386,072	21,008,164,684	22,149,380,646
Non-Production related Waste	22,975,506	30,218,975	42,181,312	69,058,603

Management Activity	1991-1992 Change Percent	1992-1993 Change Percent	1993-1994 Change Percent	1991-1994 Change Percent
Recycled On-site	-7.1	13.5	5.9	11.6
Recycled Off-site	19.2	-1.3	6.2	25.0
Energy Recovery On-site	-3.2	-5.9	24.7	13.5
Energy Recovery Off-site	-1.1	5.3	1.0	5.2
Treated On-site	6.8	-2.5	2.4	6.6
Treated Off-site	-4.3	-7.4	1.0	-10.6
Quantity Released/Disposed of	-6.4	-7.8	-8.3	-20.9
Total Production-related Waste	0.1	0.9	5.4	6.5
Non-Production related Waste	31.5	39.6	63.7	200.6

recycling was not reported for 1994, causing the total reported quantity of recycling to decline significantly.

This change in the reported distribution of waste by waste management activity is not evident in any of the data tables presented in this chapter. It is evident only if the data tables in this chapter are compared to data tables included in publications from prior years. This is because all of the data tables presented in this chapter (except Table 2-1, which is based on the 1994 chemical list) are based on "normalized" lists of chemicals which were reportable in the same manner in all years being compared. The purpose of this normalization process is to ensure that changes or trends which appear in these data tables cannot be attributed merely to changes in the list of chemicals for which reporting was required.

Table 2-2 illustrates the change in the quantities of TRI chemicals undergoing each waste management activity from 1991 to 1994. The amounts for each year are taken from the "current year" column from each year's reports. In other words, the 1991 data were taken from the 1991 reports, the 1992 data from the 1992 reports, and so on. These tables exclude all data

❷ Data from Form R of year indicated. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 2-3. Actual and Projected Quantities of TRI Chemicals in Waste, 1991, 1993-1996.❸

Management Activity	1991		1993		1994		Projected 1995		Projected 1996	
	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent
Recycled On-site	6,181,234,575	29.7	6,515,629,910	30.7	6,900,335,015	31.2	7,096,325,919	31.4	7,135,275,502	31.4
Recycled Off-site	1,807,283,961	8.7	2,127,363,889	9.9	2,258,734,855	10.2	2,252,882,204	10.0	2,284,711,821	10.0
Energy Recovery On-site	2,961,508,892	14.2	2,695,986,697	13.6	3,362,108,485	15.2	3,468,027,754	15.3	3,415,762,244	15.0
Energy Recovery Off-site	443,911,248	2.1	462,295,792	2.2	467,147,187	2.1	439,975,914	1.9	430,772,542	1.9
Treated On-site	6,088,621,955	29.3	6,339,532,960	30.5	6,489,547,578	29.3	6,805,650,805	30.1	6,824,889,955	30.0
Treated Off-site	501,093,181	2.4	443,669,385	2.1	447,983,815	2.0	446,484,807	2.0	417,433,837	1.8
Quantity Released/ Disposed of	2,809,548,220	13.5	2,423,686,051	11.1	2,223,523,711	10.0	2,103,046,036	9.3	2,240,862,178	9.9
Total Production-related Waste	20,793,202,032	100.0	21,008,164,684	100.0	22,149,380,646	100.0	22,612,393,439	100.0	22,749,708,079	100.0

for sulfuric acid, ammonia, ammonium sulfate (solution), delisted chemicals, and chemicals which were added for the 1994 reporting year.

The first three years of PPA reporting show little change in the total quantity of TRI chemicals in production-related waste. Between 1991 and 1992, the total quantity of TRI chemicals in waste increased by less than 0.1%. Between 1992 and 1993, the increase was 0.9%. But between 1993 and 1994, the total quantity of TRI chemicals in waste increased by 5.4%. This increase was due to increases in the quantities of TRI chemicals burned for energy recovery or recycled. The quantity of TRI chemicals burned for energy recovery increased by 671 million pounds, or 21.2%, between 1993 and 1994. The quantity recycled increased by 516 million pounds, or 6.0%.

Table 2-2 also illustrates a significant increase in the total quantity of TRI chemicals in non-production related waste. Because these quantities represent waste generated due to a variety of non-routine events (e.g., catastrophic releases due to natural disasters, accidental releases, remedial actions), it is not possible to determine why non-production related waste has increased. The non-routine nature of such waste makes it less amenable to source reduction than production-related waste.

Table 2-3 shows the actual and projected quantities of TRI chemicals in waste for the baseline year of 1991 and for 1993 through 1996. Quantities for 1991 were taken from the 1991 reports, and quantities for 1993 were taken from the 1993 reports. Quantities for 1994 through 1996 were taken from the 1994 reports. Quantities for 1995 and 1996 represent facility projections of the amounts of TRI chemicals in waste they expect to manage during those years. This table, like Table 2-2, excludes data for sulfuric acid, ammonia, ammonium sulfate (solution), delisted chemicals, and chemicals that were added for the 1994 reporting year. This is why the quantities listed for 1993 through 1996 are lower than the quantities listed

❸ Data for 1991 from 1991 Form R, for 1993 from 1993 Form R, all other years from 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

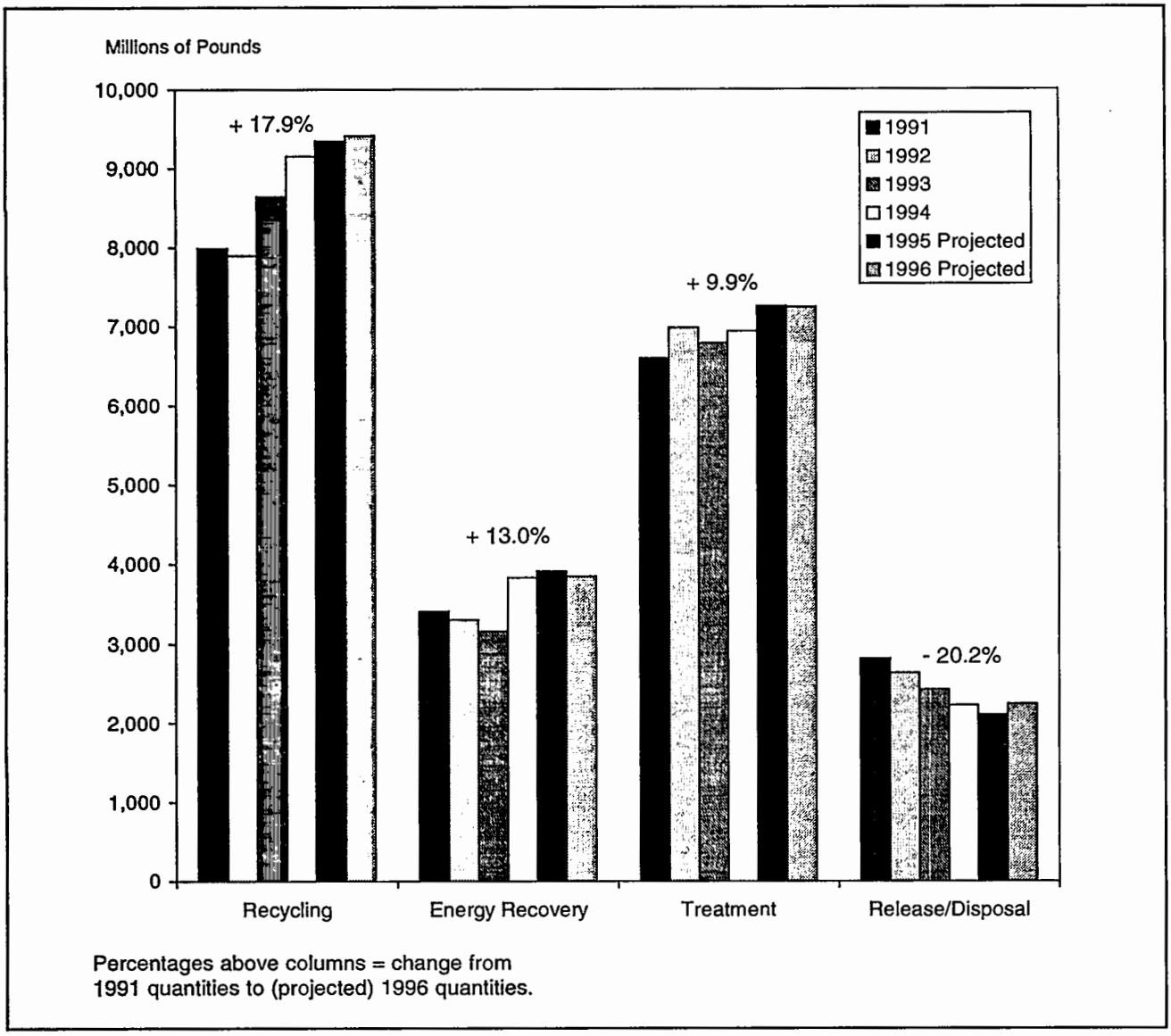


Figure 2-4. Quantities of TRI Chemicals Managed in Waste, Actual and Projected, 1991-1996.❹

for those years in Table 2-1 (Table 2-1 includes data for sulfuric acid and some other chemicals excluded from Tables 2-2 and 2-3).

As discussed above, the total quantity of TRI chemicals in production-related waste increased significantly between 1991 and 1994, primarily between 1993 and 1994. Facilities are projecting that the quantity of TRI chemicals in waste will continue to rise, to more than 22.7 billion pounds in 1996. Again, the 1996 projection in Table 2-3 is lower than the 1996 projection in Table 2-1 because Table 2-3 is based on a smaller chemical set. Figure 2-4 provides a graphical depiction of Table 2-3 and includes 1992 data in order to provide a more complete picture of changes in waste management practices since 1991.

❹ Data for 1991 as reported on 1991 forms; data for 1992 as reported on 1992 forms; data for 1993 as reported on 1993 forms; all other years from 1994 forms. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Facility projections for 1995 and 1996 show that facilities do not expect much change in how they handle their waste in the next two years. Recycling will continue to account for about 41.4% of waste management, the same percentage reported for 1994 for the normalized chemical set in Table 2-3. Energy recovery is projected to decline slightly as a percentage of waste management, from 17.3% in 1994 to 16.9% in 1996. Treatment is projected to increase slightly as a percentage of waste management, from 31.3% in 1994 to 31.8% in 1996. The quantity of TRI chemicals released or disposed of is projected to remain about the same as a percentage of waste management. The data indicate that facilities did not anticipate much progress in moving up the waste management hierarchy in the next two years.

The reasons for the continued increase in the quantities of TRI chemicals in waste and for the lack of major progress in moving up the waste management hierarchy are not clear. The data suggest that current source reduction efforts may not be succeeding in reducing the quantities of TRI chemicals in waste. However, an improving economy and resulting increases in production may account for some or all of the increases of TRI chemicals in waste. To help relate changes in waste generation to changes in production, facilities must report a production activity index, which indicates how much production has changed at that facility since the preceding year. This production activity index is discussed later in this chapter. While this production activity index can provide some insight into reasons for changes in waste generation, it alone is not sufficient to determine the reasons for the trends seen in the PPA data.

STATE, INDUSTRY, AND CHEMICAL-SPECIFIC DATA

Table 2-4 provides the waste management data for each state. The table includes quantities of TRI chemicals in production-related waste for each waste management activity for 1993 through 1996 and the quantity of non-production related waste for 1994. All data are taken from the 1994 reporting forms.

In considering the comparisons presented here, it is important to note that facilities may vary in how they interpret some of the reporting requirements under the PPA. EPA has not yet specifically defined in rulemaking the reporting requirements for these data elements, so some facilities may include in their reports amounts that other facilities do not believe they must include. Because of this, higher quantities of TRI chemicals in waste for a particular state or industry may reflect not only differences in actual quantities, but also different interpretations of the reporting requirements.

Facilities in Texas reported the largest quantity of TRI chemicals in production-related waste in 1994, with 4.11 billion pounds. Louisiana followed with 1.95 billion pounds. These states ranked first and third, respectively, for largest total releases of TRI chemicals in 1994 (see Chapter 1). Pennsylvania ranked third for quantity of TRI chemicals in production-related waste, with 1.30 billion pounds in 1994, but ranked 14th for total releases of TRI chemicals. Ohio ranked fourth for TRI chemicals in production-related waste, with 1.06 billion pounds, and ranked fifth for total releases of TRI chemicals. North Carolina ranked fifth for TRI chemicals in production-related waste, with 1.04 billion pounds, but ninth for total releases.

Tennessee and Mississippi each ranked in the top five states for total TRI releases but were not in the top five for quantity of TRI chemicals in production-related waste. The reason for their relatively high ranking for total releases compared to their ranking for chemicals in waste is that they each released relatively high percentages of the TRI chemicals they manage

Table 2-4. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1993-1996 (Alphabetically Ordered).

State	Year❺	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
Alabama	93	176,395,423	33,932,198	59,603,062	10,531,834
	94	131,815,562	37,027,514	62,726,106	13,729,275
	95	136,758,413	38,932,096	68,036,878	13,809,273
	96	148,884,175	39,857,221	72,364,971	13,720,373
Alaska	93	7,880	388,600	1,522,000	1,100,000
	94	9,970	352,980	1,522,000	1,100,000
	95	10,350	58,800	1,380,640	1,100,000
	96	9,970	0	1,372,000	900,000
American Samoa	93	0	0	0	0
	94	0	0	0	0
	95	0	0	0	0
	96	0	0	0	0
Arizona	93	462,679,969	31,487,951	193,122	575,266
	94	497,618,688	36,872,406	208,196	644,830
	95	517,978,558	39,038,805	211,000	666,251
	96	521,986,955	33,006,760	168,450	715,903
Arkansas	93	78,408,817	90,742,211	20,478,459	5,555,165
	94	230,944,014	121,515,254	22,708,888	5,620,005
	95	253,405,952	125,492,916	18,343,511	5,241,014
	96	334,146,376	132,758,509	18,546,203	4,821,740
California	93	74,678,211	67,115,052	285,273,385	8,045,997
	94	336,847,206	70,456,348	271,142,434	7,592,288
	95	331,858,188	70,269,154	254,472,361	7,249,903
	96	341,690,580	71,325,753	275,399,473	7,048,105
Colorado	93	16,941,451	10,412,670	4,480,000	2,227,784
	94	21,115,971	11,547,061	6,530,000	3,546,601
	95	15,506,858	10,886,133	6,530,000	3,648,592
	96	12,017,608	11,812,795	6,530,000	3,065,416
Connecticut	93	134,233,474	24,806,771	5,848,944	2,026,291
	94	154,147,382	26,192,151	6,429,390	2,068,832
	95	75,118,955	25,394,816	5,597,671	2,106,479
	96	74,596,454	24,468,446	4,939,748	2,087,058
Delaware	93	25,708,211	15,038,241	182,484	400,961
	94	26,857,015	13,280,563	225,039	2,284,616
	95	27,351,206	14,814,124	269,661	1,790,500
	96	27,558,786	16,261,676	220,092	422,921
District of Columbia	93	0	1,729	0	0
	94	0	2,010	0	0
	95	0	14,505	0	0
	96	0	14,572	0	0
Florida	93	124,191,843	19,554,114	33,074,550	2,682,843
	94	122,400,873	18,274,930	22,152,004	2,090,078
	95	132,012,923	16,265,143	28,559,834	1,812,816
	96	134,260,016	20,652,250	30,526,742	1,839,565

Table 2-4.

State	Year❺	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Alabama	93	676,886,466	3,985,797	110,361,571	1,071,696,351	
	94	621,153,237	10,829,640	105,918,588	983,199,922	155,370
	95	704,595,479	13,416,682	99,576,217	1,075,125,038	
	96	660,644,998	13,077,457	88,170,173	1,036,719,368	
Alaska	93	629,860	1,630	7,310,454	10,960,424	
	94	1,645,020	148,488	6,667,722	11,446,180	219,827
	95	1,704,139	1,141	6,056,106	10,311,176	
	96	1,764,120	74	4,243,077	8,289,241	
American Samoa	93	0	0	18,500	18,500	
	94	0	0	12,250	12,250	0
	95	0	0	7,500	7,500	
	96	0	0	6,500	6,500	
Arizona	93	28,907,390	2,817,634	13,979,755	540,641,087	
	94	15,730,533	2,882,131	31,720,306	585,677,090	5,882
	95	26,648,736	2,908,376	30,727,423	618,179,149	
	96	29,839,212	2,917,447	30,001,307	618,636,034	
Arkansas	93	132,031,176	1,896,441	35,591,881	364,704,150	
	94	142,849,679	1,949,340	42,407,418	567,994,598	91,820
	95	137,391,476	1,487,263	36,414,616	577,776,748	
	96	137,891,319	1,429,178	35,585,597	665,178,922	
California	93	182,248,768	24,481,312	54,123,277	695,966,002	
	94	226,518,537	21,395,182	52,938,676	986,890,671	1,012,393
	95	222,529,563	17,237,818	44,760,473	948,377,460	
	96	229,156,963	14,065,375	37,208,718	975,894,967	
Colorado	93	15,603,331	3,993,225	4,670,504	58,328,965	
	94	16,219,466	2,183,845	4,748,722	65,891,666	30,199
	95	15,259,028	1,714,277	4,182,676	57,727,564	
	96	15,750,510	1,278,513	4,003,905	54,458,747	
Connecticut	93	49,692,076	6,321,563	14,146,478	237,075,597	
	94	32,973,426	6,629,250	14,099,917	242,540,348	42,960
	95	31,122,992	5,534,877	12,940,345	157,816,135	
	96	31,764,430	4,560,749	11,670,258	154,087,143	
Delaware	93	85,777,397	21,266,252	4,642,016	153,015,562	
	94	102,679,372	4,028,243	4,426,351	153,781,199	69,688
	95	107,732,312	4,019,341	3,809,943	159,787,087	
	96	112,403,178	3,483,425	3,034,558	163,384,636	
District of Columbia	93	1,562,410	146,245	13,137	1,723,521	
	94	2,288,764	143,673	22,296	2,456,743	0
	95	2,228,708	142,106	18,216	2,403,535	
	96	2,183,776	139,915	16,501	2,354,764	
Florida	93	216,069,451	12,593,455	69,871,313	478,037,569	
	94	202,419,909	7,573,863	73,558,770	448,470,427	21,039,092
	95	224,862,818	14,401,975	73,085,740	491,001,249	
	96	222,300,625	4,288,408	73,685,392	487,552,998	

Table 2-4. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1993-1996 (Alphabetically Ordered), Continued.

State	Year❺	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
Georgia	93	330,975,152	52,649,133	50,177,119	6,255,670
	94	330,304,447	50,369,606	61,492,719	8,278,391
	95	331,451,678	45,985,654	64,712,160	7,940,851
	96	298,794,318	46,366,523	66,127,080	7,639,702
Hawaii	93	15,261	45,726	1,800,000	0
	94	9,321	45,128	1,600,000	6,220
	95	9,010	45,900	1,700,000	6,580
	96	8,996	45,300	1,800,000	7,090
Idaho	93	65,519	512,008	335,000	57,000
	94	784,322	701,508	230,000	56,529
	95	949,960	546,000	278,000	56,510
	96	1,181,339	349,377	287,000	57,782
Illinois	93	175,673,515	135,038,513	22,797,847	32,590,300
	94	179,143,628	142,075,615	20,358,151	31,079,182
	95	190,200,515	140,636,986	19,220,435	28,908,394
	96	185,011,563	139,642,086	19,411,002	27,896,299
Indiana	93	246,224,915	187,536,774	55,625,744	13,408,042
	94	284,674,596	211,278,798	37,089,102	13,260,748
	95	284,628,743	192,525,671	40,404,920	13,524,264
	96	263,687,815	192,727,366	41,507,814	12,126,000
Iowa	93	30,761,124	24,193,783	1,901,925	4,362,158
	94	158,754,402	45,798,598	2,226,660	5,125,639
	95	188,581,493	49,299,207	2,084,629	4,997,463
	96	257,060,680	49,026,029	1,645,248	5,029,747
Kansas	93	556,864,887	40,252,457	190,880,066	2,112,175
	94	299,621,036	46,799,730	158,619,298	2,509,963
	95	190,408,508	46,173,796	139,115,465	1,819,824
	96	88,199,217	46,356,422	146,454,613	2,252,873
Kentucky	93	171,210,158	47,492,790	58,177,244	7,792,332
	94	242,816,105	53,585,087	62,373,514	6,963,072
	95	276,850,504	60,286,211	58,872,602	5,977,800
	96	283,116,164	63,488,754	59,140,698	6,012,758
Louisiana	93	851,929,886	78,264,129	240,378,409	6,835,099
	94	630,194,807	56,857,678	227,637,396	6,738,217
	95	664,782,648	56,263,360	247,415,580	7,437,968
	96	637,311,214	56,139,335	246,254,859	7,263,746
Maine	93	7,172,979	2,385,209	10,641,112	580,895
	94	7,039,168	2,469,802	12,848,611	497,753
	95	8,647,757	2,259,928	13,116,158	465,351
	96	8,637,677	2,212,574	13,962,510	426,290
Maryland	93	41,160,211	51,397,147	9,261,452	2,197,792
	94	27,474,862	35,903,118	11,308,596	1,077,647
	95	31,318,704	43,659,507	11,253,476	1,047,837
	96	33,613,727	45,278,273	11,037,348	963,375

Table 2-4, Cont.

State	Year❺	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Georgia	93	300,593,764	5,891,898	52,065,925	798,608,661	
	94	333,804,405	5,775,804	60,164,332	850,189,704	1,144,356
	95	380,461,351	5,753,031	58,298,008	894,602,733	
	96	329,398,764	5,773,451	57,730,665	811,830,503	
Hawaii	93	387,877	5,534	723,999	2,978,397	
	94	658,798	6,603	746,281	3,072,351	22
	95	982,750	6,432	727,502	3,478,174	
	96	981,650	6,432	729,594	3,579,062	
Idaho	93	19,705,602	2,023,992	6,416,967	29,116,088	
	94	18,661,918	1,386,519	5,755,055	27,575,851	33,336
	95	20,731,482	1,299,422	5,946,492	29,807,866	
	96	21,073,307	1,313,711	6,056,356	30,318,872	
Illinois	93	202,774,067	61,944,143	114,550,595	745,368,980	
	94	203,537,368	44,902,857	120,280,694	741,377,495	1,276,420
	95	198,336,209	50,173,004	109,915,287	737,390,830	
	96	200,915,191	38,556,252	302,207,136	913,639,529	
Indiana	93	157,894,725	16,683,762	101,268,095	778,642,057	
	94	160,500,583	33,740,265	92,993,661	833,537,753	561,192
	95	146,908,515	46,451,509	85,820,439	810,264,061	
	96	156,948,552	46,321,951	83,036,736	796,356,234	
Iowa	93	75,401,516	10,851,710	30,579,925	178,052,141	
	94	75,789,264	11,600,150	33,186,365	332,481,078	18,523,435
	95	90,442,940	12,276,783	28,519,583	376,202,098	
	96	135,695,189	13,410,762	27,530,198	489,397,853	
Kansas	93	50,647,161	5,347,808	36,331,012	882,435,566	
	94	58,161,720	5,538,556	27,710,115	598,960,418	189,705
	95	59,052,339	4,893,597	29,186,799	470,650,328	
	96	63,702,806	4,821,733	28,298,292	380,085,956	
Kentucky	93	257,081,994	10,715,603	35,696,252	588,166,373	
	94	171,323,603	9,166,779	40,553,680	586,781,840	137,431
	95	153,863,932	10,077,677	37,116,194	603,044,920	
	96	155,882,821	10,575,230	35,711,572	613,927,997	
Louisiana	93	913,171,422	5,598,618	366,056,036	2,462,233,599	
	94	856,649,040	6,293,111	166,677,191	1,951,047,440	1,240,700
	95	886,865,804	5,988,875	176,557,775	2,045,312,010	
	96	904,844,475	4,718,264	166,932,756	2,023,464,649	
Maine	93	72,158,220	551,603	10,889,490	104,379,508	
	94	86,959,486	988,340	10,860,894	121,664,054	15,930
	95	89,658,771	522,643	10,640,017	125,310,625	
	96	91,380,846	473,049	10,456,728	127,549,674	
Maryland	93	286,728,368	7,122,185	12,972,629	410,839,784	
	94	267,062,975	4,996,678	13,916,024	361,739,900	169,786
	95	291,195,856	12,581,257	16,950,409	408,007,046	
	96	314,722,795	4,437,899	13,652,144	423,705,561	

Table 2-4. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1993-1996 (Alphabetically Ordered), Continued.

State	Year❺	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
Massachusetts	93	21,826,295	23,284,520	10,096,597	6,045,170
	94	21,303,123	26,420,533	10,840,725	6,409,247
	95	20,505,894	24,364,258	8,556,158	5,453,221
	96	21,182,003	24,060,145	5,459,995	5,209,296
Michigan	93	166,781,431	132,412,741	91,664,519	66,920,216
	94	187,633,467	145,763,253	118,436,808	78,892,968
	95	178,869,538	143,501,079	126,102,587	74,878,766
	96	170,185,296	143,633,316	132,897,096	76,652,026
Minnesota	93	107,102,247	14,049,945	11,613,883	4,610,932
	94	127,777,459	17,966,537	10,938,561	2,645,900
	95	131,437,545	17,789,128	10,649,969	2,544,970
	96	139,465,301	19,014,681	10,682,293	2,523,554
Mississippi	93	204,073,499	58,278,744	27,114,312	3,524,428
	94	292,679,063	34,106,802	57,480,272	3,440,094
	95	262,267,203	33,911,465	72,460,947	2,983,107
	96	261,804,787	35,561,065	72,467,902	2,855,734
Missouri	93	142,955,104	41,660,788	215,336,026	16,467,628
	94	220,758,719	64,935,333	259,913,210	16,931,240
	95	212,280,612	59,216,658	284,428,837	14,385,333
	96	221,300,457	58,617,019	285,222,807	14,241,093
Montana	93	38,387,039	1,900,914	5,806,600	104,489
	94	39,178,692	2,406,947	2,563,200	43,872
	95	42,304,270	2,326,600	1,868,600	46,519
	96	42,304,270	2,347,900	1,826,332	22,169
Nebraska	93	13,772,440	24,748,064	2,736,319	747,575
	94	11,904,525	45,088,993	1,903,137	658,191
	95	12,344,100	44,045,131	1,534,850	624,188
	96	12,358,742	43,106,538	1,543,070	614,921
Nevada	93	5,200,324	446,498	0	4,579
	94	5,689,885	409,351	0	5,960
	95	24,041,320	391,093	0	6,080
	96	24,015,805	380,196	0	6,080
New Hampshire	93	20,396,683	8,521,051	1,121,022	300,445
	94	20,052,585	10,218,963	1,179,606	335,467
	95	28,093,248	9,961,582	1,460,978	290,946
	96	28,037,688	9,936,987	1,462,078	217,047
New Jersey	93	58,020,858	52,174,527	178,458,114	26,242,524
	94	56,541,028	46,214,691	170,604,266	30,176,911
	95	55,970,189	42,195,706	169,475,511	28,505,141
	96	57,053,139	41,780,654	168,383,163	28,474,791
New Mexico	93	244,150	159,568	36,429,390	148,299
	94	1,697,237	149,350	47,613,106	145,450
	95	1,815,721	492,138	47,500,000	34,969
	96	1,854,418	527,010	47,500,000	35,242

Table 2-4, Cont.

State	Year❺	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Massachusetts	93	34,664,430	8,440,254	10,659,622	115,016,888	
	94	37,530,560	9,678,275	10,404,930	122,587,393	70,674
	95	37,448,106	9,683,696	8,371,886	114,383,219	
	96	36,849,906	9,083,708	8,398,013	110,243,066	
Michigan	93	336,592,099	33,003,586	100,777,590	928,152,182	
	94	349,457,081	35,514,256	109,802,806	1,025,500,639	616,953
	95	244,030,625	25,107,150	99,083,847	891,573,592	
	96	225,757,919	25,348,166	95,612,137	870,085,956	
Minnesota	93	37,898,214	6,540,261	22,463,249	204,278,731	
	94	42,759,383	8,317,707	22,931,515	233,337,062	4,300
	95	42,244,744	8,159,761	19,909,596	232,735,713	
	96	42,037,988	7,908,843	18,879,425	240,512,085	
Mississippi	93	168,588,613	1,564,460	113,637,230	576,781,286	
	94	151,582,229	2,833,739	108,714,590	650,836,789	302,384
	95	162,702,317	2,220,542	108,009,087	644,554,668	
	96	162,487,515	2,037,358	110,922,479	648,136,840	
Missouri	93	73,401,426	27,802,058	51,093,593	568,716,623	
	94	86,114,343	30,345,069	52,791,067	731,788,981	3,558,261
	95	89,353,159	29,584,662	50,573,402	739,822,663	
	96	89,644,308	28,926,558	49,116,819	747,069,061	
Montana	93	31,707,160	37,999	51,487,485	129,431,686	
	94	32,286,340	22,971	60,086,091	136,588,113	13,170
	95	32,461,108	19,952	42,247,190	121,274,239	
	96	32,829,408	19,963	42,288,079	121,638,121	
Nebraska	93	14,302,793	3,797,948	14,327,254	74,432,393	
	94	11,788,224	3,880,461	16,317,230	91,540,761	8,463
	95	12,155,427	3,741,203	12,124,942	86,569,841	
	96	12,423,745	3,759,490	11,990,849	85,797,355	
Nevada	93	75,981,860	16,410	4,175,645	85,825,316	
	94	9,037,035	17,167	3,359,559	18,518,957	0
	95	8,851,099	18,044	3,350,619	36,658,255	
	96	8,971,119	18,686	3,394,010	36,785,896	
New Hampshire	93	13,776,465	392,973	3,496,839	48,005,478	
	94	12,195,513	516,434	3,207,277	47,705,845	5,880
	95	12,415,674	734,508	2,814,293	55,771,229	
	96	12,536,554	728,745	2,446,076	55,365,175	
New Jersey	93	206,849,703	34,862,707	20,007,224	576,615,657	
	94	186,059,047	38,561,256	19,765,752	547,922,951	1,378,208
	95	174,973,274	32,226,654	17,598,780	520,945,255	
	96	170,217,909	30,286,263	16,117,969	512,313,888	
New Mexico	93	7,664,761	324,035	23,266,972	68,237,175	
	94	2,250,170	386,086	18,128,719	70,370,118	146
	95	2,841,115	176,052	17,834,075	70,694,070	
	96	3,025,204	188,257	17,650,426	70,780,557	

Table 2-4. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1993-1996 (Alphabetically Ordered), Continued.

State	Year❺	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
New York	93	184,004,842	79,626,173	18,804,242	5,667,043
	94	184,124,601	85,403,597	21,877,947	8,288,061
	95	174,648,398	77,407,706	21,247,455	7,384,659
	96	172,598,114	76,668,720	21,659,573	6,626,974
North Carolina	93	331,092,977	99,508,203	28,902,698	9,384,916
	94	360,060,798	96,918,693	37,443,054	7,869,406
	95	627,254,365	98,324,423	37,162,141	8,931,064
	96	638,350,506	99,797,585	45,701,660	10,092,579
North Dakota	93	4,936	178,720	0	8,029
	94	44,757	404,050	0	9,904
	95	6,547	510,400	0	8,875
	96	6,815	510,400	0	6,395
Ohio	93	541,836,954	197,037,768	104,398,942	28,003,953
	94	261,963,097	221,367,297	95,277,268	37,070,669
	95	249,827,968	221,247,072	98,244,529	34,042,388
	96	262,496,660	228,957,854	110,370,663	33,455,293
Oklahoma	93	77,720,590	21,264,824	5,475,660	2,407,624
	94	107,158,370	20,857,535	72,911,635	2,142,073
	95	104,435,320	22,517,875	240,542	1,902,531
	96	105,514,003	21,985,055	240,542	1,708,782
Oregon	93	41,900,605	18,513,642	12,984,140	428,651
	94	41,759,263	21,187,891	21,415,126	770,757
	95	43,121,793	23,462,716	18,234,115	700,530
	96	47,106,515	26,954,814	17,051,415	646,512
Pennsylvania	93	366,668,918	199,426,810	180,652,125	19,020,412
	94	432,233,444	195,409,021	254,300,352	18,233,384
	95	423,349,932	197,288,169	256,768,048	17,670,818
	96	427,073,040	173,097,081	259,033,339	17,341,263
Puerto Rico	93	21,536,781	14,345,933	5,720,842	5,708,361
	94	25,485,494	10,276,639	5,355,609	9,405,241
	95	24,772,904	9,593,349	6,203,564	10,812,261
	96	24,338,025	9,812,059	7,361,870	9,421,366
Rhode Island	93	11,254,659	12,569,308	274,585	340,542
	94	13,144,927	15,719,508	233,815	466,597
	95	13,367,377	15,137,445	208,630	554,646
	96	13,517,424	16,211,612	162,340	625,343
South Carolina	93	223,409,506	143,799,554	82,857,486	8,993,968
	94	222,698,739	87,720,688	64,695,488	9,999,859
	95	209,779,541	85,671,777	79,537,934	7,999,008
	96	217,418,829	87,148,473	76,761,376	7,666,964
South Dakota	93	43,443	351,940	766,600	205,450
	94	285,745	664,250	991,000	97,210
	95	215,493	613,513	1,048,000	102,699
	96	215,232	633,475	1,058,000	117,938

Table 2-4, Cont.

State	Year❺	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
New York	93	177,057,626	14,303,755	41,716,888	521,180,569	
	94	199,012,065	14,306,574	39,370,852	552,383,697	204,306
	95	202,701,242	12,691,795	34,366,484	530,447,739	
	96	199,316,112	11,674,747	30,548,637	519,092,877	
North Carolina	93	313,542,239	7,740,399	84,280,914	874,452,346	
	94	427,659,291	16,081,307	97,996,754	1,044,029,303	130,244
	95	664,272,783	17,348,462	90,513,323	1,543,806,561	
	96	662,952,190	15,409,944	87,438,060	1,559,742,524	
North Dakota	93	1,702,510	199,829	1,396,291	3,490,315	
	94	1,781,930	278,815	1,614,972	4,134,428	40
	95	1,822,398	211,152	1,640,100	4,199,472	
	96	1,820,360	209,810	1,615,050	4,168,830	
Ohio	93	310,500,473	45,068,987	162,225,498	1,389,072,575	
	94	270,659,789	29,436,352	148,911,291	1,064,685,763	1,400,743
	95	282,319,164	25,584,138	144,648,462	1,055,913,721	
	96	292,435,974	20,983,945	140,426,940	1,089,127,329	
Oklahoma	93	54,841,995	1,354,616	30,037,145	193,102,454	
	94	53,335,369	1,396,109	25,763,678	283,564,769	32,712
	95	51,311,325	5,805,409	28,724,205	214,937,207	
	96	51,737,904	5,660,828	21,532,108	208,379,222	
Oregon	93	73,002,735	5,137,352	16,233,849	168,200,974	
	94	59,191,042	10,940,684	21,640,967	176,905,730	171,486
	95	58,221,977	14,927,058	23,099,067	181,767,256	
	96	59,045,240	13,765,662	24,481,473	189,051,631	
Pennsylvania	93	254,811,464	27,982,828	84,662,493	1,133,225,050	
	94	290,067,134	27,725,031	86,367,722	1,304,336,088	18,626,906
	95	296,920,320	30,089,426	79,198,941	1,301,285,654	
	96	302,820,922	48,157,110	79,765,026	1,307,287,781	
Puerto Rico	93	23,205,642	9,431,890	10,786,065	90,735,514	
	94	23,802,825	9,540,512	9,670,083	93,536,403	22,514
	95	22,146,304	8,712,606	8,583,406	90,824,394	
	96	20,660,877	9,334,123	8,135,509	89,063,829	
Rhode Island	93	8,619,328	777,227	5,634,944	39,470,593	
	94	7,159,041	778,519	6,701,969	44,204,376	40,621
	95	7,565,676	652,496	2,905,865	40,392,135	
	96	7,591,793	515,154	2,421,500	41,045,166	
South Carolina	93	165,428,946	8,232,568	52,855,343	685,577,371	
	94	200,723,512	11,826,322	54,160,851	651,825,459	1,576,760
	95	187,258,567	9,805,922	50,067,088	630,119,837	
	96	194,305,696	10,300,046	48,436,000	642,037,384	
South Dakota	93	28,725,294	248,141	2,101,728	32,442,596	
	94	31,189,110	397,130	2,164,375	35,788,820	123
	95	32,905,037	350,873	1,603,657	36,839,272	
	96	33,065,807	316,699	1,352,779	36,759,930	

Table 2-4. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1993-1996 (Alphabetically Ordered), Continued.

State	Year❺	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
Tennessee	93	129,734,164	45,429,543	57,421,020	7,920,006
	94	114,246,920	54,732,280	80,091,737	8,105,259
	95	118,189,870	56,029,421	68,185,405	5,509,056
	96	119,982,415	60,013,889	63,745,111	6,047,312
Texas	93	1,508,256,289	119,542,800	629,173,785	94,125,147
	94	1,423,803,512	134,535,559	718,629,195	74,801,244
	95	1,458,356,825	141,692,071	826,040,970	72,088,125
	96	1,471,893,398	142,706,211	742,536,315	68,161,488
Utah	93	12,922,157	7,893,340	31,937	173,968
	94	15,829,542	9,443,205	112,168	122,880
	95	48,119,742	9,530,048	137,600	128,955
	96	47,578,482	9,318,163	145,200	129,072
Vermont	93	125,986	1,327,077	4,600	127,602
	94	112,000	1,232,597	16,100	120,510
	95	137,327	1,208,700	16,000	97,500
	96	148,478	731,700	16,000	97,800
Virgin Islands	93	3,157,078	680,497	969,485	309
	94	104,029,035	42,563	162,448,209	47,629
	95	107,149,902	43,839	167,321,641	49,056
	96	107,149,902	43,839	167,321,641	49,056
Virginia	93	116,644,592	26,143,024	41,358,831	6,822,908
	94	135,106,255	29,942,241	44,592,782	8,823,248
	95	131,471,069	30,864,011	47,879,482	7,942,964
	96	142,071,478	29,664,183	46,717,176	7,555,513
Washington	93	93,004,847	14,054,534	120,486,026	746,463
	94	84,674,510	12,288,948	155,126,847	801,828
	95	84,965,301	12,596,322	154,999,691	814,946
	96	87,314,917	12,510,664	155,286,405	810,414
West Virginia	93	137,105,177	31,603,265	7,825,594	14,632,002
	94	127,030,922	44,921,783	7,470,016	10,909,099
	95	130,489,643	47,882,480	31,868,017	9,217,042
	96	140,966,445	47,859,810	7,827,917	10,046,255
Wisconsin	93	85,682,803	53,299,772	9,007,302	18,684,849
	94	82,316,325	57,165,955	8,517,196	17,165,446
	95	70,140,207	63,802,545	9,743,040	16,271,904
	96	69,556,303	64,315,612	9,925,120	16,397,370
Wyoming	93	77,909,610	34,676,376	268,760	4,047
	94	2,932,289	41,672,436	149,629	2,123
	95	2,939,995	40,064,015	150,780	2,123
	96	2,939,090	40,066,115	150,780	2,123
Total	93	8,248,075,870	2,392,157,669	2,940,393,366	457,860,139
	94	8,406,829,703	2,516,993,374	3,422,556,168	469,207,613
	95	8,650,500,082	2,512,531,447	3,530,851,002	441,592,060
	96	8,729,571,607	2,519,762,846	3,478,213,030	432,154,508

Table 2-4, Cont.

State	Year❺	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Tennessee	93	175,246,948	13,195,726	170,052,758	599,000,165	
	94	193,545,676	28,039,642	174,747,715	653,509,229	93,654
	95	196,109,837	8,693,160	174,378,947	627,095,696	
	96	187,597,663	8,382,224	182,831,257	628,599,871	
Texas	93	1,584,150,039	66,314,989	366,842,009	4,368,405,058	
	94	1,444,871,791	52,744,900	264,405,662	4,113,791,863	3,510,712
	95	1,457,108,098	51,974,669	250,938,611	4,258,199,369	
	96	1,463,009,941	46,454,471	270,828,656	4,205,590,480	
Utah	93	72,346,228	1,056,251	96,483,723	190,907,604	
	94	67,751,599	1,250,194	72,510,108	167,019,696	164,593
	95	35,434,290	4,813,945	82,186,785	180,351,365	
	96	39,241,335	1,130,374	83,796,571	181,339,197	
Vermont	93	6,612,657	278,039	627,397	9,103,358	
	94	6,838,969	324,930	663,360	9,308,466	0
	95	7,019,760	211,636	478,056	9,168,979	
	96	7,055,260	189,879	335,755	8,574,872	
Virgin Islands	93	865,850	6,339	1,740,931	7,420,489	
	94	10,283,476	414,075	1,162,604	278,427,591	11,832
	95	10,591,978	426,496	1,197,386	286,780,298	
	96	10,591,978	426,496	1,178,594	286,761,506	
Virginia	93	313,261,514	16,571,246	52,886,019	573,688,134	
	94	371,628,758	16,939,112	54,546,908	661,579,304	167,096
	95	449,262,568	16,085,969	51,207,881	734,713,944	
	96	455,417,752	15,278,360	49,659,340	746,363,802	
Washington	93	200,572,606	1,673,771	25,453,059	455,991,306	
	94	200,620,246	1,526,430	25,611,081	480,649,890	7,296
	95	198,399,192	1,325,928	25,094,386	478,195,766	
	96	201,758,269	1,358,191	24,523,556	483,562,416	
West Virginia	93	183,134,625	7,037,190	24,093,062	405,430,915	
	94	193,793,367	5,988,029	25,112,934	415,226,150	453,943
	95	184,894,338	6,460,743	25,817,800	436,630,063	
	96	190,561,007	6,725,262	25,250,931	429,237,627	
Wisconsin	93	84,791,505	13,952,956	40,649,962	306,069,149	
	94	82,129,607	15,155,595	43,838,387	306,288,511	167,909
	95	84,052,447	13,077,240	41,958,762	299,046,145	
	96	83,827,971	13,185,640	41,570,712	298,778,728	
Wyoming	93	2,203,696	3,016	16,448,139	131,513,644	
	94	4,365,696	4,180	22,745,439	71,871,792	854
	95	4,501,962	4,052	14,546,110	62,209,037	
	96	4,498,962	4,031	14,529,242	62,190,343	
Total	93	8,762,004,485	561,590,216	2,784,880,731	26,146,962,476	
	94	8,659,057,321	557,327,180	2,514,582,556	26,546,553,915	78,702,327
	95	9,046,871,111	551,813,485	2,386,330,799	27,120,489,986	
	96	9,085,340,115	513,418,308	2,537,442,141	27,295,902,555	

❺ Data for all years are taken from the 1994 Form R.

in waste. Nationally, facilities released or disposed of about 9.5% of their TRI chemicals in waste in 1994. However, facilities in Mississippi reported releasing or disposing of 16.7% of their TRI chemicals in waste, while facilities in Tennessee reported releasing or disposing of 26.7%.

In 1994, facilities in Florida reported the largest quantity of TRI chemicals in non-production related waste, with 21.0 million pounds. Non-production related waste is waste that is associated with one-time or accidental events. Pennsylvania was second, with 18.6 million pounds, and Iowa was third, with 18.5 million pounds.

Figure 2-5 shows the top 10 industries for TRI chemicals in production-related waste for 1994. Table 2-5 provides the PPA data for each industry group. The chemical industry reported the largest quantity of TRI chemicals in waste, with 11.2 billion pounds in 1994. The primary metals industry followed with 4.2 billion pounds, and the paper industry ranked third, with 2.2 billion pounds. These industries also ranked first through third, respectively, for total releases of TRI chemicals (see Chapter 1).

The chemical industry also ranked first for the quantity of TRI chemicals in non-production related waste, with 27.9 million pounds in 1994. The primary metals industry followed, with 23.9 million pounds.

Table 2-6 presents the 25 chemicals reported as recycled in the greatest quantities in 1994. Sulfuric acid (acid aerosols) tops the list, with 1.5 billion pounds. However, a significant portion of this quantity may represent non-aerosol forms of sulfuric acid, which facilities were no longer required to report effective with the 1994 reporting year. Some facilities that reported their non-aerosol forms of sulfuric acid for 1994 despite the change in reporting requirements declined to withdraw or revise their 1994 reporting forms, but presumably will no longer report these quantities beginning in 1995. Therefore, further declines in the quantity of sulfuric acid reported as recycled probably can be expected.

Ten of the top 25 chemicals for recycling were metals or metal compound categories, including copper, which ranked second, and lead compounds, which ranked fourth. Toluene and methanol, two common solvents, ranked third and fifth, respectively.

Table 2-7 presents the 25 chemicals that were burned for energy recovery in the greatest quantities in 1994. Mixtures and trade name products ranked fourth for energy recovery in 1994. This amount consists of chlorinated and nonchlorinated solvents, chlorinated hydrocarbons, and acetic acid esters received in waste and burned as fuel in cement kilns by four cement manufacturers. Table 2-8 presents the top 25 chemicals based on quantities treated in 1994. A number of these chemicals are acids, which are often neutralized prior to discharge.

Table 2-9 lists the 25 chemicals which were reported as released or disposed of in the greatest quantities, based on the PPA data. Twenty-four of these chemicals also appear among the top 25 chemicals for total releases based on the TRI release data reported in section 5 of the reporting form (see Table 1-24). Lead compounds, which rank 20th for releases based on the PPA data, rank 30th based on the section 5 release data. The rankings of the chemicals in these two tables (2-9 and 1-24) are sometimes different due to the inclusion of off-site disposal in the release quantities reported in Section 8 of Form R and presented in this chapter.

Table 2-10 presents the quantities of TRI chemicals in waste for each TRI chemical for 1993 to 1996. All quantities were taken from the 1994 reporting form.

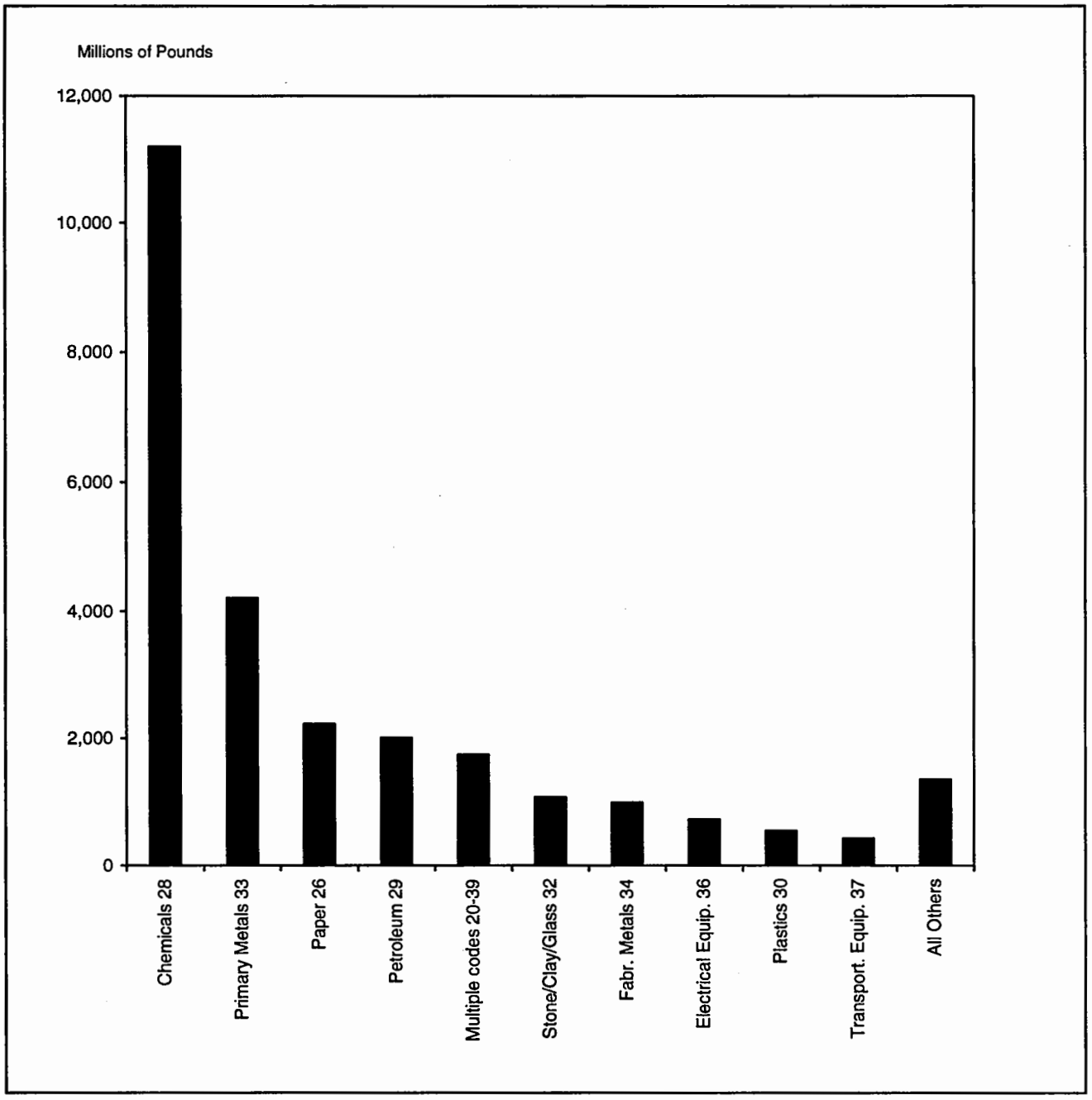


Figure 2-5. Top 10 Industries for Total Production-related Waste, 1994.

Table 2-5. Actual and Projected Quantities of TRI Chemicals in Waste, by Industry, 1993-1996.

SIC Code	Industry	Year❻	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
20	Food	93	12,653,313	1,276,350	164,674	98,555
		94	16,859,873	1,598,737	203,561	145,469
		95	13,916,489	1,534,030	210,062	103,285
		96	14,309,294	1,496,804	220,749	121,205
21	Tobacco	93	0	0	0	0
		94	0	0	0	0
		95	0	0	0	0
		96	0	0	0	0
22	Textiles	93	10,731,325	635,527	4,077,097	1,113,254
		94	13,503,757	730,626	3,994,479	1,252,913
		95	13,830,860	741,425	4,026,196	1,147,825
		96	14,419,213	743,265	4,091,488	1,067,121
23	Apparel	93	223,386	128,200	0	183,484
		94	246,116	82,225	0	125,485
		95	229,401	24,952	0	93,194
		96	203,420	3,472	0	57,893
24	Lumber	93	10,814,841	803,160	1,691,654	3,083,036
		94	16,149,324	718,808	2,259,265	2,814,767
		95	18,208,128	601,845	2,071,113	2,705,388
		96	11,274,790	514,116	1,993,340	2,709,157
25	Furniture	93	3,355,152	4,329,423	156,981	5,767,575
		94	1,727,653	4,199,494	172,607	7,050,286
		95	1,956,150	4,199,882	179,934	6,439,932
		96	1,965,491	4,355,086	189,726	6,439,915
26	Paper	93	220,008,030	3,774,391	205,006,970	7,627,121
		94	221,495,294	2,920,381	210,565,551	8,889,446
		95	211,436,760	3,605,958	213,843,450	8,959,494
		96	210,465,993	1,683,111	214,675,824	8,776,378
27	Printing	93	186,677,712	10,500,140	239,996	3,705,739
		94	187,303,092	6,308,508	263,890	3,398,369
		95	196,478,203	6,054,274	213,330	2,820,668
		96	178,288,376	5,839,953	121,300	2,716,122
28	Chemicals	93	4,182,257,222	297,073,658	974,967,776	345,613,052
		94	3,876,013,299	290,586,425	1,007,087,119	353,424,191
		95	3,939,153,598	291,747,038	1,137,404,475	342,671,950
		96	4,047,499,708	292,158,177	1,031,444,882	335,805,762
29	Petroleum	93	162,712,320	216,586,759	745,894,990	1,025,736
		94	381,203,011	179,837,948	1,073,927,775	1,283,508
		95	376,970,892	184,976,591	958,807,618	1,501,904
		96	381,346,628	158,316,986	977,057,970	485,094
30	Plastics	93	300,073,234	16,467,037	17,690,996	7,573,215
		94	304,370,857	21,085,258	20,419,657	8,249,207
		95	190,113,731	20,752,073	21,848,280	7,562,679
		96	80,868,506	19,894,893	23,365,382	7,318,780
31	Leather	93	842,278	440,730	0	306,162
		94	864,245	571,328	0	271,880
		95	839,724	402,347	0	224,095
		96	867,451	449,124	0	207,014

Table 2-5.

SIC Code	Industry	Year❻	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
20	Food	93	206,563,821	29,760,806	34,677,806	285,195,325	
		94	195,343,115	23,583,855	35,919,597	273,654,207	596,685
		95	206,521,071	26,079,741	31,838,863	280,203,541	
		96	200,988,941	24,212,603	30,216,871	271,566,467	
21	Tobacco	93	553,932	54,345	2,243,907	2,852,184	
		94	179,276	70,083	1,427,718	1,677,077	12,500
		95	144,450	77,400	1,408,447	1,630,297	
		96	120,000	88,200	1,414,208	1,622,408	
22	Textiles	93	50,229,442	5,767,700	19,304,951	91,859,296	
		94	55,106,755	24,552,300	18,913,778	118,054,608	37,807
		95	53,124,900	6,011,052	17,429,208	96,311,466	
		96	45,088,577	5,792,436	16,791,744	87,993,844	
23	Apparel	93	900,595	48,650	1,429,357	2,913,672	
		94	1,051,632	147,529	1,462,619	3,115,606	242
		95	921,035	76,037	1,201,986	2,546,605	
		96	834,143	41,255	824,145	1,964,328	
24	Lumber	93	3,783,652	889,015	32,186,951	53,252,309	
		94	4,418,431	424,383	38,992,407	65,777,385	1,564,040
		95	4,574,939	587,110	34,705,145	63,453,668	
		96	4,809,948	373,892	34,080,170	55,755,413	
25	Furniture	93	1,928,152	916,691	49,562,352	66,016,326	
		94	2,040,410	1,831,321	51,481,050	68,502,821	40,437
		95	2,213,866	1,287,238	48,149,777	64,426,779	
		96	2,321,870	1,219,583	48,074,053	64,565,724	
26	Paper	93	1,507,715,459	45,712,652	206,343,888	2,196,188,511	
		94	1,495,116,784	50,790,319	246,352,081	2,236,129,856	95,871
		95	1,513,572,799	57,055,062	242,053,600	2,250,527,123	
		96	1,482,518,076	44,817,258	238,989,366	2,201,926,006	
27	Printing	93	9,483,722	523,881	31,705,736	242,836,926	
		94	11,667,701	628,703	31,332,524	240,902,787	25,448
		95	20,104,460	455,925	30,422,351	256,549,211	
		96	12,624,105	444,575	29,654,486	229,688,917	
28	Chemicals	93	4,436,150,731	307,056,146	1,191,668,935	11,734,787,520	
		94	4,519,434,112	274,627,293	884,267,461	11,205,439,900	27,928,341
		95	5,005,121,646	258,680,771	857,003,731	11,831,783,209	
		96	5,067,266,428	240,224,733	840,208,469	11,854,608,159	
29	Petroleum	93	421,555,438	6,457,328	76,418,465	1,630,651,036	
		94	303,766,065	5,961,908	58,375,205	2,004,355,420	450,156
		95	290,985,718	5,285,968	56,288,994	1,874,817,685	
		96	289,580,092	4,844,213	55,814,708	1,867,445,691	
30	Plastics	93	45,383,261	6,978,182	116,451,331	510,617,256	
		94	53,516,778	5,226,801	135,768,001	548,636,559	405,287
		95	52,143,995	3,918,896	119,370,053	415,709,707	
		96	52,527,624	3,708,391	124,092,279	311,775,855	
31	Leather	93	15,102,301	2,844,625	8,072,802	27,608,898	
		94	10,251,622	1,714,538	5,776,775	19,450,388	55
		95	10,300,034	2,073,264	5,614,685	19,454,149	
		96	10,509,864	15,633,851	9,884,783	37,552,087	

Table 2-5. Actual and Projected Quantities of TRI Chemicals in Waste, by Industry, 1993-1996, Continued.

SIC Code	Industry	Year❻	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
32	Stone/Clay/Glass	93	101,017,765	2,664,315	800,186,769	7,353,784
		94	93,606,352	2,994,636	920,373,443	4,320,159
		95	94,536,825	2,941,877	1,001,558,876	3,923,135
		96	102,195,325	2,990,030	1,026,547,546	4,184,187
33	Primary Metals	93	1,559,218,411	809,621,701	24,517,989	11,509,581
		94	2,073,661,222	898,694,593	29,104,092	12,270,243
		95	2,181,584,686	917,701,870	30,315,191	3,484,963
		96	2,284,034,305	934,463,658	31,030,717	3,425,733
34	Fabr. Metals	93	254,168,171	252,798,641	19,455,097	12,543,710
		94	329,904,350	284,693,735	20,718,348	13,591,424
		95	510,908,539	285,700,651	19,117,485	12,295,832
		96	521,811,615	292,043,818	19,135,976	12,045,095
35	Machinery	93	61,071,555	51,962,637	180,325	2,849,397
		94	69,813,295	58,555,600	247,313	2,926,014
		95	63,882,688	66,277,386	252,236	2,810,597
		96	54,432,553	67,195,405	252,235	2,542,906
36	Electrical Equip.	93	123,486,588	352,945,648	1,113,046	8,232,961
		94	137,827,226	352,766,057	2,104,530	9,553,499
		95	138,482,914	343,820,144	2,113,786	8,653,846
		96	150,101,543	352,227,467	2,317,797	8,613,961
37	Transportation Equip.	93	67,290,200	150,472,321	918,315	17,265,206
		94	54,246,220	175,141,217	1,702,139	16,672,984
		95	62,156,181	163,421,190	1,917,916	16,594,443
		96	39,907,745	169,303,158	2,089,786	16,129,279
38	Measure./Photo.	93	3,500,751	12,898,730	867,627	3,181,798
		94	3,975,431	14,411,674	967,647	3,056,976
		95	3,490,481	12,712,686	1,020,000	2,587,882
		96	3,178,879	11,599,714	1,023,355	2,519,936
39	Miscellaneous	93	11,450,646	18,370,502	1,356,405	2,665,391
		94	16,914,246	19,573,940	2,195,201	2,701,407
		95	16,012,771	16,779,575	2,405,200	2,336,408
		96	16,259,599	17,237,194	2,882,800	2,274,476
	Multiple codes 20-39❼	93	956,856,448	183,765,674	102,864,377	15,603,836
		94	583,107,777	197,749,058	89,463,005	16,327,515
		95	597,991,633	183,919,881	91,864,704	13,921,163
		96	611,615,982	1[illegible],330,128	94,292,487	13,979,458
	No codes 20-39❽	93	19,666,522	4,642,125	39,042,282	557,546
		94	24,037,063	3,773,126	36,786,546	881,871
		95	18,319,428	4,615,772	41,681,150	753,377
		96	4,525,191	4,917,287	45,479,670	735,036
	Total	93	8,248,075,870	2,392,157,669	2,940,393,366	457,860,139
		94	8,406,829,703	2,516,993,374	3,422,556,168	469,207,613
		95	8,650,500,082	2,512,531,447	3,530,851,002	441,592,060
		96	8,729,571,607	2,519,762,846	3,478,213,030	432,154,508

Table 2-5, Cont.

SIC Code	Industry	Year❻	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
32	Stone/Clay/Glass	93	22,171,754	5,749,086	30,016,691	969,160,164	
		94	24,159,749	2,877,236	25,331,659	1,073,663,234	62,408
		95	21,552,882	2,659,250	23,735,791	1,150,908,636	
		96	21,986,257	2,319,961	23,062,107	1,183,285,413	
33	Primary Metals	93	717,582,435	51,909,646	456,708,033	3,631,067,796	
		94	670,703,873	65,961,645	460,280,745	4,210,676,413	23,941,741
		95	633,084,184	95,298,630	451,748,565	4,313,218,089	
		96	656,225,341	78,565,300	650,644,101	4,638,389,155	
34	Fabr. Metals	93	189,297,817	19,702,575	100,919,233	848,885,244	
		94	213,231,438	22,320,861	106,444,425	990,904,581	87,375
		95	204,967,516	17,785,397	95,836,605	1,146,612,025	
		96	206,906,287	17,137,984	93,214,690	1,162,295,465	
35	Machinery	93	17,692,327	3,181,202	25,251,207	162,188,650	
		94	17,471,521	3,562,584	28,371,966	180,948,293	254,570
		95	16,900,567	3,135,123	25,395,844	178,654,441	
		96	16,580,620	2,859,437	22,230,215	166,093,371	
36	Electrical Equip.	93	162,484,620	15,806,193	41,976,533	706,045,589	
		94	167,813,807	17,664,458	43,419,693	731,149,270	76,369
		95	189,315,481	17,153,133	36,286,409	735,825,713	
		96	204,172,244	18,211,342	30,734,853	766,379,207	
37	Transportation Equip.	93	47,141,305	11,621,598	121,782,477	416,491,422	
		94	45,859,759	10,592,822	128,965,487	433,180,628	346,399
		95	43,832,502	9,357,864	122,167,859	419,447,955	
		96	43,862,654	8,709,436	114,740,194	394,742,252	
38	Measure./Photo.	93	36,519,946	3,600,358	22,929,558	83,498,768	
		94	36,150,815	5,032,324	18,968,375	82,563,242	9,107
		95	35,963,303	4,757,476	16,125,293	76,657,121	
		96	37,304,719	4,364,680	13,831,123	73,822,406	
39	Miscellaneous	93	5,803,829	878,762	15,061,103	55,586,638	
		94	6,145,443	1,310,459	15,792,933	64,633,629	20,791
		95	6,027,265	999,135	13,502,781	58,063,135	
		96	6,388,617	936,234	13,286,298	59,265,218	
	Multiple codes 20-39❼	93	699,158,060	41,442,627	178,196,366	2,177,887,388	
		94	669,177,292	36,354,243	157,860,831	1,750,039,721	22,343,713
		95	678,139,862	38,032,917	145,739,352	1,749,609,512	
		96	696,391,644	37,924,949	137,100,478	1,773,635,126	
	No codes 20-39❽	93	164,801,886	688,148	21,973,049	251,371,558	
		94	156,450,943	2,091,515	19,077,226	243,098,290	402,985
		95	57,358,636	1,046,096	10,305,460	134,079,919	
		96	26,332,064	987,995	8,552,800	91,530,043	
	Total	93	8,762,004,485	561,590,216	2,784,880,731	26,146,962,476	
		94	8,659,057,321	557,327,180	2,514,582,556	26,546,553,915	78,702,327
		95	9,046,871,111	551,813,485	2,386,330,799	27,120,489,986	
		96	9,085,340,115	513,418,308	2,537,442,141	27,295,902,555	

❻ Data for all years are taken from the 1994 Form R.
❼ Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
❽ Facilities/forms that did not report an SIC code and facilities that reported SIC codes outside the 20-to-39 range.

Table 2-6. Top 25 TRI Chemicals Reported as Recycled, 1994.

CAS Number[9]	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Total Recycled Pounds
7664-93-9	Sulfuric acid (acid aerosols)[10]	1,261,886,360	244,770,224	1,506,656,584
7440-50-8	Copper	621,057,880	519,462,953	1,140,520,833
108-88-3	Toluene	1,022,017,402	23,356,695	1,045,374,097
—	Lead compounds	523,496,788	295,991,458	819,488,246
67-56-1	Methanol	537,178,714	17,423,208	554,601,922
—	Copper compounds	259,628,033	158,386,986	418,015,019
—	Zinc compounds	163,562,165	244,871,914	408,434,079
107-21-1	Ethylene glycol	221,408,060	119,877,285	341,285,345
74-85-1	Ethylene	336,088,862	0	336,088,862
7647-01-0	Hydrochloric acid	261,331,683	58,676,372	320,008,055
75-01-4	Vinyl chloride	301,099,066	19,273	301,118,339
79-01-6	Trichloroethylene	248,092,051	8,462,852	256,554,903
7664-41-7	Ammonia	213,617,427	10,289,359	223,906,786
7664-38-2	Phosphoric acid	207,319,461	11,128,655	218,448,116
115-07-1	Propylene	190,030,400	0	190,030,400
7439-92-1	Lead	119,673,015	46,388,271	166,061,286
1330-20-7	Xylene (mixed isomers)	124,414,107	39,374,517	163,788,624
7440-47-3	Chromium	37,699,880	109,926,348	147,626,228
—	Manganese compounds	83,384,761	52,142,486	135,527,247
7440-02-0	Nickel	41,474,166	78,202,733	119,676,899
7439-96-5	Manganese	26,761,432	83,013,913	109,775,345
7440-66-6	Zinc (fume or dust)	20,028,493	84,482,496	104,510,989
—	Glycol ethers	99,339,310	4,292,279	103,631,589
50-00-0	Formaldehyde	100,021,993	124,952	100,146,945
6484-52-2	Ammonium nitrate (solution)	92,269,711	848,132	93,117,843
	Subtotal	7,112,881,220	2,211,513,361	9,324,394,581
	Total for All TRI Chemicals	8,406,829,703	2,516,993,374	10,923,823,077

[9] Compound categories do not have CAS numbers (—).

[10] These quantities may include significant amounts of non-aerosol forms of sulfuric acid.

Table 2-7. Top 25 TRI Chemicals Reported as Used for Energy Recovery, 1994.

CAS Number[11]	Chemical	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds	Total Energy Recovery Pounds
74-85-1	Ethylene	726,539,554	9,961,634	736,501,188
115-07-1	Propylene	687,026,163	2,159,273	689,185,436
67-56-1	Methanol	335,791,168	78,727,556	414,518,724
—	Mixtures and other trade names[12]	342,827,675	29,401	342,857,076
108-88-3	Toluene	240,295,525	81,028,606	321,324,131
1330-20-7	Xylene (mixed isomers)	170,294,546	76,546,202	246,840,748
78-93-3	Methyl ethyl ketone	94,269,472	47,569,206	141,838,678
75-65-0	tert-Butyl alcohol	34,710,614	29,727,280	64,437,894
108-10-1	Methyl isobutyl ketone	35,412,662	18,886,033	54,298,695
7664-41-7	Ammonia	46,790,530	1,140,705	47,931,235
100-41-4	Ethylbenzene	37,291,804	9,106,041	46,397,845
106-99-0	1,3-Butadiene	45,071,333	14,468	45,085,801
74-90-8	Hydrogen cyanide	43,141,554	51	43,141,605
95-47-6	o-Xylene	37,088,018	2,554,666	39,642,684
—	Glycol ethers	20,464,272	14,587,324	35,051,596
107-06-2	1,2-Dichloroethane	32,709,481	636,889	33,346,370
100-42-5	Styrene	27,782,188	5,315,303	33,097,491
75-05-8	Acetonitrile	26,827,192	5,487,384	32,314,576
79-10-7	Acrylic acid	22,104,705	5,401,347	27,506,052
78-87-5	1,2-Dichloropropane	25,700,000	1	25,700,001
71-43-2	Benzene	22,558,478	1,657,355	24,215,833
71-36-3	n-Butyl alcohol	15,354,385	7,765,686	23,120,071
107-21-1	Ethylene glycol	15,497,276	7,611,265	23,108,541
542-75-6	1,3-Dichloropropylene	22,800,000	1,703	22,801,703
108-95-2	Phenol	18,573,912	3,546,324	22,120,236
	Subtotal	3,126,922,507	409,461,703	3,536,384,210
	Total for All TRI Chemicals	3,422,556,168	469,207,613	3,891,763,781

[11] Compound categories do not have CAS numbers (—).

[12] This amount is the total of mixtures received as waste and burned as fuel in cement kilns by four cement manufacturers.

Table 2-8. Top 25 TRI Chemicals Reported as Treated, 1994.

CAS Number[13]	Chemical	Treated On-site Pounds	Treated Off-site Pounds	Total Treated Pounds
7647-01-0	Hydrochloric acid	1,936,246,211	72,036,146	2,008,282,357
7664-93-9	Sulfuric acid (acid aerosols)[14]	1,730,952,568	15,545,913	1,746,498,481
67-56-1	Methanol	920,822,203	122,852,817	1,043,675,020
7664-41-7	Ammonia	339,066,772	57,650,805	396,717,577
7664-38-2	Phosphoric acid	387,132,377	5,472,773	392,605,150
74-85-1	Ethylene	377,166,282	66,460	377,232,742
76-13-1	Freon 113	280,047,264	1,106,697	281,153,961
7697-37-2	Nitric acid	263,397,385	14,335,424	277,732,809
115-07-1	Propylene	243,323,866	280,114	243,603,980
7782-50-5	Chlorine	216,618,766	1,165,675	217,784,441
108-88-3	Toluene	155,607,346	17,645,405	173,252,751
—	Copper compounds	134,841,442	2,922,112	137,763,554
7664-39-3	Hydrogen fluoride	118,947,078	2,643,027	121,590,105
107-21-1	Ethylene glycol	63,548,878	32,481,157	96,030,035
64-18-6	Formic acid	89,222,455	2,031,004	91,253,459
—	Chromium compounds	78,804,179	3,977,484	82,781,663
50-00-0	Formaldehyde	77,492,668	3,463,489	80,956,157
1330-20-7	Xylene (mixed isomers)	64,105,008	9,179,879	73,284,887
10049-04-4	Chlorine dioxide	69,805,013	46	69,805,059
78-93-3	Methyl ethyl ketone	62,307,378	6,546,417	68,853,795
107-06-2	1,2-Dichloroethane	64,471,449	1,202,731	65,674,180
—	Glycol ethers	32,814,456	14,272,906	47,087,362
106-99-0	1,3-Butadiene	44,734,559	407,145	45,141,704
7783-20-2	Ammonium sulfate (solution)	5,277,503	32,431,983	37,709,486
—	Lead compounds	31,945,152	5,144,249	37,089,401
	Subtotal	7,788,698,258	424,861,858	8,213,560,116
	Total for All TRI Chemicals	8,659,057,321	557,327,180	9,216,384,501

[13] Compound categories do not have CAS numbers (—).
[14] These quantities may include significant amounts of non-aerosol forms of sulfuric acid.

Table 2-9. Top 25 TRI Chemicals Reported as Released (Includes Off-site Disposal), 1994.

CAS Number[15]	Chemical	Quantity Released/Disposed of Pounds
67-56-1	Methanol	264,154,976
7647-01-0	Hydrochloric acid	226,303,479
7664-41-7	Ammonia	206,153,499
108-88-3	Toluene	164,627,303
—	Zinc compounds	150,283,170
1330-20-7	Xylene (mixed isomers)	109,582,235
75-15-0	Carbon disulfide	84,510,491
78-93-3	Methyl ethyl ketone	80,107,774
75-09-2	Dichloromethane	69,053,033
—	Copper compounds	66,540,264
—	Manganese compounds	60,845,164
6484-52-2	Ammonium nitrate (solution)	60,806,176
7782-50-5	Chlorine	60,418,267
7664-38-2	Phosphoric acid	59,086,815
—	Glycol ethers	49,960,881
7664-93-9	Sulfuric acid (acid aerosols)[16]	44,297,411
100-42-5	Styrene	43,802,296
71-55-6	1,1,1-Trichloroethane	37,826,474
74-85-1	Ethylene	35,442,835
—	Chromium compounds	31,492,242
—	Lead compounds	31,004,058
71-36-3	n-Butyl alcohol	30,219,697
79-01-6	Trichloroethylene	29,980,770
108-10-1	Methyl isobutyl ketone	25,615,023
7697-37-2	Nitric acid	23,954,649
	Subtotal	2,046,068,982
	Total for All TRI Chemicals	2,514,582,556

[15] Compound categories do not have CAS numbers (—).

[16] These quantities may include significant amounts of non-aerosol forms of sulfuric acid.

Table 2-10. Quantities of TRI Chemicals in Waste, by Chemical, 1994 (Alphabetically Ordered).

CAS Number⑰	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
75-07-0	Acetaldehyde	142,000	28,000	8,068,237	231,651
60-35-5	Acetamide	0	0	119,600	0
75-05-8	Acetonitrile	10,391,440	1,732,015	26,827,192	5,487,384
98-86-2	Acetophenone	0	77,897	11,033,790	543,436
107-02-8	Acrolein	6,600	0	3,347,349	11,894
79-06-1	Acrylamide	2,449	0	0	41,650
79-10-7	Acrylic acid	2,734,524	70,984	22,104,705	5,401,347
107-13-1	Acrylonitrile	11,344,298	100	3,189,640	421,630
107-18-6	Allyl alcohol	1,857,835	0	707,833	98,233
107-05-1	Allyl chloride	489,720	0	180,000	15,143
7429-90-5	Aluminum (fume or dust)	13,897,992	28,929,721	0	86,966
1344-28-1	Aluminum oxide (fibrous forms)	22,580	421,600	0	7,800
60-09-3	4-Aminoazobenzene	0	0	0	0
92-67-1	4-Aminobiphenyl	0	0	0	0
7664-41-7	Ammonia	213,617,427	10,289,359	46,790,530	1,140,705
6484-52-2	Ammonium nitrate (solution)	92,269,711	848,132	0	10,328
7783-20-2	Ammonium sulfate (solution)	14,828,179	2,426,600	0	453
62-53-3	Aniline	43,976,771	0	7,272,647	1,125,452
90-04-0	o-Anisidine	0	0	100	0
104-94-9	p-Anisidine	0	0	0	0
120-12-7	Anthracene	447,802	38,650	134,382	65,114
7440-36-0	Antimony	2,369,205	2,921,068	0	2,840
—	Antimony compounds	5,471,830	3,947,003	0	30,810
7440-38-2	Arsenic	1,580,322	947,262	0	0
—	Arsenic compounds	1,806,460	313,967	0	3
1332-21-4	Asbestos (friable)	484,280	0	0	0
7440-39-3	Barium	23,305	140,947	0	19
—	Barium compounds	15,168,173	1,684,949	0	94,044
98-87-3	Benzal chloride	0	0	0	54,000
71-43-2	Benzene	48,236,739	560,803	22,558,478	1,657,355
92-87-5	Benzidine	0	0	0	0
98-07-7	Benzoic trichloride	0	0	0	0
98-88-4	Benzoyl chloride	0	0	0	0
94-36-0	Benzoyl peroxide	6,805	9,000	0	1,410
100-44-7	Benzyl chloride	972	0	0	401,116
7440-41-7	Beryllium	39,964	13,863	0	0
—	Beryllium compounds	8	315,577	0	0
92-52-4	Biphenyl	456,329	157,154	1,174,140	308,221
111-91-1	Bis(2-chloroethoxy)methane	0	0	0	0
111-44-4	Bis(2-chloroethyl) ether	0	186,472	40,000	162,625
542-88-1	Bis(chloromethyl) ether	0	0	0	0
108-60-1	Bis(2-chloro-1-methylethyl) ether	3,100,000	0	7,800,000	0
103-23-1	Bis(2-ethylhexyl) adipate	1,769,184	182,550	40,688	78,473
353-59-3	Bromochlorodifluoromethane (Halon 1211)	383,800	0	0	0
74-83-9	Bromomethane	772,910	0	79,000	100
75-63-8	Bromotrifluoromethane (Halon 1301)	292,259	0	0	0
106-99-0	1,3-Butadiene	5,600,731	15,270,960	45,071,333	14,468
141-32-2	Butyl acrylate	140,109	108,137	3,776,871	181,887
71-36-3	n-Butyl alcohol	26,333,519	2,653,913	15,354,385	7,765,686
78-92-2	sec-Butyl alcohol	410,890	43,864	10,544,065	5,258,084
75-65-0	tert-Butyl alcohol	473,322	1,356	34,710,614	29,727,280
106-88-7	1,2-Butylene oxide	0	2,650	47,000	360,015
123-72-8	Butyraldehyde	0	0	520,034	18,725

Table 2-10.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Acetaldehyde	13,686,109	877,655	13,137,572	36,171,224	651
Acetamide	1	622	466,001	586,224	0
Acetonitrile	13,036,752	4,887,401	18,249,592	80,611,776	5,568
Acetophenone	1,040,803	52,909	728,785	13,477,620	2,124
Acrolein	823,418	3,857	169,900	4,363,018	85
Acrylamide	526,024	129,621	5,226,967	5,926,711	4
Acrylic acid	29,453,465	507,354	6,974,745	67,247,124	4,349
Acrylonitrile	13,326,367	1,000,927	6,351,157	35,634,119	24,441
Allyl alcohol	756,020	339,180	246,435	4,005,536	113
Allyl chloride	576,888	463,481	204,733	1,929,965	120
Aluminum (fume or dust)	15,332,096	153,415	15,741,771	74,141,961	7,130
Aluminum oxide (fibrous forms)	25,000	91,762	1,508,017	2,076,759	2
4-Aminoazobenzene	3,000	0	351	3,351	0
4-Aminobiphenyl	91,400	0	5	91,405	0
Ammonia	339,066,772	57,650,805	206,153,499	874,709,097	9,392,283
Ammonium nitrate (solution)	7,305,282	4,464,156	60,806,176	165,703,785	11,047,308
Ammonium sulfate (solution)	5,277,503	32,431,983	5,013,026	59,977,744	11,030
Aniline	3,009,125	2,138,537	2,080,027	59,602,559	352
o-Anisidine	14,166	2,171	1,060	17,497	0
p-Anisidine	96	5	17	118	0
Anthracene	198,533	7,585	136,839	1,028,905	24,269
Antimony	2,406,135	32,614	275,732	8,007,594	395
Antimony compounds	160,938	680,891	5,310,334	15,601,806	401,478
Arsenic	14,150	10,892	49,340	2,601,966	3,922
Arsenic compounds	263,695	993,217	3,061,190	6,438,532	137,745
Asbestos (friable)	521,499	1,571	3,963,790	4,971,140	66,560
Barium	1,956	12,363	540,512	719,102	4
Barium compounds	3,868,015	2,705,504	5,591,491	29,112,176	372,883
Benzal chloride	7,200	0	175	61,375	0
Benzene	32,088,508	2,226,836	9,966,186	117,294,905	207,530
Benzidine	0	0	31,606	31,606	0
Benzoic trichloride	120,000	12	2,862	122,874	1
Benzoyl chloride	1,639,368	496,769	13,830	2,149,967	0
Benzoyl peroxide	50,900	44,657	16,085	128,857	3
Benzyl chloride	210,199	6,289	21,743	640,319	33
Beryllium	780	19	33,186	87,812	0
Beryllium compounds	0	1,060	18,802	335,447	0
Biphenyl	712,220	682,228	741,905	4,232,197	5,817
Bis(2-chloroethoxy)methane	0	0	12,516	12,516	0
Bis(2-chloroethyl) ether	105,800	7,891	3,226	506,014	1
Bis(chloromethyl) ether	13,135	0	57	13,192	0
Bis(2-chloro-1-methylethyl) ether	7,500,000	0	7,900	18,407,900	0
Bis(2-ethylhexyl) adipate	220,473	43,827	1,466,124	3,801,319	5,141
Bromochlorodifluoromethane (Halon 1211)	0	0	970	384,770	1,331
Bromomethane	108,195	750	2,666,950	3,627,905	0
Bromotrifluoromethane (Halon 1301)	0	0	22,153	314,412	1,250
1,3-Butadiene	44,734,559	407,145	2,627,513	113,726,709	234,370
Butyl acrylate	1,586,926	193,818	331,389	6,319,137	2,153
n-Butyl alcohol	26,642,020	4,113,931	30,219,697	113,083,151	26,476
sec-Butyl alcohol	1,727,242	108,281	1,163,879	19,256,305	304
tert-Butyl alcohol	1,877,286	1,923,742	1,960,961	70,674,561	2,766
1,2-Butylene oxide	3,300,131	10	9,906	3,719,712	0
Butyraldehyde	1,561,850	207,935	366,498	2,675,042	22

Table 2-10. Quantities of TRI Chemicals in Waste, by Chemical, 1994 (Alphabetically Ordered), Continued.

CAS Number⑰	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
569-64-2	C.I. Basic Green 4	0	0	0	0
989-38-8	C.I. Basic Red 1	0	0	0	114
2832-40-8	C.I. Disperse Yellow 3	0	0	0	0
81-88-9	C.I. Food Red 15	0	0	0	0
3118-97-6	C.I. Solvent Orange 7	450	0	0	0
7440-43-9	Cadmium	935,480	780,949	0	0
—	Cadmium compounds	3,889,303	2,312,673	0	2,334
156-62-7	Calcium cyanamide	0	0	0	0
133-06-2	Captan	10,794	0	0	0
63-25-2	Carbaryl	24,234	0	0	0
75-15-0	Carbon disulfide	22,399,099	389	2,815,953	205,343
56-23-5	Carbon tetrachloride	9,615,424	850,623	118,200	17,311
463-58-1	Carbonyl sulfide	0	0	749,467	0
120-80-9	Catechol	2,040	0	6,319,996	9,318
57-74-9	Chlordane	0	0	0	0
7782-50-5	Chlorine	85,515,731	2,832,062	1,303,170	4,809
10049-04-4	Chlorine dioxide	2,388,780	0	0	0
79-11-8	Chloroacetic acid	38,482	0	0	250
108-90-7	Chlorobenzene	15,489,324	1,084,976	1,546,627	604,217
75-45-6	Chlorodifluoromethane (HCFC-22)	2,704,147	259,342	563	42,267
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3,500,000	0	0	0
75-00-3	Chloroethane	1,388,619	173,859	20,215,866	58,709
67-66-3	Chloroform	5,502,781	350,379	10,972,419	59,270
74-87-3	Chloromethane	2,333,832	0	4,594,405	7,039
107-30-2	Chloromethyl methyl ether	0	0	0	0
—	Chlorophenols	2,822,928	17,232	0	0
126-99-8	Chloroprene	0	1,153,305	26,064	96,000
354-25-6	1-Chloro-1,1,2,2-tetra-fluoroethane (HCFC-124a)	50	0	0	0
2837-89-0	2-Chloro-1,1,1,2-tetra-fluoroethane (HCFC-124)	49,540	142,400	0	0
1897-45-6	Chlorothalonil	5,243	0	0	15
7440-47-3	Chromium	37,699,880	109,926,348	40,180	26,193
—	Chromium compounds	35,509,926	41,844,525	65,292	122,463
7440-48-4	Cobalt	3,241,414	11,905,083	0	0
—	Cobalt compounds	524,605	1,992,396	0	1,041
7440-50-8	Copper	621,057,880	519,462,953	1,000	149,887
—	Copper compounds	259,628,033	158,386,986	0	37,863
8001-58-9	Creosote	13,621,627	1,530	19,100	105,687
120-71-8	p-Cresidine	0	0	0	0
1319-77-3	Cresol (mixed isomers)	1,680,845	338,034	3,845,709	572,034
108-39-4	m-Cresol	2,204,055	680,013	578,235	21,207
95-48-7	o-Cresol	178,409	0	486,957	11,301
106-44-5	p-Cresol	169,555	450,009	518,695	44,701
98-82-8	Cumene	14,355,165	99,390	5,681,718	628,904
80-15-9	Cumene hydroperoxide	0	0	0	568
135-20-6	Cupferron	0	0	0	17,811
—	Cyanide compounds	723,584	24,500	54,000	8,094
110-82-7	Cyclohexane	61,570,482	1,531,781	14,347,049	2,526,880
94-75-7	2,4-D (acetic acid)	66,526	0	0	0
1163-19-5	Decabromodiphenyl oxide	1,046,321	83,068	0	30,410
101-80-4	4,4'-Diaminodiphenyl ether	11,210	0	0	0
25376-45-8	Diaminotoluene (mixed isomers)	0	320	3,218,550	354,740
95-80-7	2,4-Diaminotoluene	0	0	0	480

Table 2-10, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
C.I. Basic Green 4	0	499	10	509	0
C.I. Basic Red 1	0	38	808	960	0
C.I. Disperse Yellow 3	2,496	2,483	2,861	7,840	0
C.I. Food Red 15	0	0	0	0	0
C.I. Solvent Orange 7	0	284	350	1,084	0
Cadmium	73,842	76,531	81,619	1,948,421	0
Cadmium compounds	29,918	151,697	1,965,578	8,351,503	976
Calcium cyanamide	0	0	5	5	0
Captan	9,700	897	7,992	29,383	0
Carbaryl	420,867	7,580	17,533	470,214	0
Carbon disulfide	13,863,758	384,067	84,510,491	124,179,100	16,298
Carbon tetrachloride	14,419,837	929,597	847,419	26,798,411	103,159
Carbonyl sulfide	11,031,008	18,000	17,983,759	29,782,234	2
Catechol	3,082,521	43,007	65,805	9,522,687	1,982
Chlordane	5,200	110	1,300	6,610	0
Chlorine	216,618,766	1,165,675	60,418,267	367,858,480	19,152
Chlorine dioxide	69,805,013	46	1,521,766	73,715,605	583
Chloroacetic acid	1,229,602	5,390	15,850	1,289,574	1,601
Chlorobenzene	7,205,711	1,112,447	1,521,263	28,564,565	11,853
Chlorodifluoromethane (HCFC-22)	343,094	102,755	8,060,361	11,512,529	85,383
1-Chloro-1,1-difluoroethane (HCFC-142b)	545,892	6,730	5,656,571	9,709,193	47
Chloroethane	26,027,122	360,719	2,777,691	51,002,585	972
Chloroform	19,744,218	2,319,118	11,466,125	50,414,310	45,126
Chloromethane	12,100,977	361,014	5,169,614	24,566,881	10,162
Chloromethyl methyl ether	14,600	0	2,806	17,406	0
Chlorophenols	230,113	28,042	122,724	3,221,039	335
Chloroprene	4,137,812	67,371	1,160,282	6,640,834	1,267
1-Chloro-1,1,2,2-tetra-fluoroethane (HCFC-124a)	1,000	0	482,143	483,193	0
2-Chloro-1,1,1,2-tetra-fluoroethane (HCFC-124)	48,224	21,637	835,723	1,097,524	2,232
Chlorothalonil	4,823	9,457	229,337	248,875	0
Chromium	845,446	1,179,392	6,227,613	155,945,052	31,543
Chromium compounds	78,804,179	3,977,484	31,492,242	191,816,111	618,605
Cobalt	165,444	67,964	220,833	15,600,738	0
Cobalt compounds	717,123	126,119	627,403	3,988,687	1,903
Copper	35,341,535	1,302,757	11,363,977	1,188,679,989	45,633
Copper compounds	134,841,442	2,922,112	66,540,264	622,356,700	2,875,773
Creosote	159,813	151,063	6,456,853	20,515,673	1,517,906
p-Cresidine	1,063	30,896	4,155	36,114	0
Cresol (mixed isomers)	7,773,282	308,123	2,576,422	17,094,449	1,503
m-Cresol	250,558	23,632	684,265	4,441,965	114
o-Cresol	170,623	131,087	684,889	1,663,266	78
p-Cresol	170,207	1,756,197	377,948	3,487,312	239
Cumene	7,930,740	212,549	2,203,176	31,111,642	16,961
Cumene hydroperoxide	796,694	3,264	497,691	1,298,217	0
Cupferron	0	78	11	17,900	0
Cyanide compounds	11,876,977	531,366	4,457,975	17,676,496	73,729
Cyclohexane	18,705,628	2,273,080	8,801,657	109,756,557	598,929
2,4-D (acetic acid)	16,416	44,954	42,602	170,498	0
Decabromodiphenyl oxide	32,504	165,638	1,544,164	2,902,105	0
4,4'-Diaminodiphenyl ether	15,028	9,577	1,896	37,711	0
Diaminotoluene (mixed isomers)	1,204,855	671,793	42,336	5,492,594	58
2,4-Diaminotoluene	23,406	64,350	2,044	90,280	4

Table 2-10. Quantities of TRI Chemicals in Waste, by Chemical, 1994 (Alphabetically Ordered), Continued.

CAS Number⑰	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
132-64-9	Dibenzofuran	93,923	26,485	11,000	0
106-93-4	1,2-Dibromoethane	5,015	82	1,800	3
84-74-2	Dibutyl phthalate	41,908	23,124	294,706	229,843
25321-22-6	Dichlorobenzene (mixed isomers)	0	0	20,649	2,566
95-50-1	1,2-Dichlorobenzene	4,477,061	2,518,193	303,389	771,983
541-73-1	1,3-Dichlorobenzene	823	7,504	44,000	0
106-46-7	1,4-Dichlorobenzene	5,373,248	7,249	0	2,730
91-94-1	3,3'-Dichlorobenzidine	0	0	0	12,000
75-27-4	Dichlorobromomethane	0	0	0	0
764-41-0	1,4-Dichloro-2-butene	0	0	12,930	120,014
75-71-8	Dichlorodifluoromethane (CFC-12)	963,343	196,654	0	1,106
107-06-2	1,2-Dichloroethane	67,353,210	15,611,294	32,709,481	636,889
540-59-0	1,2-Dichloroethylene	510,000	2,400	2,426,000	0
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	5,590,507	280,756	0	96,710
75-09-2	Dichloromethane	60,442,075	20,783,673	12,010,971	3,807,830
120-83-2	2,4-Dichlorophenol	1,412	0	0	0
78-87-5	1,2-Dichloropropane	55,000,024	0	25,700,000	1
78-88-6	2,3-Dichloropropene	6,400,000	0	2,200,000	0
542-75-6	1,3-Dichloropropylene	26,057,000	5,007	22,800,000	1,703
76-14-2	Dichlorotetrafluoroethane (CFC-114)	14,900	20,995	0	0
34077-87-7	Dichlorotrifluoroethane	0	0	0	0
306-83-2	2,2-Dichloro-1,1,1-tri-fluoroethane (HCFC-123)	0	680	0	0
62-73-7	Dichlorvos	80	0	0	300
115-32-2	Dicofol	270	0	0	0
111-42-2	Diethanolamine	38,462	263,891	103,860	84,260
117-81-7	Di-(2-ethylhexyl) phthalate	3,008,485	5,984,454	150,969	280,218
84-66-2	Diethyl phthalate	278,899	569,620	150,778	87,890
64-67-5	Diethyl sulfate	0	6,100,000	0	76
94-58-6	Dihydrosafrole	0	0	0	0
119-90-4	3,3'-Dimethoxybenzidine	0	0	0	0
57-14-7	1,1-Dimethyl hydrazine	0	46	0	0
105-67-9	2,4-Dimethylphenol	48,340	46,066	1,287,320	43,303
131-11-3	Dimethyl phthalate	8,873	576	192,701	73,692
77-78-1	Dimethyl sulfate	0	35,803	3	0
99-65-0	m-Dinitrobenzene	0	0	670	0
528-29-0	o-Dinitrobenzene	0	0	5	0
100-25-4	p-Dinitrobenzene	0	0	0	0
534-52-1	4,6-Dinitro-o-cresol	0	0	1,057,120	74
51-28-5	2,4-Dinitrophenol	0	0	276,162	0
121-14-2	2,4-Dinitrotoluene	0	0	992	1,187
606-20-2	2,6-Dinitrotoluene	0	0	248	156
25321-14-6	Dinitrotoluene (mixed isomers)	0	0	0	200
123-91-1	1,4-Dioxane	117,534	23,707	1,168,286	618,867
106-89-8	Epichlorohydrin	6,701,226	0	432,000	184,943
110-80-5	2-Ethoxyethanol	7,000	304,696	559,365	210,478
140-88-5	Ethyl acrylate	119	38,770	7,563,754	1,580,036
100-41-4	Ethylbenzene	19,076,075	4,929,958	37,291,804	9,106,041
541-41-3	Ethyl chloroformate	0	0	0	70
74-85-1	Ethylene	336,088,862	0	726,539,554	9,961,634
107-21-1	Ethylene glycol	221,408,060	119,877,285	15,497,276	7,611,265
—	Ethylenebisdithiocarbamic acid, salts and esters	2,700	0	0	0

Table 2-10, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Dibenzofuran	56,711	162	44,292	232,573	25,302
1,2-Dibromoethane	13,532	58,248	11,490	90,170	21,604
Dibutyl phthalate	146,432	144,570	434,446	1,315,029	0
Dichlorobenzene (mixed isomers)	26,032	211	3,545	53,003	88
1,2-Dichlorobenzene	168,885	2,160,268	308,973	10,708,752	3,627
1,3-Dichlorobenzene	14	3,126	10,732	66,199	104
1,4-Dichlorobenzene	26,180	232,551	264,330	5,906,288	43,462
3,3'-Dichlorobenzidine	19,435	15,021	650	47,106	0
Dichlorobromomethane	0	0	0	0	0
1,4-Dichloro-2-butene	1,250,000	120,000	3,906	1,506,850	15
Dichlorodifluoromethane (CFC-12)	352,709	158,287	4,840,997	6,513,096	50,504
1,2-Dichloroethane	64,471,449	1,202,731	1,952,786	183,937,840	67,083
1,2-Dichloroethylene	4,430,024	23	15,101	7,383,548	526
1,1-Dichloro-1-fluoroethane (HCFC-141b)	436,200	1,122,530	7,950,683	15,477,386	4,969
Dichloromethane	18,927,711	12,334,437	69,053,033	197,359,730	61,074
2,4-Dichlorophenol	125,546	0	12,580	139,538	0
1,2-Dichloropropane	20,023,630	2,041	712,229	101,437,925	215
2,3-Dichloropropene	2,260,000	560,000	47,039	11,467,039	0
1,3-Dichloropropylene	6,280,671	11,065	24,711	55,180,157	0
Dichlorotetrafluoroethane (CFC-114)	229,059	19,651	1,328,596	1,613,201	0
Dichlorotrifluoroethane	10,000	0	450	10,450	0
2,2-Dichloro-1,1,1-tri-fluoroethane (HCFC-123)	0	53,420	131,277	185,377	0
Dichlorvos	63	578	1,096	2,117	6,287
Dicofol	0	170	1	441	0
Diethanolamine	2,635,988	1,360,953	1,027,686	5,515,100	16,081
Di-(2-ethylhexyl) phthalate	608,427	394,994	2,434,924	12,862,471	2,201
Diethyl phthalate	346,513	283,895	163,565	1,881,160	555
Diethyl sulfate	4,082	5,822	7,978	6,117,958	0
Dihydrosafrole	0	0	552	552	0
3,3'-Dimethoxybenzidine	483	33	8	524	0
1,1-Dimethyl hydrazine	2,604	3,318	748	6,716	0
2,4-Dimethylphenol	334,334	34,309	126,491	1,920,163	2
Dimethyl phthalate	437,415	107,455	236,713	1,057,425	2,276
Dimethyl sulfate	209,888	0	5,885	251,579	0
m-Dinitrobenzene	503,598	0	5,719	509,987	95,000
o-Dinitrobenzene	408,812	0	727	409,544	0
p-Dinitrobenzene	17,568	0	197	17,765	0
4,6-Dinitro-o-cresol	13,000	10,835	5,837	1,086,866	0
2,4-Dinitrophenol	880,000	12,371	39,395	1,207,928	0
2,4-Dinitrotoluene	19,715	0	2,298	24,192	0
2,6-Dinitrotoluene	16,626	0	890	17,920	0
Dinitrotoluene (mixed isomers)	209,814	586,750	50,623	847,387	2,000
1,4-Dioxane	1,266,311	385,709	557,176	4,137,590	618
Epichlorohydrin	9,786,734	921,870	488,716	18,515,489	5,118
2-Ethoxyethanol	736,710	388,287	232,165	2,438,701	99,636
Ethyl acrylate	480,010	56,683	176,956	9,896,328	4,547
Ethylbenzene	15,851,341	1,830,511	15,341,735	103,427,465	205,302
Ethyl chloroformate	9,289	700	3,251	13,310	5
Ethylene	377,166,282	66,460	35,442,835	1,485,265,627	152,169
Ethylene glycol	63,548,878	32,481,157	17,955,396	478,379,317	435,865
Ethylenebisdithiocarbamic acid, salts and esters	335	24,614	1,242	28,891	0

Table 2-10. Quantities of TRI Chemicals in Waste, by Chemical, 1994 (Alphabetically Ordered), Continued.

CAS Number[17]	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
151-56-4	Ethyleneimine	0	0	0	0
75-21-8	Ethylene oxide	2,708,276	27,875	940	1
96-45-7	Ethylene thiourea	0	780	0	0
75-34-3	Ethylidene dichloride	150,000	0	669,000	3,900
2164-17-2	Fluometuron	0	0	0	0
50-00-0	Formaldehyde	100,021,993	124,952	6,820,438	297,020
64-18-6	Formic acid	550	0	1,610,000	39,933
76-13-1	Freon 113	6,564,016	1,950,103	0	163,037
—	Glycol ethers	99,339,310	4,292,279	20,464,272	14,587,324
76-44-8	Heptachlor	0	0	0	0
118-74-1	Hexachlorobenzene	61,700	1	0	0
87-68-3	Hexachloro-1,3-butadiene	260,000	0	170,000	0
77-47-4	Hexachlorocyclopentadiene	0	0	0	200
67-72-1	Hexachloroethane	435,000	0	199,270	61,000
70-30-4	Hexachlorophene	0	0	0	0
302-01-2	Hydrazine	0	46	0	0
10034-93-2	Hydrazine sulfate	0	0	0	0
7647-01-0	Hydrochloric acid	261,331,683	58,676,372	84,274	8,667,411
74-90-8	Hydrogen cyanide	75,303	0	43,141,554	51
7664-39-3	Hydrogen fluoride	67,527,955	214,846	37,909	0
123-31-9	Hydroquinone	3,802	0	1,068,662	3,900
78-84-2	Isobutyraldehyde	2,485	0	2,208,563	623,972
67-63-0	Isopropyl alcohol (manufacturing)	453,686	39,579	9,511,388	314,316
80-05-7	4,4'-Isopropylidenediphenol	31,484	297,938	8,838,789	59,292
7439-92-1	Lead	119,673,015	46,388,271	46,177	11,265
—	Lead compounds	523,496,788	295,991,458	0	70,876
58-89-9	Lindane	344	0	0	0
108-31-6	Maleic anhydride	3,585	1,477	2,639,632	135,235
109-77-3	Malononitrile	0	0	0	0
12427-38-2	Maneb	956	0	0	0
7439-96-5	Manganese	26,761,432	83,013,913	0	421
—	Manganese compounds	83,384,761	52,142,486	0	44,084
7439-97-6	Mercury	838,500	21,252	0	0
—	Mercury compounds	90,242	3,685	0	0
126-98-7	Methacrylonitrile	0	0	0	0
67-56-1	Methanol	537,178,714	17,423,208	335,791,168	78,727,556
72-43-5	Methoxychlor	0	0	0	0
109-86-4	2-Methoxyethanol	2,269,999	4,300	520,775	1,546,314
96-33-3	Methyl acrylate	940,001	25,098	161,043	358,912
79-22-1	Methyl chlorocarbonate	0	0	0	0
1634-04-4	Methyl tert-butyl ether	238,880	17,183	149,761	913,778
101-14-4	4,4'-Methylenebis(2-chloroaniline)	720	0	0	5,748
101-68-8	Methylenebis(phenylisocyanate)	31,667	399,105	261,388	113,463
74-95-3	Methylene bromide	2,006,200	0	0	1,300
101-77-9	4,4'-Methylenedianiline	1,900	0	92,806	5,862
78-93-3	Methyl ethyl ketone	66,098,820	21,196,120	94,269,472	47,569,206
60-34-4	Methyl hydrazine	0	0	0	0
74-88-4	Methyl iodide	0	0	160	240
108-10-1	Methyl isobutyl ketone	54,877,123	16,974,510	35,412,662	18,886,033
624-83-9	Methyl isocyanate	0	0	0	0
80-62-6	Methyl methacrylate	4,667,970	21,967	3,049,923	1,354,018
109-06-8	2-Methylpyridine	140,000	0	52,000	2,102
90-94-8	Michler's ketone	0	0	0	145
1313-27-5	Molybdenum trioxide	5,571,077	3,052,598	0	0

Table 2-10, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Ethyleneimine	0	0	0	0	0
Ethylene oxide	7,260,540	84,036	747,185	10,828,853	12,428
Ethylene thiourea	1	8,538	2,886	12,205	0
Ethylidene dichloride	680,000	1	23,468	1,526,369	32
Fluometuron	0	4,410	430	4,840	0
Formaldehyde	77,492,668	3,463,489	19,820,649	208,041,209	386,360
Formic acid	89,222,455	2,031,004	11,222,267	104,126,209	1,060
Freon 113	280,047,264	1,106,697	5,078,294	294,909,411	30,651
Glycol ethers	32,814,456	14,272,906	49,960,881	235,731,428	39,499
Heptachlor	3,900	4,400	830	9,130	480
Hexachlorobenzene	2,151,738	64,272	941,812	3,219,523	8,429
Hexachloro-1,3-butadiene	4,445,710	59,990	2,078	4,937,778	560,090
Hexachlorocyclopentadiene	249,000	29,800	8,930	287,930	1
Hexachloroethane	11,185,582	18,650	368,005	12,267,507	110,114
Hexachlorophene	0	30,970	0	30,970	0
Hydrazine	101,341	8,367	20,582	130,336	0
Hydrazine sulfate	2,300	2,300	230,002	234,602	0
Hydrochloric acid	1,936,246,211	72,036,146	226,303,479	2,563,345,576	392,061
Hydrogen cyanide	20,653,114	7,605	3,121,205	66,998,832	21,663
Hydrogen fluoride	118,947,078	2,643,027	8,052,905	197,423,720	13,941
Hydroquinone	361,348	176,435	508,171	2,122,318	80
Isobutyraldehyde	576,124	98,870	542,029	4,052,043	4
Isopropyl alcohol (manufacturing)	23,903	23,962	1,030,518	11,397,352	5
4,4'-Isopropylidenediphenol	1,580,195	118,682	1,410,885	12,337,265	14,000
Lead	1,236,907	603,414	2,538,538	170,497,587	2,549
Lead compounds	31,945,152	5,144,249	31,004,058	887,652,581	4,969,272
Lindane	0	629	385	1,358	0
Maleic anhydride	30,265,310	835,227	279,417	34,159,883	2,777
Malononitrile	0	245	153,889	154,134	0
Maneb	30	1,938	397	3,321	13,000
Manganese	345,939	484,189	23,879,192	134,485,086	7,370
Manganese compounds	437,395	4,548,777	60,845,164	201,402,667	1,816,513
Mercury	11,065	2,458	24,445	897,720	56
Mercury compounds	0	17	28,813	122,757	5
Methacrylonitrile	0	0	79,999	79,999	0
Methanol	920,822,203	122,852,817	264,154,976	2,276,950,642	391,298
Methoxychlor	0	0	16	16	0
2-Methoxyethanol	4,601,024	1,388,604	679,255	11,010,271	10
Methyl acrylate	1,382,130	108,339	262,858	3,238,381	2
Methyl chlorocarbonate	9,310	0	4,880	14,190	0
Methyl tert-butyl ether	3,310,888	782,521	3,272,879	8,685,890	262,516
4,4'-Methylenebis(2-chloroaniline)	75	2,195	25	8,763	0
Methylenebis(phenylisocyanate)	796,728	577,520	1,153,425	3,333,296	1,643
Methylene bromide	97,228	1,149	77,695	2,183,572	0
4,4'-Methylenedianiline	50,125	173,189	59,243	383,125	1
Methyl ethyl ketone	62,307,378	6,546,417	80,107,774	378,095,187	46,835
Methyl hydrazine	457	5	0	462	0
Methyl iodide	180	270	32,783	33,633	0
Methyl isobutyl ketone	16,549,233	2,062,305	25,615,023	170,376,889	19,221
Methyl isocyanate	71,030	0	19,731	90,761	4
Methyl methacrylate	2,970,916	1,053,451	3,253,772	16,372,017	72,549
2-Methylpyridine	14,000	20,033	173,455	401,590	0
Michler's ketone	0	0	999	1,144	0
Molybdenum trioxide	13,950	400,767	851,398	9,889,790	3,767

Table 2-10. Quantities of TRI Chemicals in Waste, by Chemical, 1994 (Alphabetically Ordered), Continued.

CAS Number⑰	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
76-15-3	Monochloropentafluoroethane (CFC-115)	30,300	0	0	0
91-20-3	Naphthalene	16,856,917	436,815	6,067,030	1,136,445
134-32-7	alpha-Naphthylamine	0	0	0	0
7440-02-0	Nickel	41,474,166	78,202,733	0	9,187
—	Nickel compounds	21,033,218	32,291,880	0	1,044
7697-37-2	Nitric acid	34,802,605	3,902,833	23,000	3
139-13-9	Nitrilotriacetic acid	1,840	0	0	0
99-59-2	5-Nitro-o-anisidine	0	0	0	0
98-95-3	Nitrobenzene	5,175,345	3,603	1,577,630	24,293
55-63-0	Nitroglycerin	14,210	690	0	0
99-55-8	5-Nitro-o-toluidine	0	0	0	0
88-75-5	2-Nitrophenol	0	0	0	0
100-02-7	4-Nitrophenol	0	0	0	0
79-46-9	2-Nitropropane	0	3,300	1,584	1,779
156-10-5	p-Nitrosodiphenylamine	0	0	9,100	16,000
121-69-7	N,N-Dimethylaniline	52,500	0	0	640,609
86-30-6	N-Nitrosodiphenylamine	0	0	0	0
123-63-7	Paraldehyde	0	0	46,230	49
56-38-2	Parathion	0	0	0	0
76-01-7	Pentachloroethane	1,500,000	0	140,000	0
87-86-5	Pentachlorophenol	105,705	228	0	24,856
79-21-0	Peracetic acid	21,060	0	0	0
108-95-2	Phenol	38,574,604	479,321	18,573,912	3,546,324
106-50-3	p-Phenylenediamine	0	0	43,000	0
90-43-7	2-Phenylphenol	0	0	110	0
75-44-5	Phosgene	0	0	380	0
7664-38-2	Phosphoric acid	207,319,461	11,128,655	12,000	44,563
7723-14-0	Phosphorus (yellow or white)	1,208	206,133	0	0
85-44-9	Phthalic anhydride	527,847	2,781	2,272,095	4,186,515
88-89-1	Picric acid	0	0	387,228	13
—	Polybrominated biphenyls	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	0	0	0	0
23950-58-5	Pronamide	2,100	0	0	0
1120-71-4	Propane sultone	0	0	0	0
123-38-6	Propionaldehyde	0	0	2,081,855	12,950
114-26-1	Propoxur	0	0	0	0
115-07-1	Propylene	190,030,400	0	687,026,163	2,159,273
75-55-8	Propyleneimine	0	0	0	0
75-56-9	Propylene oxide	11,716	66	2,645,309	5,214
110-86-1	Pyridine	1,991,787	4,178	1,910,784	129,141
91-22-5	Quinoline	2,168	4,178	280,592	7,500
106-51-4	Quinone	0	0	9,868	0
82-68-8	Quintozene	6,328	0	13,000	0
81-07-2	Saccharin (manufacturing)	0	0	0	0
7782-49-2	Selenium	0	28,325	0	0
—	Selenium compounds	343,313	136,856	0	30
7440-22-4	Silver	330,239	815,529	0	3
—	Silver compounds	291,857	1,494,780	0	0
100-42-5	Styrene	7,585,916	900,424	27,782,188	5,315,303
96-09-3	Styrene oxide	23	0	35,337	0
7664-93-9	Sulfuric acid (acid aerosols)⑱	1,261,886,360	244,770,224	92,640	69,844
630-20-6	1,1,1,2-Tetrachloroethane	2,500,000	0	0	0
79-34-5	1,1,2,2-Tetrachloroethane	4,740,000	2,227,120	958,000	0
127-18-4	Tetrachloroethylene	56,920,709	7,634,068	10,715,929	893,544

Table 2-10, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Monochloropentafluoroethane (CFC-115)	103,718	561	327,948	462,527	0
Naphthalene	9,789,166	589,168	3,586,853	38,462,394	214,550
alpha-Naphthylamine	0	0	2	2	0
Nickel	1,479,903	1,140,364	3,844,918	126,151,271	11,665
Nickel compounds	1,207,655	1,521,384	5,533,558	61,588,739	1,045,111
Nitric acid	263,397,385	14,335,424	23,954,649	340,415,899	219,100
Nitrilotriacetic acid	398,169	2,080	3,261	405,350	0
5-Nitro-o-anisidine	0	0	0	0	0
Nitrobenzene	585,708	457,379	857,008	8,680,966	1,750
Nitroglycerin	303,371	105,864	47,137	471,272	0
5-Nitro-o-toluidine	0	92	13	105	0
2-Nitrophenol	348,379	20,989	85	369,453	0
4-Nitrophenol	73,000	583,000	1,000	657,000	0
2-Nitropropane	79,484	29	40,298	126,474	0
p-Nitrosodiphenylamine	0	0	24	25,124	0
N,N-Dimethylaniline	50,972	219,207	92,683	1,055,971	0
N-Nitrosodiphenylamine	0	200,000	0	200,000	0
Paraldehyde	260,000	0	17	306,296	0
Parathion	0	1,143	16,375	17,518	0
Pentachloroethane	91,025	2,500	1,128	1,734,653	1
Pentachlorophenol	42,203	63,695	60,846	297,533	251
Peracetic acid	84,180	1,960	30,233	137,433	0
Phenol	28,522,902	6,074,512	13,352,511	109,124,086	23,766
p-Phenylenediamine	915,974	27,068	9,236	995,278	102
2-Phenylphenol	423,403	2,195	44,305	470,013	3
Phosgene	14,023,971	158	7,499	14,032,008	807
Phosphoric acid	387,132,377	5,472,773	59,086,815	670,196,644	22,555,154
Phosphorus (yellow or white)	39,006	7,655	64,773	318,775	47,325
Phthalic anhydride	18,908,160	248,253	528,181	26,673,832	164,079
Picric acid	285,129	836	43,966	717,172	0
Polybrominated biphenyls	0	0	899	899	0
Polychlorinated biphenyls (PCBs)	0	154,532	26,653	181,185	107,422
Pronamide	0	1,100	300	3,500	0
Propane sultone	0	0	0	0	0
Propionaldehyde	1,134,524	385	579,862	3,809,576	432
Propoxur	0	1,942	35	1,977	0
Propylene	243,323,866	280,114	20,412,740	1,143,232,556	184,299
Propyleneimine	1,748	0	385	2,133	0
Propylene oxide	9,278,622	159,078	1,106,260	13,206,265	9,191
Pyridine	543,969	525,691	468,423	5,573,973	28
Quinoline	51,342	38,532	93,768	478,080	757
Quinone	130,000	26,186	14,001	180,055	0
Quintozene	17	543,123	2,566	565,034	2,002
Saccharin (manufacturing)	10,000	10	1,519	11,529	0
Selenium	0	1,202	597	30,124	0
Selenium compounds	0	31,107	211,940	723,246	3,800
Silver	99,763	289	16,447	1,262,270	956
Silver compounds	2,958,879	12,594	53,134	4,811,244	1,307
Styrene	11,725,933	4,228,315	43,802,296	101,340,375	388,970
Styrene oxide	0	0	57	35,417	0
Sulfuric acid (acid aerosols)⑱	1,730,952,568	15,545,913	44,297,411	3,297,614,960	144,548
1,1,1,2-Tetrachloroethane	260,000	117,028	11,749	2,888,777	0
1,1,2,2-Tetrachloroethane	8,551,216	40,020	13,684	16,530,040	60
Tetrachloroethylene	21,514,333	2,144,993	10,785,921	110,609,497	42,944

Table 2-10. Quantities of TRI Chemicals in Waste, by Chemical, 1994 (Alphabetically Ordered), Continued.

CAS Number[17]	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
961-11-5	Tetrachlorvinphos	16,075	0	3	0
7440-28-0	Thallium	27,482	4,615	0	0
—	Thallium compounds	0	0	0	0
62-56-6	Thiourea	0	0	0	0
137-26-8	Thiram	23,128	11,261	0	1,013
1314-20-1	Thorium dioxide	0	0	0	0
7550-45-0	Titanium tetrachloride	0	3,500	0	0
108-88-3	Toluene	1,022,017,402	23,356,695	240,295,525	81,028,606
584-84-9	Toluene-2,4-diisocyanate	584	59,000	58,686	26,282
91-08-7	Toluene-2,6-diisocyanate	99	7,800	14,672	6,232
26471-62-5	Toluenediisocyanate (mixed isomers)	21,300	9,030	5,300,200	27,488
95-53-4	o-Toluidine	49	0	342,900	110,697
52-68-6	Trichlorfon	70	0	0	0
120-82-1	1,2,4-Trichlorobenzene	36,737	10,765	28,219	53,791
71-55-6	1,1,1-Trichloroethane	71,974,733	6,890,719	2,893,185	1,898,289
79-00-5	1,1,2-Trichloroethane	14,275,000	11,158,658	10,640,000	135,425
79-01-6	Trichloroethylene	248,092,051	8,462,852	2,379,037	1,192,486
75-69-4	Trichlorofluoromethane (CFC-11)	68,811	137,530	859,373	190,960
88-06-2	2,4,6-Trichlorophenol	0	0	0	0
1582-09-8	Trifluralin	1,220	0	0	0
95-63-6	1,2,4-Trimethylbenzene	16,818,609	1,101,814	5,241,054	2,296,594
51-79-6	Urethane	0	0	0	0
7440-62-2	Vanadium (fume or dust)	135,004	7,336	0	0
108-05-4	Vinyl acetate	6,488,533	550,993	14,222,230	7,743,616
593-60-2	Vinyl bromide	0	0	0	0
75-01-4	Vinyl chloride	301,099,066	19,273	12,684,596	14,029
75-35-4	Vinylidene chloride	400,000	140	16,000	105
1330-20-7	Xylene (mixed isomers)	124,414,107	39,374,517	170,294,546	76,546,202
108-38-3	m-Xylene	609,216	174,852	4,422,579	45,221
95-47-6	o-Xylene	423,194	49,072	37,088,018	2,554,666
106-42-3	p-Xylene	763,112	2,005	1,670,795	17,708
87-62-7	2,6-Xylidine	0	0	22,015	0
7440-66-6	Zinc (fume or dust)	20,028,493	84,482,496	0	130,647
—	Zinc compounds	163,562,165	244,871,914	58,249	263,233
—	Mixtures and other trade names	323,948	3,944	342,827,675	29,401
—	Trade secrets	1,870,000	597,825	1,400,000	850
	Total for All TRI Chemicals	8,406,829,703	2,516,993,374	3,422,556,168	469,207,613

Table 2-10, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Tetrachlorvinphos	0	16,814	2,969	35,861	0
Thallium	0	5	65	32,167	0
Thallium compounds	0	0	36	36	0
Thiourea	3,860	2,109	13,818	19,787	0
Thiram	562	7,096	59,535	102,595	0
Thorium dioxide	0	0	0	0	0
Titanium tetrachloride	23,244,683	317,582	21,928	23,587,693	983
Toluene	155,607,346	17,645,405	164,627,303	1,704,578,282	256,389
Toluene-2,4-diisocyanate	3,733	32,144	33,623	214,052	0
Toluene-2,6-diisocyanate	833	3,295	19,658	52,589	0
Toluenediisocyanate (mixed isomers)	2,863,651	218,890	57,801	8,498,360	5,736
o-Toluidine	110,844	181,797	42,579	788,866	2
Trichlorfon	211	160	40	481	0
1,2,4-Trichlorobenzene	734,646	543,533	188,502	1,596,193	12,322
1,1,1-Trichloroethane	1,146,568	2,420,884	37,826,474	125,050,852	45,887
1,1,2-Trichloroethane	25,729,768	4,755,527	308,959	67,003,337	2,676
Trichloroethylene	6,004,328	2,798,413	29,980,770	298,909,937	40,215
Trichlorofluoromethane (CFC-11)	221,700	261,275	3,008,341	4,747,990	9,762
2,4,6-Trichlorophenol	1,060,598	0	264	1,060,862	0
Trifluralin	100,294	14,305	24,031	139,850	8,529
1,2,4-Trimethylbenzene	12,963,754	372,063	7,618,066	46,411,954	11,533
Urethane	0	6,939	15,076	22,015	2,500
Vanadium (fume or dust)	0	31	81,658	224,029	0
Vinyl acetate	13,866,895	1,384,417	5,030,656	49,287,340	4,585
Vinyl bromide	13	0	2,600	2,613	0
Vinyl chloride	36,256,838	158,934	1,091,425	351,324,161	30,402
Vinylidene chloride	9,393,764	223,229	166,868	10,200,106	250
Xylene (mixed isomers)	64,105,008	9,179,879	109,582,235	593,496,494	317,767
m-Xylene	3,641,325	10,749	971,081	9,875,023	2,899
o-Xylene	3,094,628	346,525	1,459,600	45,015,703	1,008
p-Xylene	1,729,790	4,630	3,414,014	7,602,054	18,439
2,6-Xylidine	1,362	722	238	24,337	0
Zinc (fume or dust)	2,214,521	717,317	12,015,279	119,588,753	10,648
Zinc compounds	3,811,473	16,186,744	150,283,170	579,036,948	14,161,510
Mixtures and other trade names	27,855	309,882	276,687	343,799,392	7,244
Trade secrets	170,752	0	34,960	4,074,387	18
Total for All TRI Chemicals	8,659,057,321	557,327,180	2,514,582,556	26,546,553,915	78,702,327

⑰ Compound categories do not have CAS numbers (—).

⑱ These quantities may include significant amounts of non-aerosol forms of sulfuric acid.

COMPARING WASTE MANAGEMENT DATA TO RELEASE AND TRANSFER DATA

On-site releases of toxic chemicals to the environment are reported in Section 5 of the TRI reporting form, and off-site transfers are reported in Section 6. Both on-site and off-site management of toxic chemicals in waste is reported in Section 8, although it is aggregated differently.

Release estimates in section 5 of the form include releases which result from routine production operations, as well as releases which result from one-time events, such as accidents or clean-up operations. The same is true of transfer estimates reported in section 6. However, in section 8, waste resulting from routine production operations (sections 8.1 through 8.7) is reported separately from non-production related waste, which is reported only in section 8.8.

If a facility does not report any non-production related waste in section 8.8, the release and transfer data in sections 5 and 6 should match the on-site and off-site waste management quantities in sections 8.1 through 8.7. For example, the quantity of a TRI chemical transferred off-site for recycling (section 6) should approximately equal the quantity of the chemical reported as recycled off-site (section 8.5). However, if a facility reports any non-production related waste in section 8.8, this will not be true. In that case, quantities in sections 5 and 6 may be higher than the corresponding quantities in sections 8.1 through 8.7, because part of the section 5 and 6 quantities will be in section 8.8 instead of 8.1 through 8.7.

Table 2-11 compares the release and transfer quantities from sections 5 and 6 to the relevant waste management quantities in section 8. The comparison shows some discrepancies in this reporting. The largest discrepancy on a percentage basis was in off-site treatment. Transfers off-site for treatment reported in section 6 exceeded off-site treatment reported in section 8 by 59.1 million pounds, or 10.6%. One facility in Alabama reported nearly 29 million pounds of 1,2,4-trichlorobenzene transferred off-site for treatment in section 6, but only 5 pounds treated off-site in section 8. The largest discrepancy between sections 5 and 6 and section 8 in terms of pounds was found in off-site recycling (60.9 million pounds). One facility in Wyoming reported 41.6 million pounds of sulfuric acid recycled off-site in section 8, but zero pounds transferred off-site for recycling in section 6. EPA provided some guidelines for reducing these discrepancies during the 1993 reporting year and anticipates that promulgation of final guidance for reporting the PPA data will further reduce these discrepancies.

Table 2-11. Difference in Release and Transfer Data and Waste Management Data, 1994.

Management Activity	Quantity Reported in Section 8 Pounds	Quantity Reported in Sections 5 and 6 Pounds	Difference Pounds	Difference as Percent of Section 8 Quantity Percent
Off-site Recycling	2,516,993,374	2,456,120,948	-60,872,426	-2.4
Off-site Energy Recovery	469,207,613	464,206,483	-5,001,130	-1.1
Off-site Treatment	557,327,180	616,410,795	59,083,615	10.6
Releases and Off-site Disposal	2,514,582,556	2,561,413,613	46,831,057	1.9

UNDERSTANDING WHAT SPECIFIC ELEMENTS MEAN

Quantities recycled. Some facilities believe that what is to be reported as recycled off-site in Section 8 is inherently different from what is to be reported as transferred off-site for recycling in Section 6. They believe that section 6 off-site transfers should include only quantities of toxic chemicals in waste, while off-site recycling reported in Section 8 should include quantities of toxic chemicals in materials that are not considered waste by the facility. For example, a facility which ships silver residuals off-site to a jewelry manufacturer may decide to report the transfer in Section 8 but not in Section 6, because although the facility considers the silver recycled off-site, it does not consider the silver to be "in waste." EPA is considering these issues as it develops final guidance for reporting quantities recycled both on- and off-site.

Facilities also differ in how they calculate the quantity of a chemical recycled on-site. For example, a facility may use a total of 15,000 pounds of 1,1,1-trichloroethane for cleaning and other purposes during the reporting year, recycling it 15 times for a total recovery of 225,000 pounds of the chemical during that year. This quantity is much greater than the amount of the toxic chemical that was used at the facility, but reflects the amount of 1,1,1-trichloroethane in waste managed at the facility during the reporting year. Although many facilities would report this as 225,000 pounds recycled on-site, not all facilities would report it in this manner. Some facilities may choose to report this quantity as 15,000 pounds.

Quantities combusted for energy recovery. Facilities are instructed not to report metals or metal compounds, as well as other chemicals that have no significant fuel value, as combusted for energy recovery. Some facilities do not follow these instructions. In the case of metal compounds, the parent metals do not contribute heating value to the combusted waste and are either ultimately discharged to air or remain in the ash, which is usually disposed of.

Quantities treated on-site. Facilities were instructed to include in this data element only those quantities of TRI chemicals which are destroyed through treatment. However, some facilities have misinterpreted how to report these quantities. This is evident in Table 2-8, which includes three metal compound categories among the top 25 chemicals reported as treated with large quantities reported as treated on-site. Although parent metals in metal compounds may be removed from waste, they are not destroyed through on-site treatment. Therefore, these metal compounds should not be reported as treated on-site. Such misreporting incorrectly characterizes the ultimate disposition of the chemical in waste. For example, the parent metals in metal compounds ultimately are released or disposed of and that final disposition should be reported.

Quantities treated off-site. In reporting transfers off-site, facilities are instructed to provide the ultimate known disposition of the toxic chemical. For example, in a situation where a metal is sent off-site and stabilized prior to disposal in a landfill, the quantity of the metal sent off-site should be reported as disposed of, not treated, off-site in both Sections 6 and 8 of Form R. There may be situations, however, where the facility does not know whether the TRI chemical is destroyed through treatment or what the final disposition of the chemical is. Therefore, quantities reported as treated off-site can sometimes represent amounts that are ultimately released or disposed of. This is the case whenever metal compounds are reported as treated off-site because the parent metals will not be destroyed and will ultimately be released or disposed of.

Similar occurrences can be found with transfers to POTWs. Facilities are instructed to consider all quantities transferred to POTWs as transferred off-site for treatment for the purpose of reporting in Section 8 of Form R. However, POTWs can have varying levels of treatment capabilities, which means that a TRI chemical sent to a POTW may or may not be destroyed. Metal compounds and certain organic chemicals can be passed through a POTW, meaning that they are discharged directly from the POTW or are contained in the sludges from the POTW, which are ultimately disposed of on land. When such reporting occurs, quantities reported as treated off-site represent amounts that are ultimately released or disposed of.

SOURCE REDUCTION ACTIVITIES

In addition to reporting quantities of toxic chemicals managed in waste, facilities must provide information about any source reduction activities they implemented during the reporting year. Source reduction activities are undertaken to reduce the amount of a toxic chemical which enters a waste stream or is otherwise released to the environment. By reducing the generation of toxic chemicals in waste, source reduction activities reduce the need to recycle, treat, or dispose of toxic chemicals.

Box 2-2 explains source reduction as defined by the PPA. Box 2-3 lists all of the reportable source reduction activities and the categories in which they are grouped.

A reported source reduction activity could have been implemented at any time during the reporting year. This is important to consider when analyzing the impact that source reduction activities may have had on the total quantity of waste that had to be managed by a facility during the year. The implementation of a source reduction activity late in the reporting year would have a smaller impact on the amount of waste that was managed during the year than the implementation of the same activity earlier in the reporting year.

Table 2-12 shows the number and percentage of facilities and forms reporting at least one source reduction activity for 1991 through 1994. In 1994, 32.3% of all TRI facilities reported implementing at least one source reduction

What is Source Reduction?

Through source reduction, risks to people and the environment can be reduced, financial and natural resources can be saved that would otherwise have to be expended on environmental clean-up or pollution control, and industrial processes can become more efficient. Source reduction is defined in the PPA as any practice that:

- reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions); and
- reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.

Source reduction practices can include equipment, process, procedure, or technology modifications, reformulation or redesign of products, substitution of raw materials, and improvements in maintenance and inventory controls. Under this definition, waste management activities, including recycling, treatment, and disposal, are not considered forms of source reduction.

Box 2-2. What Is Source Reduction?

Source Reduction Activity Codes

Good Operating Practices
- W13 Improved maintenance scheduling, recordkeeping, or procedures
- W14 Changed production schedule to minimize equipment and feedstock changeovers
- W19 Other changes in operating practices

Inventory Control
- W21 Instituted procedures to ensure that materials do not stay in inventory beyond shelf-life
- W22 Began to test outdated material -- continue to use if still effective
- W23 Eliminated shelf-life requirements for stable materials
- W24 Instituted better labelling procedures
- W25 Instituted clearinghouse to exchange materials that would otherwise be discarded
- W29 Other changes in inventory control

Spill and Leak Prevention
- W31 Improved storage or stacking procedures
- W32 Improved procedures for loading, unloading, and transfer operations
- W33 Installed overflow alarms or automatic shut-off valves
- W35 Installed vapor recovery systems
- W36 Implemented inspection or monitoring program of potential spill or leak sources
- W39 Other spill and leak prevention

Raw Material Modifications
- W41 Increased purity of raw materials
- W42 Substituted raw materials
- W49 Other raw material modifications

Process Modifications
- W51 Instituted recirculation within a process
- W52 Modified equipment, layout, or piping
- W53 Use of a different process catalyst
- W54 Instituted better controls on operating bulk containers to minimize discarding of empty containers
- W55 Changed from small volume containers to bulk containers to minimize discarding of empty containers
- W58 Other process modifications

Cleaning and Degreasing
- W59 Modified stripping/cleaning equipment
- W60 Changed to mechanical stripping/cleaning devices (from solvents or other materials)
- W61 Changed to aqueous cleaners (from solvents or other materials)
- W63 Modified containment procedures for cleaning units
- W64 Improved draining procedures
- W65 Redesigned parts racks to reduce dragout
- W66 Modified or installed rinse systems
- W67 Improved rinse equipment design
- W68 Improved rinse equipment operation
- W71 Other cleaning and degreasing modifications

Surface Preparation and Finishing
- W72 Modified spray systems or equipment
- W73 Substituted coating materials used
- W74 Improved application techniques
- W75 Changed from spray to other system
- W78 Other surface preparation and finishing modifications

Product Modifications
- W81 Changed product specifications
- W82 Modified design or composition
- W83 Modified packaging
- W89 Other product modifications

Box 2-3. Source Reduction Activity Codes.

Table 2-12. Facilities and Forms Reporting Source Reduction Activity, 1991-1994.[19]

Year	Facilities Reporting Source Reduction Activity		Forms Reporting Source Reduction Activity	
	Number	As Percent of All TRI Facilities Percent	Number	As Percent of All TRI Forms Percent
1991	8,245	35.6	19,117	26.1
1992	7,871	34.7	18,152	25.5
1993	7,477	33.9	17,424	25.1
1994	6,861	32.0	16,184	24.0

activity. This represents a slight decline from the 1993 level of 33.9% and the 1991 level of 35.6%. Facilities reported source reduction on 24.0% of their chemical-reporting forms in 1994, down from 25.1% in 1993 and 26.1% in 1991.

The categories or types of source reduction activities that can be reported, as well as the more specific activities reported under each category, are shown in Box 2-3. Table 2-13 summarizes national source reduction activity reporting by category for 1994. The most frequently reported categories of source reduction activities were good operating practices (12.1% of all forms), process modifications (8.2% of all forms), and spill and leak prevention activities (6.5% of all forms). These categories were also the most frequently reported in previous years.

Facilities are also required to report the methods they used to identify the reported source reduction activity. Table 2-14 shows how many times each method was used to identify source reduction activities during 1994. The most frequently reported methods of identifying opportunities for source reduction were participative team management and internal pollution prevention opportunity audits.

Table 2-15 shows how many facilities and forms in each state reported source reduction activities. Table 2-16 shows how often each category of source reduction activity was reported in each state. The states with the highest percentages of facilities reporting at least one source reduction activity in 1994 were

Table 2-13. Facilities and Forms Reporting Source Reduction Activity, by Category, 1994.

Source Reduction Activity Category	Facilities Reporting Source Reduction Activity		Forms Reporting Source Reduction Activity[20]	
	Number	As Percent of All TRI Facilities Percent	Number	As Percent of All TRI Forms Percent
Good Operating Practices	3,427	15.1	9,100	12.1
Inventory Control	834	3.7	2,332	3.1
Spill and Leak Prevention	1,647	7.2	4,921	6.5
Raw Material Modifications	1,852	8.1	3,173	4.2
Process Modifications	2,637	11.6	6,167	8.2
Cleaning and Degreasing	1,015	4.5	1,676	2.2
Surface Preparation/Finishing	813	3.6	2,135	2.8
Product Modifications	767	3.4	1,543	2.0
Any Source Reduction Activity[21]	7,355	32.3	17,557	23.3

[19] Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.
[20] All source reduction activities on a form are counted in the corresponding category.
[21] Totals do not equal the sum of the categories because facilities and forms may report more than one source reduction activity.

American Samoa (50%, based on just two facilities), New Mexico (46.7%), Massachusetts (46.2%), Maine (45.7%), and Minnesota (45.2%). The states with the highest percentage of forms reporting source reduction activities were Hawaii (44.4%), New Mexico (41.5%), Vermont (40.9%), and Minnesota (37.7%). Table 2-17 shows the frequency of the methods used to identify source reduction activities in each state.

Table 2-18 shows the number of facilities and forms in each industry group which reported source reduction in 1994. The industries with the highest percentage of facilities reporting source reduction were measurements/photographic instruments (46.3%), furniture (44.1%), printing (41.9%), and petroleum (41.6%). The furniture, printing, and measurements/photographic instruments industries also had the highest percentage of forms reporting source reduction. Table 2-19 shows how often each category of source reduction activity was reported by each industry group. Methods used to identify source reduction activities by industry are listed in Table 2-20. Table 2-21 shows the number and percentage of facilities in each industry group reporting source reduction from 1991 to 1994. Table 2-22 shows the number and percentage of TRI forms from each industry group reporting source reduction from 1991 to 1994.

The top 50 chemicals for which source reduction was reported are listed in Table 2-23. Table 2-24 shows the number of times each category of source reduction activity was reported for the top 50 chemicals for source reduction activity reporting. The chemicals for which source reduction was reported most frequently were toluene, xylene, and methyl ethyl ketone. More than 36% of the forms for each of these three chemicals reported source reduction in 1994, compared to 23.3% of TRI reporting forms for all chemicals.

Among the 50 chemicals in these tables, the chemicals with the highest percentage of forms reporting source reduction were Freon 113 (60.3%), 1,1,1-trichloroethane (49.0%), and dichlorodifluoromethane, also known as CFC-12 (40.2%). Production of each of these three chemicals was to be phased out by January 1, 1996, because of their ozone-depleting potential. This phase-out was required in a final rule issued by EPA in 1993 to implement the provisions of the Clean Air Act Amendments and the Montreal Protocol agreement (see Chapter 1 and Appendix A).

Table 2-25 shows the methods used to identify source reduction activities for the 50 chemicals for which source reduction was reported most often.

An explanation of the methods used to tabulate source reduction activities, categories, and other elements of source reduction reporting for Tables 2-14 through 2-25 appears in Box 2-4, following those tables.

Table 2-14. Methods Used to Identify Source Reduction Activity for Each Source Reduction Activity (Number of Times Each Method was Reported), 1994.

Source Reduction Activity	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
	Internal	External			Informal	Formal Program
Good Operating Practices	**3,429**	**362**	**1,424**	**4,914**	**1,639**	**951**
W13	1,785	219	779	2,113	760	422
W14	466	33	228	982	309	204
W19	1,178	110	417	1,819	570	325
Inventory Control	**823**	**103**	**487**	**1,199**	**381**	**240**
W21	265	20	153	366	126	81
W22	102	22	80	201	73	35
W23	8	0	5	9	4	0
W24	89	8	21	152	40	48
W25	89	4	17	75	28	15
W29	270	49	211	396	110	61
Spill and Leak Prevention	**2,425**	**259**	**425**	**2,111**	**843**	**547**
W31	217	21	52	215	160	82
W32	521	46	94	531	243	89
W33	135	21	28	172	56	51
W35	192	35	45	122	22	29
W36	775	93	130	608	196	186
W39	585	43	76	463	166	110
Raw Material Modifications	**965**	**109**	**275**	**1,218**	**393**	**247**
W41	69	3	24	96	57	13
W42	738	81	190	942	282	191
W49	158	25	61	180	54	43
Process Modifications	**2,271**	**256**	**676**	**2,922**	**1,056**	**669**
W51	390	40	177	502	172	125
W52	948	117	224	1,042	397	233
W53	30	2	10	51	22	6
W54	117	16	41	145	52	51
W55	94	2	34	234	112	72
W58	692	79	190	948	301	182
Cleaning and Degreasing	**518**	**35**	**92**	**630**	**219**	**136**
W59	80	6	18	89	18	24
W60	27	1	3	28	3	2
W61	221	16	32	239	53	39
W63	37	5	7	55	32	19
W64	49	4	8	67	29	12
W65	20	1	6	31	22	11
W66	29	0	2	31	26	3
W67	16	0	0	13	9	8
W68	39	2	16	77	27	18
Surface Preparation/Finishing	**778**	**80**	**325**	**1,028**	**256**	**172**
W71	144	11	43	188	46	45
W72	193	18	96	172	69	36
W73	227	31	82	323	50	34
W74	131	14	86	235	67	32
W75	47	1	11	58	7	9
W78	36	5	7	52	17	16
Product Modifications	**326**	**44**	**70**	**688**	**177**	**177**
W81	97	15	26	168	48	49
W82	156	21	26	385	106	88
W83	9	1	0	29	10	2
W89	64	7	18	106	13	38
Total	11,535	1,248	3,774	14,710	4,964	3,139
Percent of Total	22.0	2.4	7.2	28.0	9.5	6.0

Table 2-14.

Source Reduction Activity	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other	Total Number of Times Reported	Percent of Total Reported
Good Operating Practices	**85**	**19**	**453**	**899**	**1,206**	**15,381**	**29.3**
W13	40	15	189	440	372	7,134	13.6
W14	14	0	46	88	118	2,488	4.7
W19	31	4	218	371	716	5,759	11.0
Inventory Control	**26**	**9**	**149**	**277**	**333**	**4,027**	**7.7**
W21	6	2	22	148	93	1,282	2.4
W22	2	0	1	16	40	572	1.1
W23	0	0	2	1	1	30	0.1
W24	4	0	13	14	10	399	0.8
W25	8	1	7	29	43	316	0.6
W29	6	6	104	69	146	1,428	2.7
Spill and Leak Prevention	**55**	**44**	**281**	**498**	**813**	**8,301**	**15.8**
W31	12	5	22	53	60	899	1.7
W32	1	7	76	136	88	1,832	3.5
W33	0	1	8	32	41	545	1.0
W35	7	4	30	63	88	637	1.2
W36	18	16	95	164	291	2,572	4.9
W39	17	11	50	50	245	1,816	3.5
Raw Material Modifications	**26**	**13**	**181**	**1,277**	**574**	**5,278**	**10.1**
W41	0	0	15	107	13	397	0.8
W42	20	11	128	863	402	3,848	7.3
W49	6	2	38	307	159	1,033	2.0
Process Modifications	**41**	**11**	**308**	**1,003**	**1,058**	**10,271**	**19.6**
W51	3	5	25	130	88	1,657	3.2
W52	20	1	81	357	311	3,731	7.1
W53	1	0	10	57	13	202	0.4
W54	1	1	21	71	63	579	1.1
W55	0	0	13	153	58	772	1.5
W58	16	4	158	235	525	3,330	6.3
Cleaning and Degreasing	**14**	**10**	**70**	**294**	**137**	**2,155**	**4.1**
W59	2	2	10	48	20	317	0.6
W60	0	2	4	13	9	92	0.2
W61	7	4	34	148	68	861	1.6
W63	0	0	4	16	6	181	0.3
W64	2	0	9	18	8	206	0.4
W65	0	1	3	7	3	105	0.2
W66	0	0	1	18	19	129	0.2
W67	1	0	3	10	1	61	0.1
W68	2	1	2	16	3	203	0.4
Surface Preparation/Finishing	**38**	**10**	**258**	**1,215**	**435**	**4,595**	**8.8**
W71	9	2	14	102	41	645	1.2
W72	14	0	100	270	65	1,033	2.0
W73	8	1	67	506	142	1,471	2.8
W74	5	7	67	255	126	1,025	2.0
W75	0	0	2	29	31	195	0.4
W78	2	0	8	53	30	226	0.4
Product Modifications	**10**	**16**	**175**	**387**	**416**	**2,486**	**4.7**
W81	1	15	27	147	138	731	1.4
W82	9	1	126	189	174	1,281	2.4
W83	0	0	3	19	4	77	0.1
W89	0	0	19	32	100	397	0.8
Total	295	132	1,875	5,850	4,972	52,494	100.0
Percent of Total	0.6	0.3	3.6	11.1	9.5	100.0	

Table 2-15. Number of TRI Facilities and Forms Reporting Source Reduction, by State, 1994.

State	TRI Facilities	Facilities Reporting Source Reduction Activities		TRI Forms	Forms Reporting Source Reduction Activities	
	Number	Number	Percent of All Facilities	Number	Number	Percent of All Forms
Alabama	526	151	28.7	1,930	428	22.2
Alaska	14	2	14.3	64	7	10.9
American Samoa	2	1	50.0	3	1	33.3
Arizona	185	72	38.9	479	151	31.5
Arkansas	394	101	25.6	1,279	215	16.8
California	1,632	637	39.0	4,512	1,496	33.2
Colorado	189	65	34.4	532	136	25.6
Connecticut	359	141	39.3	996	257	25.8
Delaware	71	23	32.4	246	38	15.4
District of Columbia	5	0	0.0	8	0	0.0
Florida	510	155	30.4	1,357	310	22.8
Georgia	729	217	29.8	2,311	534	23.1
Hawaii	17	4	23.5	63	28	44.4
Idaho	67	16	23.9	175	33	18.9
Illinois	1,367	388	28.4	4,687	1,042	22.2
Indiana	1,042	338	32.4	3,466	858	24.8
Iowa	414	117	28.3	1,227	264	21.5
Kansas	281	93	33.1	944	232	24.6
Kentucky	423	107	25.3	1,600	255	15.9
Louisiana	325	100	30.8	2,008	351	17.5
Maine	105	48	45.7	337	90	26.7
Maryland	205	67	32.7	635	135	21.3
Massachusetts	541	250	46.2	1,466	499	34.0
Michigan	956	318	33.3	3,501	809	23.1
Minnesota	502	227	45.2	1,386	522	37.7
Mississippi	329	93	28.3	1,100	232	21.1
Missouri	578	174	30.1	1,866	368	19.7
Montana	24	6	25.0	138	22	15.9
Nebraska	163	47	28.8	474	108	22.8
Nevada	41	15	36.6	98	25	25.5
New Hampshire	108	35	32.4	292	65	22.3
New Jersey	673	213	31.6	2,336	508	21.7
New Mexico	45	21	46.7	164	68	41.5
New York	768	263	34.2	2,329	577	24.8
North Carolina	906	300	33.1	2,733	678	24.8
North Dakota	34	12	35.3	93	17	18.3
Ohio	1,685	469	27.8	5,665	1,125	19.9
Oklahoma	275	72	26.2	862	167	19.4
Oregon	260	99	38.1	740	186	25.1
Pennsylvania	1,231	389	31.6	4,003	936	23.4
Puerto Rico	171	47	27.5	510	84	16.5
Rhode Island	150	43	28.7	390	95	24.4
South Carolina	486	163	33.5	1,839	363	19.7
South Dakota	66	15	22.7	123	20	16.3
Tennessee	672	246	36.6	2,174	552	25.4
Texas	1,215	397	32.7	5,620	1,277	22.7
Utah	159	55	34.6	543	134	24.7
Vermont	37	15	40.5	88	36	40.9
Virgin Islands	3	0	0.0	27	0	0.0
Virginia	462	127	27.5	1,499	292	19.5
Washington	301	98	32.6	954	233	24.4
West Virginia	151	54	35.8	688	131	19.0
Wisconsin	863	240	27.8	2,639	545	20.7
Wyoming	27	9	33.3	133	22	16.5
Total	22,744	7,355	32.3	75,332	17,557	23.3

Table 2-16. Number of Times Source Reduction Activity Reported, by Category, by State, 1994.

State	Category of Source Reduction Activity							
	Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifi-cations	Process Modifi-cations	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifi-cations
Alabama	293	52	110	64	119	20	44	32
Alaska	2	0	4	0	1	0	1	0
American Samoa	1	0	1	0	0	0	0	0
Arizona	63	7	41	52	67	10	9	5
Arkansas	99	33	45	39	94	20	52	23
California	888	273	556	169	430	207	96	98
Colorado	71	8	26	26	60	10	21	6
Connecticut	138	49	60	27	107	67	17	20
Delaware	15	2	7	9	10	5	1	4
District of Columbia	0	0	0	0	0	0	0	0
Florida	167	47	154	66	100	22	30	20
Georgia	286	59	183	110	188	43	50	39
Hawaii	4	0	20	0	2	0	0	3
Idaho	21	2	11	4	30	0	0	0
Illinois	601	176	299	203	406	102	69	125
Indiana	418	108	226	199	309	87	175	81
Iowa	151	24	49	64	88	7	38	22
Kansas	109	41	58	42	108	17	44	22
Kentucky	148	11	73	50	82	19	8	21
Louisiana	153	9	163	36	191	22	36	8
Maine	37	8	12	24	25	8	20	9
Maryland	57	65	35	14	57	12	8	6
Massachusetts	286	65	63	115	172	75	30	36
Michigan	418	110	200	165	346	105	120	99
Minnesota	243	91	104	104	170	41	105	45
Mississippi	92	5	83	41	59	23	62	9
Missouri	178	42	108	75	121	26	50	27
Montana	13	2	15	1	4	0	0	0
Nebraska	58	2	27	36	37	13	14	16
Nevada	19	0	10	6	8	0	0	2
New Hampshire	11	0	12	15	30	7	4	3
New Jersey	248	56	161	101	217	50	18	46
New Mexico	35	4	30	2	24	5	12	4
New York	318	81	125	114	210	56	61	50
North Carolina	288	115	143	116	197	54	218	71
North Dakota	3	0	2	0	11	4	2	1
Ohio	579	106	248	228	356	93	139	124
Oklahoma	102	32	34	28	46	28	26	31
Oregon	93	23	37	45	63	9	32	24
Pennsylvania	474	165	224	169	381	86	99	88
Puerto Rico	39	23	22	7	39	7	3	0
Rhode Island	51	14	8	27	22	18	6	11
South Carolina	184	30	81	64	157	32	20	32
South Dakota	12	4	4	7	2	0	2	2
Tennessee	300	51	102	111	161	24	73	66
Texas	623	145	550	127	465	120	79	94
Utah	66	16	46	12	38	9	23	25
Vermont	11	0	3	5	20	3	6	2
Virgin Islands	0	0	0	0	0	0	0	0
Virginia	158	63	96	69	71	13	62	20
Washington	109	72	94	41	79	27	41	16
West Virginia	69	14	38	8	44	1	15	10
Wisconsin	294	27	105	136	139	67	94	44
Wyoming	4	0	13	0	4	2	0	1
Total	9,100	2,332	4,921	3,173	6,167	1,676	2,135	1,543

Table 2-17. Methods Used to Identify Reported Source Reduction Activities, by State, 1994.

State	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
	Internal	External			Informal	Formal Program
Alabama	157	38	72	215	84	70
Alaska	2	2	1	3	1	0
American Samoa	0	0	0	1	0	0
Arizona	49	3	24	69	40	11
Arkansas	86	4	30	114	36	19
California	706	95	234	667	208	121
Colorado	46	7	21	63	26	19
Connecticut	103	17	21	156	53	22
Delaware	20	1	9	22	7	4
District of Columbia	0	0	0	0	0	0
Florida	111	24	51	131	58	28
Georgia	200	22	57	263	104	50
Hawaii	5	0	0	24	0	0
Idaho	19	1	3	9	6	7
Illinois	379	43	119	541	235	200
Indiana	309	34	93	403	187	101
Iowa	74	17	48	120	50	25
Kansas	75	13	50	110	45	33
Kentucky	92	8	29	138	39	32
Louisiana	174	7	37	162	58	62
Maine	38	5	9	45	14	7
Maryland	63	8	15	75	19	12
Massachusetts	172	22	74	251	73	66
Michigan	324	52	112	419	128	94
Minnesota	225	12	35	306	146	38
Mississippi	81	6	32	98	43	29
Missouri	132	20	56	185	67	41
Montana	13	1	0	5	5	12
Nebraska	38	13	6	43	27	19
Nevada	8	0	5	18	7	0
New Hampshire	21	0	7	26	6	6
New Jersey	245	22	83	243	50	33
New Mexico	17	0	5	16	15	1
New York	236	19	88	269	100	65
North Carolina	237	15	61	232	98	50
North Dakota	0	0	0	12	3	0
Ohio	357	68	150	543	251	93
Oklahoma	71	4	25	85	31	24
Oregon	65	5	20	86	47	23
Pennsylvania	357	34	125	452	189	104
Puerto Rico	40	6	17	32	12	14
Rhode Island	22	4	13	45	28	7
South Carolina	163	14	43	187	70	24
South Dakota	6	0	0	11	6	0
Tennessee	196	27	76	244	118	37
Texas	698	39	217	596	235	160
Utah	43	3	49	73	15	28
Vermont	20	1	6	18	3	4
Virgin Islands	0	0	0	0	0	0
Virginia	127	2	53	118	57	4
Washington	125	15	20	139	40	18
West Virginia	40	7	22	74	13	8
Wisconsin	164	13	66	256	101	41
Wyoming	7	0	2	3	2	0
Total	6,958	773	2,391	8,416	3,256	1,866
Percent of Total	21.3	2.4	7.3	25.8	10.0	5.7

Table 2-17.

State	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other
Alabama	2	7	28	96	103
Alaska	0	1	0	0	4
American Samoa	0	0	0	0	1
Arizona	1	1	11	44	25
Arkansas	0	0	15	43	35
California	13	16	119	225	354
Colorado	0	2	0	21	35
Connecticut	1	0	16	50	30
Delaware	2	0	0	7	2
District of Columbia	0	0	0	0	0
Florida	2	13	28	74	79
Georgia	3	5	18	126	127
Hawaii	0	0	0	15	3
Idaho	0	0	2	3	4
Illinois	5	1	79	246	212
Indiana	9	2	52	315	167
Iowa	0	1	30	87	44
Kansas	0	0	6	65	73
Kentucky	2	2	9	63	44
Louisiana	1	2	29	50	46
Maine	0	0	4	30	15
Maryland	8	0	8	31	17
Massachusetts	25	2	17	91	77
Michigan	6	0	56	180	160
Minnesota	17	1	20	124	52
Mississippi	2	0	8	72	56
Missouri	4	0	15	102	67
Montana	0	0	0	1	0
Nebraska	0	0	8	40	20
Nevada	0	0	0	4	7
New Hampshire	0	0	2	13	5
New Jersey	7	0	20	43	62
New Mexico	1	1	0	4	27
New York	4	0	26	112	132
North Carolina	17	1	87	227	141
North Dakota	0	0	0	10	6
Ohio	5	0	47	291	213
Oklahoma	0	3	10	45	23
Oregon	7	0	18	58	31
Pennsylvania	2	0	30	204	184
Puerto Rico	2	0	2	7	19
Rhode Island	3	0	3	15	26
South Carolina	10	2	23	93	84
South Dakota	0	0	0	8	2
Tennessee	21	1	50	170	106
Texas	7	7	67	190	275
Utah	0	11	16	47	40
Vermont	1	0	0	7	8
Virgin Islands	0	0	0	0	0
Virginia	4	2	13	67	59
Washington	10	8	20	63	50
West Virginia	0	0	1	42	24
Wisconsin	5	2	41	185	132
Wyoming	0	0	1	6	10
Total	209	94	1,055	4,112	3,518
Percent of Total	0.6	0.3	3.2	12.6	10.8

Table 2-18. Number of TRI Facilities and Forms Reporting Source Reduction, by Industry, 1994.

SIC Code	Industry	TRI Facilities	Facilities Reporting Source Reduction Activities		TRI Forms	Forms Reporting Source Reduction Activities	
		Number	Number	Percent of All Facilities	Number	Number	Percent of All Forms
20	Food	2,033	386	19.0	3,676	585	15.9
21	Tobacco	14	3	21.4	27	3	11.1
22	Textiles	404	120	29.7	834	171	20.5
23	Apparel	35	8	22.9	64	12	18.8
24	Lumber	743	208	28.0	1,953	502	25.7
25	Furniture	535	236	44.1	1,595	587	36.8
26	Paper	538	202	37.5	2,421	411	17.0
27	Printing	289	121	41.9	570	198	34.7
28	Chemicals	4,026	1,577	39.2	21,200	5,274	24.9
29	Petroleum	401	167	41.6	3,087	779	25.2
30	Plastics	1,871	548	29.3	3,881	913	23.5
31	Leather	109	36	33.0	279	62	22.2
32	Stone/Clay/Glass	628	164	26.1	1,538	321	20.9
33	Primary Metals	1,872	393	21.0	6,694	1,059	15.8
34	Fabr. Metals	3,116	935	30.0	8,574	1,868	21.8
35	Machinery	1,055	290	27.5	2,854	528	18.5
36	Electrical Equip.	1,336	515	38.5	3,641	948	26.0
37	Transportation Equip.	1,262	502	39.8	4,498	1,134	25.2
38	Measure./Photo.	320	148	46.3	812	276	34.0
39	Miscellaneous	368	114	31.0	801	216	27.0
	Multiple codes 20-39 (22)	1,515	592	39.1	5,429	1,450	26.7
	No codes 20-39 (23)	274	90	32.8	904	260	28.8
	Total	22,744	7,355	32.3	75,332	17,557	23.3

(22) Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g. paper (26) and chemicals (28)].
(23) Facilities/forms that did not report an SIC code and facilities that reported SIC codes outside the 20-to-39 range.

Table 2-19. Number of Times Source Reduction Activity Reported, by Category, by Industry, 1994.

Industry		Category of Source Reduction Activity							
		Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifi-cations	Process Modifi-cations	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifi-cations
20	Food	394	38	262	34	186	29	15	28
21	Tobacco	0	0	0	0	2	0	0	1
22	Textiles	56	10	8	80	46	5	15	31
23	Apparel	6	2	4	6	4	0	0	3
24	Lumber	293	44	147	104	129	20	149	44
25	Furniture	184	91	63	126	88	14	536	33
26	Paper	176	32	45	166	137	10	11	55
27	Printing	99	18	9	94	47	16	4	19
28	Chemicals	3,022	978	2,115	799	2,206	342	30	574
29	Petroleum	289	36	520	43	294	5	0	44
30	Plastics	405	114	205	272	291	103	134	99
31	Leather	14	0	8	29	12	3	46	5
32	Stone/Clay/Glass	147	25	83	82	135	6	15	44
33	Primary Metals	655	75	239	166	504	49	50	55
34	Fabr. Metals	1,063	214	313	284	530	334	354	95
35	Machinery	241	44	49	92	148	79	119	63
36	Electrical Equip.	485	91	197	178	442	124	54	63
37	Transportation Equip.	500	173	150	201	235	176	312	89
38	Measure./Photo.	162	24	33	52	79	90	14	41
39	Miscellaneous	95	30	21	46	65	35	50	11
	Multiple codes 20-39 [24]	721	212	365	279	520	181	184	140
	No codes 20-39 [25]	93	81	85	40	67	55	43	6
	Total	9,100	2,332	4,921	3,173	6,167	1,676	2,135	1,543

[24] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g. paper (26) and chemicals (28)].

[25] Facilities/forms that did not report an SIC code and facilities that reported SIC codes outside the 20-to-39 range.

Table 2-20. Methods Used to Identify Reported Source Reduction Activities, by Industry, 1994.

SIC Code	Industry	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
		Internal	External			Informal	Formal Program
20	Food	207	15	81	264	102	35
21	Tobacco	3	0	0	0	0	0
22	Textiles	40	9	19	67	17	11
23	Apparel	2	0	1	6	2	0
24	Lumber	193	7	41	224	89	21
25	Furniture	193	33	72	188	81	36
26	Paper	135	13	20	180	68	33
27	Printing	69	3	26	81	23	14
28	Chemicals	2201	269	713	2670	1143	719
29	Petroleum	333	5	27	275	131	53
30	Plastics	325	25	172	480	139	73
31	Leather	18	0	7	31	11	9
32	Stone/Clay/Glass	140	7	19	138	53	37
33	Primary Metals	422	56	179	525	187	81
34	Fabr. Metals	727	113	265	902	313	191
35	Machinery	197	19	73	252	115	42
36	Electrical Equip.	418	30	148	495	187	156
37	Transportation Equip.	449	42	144	559	179	135
38	Measure./Photo.	105	6	42	150	47	29
39	Miscellaneous	72	3	41	121	22	18
	Multiple codes 20-39[26]	569	82	271	734	297	167
	No codes 20-39[27]	140	36	30	74	50	6
	Total	6,958	773	2,391	8,416	3,256	1,866
	Percent of Total	21.3	2.4	7.3	25.8	10.0	5.7

Table 2-20.

Industry	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other
Food	3	2	34	163	90
Tobacco	0	0	0	0	0
Textiles	1	0	10	77	37
Apparel	1	0	1	4	0
Lumber	1	0	50	209	73
Furniture	20	0	101	354	130
Paper	5	0	21	99	109
Printing	1	1	13	85	42
Chemicals	58	12	245	559	1095
Petroleum	2	13	78	74	275
Plastics	17	0	69	269	137
Leather	0	0	8	38	4
Stone/Clay/Glass	1	0	8	73	98
Primary Metals	5	6	93	255	236
Fabr. Metals	34	6	122	588	322
Machinery	12	1	12	165	71
Electrical Equip.	11	13	41	226	164
Transportation Equip.	6	11	60	380	158
Measure./Photo.	3	2	8	53	82
Miscellaneous	4	0	8	77	23
Multiple codes 20-39 [26]	24	10	69	331	289
No codes 20-39 [27]	0	17	4	33	83
Total	209	94	1,055	4,112	3,518
Percent of Total	0.6	0.3	3.2	12.6	10.8

[26] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g. paper (26) and chemicals (28)].

[27] Facilities/forms that did not report an SIC code and facilities that reported SIC codes outside the 20-to-39 range.

Table 2-21. Number of TRI Facilities Reporting Source Reduction, by Industry, 1991-1994.[28]

SIC Code	Industry	1991 Number	1991 Percent of All Facilities in the Industry Percent	1992 Number	1992 Percent of All Facilities in the Industry Percent	1993 Number	1993 Percent of All Facilities in the Industry Percent	1994 Number	1994 Percent of All Facilities in the Industry Percent
20	Food	261	16.1	238	14.9	254	15.5	240	14.8
21	Tobacco	6	30.0	3	20.0	6	40.0	1	11.1
22	Textiles	129	34.1	132	35.5	114	30.9	107	31.0
23	Apparel	11	29.7	9	20.9	12	32.4	8	24.2
24	Lumber	241	32.1	197	27.1	204	27.9	206	28.0
25	Furniture	234	40.7	253	44.5	242	43.7	235	44.1
26	Paper	246	42.9	227	42.2	200	38.2	182	37.0
27	Printing	184	45.4	174	45.8	127	41.0	119	43.0
28	Chemicals	1,657	40.9	1,568	39.4	1,522	38.9	1,503	39.1
29	Petroleum	150	35.3	162	38.7	166	41.1	162	40.9
30	Plastics	650	35.0	666	35.4	597	32.3	537	29.1
31	Leather	56	40.6	53	40.8	45	38.1	34	34.0
32	Stone/Clay/Glass	187	28.0	178	28.2	175	28.3	157	26.2
33	Primary Metals	476	25.2	437	23.4	427	23.2	363	20.4
34	Fabr. Metals	1,055	33.2	1,019	32.5	957	31.3	882	29.5
35	Machinery	401	35.2	381	33.8	343	32.2	273	26.8
36	Electrical Equip.	705	44.9	618	42.1	557	42.0	469	38.4
37	Transportation Equip.	506	39.5	514	41.0	530	42.2	495	40.1
38	Measure./Photo.	227	51.9	209	51.0	186	52.8	138	46.2
39	Miscellaneous	148	37.4	130	34.9	129	34.4	110	31.1
	Multiple codes 20-39[29]	672	42.9	669	41.4	644	41.9	565	38.5
	No codes 20-39[30]	43	21.3	34	19.3	40	24.8	75	31.8
	Total	8,245	35.6	7,871	34.7	7,477	33.9	6,861	32.0

[28] Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

[29] Facilities that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g. paper(26) and chemicals (28)].

[30] Facilities that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

Table 2-22. Number of TRI Forms Reporting Source Reduction, by Industry, 1991-1994.[31]

SIC Code	Industry	1991 Number	1991 Percent of All Forms in the Industry Percent	1992 Number	1992 Percent of All Forms in the Industry Percent	1993 Number	1993 Percent of All Forms in the Industry Percent	1994 Number	1994 Percent of All Forms in the Industry Percent
20	Food	371	14.2	343	13.3	363	13.8	366	13.9
21	Tobacco	6	20.0	5	21.7	7	30.4	1	7.1
22	Textiles	209	27.1	206	28.5	173	24.1	150	22.8
23	Apparel	17	27.0	10	13.5	12	20.0	12	20.7
24	Lumber	545	28.3	452	24.1	490	26.5	496	26.2
25	Furniture	628	38.3	662	39.5	620	36.7	584	37.0
26	Paper	460	24.1	433	23.0	401	21.4	349	18.3
27	Printing	279	36.0	256	37.0	193	33.3	192	36.0
28	Chemicals	5,586	27.5	5,197	26.3	5,093	26.1	4,944	25.9
29	Petroleum	755	23.9	769	24.6	753	25.0	745	26.0
30	Plastics	1,115	27.5	1,147	28.6	1,043	26.9	883	24.1
31	Leather	102	39.8	95	38.8	80	36.4	55	30.7
32	Stone/Clay/Glass	412	26.8	354	25.0	356	25.4	298	21.1
33	Primary Metals	1,210	18.8	1,143	18.2	1,089	17.3	978	15.9
34	Fabr. Metals	1,888	23.0	1,819	22.5	1,793	22.8	1,700	22.1
35	Machinery	682	23.1	681	23.6	627	22.7	489	18.7
36	Electrical Equip.	1,276	31.6	1,077	29.2	931	28.3	794	26.7
37	Transportation Equip.	1,270	28.0	1,198	27.1	1,211	27.5	1,103	25.7
38	Measure./Photo.	396	38.8	363	37.3	331	38.7	251	34.4
39	Miscellaneous	272	30.8	242	29.7	256	30.9	208	27.8
	Multiple codes 20-39[32]	1,542	28.4	1,604	29.3	1,500	28.8	1,351	27.4
	No codes 20-39[33]	96	14.5	96	17.3	102	18.3	235	28.9
	Total	19,117	26.1	18,152	25.5	17,424	25.1	16,184	24.0

[31] Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.
[32] Forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
[33] Forms that did not report an SIC code or reported SIC codes outside the 20-to-39 range.

Table 2-23. Top 50 TRI Chemicals for Number of Forms Reporting Source Reduction Activities, 1994.

CAS Number[34]	Chemical	TRI Forms	Forms Reporting Source Reduction Activities	
		Number	Number	Percent of All Forms
108-88-3	Toluene	3,566	1,343	37.7
1330-20-7	Xylene (mixed isomers)	3,346	1,211	36.2
78-93-3	Methyl ethyl ketone	2,389	911	38.1
7664-93-9	Sulfuric acid (acid aerosols)	3,895	641	16.5
—	Glycol ethers	2,157	632	29.3
67-56-1	Methanol	2,439	615	25.2
71-55-6	1,1,1-Trichloroethane	1,207	592	49.0
7647-01-0	Hydrochloric acid	3,300	587	17.8
7664-41-7	Ammonia	2,978	575	19.3
—	Zinc compounds	2,458	481	19.6
7664-38-2	Phosphoric acid	2,710	404	14.9
7697-37-2	Nitric acid	1,827	363	19.9
100-42-5	Styrene	1,489	360	24.2
108-10-1	Methyl isobutyl ketone	1,031	358	34.7
71-36-3	n-Butyl alcohol	1,145	354	30.9
7440-50-8	Copper	2,537	344	13.6
75-09-2	Dichloromethane	1,030	344	33.4
—	Chromium compounds	1,416	340	24.0
100-41-4	Ethylbenzene	969	339	35.0
79-01-6	Trichloroethylene	783	273	34.9
—	Copper compounds	1,412	271	19.2
—	Lead compounds	845	267	31.6
107-21-1	Ethylene glycol	1,321	263	19.9
7440-02-0	Nickel	1,739	233	13.4
95-63-6	1,2,4-Trimethylbenzene	753	232	30.8
7782-50-5	Chlorine	1,449	222	15.3
7440-47-3	Chromium	1,766	207	11.7
127-18-4	Tetrachloroethylene	459	169	36.8
—	Nickel compounds	834	163	19.5
—	Manganese compounds	986	163	16.5
50-00-0	Formaldehyde	781	157	20.1
7439-92-1	Lead	817	152	18.6
—	Barium compounds	618	144	23.3
76-13-1	Freon 113	237	143	60.3
71-43-2	Benzene	491	139	28.3
91-20-3	Naphthalene	527	139	26.4
7439-96-5	Manganese	1,385	137	9.9
108-95-2	Phenol	719	132	18.4
—	Antimony compounds	520	128	24.6
101-68-8	Methylenebis(phenylisocyanate)	879	121	13.8
110-82-7	Cyclohexane	374	106	28.3
7664-39-3	Hydrogen fluoride	521	93	17.9
—	Arsenic compounds	294	80	27.2
117-81-7	Di-(2-ethylhexyl) phthalate	307	70	22.8
7440-66-6	Zinc (fume or dust)	410	70	17.1
75-71-8	Dichlorodifluoromethane (CFC-12)	169	68	40.2
111-42-2	Diethanolamine	358	64	17.9
—	Cyanide compounds	247	63	25.5
74-85-1	Ethylene	276	62	22.5
115-07-1	Propylene	343	61	17.8
	Subtotal	64,509	15,386	23.9
	Total for All TRI Chemicals	75,332	17,557	23.3

[34] Compound categories do not have CAS numbers (—).

Table 2-24. Number of Times Source Reduction Activity Reported, by Category, for the Top 50 TRI Chemicals for Forms Reporting Source Reduction Activities, 1994.

CAS Number[35]	Chemical	Category of Source Reduction Activity: Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
108-88-3	Toluene	636	204	295	342	387	112	404	162
1330-20-7	Xylene (mixed isomers)	567	171	234	278	354	88	439	137
78-93-3	Methyl ethyl ketone	459	175	159	233	235	107	287	98
7664-93-9	Sulfuric acid (acid aerosols)	381	63	207	53	254	49	12	17
—	Glycol ethers	323	117	117	196	190	46	127	77
67-56-1	Methanol	297	84	170	107	217	30	124	52
71-55-6	1,1,1-Trichloroethane	212	49	77	171	94	272	49	71
7647-01-0	Hydrochloric acid	320	64	196	54	240	51	21	14
7664-41-7	Ammonia	304	24	222	59	257	8	6	19
—	Zinc compounds	281	80	142	70	193	25	16	51
7664-38-2	Phosphoric acid	238	65	136	36	133	37	13	24
7697-37-2	Nitric acid	203	58	120	27	132	36	12	13
100-42-5	Styrene	163	74	85	83	126	23	59	28
108-10-1	Methyl isobutyl ketone	204	69	71	69	124	29	116	47
71-36-3	n-Butyl alcohol	170	80	70	74	103	28	144	30
7440-50-8	Copper	268	35	57	40	130	22	7	26
75-09-2	Dichloromethane	159	34	82	95	110	89	19	36
—	Chromium compounds	180	38	105	71	158	17	14	37
100-41-4	Ethylbenzene	167	49	148	48	132	25	61	29
79-01-6	Trichloroethylene	136	13	35	20	54	152	8	17
—	Copper compounds	174	32	111	24	115	19	9	15
—	Lead compounds	159	41	66	88	109	4	8	40
107-21-1	Ethylene glycol	133	51	77	63	81	11	7	29
7440-02-0	Nickel	142	31	37	36	78	24	9	20
95-63-6	1,2,4-Trimethylbenzene	110	44	93	28	82	15	28	41
7782-50-5	Chlorine	80	12	54	53	93	5	2	6
7440-47-3	Chromium	131	37	25	36	69	14	7	20
127-18-4	Tetrachloroethylene	95	14	37	13	40	72	4	9
—	Nickel compounds	98	31	52	12	77	15	3	18
—	Manganese compounds	116	19	57	17	67	5	3	13
50-00-0	Formaldehyde	79	12	53	38	55	7	6	19
7439-92-1	Lead	79	19	19	49	50	3	1	26
—	Barium compounds	81	23	37	48	53	4	6	13
76-13-1	Freon 113	57	10	29	31	34	103	6	15
71-43-2	Benzene	49	10	103	8	73	3	3	1
91-20-3	Naphthalene	63	27	84	18	48	9	6	5
7439-96-5	Manganese	97	17	20	29	33	4	10	20
108-95-2	Phenol	80	14	33	22	61	8	5	13
—	Antimony compounds	81	17	32	26	60	6	0	17
101-68-8	Methylenebis(phenyl-isocyanate)	65	16	19	11	54	0	3	12
110-82-7	Cyclohexane	54	8	72	11	39	1	3	3
7664-39-3	Hydrogen fluoride	56	12	27	15	41	7	8	2
—	Arsenic compounds	60	4	43	9	34	1	2	2
117-81-7	Di-(2-ethylhexyl) phthalate	30	9	20	30	24	1	0	14
7440-66-6	Zinc (fume or dust)	45	15	24	8	23	2	13	3
75-71-8	Dichlorodifluoro-methane (CFC-12)	23	2	29	14	22	0	0	7
111-42-2	Diethanolamine	38	6	17	15	20	6	1	6
—	Cyanide compounds	30	8	15	10	35	11	1	1
74-85-1	Ethylene	26	3	35	0	28	0	0	0
115-07-1	Propylene	21	6	42	0	26	0	0	0
	Subtotal	8,020	2,096	4,090	2,888	5,247	1,606	2,092	1,375
	Total for All TRI Chemicals	9,100	2,332	4,921	3,173	6,167	1,676	2,135	1,543

[35] Compound categories do not have CAS numbers (—).

Table 2-25. Methods Used to Identify Source Reduction Activities for the Top 50 TRI Chemicals by Number of Forms Reporting Source Reduction Activities, 1994.

CAS Number	Chemical	Number of Forms Reporting Source Reduction Activities	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
			Internal	External			Informal	Formal Program
108-88-3	Toluene	1,343	520	68	171	620	222	137
1330-20-7	Xylene (mixed isomers)	1,211	475	56	159	549	221	110
78-93-3	Methyl ethyl ketone	911	360	52	162	451	164	96
7664-93-9	Sulfuric acid (acid aerosols)	641	259	26	79	319	133	61
—	Glycol ethers	632	251	29	77	321	115	69
67-56-1	Methanol	615	238	24	88	288	114	59
71-55-6	1,1,1-Trichloroethane	592	230	27	80	263	72	59
7647-01-0	Hydrochloric acid	587	243	17	69	266	138	54
7664-41-7	Ammonia	575	227	28	90	254	129	54
—	Zinc compounds	481	196	28	64	258	111	48
7664-38-2	Phosphoric acid	404	135	7	58	215	76	30
7697-37-2	Nitric acid	363	141	9	46	186	72	41
100-42-5	Styrene	360	120	11	38	149	65	35
108-10-1	Methyl isobutyl ketone	358	150	20	55	188	65	41
71-36-3	n-Butyl alcohol	354	136	21	54	171	63	42
7440-50-8	Copper	344	125	27	72	169	67	39
75-09-2	Dichloromethane	344	132	10	42	156	67	30
—	Chromium compounds	340	156	17	38	168	64	36
100-41-4	Ethylbenzene	339	161	15	37	161	62	50
79-01-6	Trichloroethylene	273	117	11	27	129	43	23
—	Copper compounds	271	128	10	33	120	55	19
—	Lead compounds	267	118	14	45	144	54	39
107-21-1	Ethylene glycol	263	100	11	36	139	56	27
7440-02-0	Nickel	233	66	16	47	130	50	22
95-63-6	1,2,4-Trimethylbenzene	232	99	9	22	93	41	34
7782-50-5	Chlorine	222	88	2	16	90	30	17
7440-47-3	Chromium	207	55	10	47	110	40	21
127-18-4	Tetrachloroethylene	169	83	6	23	80	27	12
—	Nickel compounds	163	70	6	28	98	37	21
—	Manganese compounds	163	64	10	16	71	35	17
50-00-0	Formaldehyde	157	59	7	18	74	19	22
7439-92-1	Lead	152	47	13	22	70	22	10
—	Barium compounds	144	53	11	19	79	38	26
76-13-1	Freon 113	143	72	5	16	93	22	22
71-43-2	Benzene	139	77	4	12	45	19	14
91-20-3	Naphthalene	139	58	8	10	54	29	17
7439-96-5	Manganese	137	37	7	34	65	27	10
108-95-2	Phenol	132	51	3	22	56	20	20
—	Antimony compounds	128	40	7	24	79	29	23
101-68-8	Methylenebis(phenyl-isocyanate)	121	29	1	15	48	24	15
110-82-7	Cyclohexane	106	49	3	8	41	15	9
7664-39-3	Hydrogen fluoride	93	33	4	11	41	29	11
—	Arsenic compounds	80	43	1	2	35	17	5
117-81-7	Di-(2-ethylhexyl) phthalate	70	26	3	13	34	14	4
7440-66-6	Zinc (fume or dust)	70	28	8	20	34	11	4
75-71-8	Dichlorodifluoromethane (CFC-12)	68	23	1	9	21	7	7
111-42-2	Diethanolamine	64	14	0	6	38	15	7
—	Cyanide compounds	63	29	4	5	26	11	4
74-85-1	Ethylene	62	34	1	10	22	7	8
115-07-1	Propylene	61	36	0	7	25	7	6
	Subtotal	15,386	6,081	688	2,102	7,336	2,870	1,587
	Total for All TRI Chemicals	17,557	6,958	773	2,391	8,416	3,256	1,866

Table 2-25.

Chemical	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other
Toluene	28	8	89	437	281
Xylene (mixed isomers)	21	8	88	422	237
Methyl ethyl ketone	9	3	56	281	174
Sulfuric acid (acid aerosols)	8	5	32	112	114
Glycol ethers	8	2	36	196	112
Methanol	12	0	40	141	107
1,1,1-Trichloroethane	13	10	41	195	118
Hydrochloric acid	7	1	32	86	109
Ammonia	1	2	30	97	109
Zinc compounds	6	1	20	76	86
Phosphoric acid	5	2	15	102	73
Nitric acid	4	1	9	66	55
Styrene	6	0	50	134	65
Methyl isobutyl ketone	8	2	26	109	60
n-Butyl alcohol	3	3	30	109	70
Copper	4	1	23	64	65
Dichloromethane	3	1	24	81	76
Chromium compounds	2	1	25	93	49
Ethylbenzene	2	2	17	71	79
Trichloroethylene	10	1	19	70	48
Copper compounds	1	2	17	58	37
Lead compounds	2	4	11	61	50
Ethylene glycol	1	2	13	41	48
Nickel	0	0	13	54	34
1,2,4-Trimethylbenzene	2	2	27	59	52
Chlorine	4	2	12	30	50
Chromium	0	0	10	51	46
Tetrachloroethylene	6	0	7	35	21
Nickel compounds	1	0	7	25	26
Manganese compounds	0	0	1	17	30
Formaldehyde	2	0	7	36	39
Lead	1	1	14	32	42
Barium compounds	3	1	3	29	25
Freon 113	4	0	7	32	29
Benzene	1	3	9	11	57
Naphthalene	0	2	15	26	39
Manganese	0	0	8	45	33
Phenol	1	0	8	29	33
Antimony compounds	0	3	4	26	15
Methylenebis(phenyl-isocyanate)	1	0	8	33	24
Cyclohexane	1	2	8	12	36
Hydrogen fluoride	1	0	4	20	26
Arsenic compounds	0	1	11	31	6
Di-(2-ethylhexyl) phthalate	1	0	2	11	18
Zinc (fume or dust)	0	0	7	15	21
Dichlorodifluoromethane (CFC-12)	1	0	3	15	21
Diethanolamine	1	0	0	10	13
Cyanide compounds	1	0	6	19	10
Ethylene	0	1	1	6	19
Propylene	0	1	3	7	15
Subtotal	196	81	948	3,818	3,002
Total for All TRI Chemicals	209	94	1,055	4,112	3,518

36 Compound categories do not have CAS numbers (—).

Methodology for Counting Elements of Source Reduction Reporting (Tables 2-14 through 2-25)

Table 2-14. On the Form R, more than one method can be reported for each activity reported, and more than one activity can also be reported with the same or additional methods. Table 2-14 counts each method reported for every activity. For example, an internal pollution prevention audit might identify improvements in scheduling maintenance and in scheduling production runs to minimize equipment changes affecting the use of toluene and methanol. In this case, "2"—for the two chemicals—would be added to the column marked Internal Pollution Prevention Audit and the row W13 (Improved Maintenance Scheduling) *and* "2"—again, for toluene and methanol—would be added to the same column and the row W14 (Changed Production Schedule).

Tables 2-15, 2-18, 2-21, 2-22, and 2-23. The number of facilities counts those that reported any valid source reduction code on any of their chemical forms. A facility is counted once regardless of the number of forms on which it reported source reduction activity. Similarly, the number of forms counts the forms on which a valid source reduction code was reported. A form is counted once regardless of how many source reduction activities were reported for that chemical.

Tables 2-16, 2-19, and 2-24. These tables count the number of times a source reduction activity was reported on any chemical form. The counts are summarized into eight categories, but the individual activities within each category are counted if reported. For example, if a facility reported Improved Scheduling and Changed Production Schedule for toluene, "2" would be added to the category called Good Operating Practices since both of these activities belong in this category. If a facility reported Improved Storage Procedures and Increased Purity of Raw Materials, then "1" would be added to the category Spill and Leave Prevention and "1" to the category Raw Materials Modifications. Thus, these tables count each time a source reduction activity was reported for a chemical.

Tables 2-17, 2-20, and 2-25. These tables count the number of times a specific method for identifying source reduction activities was reported for a chemical. All possible source reduction method codes appear in these tables; they are not summarized into larger categories. For any single chemical, however, a facility could report a specific method more than once if it identified more than one source reduction activity. In these tables, a method is counted only once per form, regardless of how many source reduction activities were identified. For example, if an internal pollution prevention audit identified for one chemical both improved storage procedures and increased purity of raw materials—so that the method Internal Pollution Prevention Audit is reported twice on one form—these tables would count the audit only once. If, however, the facility also reported the audit on another form (i.e., for another chemical), then the method would be counted twice, once for each form.

Box 2-4. Methodology for Counting Elements of Source Reduction Reporting (Tables 2-14 through 2-25).

RELATING WASTE GENERATION TO PRODUCTION

Quantifying progress in reducing waste is a complex question that cannot be answered by simply comparing quantities of waste generated over time. Many factors affect the quantity of toxic chemicals in waste. One such factor is changes in production at a facility.

Understanding the Production Ratio

For this reason, the PPA requires facilities to provide on Form R a production ratio or activity index as an indicator of whether production or activity involving the reported toxic chemical has increased, decreased, or remained steady since the previous year.

For the 1994 reporting year, the ratio is calculated by dividing the production or activity involving the reported toxic chemical in 1994 by the production or activity involving the reported toxic chemical in 1993. A ratio that is less than 1.0 indicates that production or activity was lower in 1994 than it was in 1993. A ratio of 1.0 indicates that production or activity has remained steady. A ratio greater than 1.0 indicates that production or activity has increased.

Table 2-26 shows the distribution of the ratios reported for 1994. This table also shows the quantity of production-related waste associated with the ratios in 1994.

Comparing Waste Generation to Value of Shipments

Although the quantity of TRI chemicals in waste has increased since 1991, this does not necessarily indicate that there has been no progress in implementing source reduction programs. To help put the changes in waste in context, it is useful to compare changes in waste generation to economic activity in the manufacturing sector during the same period. Such information can potentially indicate whether the rate of waste production is increasing or decreasing, and whether progress is being made in moving up the waste management hierarchy.

One way to examine these relationships is to compare the value of goods produced at manufacturing facilities to the quantities of toxic chemicals in waste reported to TRI. This resulting ratio, tracked over time, indicates whether more or less waste is being generated for each dollar of economic activity. Decreases over time in the ratio would indicate that a lower quantity of waste was being generated per unit of production. This might indicate that manufacturers are becoming more efficient in their use of TRI chemicals. Conversely, an increasing ratio would mean that a higher quantity of waste was being generated relative to production, which might indicate a trend towards less effective use of TRI chemicals in manufacturing.

The value of production is calculated here as the value of shipments for an industry plus the change in inventory from the previous year. The data are adjusted for inflation using the producer price indices for each industry, and are expressed in constant 1988 dollars.

The value of production for an industry is not a perfect measure of the actual quantity of materials produced. The most serious limitation is that the available figures for value of production cover an entire industry, not just the small fraction of facilities that report to TRI. Also, value of production data do not cover the production of intermediates that are not sold. Finally, it is possible that the product mix at firms reporting to TRI is not representative of their industry as a whole and that the prices of these products change at rates different from the industry as a whole. When this is true, the value of production data will reflect not only changes

Table 2-26. Distribution of Production Index, 1994.

Index	Number of Forms Reporting Number	Percent of Forms Reporting Percent	Cumulative Percent of Forms Reporting Percent	Production-related Waste Pounds	Percent of Waste Percent	Cumulative Percent of Waste Percent
0.1	408	0.6	0.6	62,740,994	0.2	0.2
0.2	297	0.4	1.0	35,798,044	0.1	0.4
0.3	370	0.5	1.5	31,186,197	0.1	0.5
0.4	520	0.7	2.3	43,760,601	0.2	0.7
0.5	783	1.1	3.4	61,903,232	0.2	0.9
0.6	1,029	1.5	4.8	96,768,197	0.4	1.3
0.7	1,797	2.5	7.3	288,970,449	1.1	2.4
0.8	3,004	4.2	11.6	868,358,354	3.3	5.7
0.9	6,175	8.7	20.3	3,734,865,438	14.2	19.9
1.0	18,266	25.8	46.1	7,579,230,709	28.8	48.7
1.1	14,949	21.1	67.2	6,172,834,669	23.5	72.2
1.2	8,786	12.4	79.6	3,209,628,942	12.2	84.4
1.3	4,496	6.3	86.0	1,381,246,800	5.3	89.6
1.4	2,446	3.5	89.4	570,584,983	2.2	91.8
1.5	1,649	2.3	91.8	386,596,441	1.5	93.3
1.6	993	1.4	93.2	390,818,524	1.5	94.8
1.7	686	1.0	94.1	98,711,614	0.4	95.1
1.8	459	0.6	94.8	125,544,788	0.5	95.6
1.9	387	0.5	95.3	64,664,199	0.2	95.9
2.0 - 2.9	1,555	2.2	97.5	431,028,301	1.6	97.5
3.0 - 3.9	414	0.6	98.1	132,861,399	0.5	98.0
4.0 - 4.9	226	0.3	98.4	30,465,074	0.1	98.1
5.0 - 9.9	370	0.5	99.0	234,298,491	0.9	99.0
10.0-24.9	183	0.3	99.2	45,740,252	0.2	99.2
25.0-49.9	56	0.1	99.3	4,956,774	0.0	99.2
50.0-99.9	243	0.3	99.6	87,127,894	0.3	99.5
>=100	258	0.4	100.0	122,760,231	0.5	100.0
Total	70,805	100.0		26,293,451,591	100.0	
Zero or Blank or NA for Index						
Zero	1,135			72,594,870		
Blank	546			18,135,260		
NA	2,845			162,372,194		
Total	4,526			253,102,324		
Negative Number for Index						
Total	1			0		

in production but also changes in prices. Despite these limitations, value of production data constitute the best data readily available to represent production for this type of comparison.

Because information on total production related waste has been available beginning with the 1991 reporting year, results for 1994 are compared to those for 1991. To determine whether there are changes in the trends, the 1994 data also are compared with those for 1993. The results are shown in Tables 2-27 and 2-28.

The value of production for the manufacturing sector increased by 15% in constant dollars, from $2,560 billion in 1991 to $2,942 billion in 1994. During the same time period, the total quantity of waste reported to TRI also increased. Excluding both facilities outside SIC codes 20-39 and chemicals for which the listing has been added, deleted or modified, the amount of production-related waste reported to TRI increased from 20.6 billion pounds in 1991 to 21.9 billion pounds in 1994, a 5% increase. Some industries showed significant decreases in the quantity of waste while others had substantial increases.

The ratio of production-related waste to the value of production for the manufacturing sector fell from 8.05 in 1991 to 7.46 in 1994, a 7% decrease. In other words, in 1994 the manufacturing sector as a whole generated 7.46 million pounds of waste for each billion dollars of production. In 1991, manufacturers generated 8.05 million pounds per billion dollars production. This is a reduction of 600,000 pounds of waste for each billion dollars of production. The ratio between waste and production for the manufacturing sector as a whole held nearly constant from 1993 to 1994, changing from 7.45 to 7.46. There was substantial variation in how the ratio changed at the industry level when comparing 1991 to 1994 or 1993 to 1994.

The changes in the ratio of waste to production for the manufacturing sector as a whole indicate that the *relative rate* of waste generation decreased from 1991 to 1994. However, this should not obscure the fact that the total volume of waste generated by TRI reporters has increased over 6% since 1991 (see Table 2-2). Even though the value of goods produced has increased during this time, it is important that we find ways to reduce the total quantity of waste generated. It is through waste reduction efforts that the related goals of sustainable development and zero-waste can be achieved.

ASSESSMENT OF PROGRESS IN SOURCE REDUCTION

Because of the complexity of quantifying progress in reducing toxic chemicals in waste at the source, there is no one method for measuring progress. Comparing changes in quantities of toxic chemicals in waste when source reduction has been implemented is one method, but this does not take production into account.

Calculating an Indicator of Changes in Quantities of Toxic Chemicals in Waste

The production index can be used to help assess changes in the quantities of toxic chemicals in waste relative to changes in production or activity at a facility.

This method assumes a direct relationship between the level of production or activity at a facility and the amount of toxic chemicals in waste generated by that production or activity. Thus, if production increases, waste is assumed to increase proportionally. Similarly, if production decreases, waste is assumed to decrease proportionally. This assumption may hold for some, but not necessarily all, processes or facilities. There may be many instances where

Table 2-27. Ratio of Production to Total Production-related Waste, by Industry, 1991, 1993, 1994.[37]

SIC Code	Industry	Value of Production $ Billion, 1988			Total Production-related Waste Million Pounds			Ratio of Production-related Waste to Value of Production Million Pounds/$ Billion		
		1991	1993	1994	1991	1993	1994	1991	1993	1994
20	Food	357	381	384	215.0	206.8	175.5	0.60	0.54	0.46
21	Tobacco	22	19	23	51.8	5.3	1.1	2.36	0.28	0.05
22	Textiles	62	70	74	57.8	50.6	53.3	0.93	0.72	0.72
23	Apparel	60	67	69	2.3	2.0	2.5	0.04	0.03	0.04
24	Lumber	64	70	73	69.1	94.3	62.3	1.08	1.35	0.85
25	Furniture	36	42	43	62.6	71.5	67.7	1.74	1.70	1.57
26	Paper	121	126	132	1,627.5	1,511.9	1,617.0	13.45	12.00	12.25
27	Printing	135	140	139	259.9	279.5	238.7	1.93	2.00	1.72
28	Chemicals	265	280	290	8,797.8	9,227.6	9,609.0	33.20	32.96	33.13
29	Petroleum	128	126	131	1,170.3	954.7	1,436.2	9.14	7.58	10.96
30	Plastics	94	114	123	465.9	507.9	515.2	4.96	4.46	4.19
31	Leather	8	9	8	18.1	9.9	8.7	2.26	1.10	1.09
32	Stone/Clay/Glass	56	60	63	956.8	932.3	1,062.1	17.09	15.54	16.86
33	Primary Metals	131	145	157	2,530.9	3,096.6	3,505.5	19.32	21.36	22.33
34	Fabr. Metals	143	159	171	716.2	856.7	853.8	5.01	5.39	4.99
35	Machinery	220	255	288	215.5	181.1	167.5	0.98	0.71	0.58
36	Electrical Equip.	187	220	241	712.5	560.1	587.9	3.81	2.55	2.44
37	Transportation Equip.	322	351	374	391.2	429.0	418.2	1.22	1.22	1.12
38	Measure./Photo.	115	121	120	120.2	82.3	75.8	1.04	0.68	0.63
39	Miscellaneous	34	38	39	60.8	62.4	63.0	1.79	1.64	1.62
	Multiple codes 20-39[38]	—	—	—	2,113.4	1,670.9	1,410.2	—	—	—
	Total	2,560	2,793	2,942	20,615.6	20,793.4	21,931.2	8.05	7.45	7.46

[37] Value of production equals value of shipments and change in inventory from previous year. Waste data are from Form R of year indicated. Amounts in pounds have been assigned to single-category SIC codes if only one SIC code was reported for a particular chemical form from the facility. Facilities that did not report any SIC codes in 20-39 are excluded. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), or sulfuric acid.

[38] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

Table 2-28. Growth Rates in Ratio of Production to Total Production-related Waste, by Industry, 1991-1994.[39]

SIC Code	Industry	Percent Change in Value of Production 1991-1994 Percent	Percent Change in Value of Production 1993-1994 Percent	Percent Change in Total Production-related Waste 1991-1994 Percent	Percent Change in Total Production-related Waste 1993-1994 Percent	Percent Change in Ratio of Production-related Waste to Value of Production 1991-1994 Percent	Percent Change in Ratio of Production-related Waste to Value of Production 1993-1994 Percent
20	Food	7.6	0.8	-18.4	-15.1	-24.1	-15.8
21	Tobacco	4.5	21.1	-97.9	-79.2	-98.0	-82.8
22	Textiles	19.4	5.7	-7.8	5.3	-22.7	-0.4
23	Apparel	15.0	3.0	8.7	25.0	-5.3	20.0
24	Lumber	14.1	4.3	-9.8	-33.9	-21.0	-36.7
25	Furniture	19.4	2.4	8.1	-5.3	-9.5	-7.5
26	Paper	9.1	4.8	-0.6	7.0	-8.9	2.1
27	Printing	3.0	-0.7	-8.2	-14.6	-10.8	-14.0
28	Chemicals	9.4	3.6	9.2	4.1	-0.2	0.5
29	Petroleum	2.3	4.0	22.7	50.4	19.9	44.7
30	Plastics	30.9	7.9	10.6	1.4	-15.5	-6.0
31	Leather	0.0	-11.1	-51.9	-12.1	-51.9	-1.1
32	Stone/Clay/Glass	12.5	5.0	11.0	13.9	-1.3	8.5
33	Primary Metals	19.8	8.3	38.5	13.2	15.6	4.6
34	Fabr. Metals	19.6	7.5	19.2	-0.3	-0.3	-7.3
35	Machinery	30.9	12.9	-22.3	-7.5	-40.6	-18.0
36	Electrical Equip.	28.9	9.5	-17.5	5.0	-36.0	-4.2
37	Transportation Equip.	16.1	6.6	6.9	-2.5	-8.0	-8.5
38	Measure./Photo.	4.3	-0.8	-36.9	-7.9	-39.5	-7.1
39	Miscellaneous	14.7	2.6	3.6	1.0	-9.7	-1.6
	Multiple codes 20-39[40]	—	—	-33.3	-15.6	—	—
	Total	14.9	5.3	6.4	5.5	-7.4	0.1

[39] Value of production equals value of shipments and change in inventory from previous year. Waste data are from Form R of year indicated. Amounts in pounds have been assigned to single-category SIC codes if only one SIC code was reported for a particular chemical form from the facility. Facilities that did not report any SIC codes in 20-39 are excluded. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

[40] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

processes do not have a directly proportional relationship between the level of activity and waste generated.

A thorough and accurate assessment of source reduction progress requires more detailed information than is included in Form R. Nonetheless, the data collected under TRI can indicate whether toxic chemicals in waste are increasing or decreasing relative to production levels. To perform the following analysis, those forms that have complete data for both 1993 and 1994 must be selected. Data for those years must be comparable, meaning that a facility has to have reported quantities for the same waste management activity, for example, on-site recycling, for both years. The calculations shown in Box 2-5 illustrate how the information reported on Form R can be used to assess changes in the quantities of toxic chemicals in waste relative to changes in production or activity.

Because production may not be directly and linearly related to the quantity of TRI chemicals in waste, analysis of progress should also include simple comparison of reporting-year and prior-year data. A decrease could indicate progress while an increase could indicate that progress is not happening. In some instances, however, source reduction could be implemented at a facility, but quantities reported for one chemical could increase if that chemical is substituted for another chemical as a source reduction measure for the latter chemical.

Changes in Quantities of Toxic Chemicals in Waste at the National Level

EPA performed an analysis of the data received for 1994 using the technique discussed in Box 2-4. Of the 75,332 Form Rs submitted for 1994, 55,077 forms had sufficient information for both 1993 and 1994 to perform an analysis of the changes of the quantity of toxic chemicals in waste for those two years.

Calculating Changes in Quantities of TRI Chemicals in Waste Relative to Production

1) Sum Sections 8.1 through 8.7 for the prior year (1993).

2) Sum Sections 8.1 through 8.7 for the reporting year (1994).

3) Multiply the sum for the prior year as calculated in step 1 by the production ratio or activity index (which is reported in Section 8.9 of Form R). This yields a quantity that would have been generated in the reporting year (call it the expected quantity).

4) Take the sum for the current year as calculated in step 2 and subtract from it the result of step 3 (the expected quantity).

If the result of step 4 is a negative number, this suggests that the total quantity of the toxic chemical in waste for the reporting year (1994) was less than that expected, given the reported level of production or activity. This could be an indication that reduction of the toxic chemical in waste is occurring. If the result of step 4 is a positive number, this means that the amount of toxic chemical in waste for the reporting year (1994) was greater than that expected, given the reported level of production or activity. This could be an indication that reduction of the toxic chemical in waste is not occurring.

Box 2-5. Calculating Changes in Quantities of TRI Chemicals in Waste Relative to Production.

Of those 55,077 forms, 12,752 indicated the implementation of a source reduction activity. For this subset of forms that reported source reduction and provided sufficient information for both 1993 and 1994, the quantity of toxic chemicals reported in waste increased by 2.7% between 1993 and 1994 in absolute terms (see Table 2-29).

However, once production changes are taken into account, the relative change in reported toxic chemicals in waste between 1993 and 1994 was a decrease of 1.9%.

As shown in Table 2-30, forms from facilities that did not indicate the implementation of source reduction showed a 1.5% increase between 1993 and 1994 in the quantity of toxic chemicals entering waste in absolute terms. After adjusting for production, the relative change was a decrease of 4.7%.

These two tables show that adjusting for production may help explain the reasons for changes in the quantities of toxic chemicals released. For both subsets of facilities in this analysis, what appeared to be a slight increase in waste turned into a modest decrease once the effects of increasing production were taken into account. However, it is interesting to note that source reduction activities reported by facilities do not appear to be significantly impacting waste generation. The adjusted decrease in waste was lower for the subset of facilities which reported source reduction than it was for the facilities which did not report source reduction. In other words, after adjusting (however imperfectly) for changes in production, the data indicate that the facilities which did not report source reduction activities in 1994 reduced their generation of waste more than facilities which did report implementation of source reduction.

Table 2-29. Change in Quantities of TRI Chemicals in Waste from 1993 to 1994 for Facilities Reporting Source Reduction Activities.[41]

Category of Waste Generated	1993 Reported Quantity Pounds	1993 Reported Percent of Total	1994 Reported Quantity Pounds	1994 Reported Percent of Total	Amount Expected for 1994 Quantity Pounds	Amount Expected for 1994 Percent of Total
Recycled On-site	2,223,961,683	38.1	2,340,935,689	39.0	2,315,317,584	37.9
Recycled Off-site	556,256,521	9.5	549,837,421	9.2	609,405,829	10.0
Energy Recovery On-site	610,291,487	10.4	635,981,252	10.6	633,991,208	10.4
Energy Recovery Off-site	118,775,010	2.0	129,589,645	2.2	127,823,243	2.1
Treated On-site	1,540,673,112	26.4	1,612,004,858	26.9	1,593,768,769	26.1
Treated Off-site	106,896,429	1.8	120,670,626	2.0	111,665,010	1.8
Quantity Released	685,000,518	11.7	609,076,556	10.2	718,794,597	11.8
Total	5,841,854,760	100.0	5,998,096,047	100.0	6,110,766,240	100.0

Category of Waste Generated	Absolute Change 1994-1993 Quantity Pounds	Absolute Change 1994-1993 Percent Change	Relative Change 1994 Reported - 1994 Expected Quantity Pounds	Relative Change 1994 Reported - 1994 Expected Percent Change
Recycled On-site	116,974,006	5.3	25,618,105	1.1
Recycled Off-site	-6,419,100	-1.2	-59,568,408	-10.8
Energy Recovery On-site	25,689,765	4.2	1,990,044	0.3
Energy Recovery Off-site	10,814,635	9.1	1,766,402	1.4
Treated On-site	71,331,746	4.6	18,236,089	1.1
Treated Off-site	13,774,197	12.9	9,005,616	7.5
Quantity Released	-75,923,962	-11.1	-109,718,041	-18.0
Total	156,241,287	2.7	-112,670,193	-1.9

Table 2-30. Change in Quantities of TRI Chemicals in Waste from 1993 to 1994 for Facilities Not Reporting Source Reduction Activities.[42]

Category of Waste Generated	1993 Reported Quantity Pounds	1993 Reported Percent of Total	1994 Reported Quantity Pounds	1994 Reported Percent of Total	Amount Expected for 1994 Quantity Pounds	Amount Expected for 1994 Percent of Total
Recycled On-site	4,059,549,732	27.3	4,136,315,511	27.4	4,438,631,089	28.1
Recycled Off-site	1,324,509,653	8.9	1,385,585,864	9.2	1,429,951,587	9.1
Energy Recovery On-site	1,618,239,023	10.9	1,964,577,898	13.0	1,770,788,414	11.2
Energy Recovery Off-site	148,724,433	1.0	144,738,606	1.0	164,371,687	1.0
Treated On-site	5,903,827,333	39.7	5,846,865,209	38.8	6,098,770,731	38.6
Treated Off-site	302,342,230	2.0	313,065,787	2.1	317,354,144	2.0
Quantity Released	1,502,467,922	10.1	1,286,128,985	8.5	1,568,355,335	9.9
Total	14,859,660,326	100.0	15,077,277,860	100.0	15,788,222,987	100.0

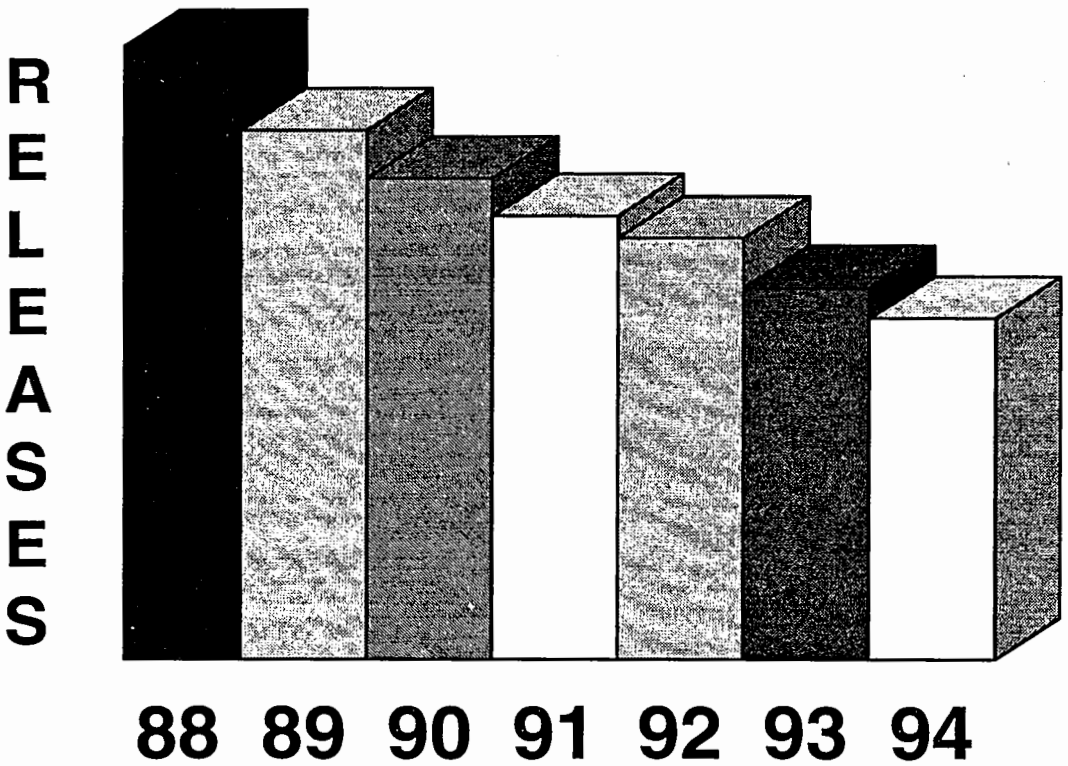
Category of Waste Generated	Absolute Change 1994-1993 Quantity Pounds	Absolute Change 1994-1993 Percent Change	Relative Change 1994 Reported - 1994 Expected Quantity Pounds	Relative Change 1994 Reported - 1994 Expected Percent Change
Recycled On-site	76,765,779	1.9	-302,315,578	-7.3
Recycled Off-site	61,076,211	4.6	-44,365,723	-3.2
Energy Recovery On-site	346,338,875	21.4	193,789,484	9.9
Energy Recovery Off-site	-3,985,827	-2.7	-19,633,081	-13.6
Treated On-site	-56,962,124	-1.0	-251,905,522	-4.3
Treated Off-site	10,723,557	3.5	-4,288,357	-1.4
Quantity Released	-216,338,937	-14.4	-282,226,350	-21.9
Total	217,617,534	1.5	-710,945,127	-4.7

[41] 12,752 of the 55,077 Form Rs met these criteria.

[42] 42,325 of the 55,077 Form Rs met these criteria.

Chapter 3

Year-to-Year Comparison of TRI Data



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YEAR-TO-YEAR COMPARISON OF TRI DATA

INTRODUCTION

Because TRI data are collected annually, they can be used to measure the nation's progress in reducing toxic chemical releases and off-site transfers from manufacturing facilities. This chapter attempts to measure such progress on a national, state, industry, and chemical-specific basis.

This chapter compares the 1994 data to the 1993 data to measure annual progress, and to the 1988 data to measure progress since the beginning of the TRI program. Although 1987 was the first year for TRI reporting, 1988 has been chosen as the baseline year for comparisons because of concerns about the data quality of industry's submissions in the first year. Most comparisons to 1988 data include data for 1988 and 1992-1994 only; data for other years have been omitted for practical reasons.

Certain TRI reporting requirements have changed since the inception of the program. It is important to understand these changes and consider their implications when comparing TRI data across years.

Chemical List Changes

EPA has the authority to add chemicals to the reporting list if they meet the statutory toxicity criteria and to delete chemicals from the list if they are determined not to meet the toxicity criteria. Since 1987, EPA has deleted a number of chemicals from the list, added others, and modified the reporting requirements for others. These chemical list changes are discussed in detail in Appendix A: Questions and Answers.

In order to control for changes to the chemical list over time, year-to-year comparisons presented in this chapter are based on a consistent set of chemicals that have been reportable for all years being compared. This use of a consistent set of chemicals ensures that any year-to-year changes in release or transfer totals seen here cannot be attributed to changes in the list of reportable chemicals.

Because of this normalization process, release and transfer totals presented in 1988-1994 comparison tables will differ slightly from totals seen in 1993-1994 comparison tables and from the totals for 1994 presented in Chapter 1 of this report. The 1988-through-1994 comparisons do not include aluminum oxide, ammonia, sulfuric acid, or any chemicals that have been added to or deleted from the chemical list since 1988. The 1993-1994 comparisons do not include ammonia, sulfuric acid, chemicals added to the list in 1994, or any delisted chemicals. Comparisons for 1993-1994 do include aluminum oxide (fibrous forms), as well as chemicals added to the list beginning with the 1990 and 1991 reporting years.

There were a number of changes to the chemical list between 1993 and 1994. Twenty-one chemicals and two chemical categories from the Resource Conservation and Recovery Act (RCRA) list of hazardous wastes were added to the TRI list. Eleven ozone-depleting hydrochlorofluorocarbons (HCFCs) also were added. Acetone and butyl benzyl phthalate were deleted from the list.

The individual listing for ammonium sulfate (solution) also was deleted, but the ammonia portion of this chemical remains reportable under the listing for ammonia. This change is explained in detail in Chapter 1. Because this deletion was announced just prior to the reporting deadline for the 1994 reports, facilities were allowed to wait until their 1995 reports to begin reporting under this new method. Therefore, some ammonium sulfate (solution) reports remain in the database for the 1994 reporting year. However, data for ammonium sulfate (solution) are not included in any year-to-year comparisons in this chapter.

The reporting requirements for ammonia also were modified effective with the 1994 reporting year. These modifications are explained in detail in Chapter 1. Because of these modifications, data for ammonia are not included in any year-to-year comparisons in this chapter.

Non-aerosol forms of sulfuric acid were removed from the list effective with the 1994 reporting year. This means that only airborne forms of this chemical count towards the reporting threshold and release calculations. Releases of non-aerosol forms of sulfuric acid are no longer reportable. Because of this modification to the reporting requirements, this chemical is not included in any year-to-year comparisons in this chapter.

Threshold Changes

Facilities are required to report for a particular chemical only if they meet the manufacture, process, or otherwise use thresholds for that chemical. The otherwise use threshold has remained 10,000 pounds since the inception of the program. However, the manufacture and process thresholds began at 75,000 pounds for 1987, dropped to 50,000 pounds for 1988, and dropped again to 25,000 pounds for 1989 and later.

Due in part to these declining thresholds, the number of facilities reporting to TRI and the number of forms filed increased from 1987 to 1988 and again from 1988 to 1989. Thresholds have not changed since 1989. Therefore, threshold changes may have impacted the TRI data between 1988 and 1989, but would not affect data after 1989.

New Transfer Types

Beginning with the 1991 reporting year, facilities were required to report transfers off-site for the purposes of recycling and energy recovery to TRI. Prior to 1991, facilities were required to report only transfers to POTWs and other off-site locations for the purposes of treatment and disposal.

Because of this change in the reporting requirements, total transfers for 1988 are not comparable to total transfers for 1991 and beyond. Comparisons between 1988 and 1994 transfers in this chapter include only those transfer types that were reportable in 1988. Comparisons between 1993 and 1994 transfers include all transfer types reportable for 1991 and beyond.

NATIONAL OVERVIEW

Total Releases

Reported releases of toxic chemicals to the environment decreased by 186 million pounds between 1993 and 1994, from 2.17 billion pounds to 1.99 billion pounds. This represents a decline of nearly 8.6%. Decreased surface water discharges accounted for most (83.7%) of the total decline in releases. Air emissions also declined, while underground injection and land releases each increased. Table 3-1 compares the 1994 TRI data to the 1993 data.

Nearly all of the decrease in surface water discharges is attributable to large reductions from just two facilities, as explained below in the surface water section. If these two facilities are excluded from the calculation, total releases declined just 1.6% since 1993. Table 3-2 shows the change in releases between 1993 and 1994, excluding these two facilities.

Between 1988 and 1994, total releases decreased by 1.56 billion pounds, a decline of 44.1%. Table 3-3 compares the 1994 TRI data to the 1988 data. Table 3-4 shows the change in releases from 1988 to 1994, excluding the two fertilizer facilities in Louisiana discussed above. Figure 3-1 shows the distribution by media of TRI releases from 1988 to 1994. Figure 3-2 shows the distribution of releases if the two fertilizer facilities mentioned above are excluded from the data.

Total Transfers

Reported transfers of TRI chemicals to off-site locations increased by 238 million pounds between 1993 and 1994, from 3.22 billion pounds to 3.46 billion pounds (see Table 3-1). This represents an increase of nearly 7.4% between 1993 and 1994. All types of off-site transfers increased except transfers to POTWs. Because transfers to recycling and energy recovery were not reportable in 1988, total transfers for 1994 cannot be compared to total transfers for 1988. However, transfers to POTWs and other off-site locations for the purposes of treatment and disposal have declined 33.6% since 1988.

Facilities and Forms

The number of facilities reporting to TRI dropped 2.8% between 1993 and 1994, from 22,048 to 21,428. The number of individual chemical reports dropped nearly 3.0%, from 69,485 in 1993 to 67,429 in 1994. However, it is likely that the number of facilities and forms for 1994 will rise somewhat over time due to late reporting and to resolution of outstanding data quality problems which may have prevented data entry of some submissions prior to the preparation of this report.

Figure 3-3 shows the change in the number of reporting facilities and the number of reports submitted to TRI since 1988. The increase in the number of reporting facilities and TRI reports between 1988 and 1989 is probably due primarily to the decrease in the reporting threshold for the manufacture and processing of chemicals, from 50,000 pounds in 1988 to 25,000 pounds in 1989. Since 1989, the number of facilities and forms has declined steadily.

Releases by Media

Air Emissions

Total air emissions declined by more than 50 million pounds between 1993 and 1994, from 1.40 billion pounds to 1.35 billion pounds. This represents a decrease of nearly 3.6% for total air emissions between 1993 and 1994. Fugitive air emissions declined by 8.5%, while stack or point source air emissions declined by just 1.7%.

Table 3-1. Comparison of TRI Releases and Transfers, 1993-1994.❶

	1993	1994	1993-1994 Change	
	Number	Number	Number	Percent
Total Facilities	22,048	21,428	-620	-2.81
Total Forms	69,485	67,429	-2,056	-2.96
	Pounds	Pounds	Pounds	Percent
Total Air Emissions	1,402,396,586	1,352,195,299	-50,201,287	-3.58
Fugitive Air	389,273,904	356,126,095	-33,147,809	-8.52
Point Source Air	1,013,122,682	996,069,204	-17,053,478	-1.68
Surface Water Discharges	203,063,767	47,044,261	-156,019,506	-76.83
Underground Injection	295,138,031	306,828,184	11,690,153	3.96
Releases to Land	274,141,302	282,364,269	8,222,967	3.00
Total Releases	2,174,739,686	1,988,432,013	-186,307,673	-8.57
Transfers to Recycling	2,060,275,634	2,234,400,339	174,124,705	8.45
Transfers to Energy Recovery	447,839,339	463,143,491	15,304,152	3.42
Transfers to Treatment	256,916,238	292,125,249	35,209,011	13.70
Transfers to POTWs	186,529,891	180,836,213	-5,693,678	-3.05
Transfers to Disposal	270,211,460	287,339,738	17,128,278	6.34
Other Off-site Transfers❷	1,715,096	3,527,303	1,812,207	105.66
Total Transfers	3,223,487,658	3,461,372,333	237,884,675	7.38
Total Releases and Transfers	5,398,227,344	5,449,804,346	51,577,002	0.96

Table 3-2. Comparison of TRI Releases, Excluding Two IMC-Agrico Plants in Louisiana, 1993-1994.❶

	1993	1994	1993-1994 Change	
	Number	Number	Number	Percent
Total Facilities	22,046	21,426	-620	-2.81
Total Forms	69,477	67,421	-2,056	-2.96
	Pounds	Pounds	Pounds	Percent
Total Air Emissions	1,402,328,724	1,352,110,722	-50,218,002	-3.58
Fugitive Air	389,273,695	356,125,732	-33,147,963	-8.52
Point Source Air	1,013,055,029	995,984,990	-17,070,039	-1.69
Surface Water	39,475,650	37,828,629	-1,647,021	-4.17
Underground Injection	295,138,031	306,828,184	11,690,153	3.96
On-site Land Releases	273,516,828	281,468,948	7,952,120	2.91
Total Releases	2,010,459,233	1,978,236,483	-32,222,750	-1.60

❶ Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.
❷ Transfers reported with no waste management codes or invalid codes.

Table 3-3. Comparison of TRI Releases and Transfers, 1988, 1992-1994.❸

	1988	1992	1993	1994	1988-1994 Change	
	Number	Number	Number	Number	Number	Percent
Total Facilities	21,046	22,593	21,938	21,336	290	1.38
Total Forms	66,571	70,238	68,567	66,777	206	0.31
	Pounds	Pounds	Pounds	Pounds	Pounds	Percent
Total Air Emissions	2,252,904,433	1,560,000,713	1,385,442,978	1,340,980,491	-911,923,942	-40.48
Fugitive Air	685,997,724	440,840,803	379,451,734	350,014,102	-335,983,622	-48.98
Point Source Air	1,566,906,709	1,119,159,910	1,005,991,244	990,966,389	-575,940,320	-36.76
Surface Water	176,726,741	195,589,595	203,003,168	47,011,773	-129,714,968	-73.40
Underground Injection	625,967,221	366,495,726	294,846,947	306,651,731	-319,315,490	-51.01
On-site Land Releases	480,451,877	327,557,956	274,062,285	282,267,922	-198,183,955	-41.25
Total Releases	3,536,050,272	2,449,643,990	2,157,355,378	1,976,911,917	-1,559,138,355	-44.09
Transfers to Recycling❹	NA	2,609,433,782	2,057,075,702	2,233,603,858	—	—
Transfers to Energy Recovery❹	NA	430,564,881	446,763,037	462,709,225	—	—
Transfers to Treatment	396,163,102	256,555,922	254,474,939	290,143,755	-106,019,347	-26.76
Transfers to POTWs	297,347,493	225,951,692	186,346,945	180,440,724	-116,906,769	-39.32
Transfers to Disposal	437,216,182	216,682,649	266,530,507	280,466,676	-156,749,506	-35.85
Other Off-site Transfers❺	42,332,939	13,028,083	1,715,096	3,527,303	—	—
Total Transfers	1,173,059,716	3,752,217,009	3,212,906,226	3,450,891,541	—	—
Total Releases and Transfers	4,709,109,988	6,201,860,999	5,370,261,604	5,427,803,458	—	—

Table 3-4. Comparison of TRI Releases, Excluding Two IMC-Agrico Plants in Louisiana, 1988, 1992-1994.❸

	1988	1992	1993	1994	1988-1994 Change	
	Number	Number	Number	Number	Number	Percent
Total Facilities	21,044	22,591	21,936	21,334	290	1.38
Total Forms	66,560	70,228	68,559	66,769	209	0.31
	Pounds	Pounds	Pounds	Pounds	Pounds	Percent
Total Air Emissions	2,252,776,766	1,559,770,102	1,385,375,116	1,340,895,914	-911,880,852	-40.48
Fugitive Air	685,884,288	440,706,923	379,451,525	350,013,739	-335,870,549	-48.97
Point Source Air	1,566,892,478	1,119,063,179	1,005,923,591	990,882,175	-576,010,303	-36.76
Surface Water	79,636,741	71,258,921	39,415,051	37,796,141	-41,840,600	-52.54
Underground Injection	625,967,221	366,495,726	294,846,947	306,651,731	-319,315,490	-51.01
On-site Land Releases	480,183,372	326,989,750	273,437,811	281,372,601	-198,810,771	-41.40
Total Releases	3,438,564,100	2,324,514,499	1,993,074,925	1,966,716,387	-1,471,847,713	-42.80

❸ Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

❹ NA: Transfers for recyling or energy recovery were not required to be reported for 1988.

❺ For 1992, 1993, and 1994, transfers reported with no waste management codes or invalid codes. For 1988, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988.

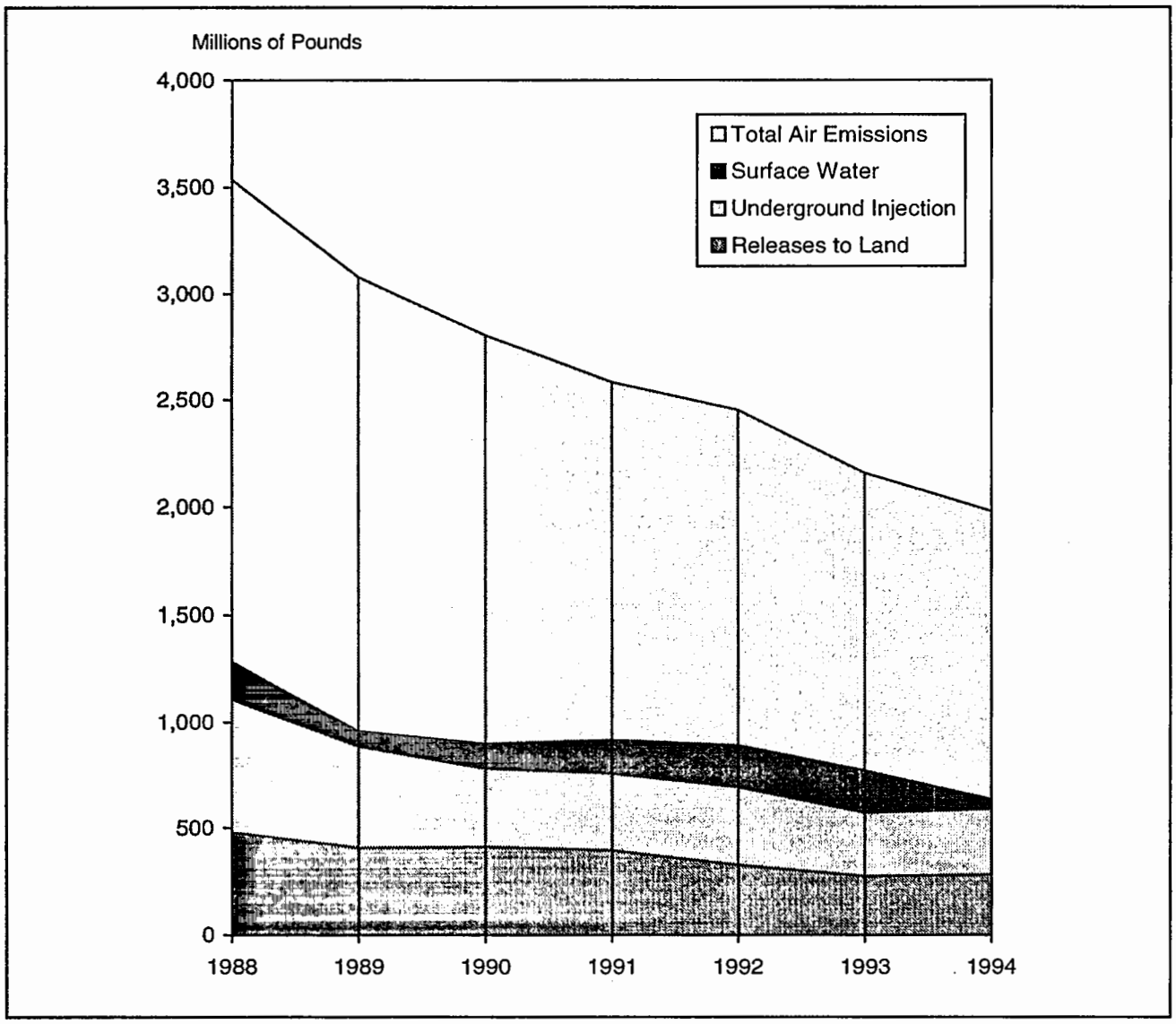

Figure 3-1. Distribution of TRI Releases, 1988-1994.[6]

Table 3-5 shows the 10 chemicals for which air emissions have declined by the greatest amount between 1993 and 1994. Emissions of 1,1,1-trichloroethane, an ozone-depleting solvent, declined by nearly 27 million pounds since 1993, a decrease of more than 41.2%. Two other ozone-depleting chemicals, Freon 113 and CFC-11, are also among the top 10 chemicals for decreases in air emissions between 1993 and 1994. Production of these three chemicals was scheduled for phase-out by January 1, 1996, which probably accounts for the rapid decline in emissions of these chemicals.

Although air emissions decreased overall between 1993 and 1994, emissions of certain chemicals increased. For example, air releases of methanol increased by more than 42 million

[6] Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

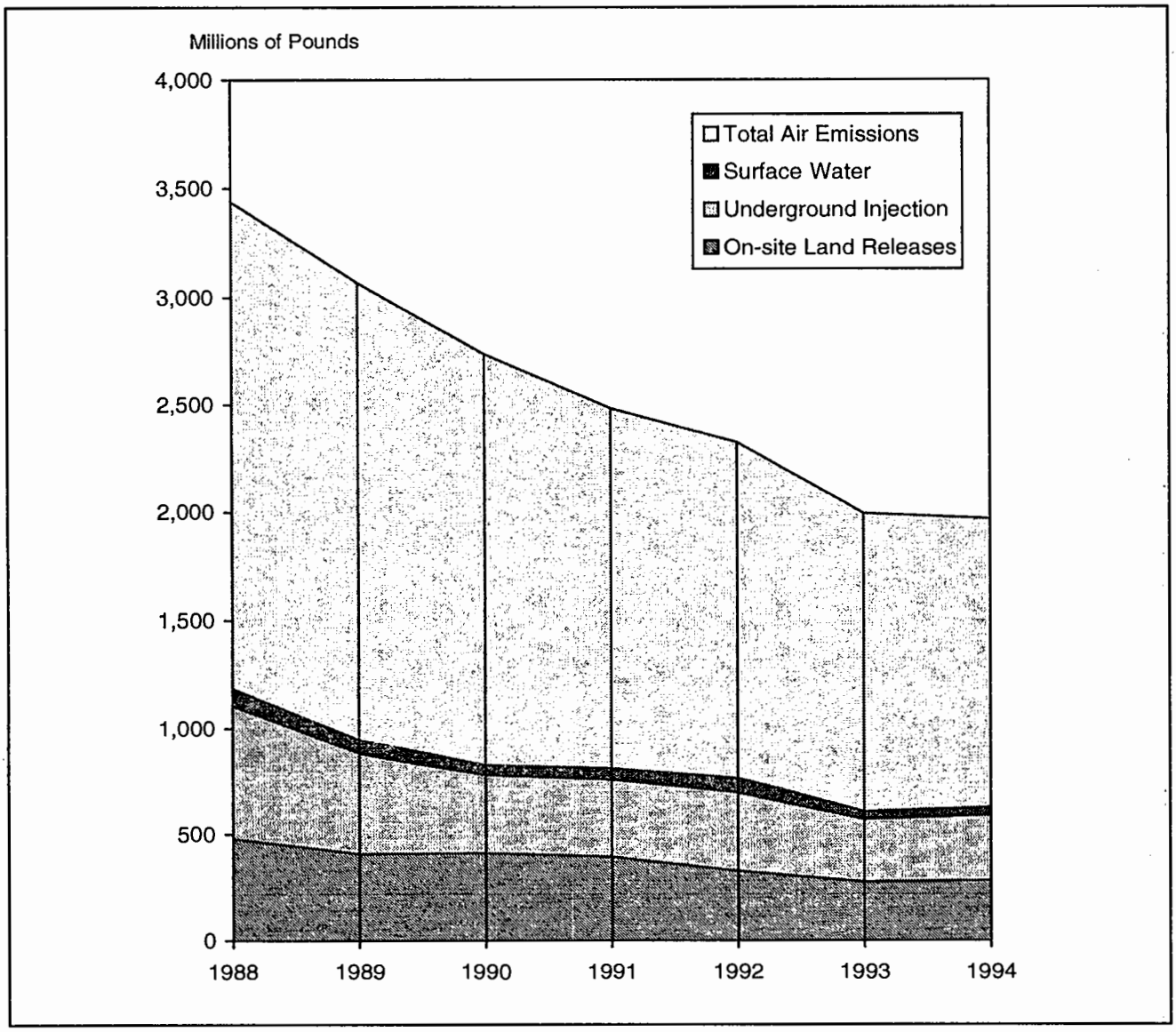

Figure 3-2. Distribution of TRI Releases, Excluding Releases from Two Louisiana Facilities, 1988-1994.❼

pounds between 1993 and 1994, an increase of nearly 24%. Much, if not all, of the reported increase in methanol emissions to air is a result of changes in the methods used by pulp and paper manufacturers to estimate their releases in 1994. Revised methanol emissions factors for the paper industry were published in 1994, leading to higher reported release estimates.

(See discussions of top increasers to air, water, and land, later in this chapter.)

Since 1988, air emissions have declined by 912 million pounds, or 40.5%. Fugitive air emissions have declined by nearly 49.0%, while stack emissions have declined by just 36.8%.

❼ Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

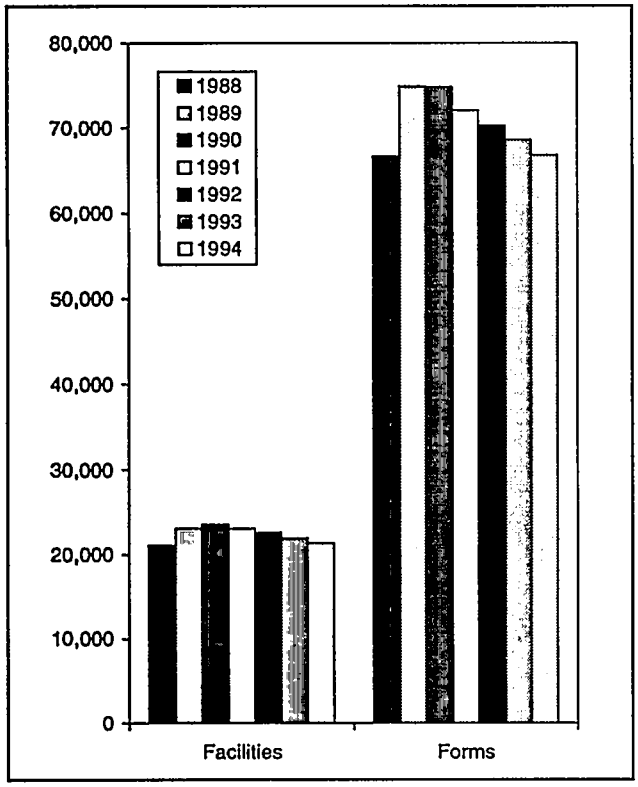

Figure 3-3. TRI Facilities Reporting and Forms Submitted, 1988-1994.[8]

Surface Water Discharges

Discharges to surface water decreased by 156 million pounds between 1993 and 1994, from 203 million pounds to 47 million pounds. This represents a 76.8% decrease since 1993.

Virtually all of this decrease in surface water discharges is attributable to large decreases from just two fertilizer facilities in Louisiana. These two facilities implemented pollution prevention and control measures to decrease runoff of phosphoric acid and other chemicals from their phosphogypsum stacks. (These measures are discussed in greater detail in the industry section of this chapter.) Together, these two facilities accounted for 154 million of the 156 million pounds of decrease in surface water discharges. If these two facilities are excluded from the calculation, surface water discharges decreased just 4.2% since 1993.

Table 3-6 shows the 10 chemicals with the greatest decrease in surface water discharges since 1993. Almost all of the decrease is due to reduced releases of phosphoric acid, which declined by nearly 155 million pounds, or 88.1%.

The total decrease in surface water discharges between 1988 and 1994 was nearly 130 million pounds or 73.4%. The decrease between 1988 and 1994 is less than the decrease between 1993 and 1994 because surface water discharge levels were higher in 1993 than in 1988. Much of the variability in surface water discharges reported to TRI since 1988 has been due to fluctuations in the levels reported by the same two fertilizer facilities discussed above. When these two facilities are excluded from the totals, surface water discharges have declined by 52.5% since 1988.

Underground Injection

Reported underground injection of TRI chemicals increased by nearly 12 million pounds between 1993 and 1994, from 295 million pounds to 307 million pounds. This represents an increase of nearly 4.0%.

Table 3-7 shows the 10 chemicals with the largest increase in reported underground injection between 1993 and 1994. Underground injection of ammonium nitrate (solution) increased by nearly 16 million pounds, which is more than the net increase for all chemicals. Underground injection of acrylic acid increased by nearly 3 million pounds. On the other hand, underground injection of methanol and of

[8] Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 3-5. Top 10 Chemicals for Decreases in Total Air Emissions, 1993-1994.❾

Chemical	1993-1994 Change	
	Pounds	Percent
1,1,1-Trichloroethane	-26,716,017	-41.25
Chlorine	-15,615,664	-20.71
Toluene	-11,722,994	-6.51
Carbon disulfide	-10,541,175	-11.23
Hydrochloric acid	-7,696,289	-9.58
Methyl ethyl ketone	-7,491,848	-8.70
Freon 113	-4,789,591	-48.55
Xylene (mixed isomers)	-4,340,739	-3.85
Trichlorofluoromethane (CFC-11)	-3,151,234	-51.29
Chloroform	-2,929,411	-21.15

Table 3-6. Top 10 Chemicals for Decreases in Surface Water Discharges, 1993-1994.❾

Chemical	1993-1994 Change	
	Pounds	Percent
Phosphoric acid	-154,961,243	-88.12
Hydrochloric acid	-693,550	-96.39
Ammonium nitrate (solution)	-421,011	-5.69
Ethylene glycol	-405,248	-34.06
1,4-Dioxane	-346,525	-53.12
Propylene	-170,536	-97.38
Manganese	-154,673	-63.50
Chloroform	-88,450	-19.60
Methyl ethyl ketone	-75,954	-41.20
Chlorine	-74,536	-12.62

hydrochloric acid each decreased by more than 4 million pounds, and underground injection of acetaldehyde decreased by more than 2 million pounds.

Since 1988, reported underground injection of TRI chemicals has decreased by 319 million pounds, or 51.0%.

Land Releases

Releases to land increased by 8 million pounds since 1993, from 274 million pounds to 282 million pounds. This represents an increase of 3.0% since 1993.

Table 3-8 shows the 10 chemicals with the largest increase in land releases since 1993. Land releases of phosphoric acid increased by 21 million pounds, or nearly 60.0%, while land releases of zinc compounds increased by nearly 11 million pounds, or 16.5%. Seven chemicals and chemical compound categories showed declines of more than 1 million pounds in land releases between 1993 and 1994, including manganese compounds (-9.8 million pounds) and ammonium nitrate (solution) (-4.9 million pounds).

Land releases have decreased by 198 million pounds, or 41.3%, since 1988.

Table 3-7. Top 10 Chemicals for Increases in Underground Injection, 1993-1994.❾

Chemical	1993-1994 Change	
	Pounds	Percent
Ammonium nitrate (solution)	15,979,650	45.38
Acrylic acid	2,929,000	83.52
Formaldehyde	1,427,085	22.61
Acetonitrile	1,397,784	8.90
Acrylamide	1,188,305	29.63
Acrylonitrile	1,071,106	28.01
Cyanide compounds	950,548	41.53
Nitrobenzene	505,844	163.47
Ethylbenzene	299,885	89.80
Aniline	298,476	21.86

Table 3-8. Top 10 Chemicals for Increases in Releases to Land, 1993-1994.❾

Chemical	1993-1994 Change	
	Pounds	Percent
Phosphoric acid	21,285,620	59.96
Zinc compounds	10,667,445	16.54
Copper compounds	1,367,511	3.41
Lead compounds	1,357,082	10.20
Manganese	902,223	11.90
Methanol	752,621	40.68
Antimony compounds	387,766	44.12
Styrene	302,783	170.03
Methylenebis(phenylisocyanate)	298,925	749.58
Aluminum (fume or dust)	220,846	23.94

❾ Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Transfers by Type

Recycling

Transfers to off-site locations for recycling increased by 174 million pounds since 1993, from 2.06 billion pounds to more than 2.23 billion pounds. This represents an increase of nearly 8.5% since 1993.

The chemicals with the largest increase in transfers to recycling were copper (45.7 million pounds), lead compounds (43.4 million pounds), zinc compounds (35.3 million pounds), and copper compounds (27.0 million pounds). The chemical with the largest decrease in transfers to recycling was aluminum (fume or dust) (-44.1 million pounds).

Energy Recovery

Transfers to off-site locations for energy recovery increased from nearly 448 million pounds in 1993 to 463 million pounds in 1994, an increase of 15 million pounds, or 3.4%.

The chemicals with the largest increase in transfers to energy recovery were methanol (8.7 million pounds), methyl isobutyl ketone (6.8 million pounds), and xylene (mixed isomers) (5.2 million pounds). The chemicals with the largest decrease in transfers to energy recovery were acrylic acid (-2.6 million pounds), ethylene (-1.7 million pounds), and n-butyl alcohol (-1.5 million pounds).

Treatment

Transfers to off-site locations for the purposes of treatment increased from 257 million pounds in 1993 to 292 million pounds in 1993, an increase of 35 million pounds, or 13.7%.

By far the largest increase was for 1,2,4-trichlorobenzene, which increased from just 623,111 pounds in 1993 to more than 29 million pounds in 1994. One facility in Alabama reported transferring nearly 29.0 million pounds of this chemical off-site for treatment in 1994. This facility has indicated that they reported this quantity incorrectly on their Form R, and that they intend to revise this amount to 4.7 pounds. Other chemicals with large increases in transfers to treatment included ethylene glycol (6.9 million pounds), lead compounds (2.9 million pounds), and chromium compounds (2.3 million pounds).

Chemicals with the greatest decreases in transfers for treatment include methanol (-4.5 million pounds), hydrochloric acid (-3.7 million pounds), and titanium tetrachloride (-2.6 million pounds).

Transfers to off-site locations for treatment have declined by 106 million pounds, or nearly 26.8%, since 1988.

POTWs

Reported transfers to POTWs decreased by nearly 6 million pounds since 1993, from 187 million pounds to 181 million pounds. This represents a decline of nearly 3.1%.

The chemicals with the largest decreases in transfers to POTWs between 1993 and 1994 were methanol (-4.0 million pounds) and phenol (-1.0 million pounds). Transfers of nitric acid and ethylene glycol to POTWs each increased by more than 1.2 million pounds.

Reported transfers to POTWs have decreased by nearly 117 million pounds since 1988, a decline of 39.3%.

Disposal

Transfers to off-site locations for disposal increased by 17 million pounds since 1993, from 270 million pounds to 287 million pounds. This represents an increase of 6.3%.

The chemicals with the largest increase in transfers to disposal were copper (7.6 million pounds), aluminum (fume or dust) (5.5 million pounds), and zinc compounds (4.5 million pounds). The chemicals with the largest decrease in transfers to disposal were barium compounds (-5.4 million pounds), copper compounds (-2.1 million pounds), and chromium (-1.9 million pounds).

Transfers off-site for disposal have decreased by 157 million pounds, or 35.9%, since 1988.

Other Off-site Transfers

This category includes transfers that are reported without valid waste management codes and that therefore cannot be assigned to one of the reporting categories. These transfers increased from 1.7 million pounds in 1993 to 3.5 million pounds in 1994.

CHANGES IN RELEASES AND TRANSFERS BY STATE

1993 - 1994 Comparisons

Table 3-9 compares the total TRI releases reported by each state for 1993 and 1994. The five states with the largest reported decreases in total TRI releases were Louisiana (-151.9 million pounds), Utah (-20.2 million pounds), Indiana (-16.7 million pounds), Kansas (-11.2 million pounds), and California (-8.6 million pounds). Reductions from these five states exceed the total net reductions for the nation as a whole from 1993 to 1994.

For four of these five states, the majority of the decrease is attributable to just one or two facilities. Many of these decreases are explained in greater detail in the industry section of this chapter.

In Louisiana, just two fertilizer facilities owned by the IMC-Agrico Co. (St. James and Uncle Sam, LA) accounted for more than 154 million pounds of decrease in releases, more than the net decrease for the state as a whole. Pollution prevention and control measures implemented at those facilities reduced surface water discharges of phosphoric acid from phosphogypsum stacks. In Utah, the Magnesium Corp. of America (Rowley, UT) reduced its reported emissions of chlorine and hydrochloric acid by 17.5 million pounds. In Indiana, Inland Steel Co. (East Chicago, IN) reduced its reported land releases of manganese compounds and zinc compounds by 9.5 million pounds. National Steel Corp. (Portage, IN) reduced its underground injection of hydrochloric acid by 2 million pounds. In Kansas, 8.4 million pounds of the state's 11.2 million pound net decrease is attributable to decreased underground injection of hydrochloric acid at a Vulcan Chemicals facility in Wichita. No single facility was responsible for a large portion of California's decrease.

Figure 3-4 displays the states by percentage change in TRI total releases from 1993 to 1994. Twenty-two states and territories reported decreases in total releases of more than 10% between 1993 and 1994. In contrast, seven states reported increases of more than 10% in total TRI releases between 1993 and 1994.

1988-1994 Comparisons

Table 3-10 compares TRI total release data by state for 1988 through 1994. Figure 3-5 displays the states by 1988-through-1994 percent change in total releases. Twenty-two states have

Table 3-9. Change in Total TRI Releases by State, 1993-1994.⑩

State	Total Releases 1993 Pounds	Total Releases 1994 Pounds	1993-1994 Change Pounds	1993-1994 Change Percent
Alabama	97,044,992	89,008,485	-8,036,507	-8.3
Alaska	2,774,493	1,666,926	-1,107,567	-39.9
American Samoa	23	0	-23	-100.0
Arizona	11,904,836	30,496,747	18,591,911	156.2
Arkansas	29,048,965	32,298,422	3,249,457	11.2
California	44,609,725	36,014,634	-8,595,091	-19.3
Colorado	4,189,292	3,753,194	-436,098	-10.4
Connecticut	12,463,948	10,162,575	-2,301,373	-18.5
Delaware	4,439,059	4,131,573	-307,486	-6.9
District of Columbia	0	23,791	23,791	—
Florida	57,081,600	82,502,671	25,421,071	44.5
Georgia	41,874,404	45,285,043	3,410,639	8.1
Hawaii	497,296	511,642	14,346	2.9
Idaho	1,837,747	2,421,895	584,148	31.8
Illinois	88,909,645	86,824,911	-2,084,734	-2.3
Indiana	87,972,232	71,284,121	-16,688,111	-19.0
Iowa	22,112,031	22,674,281	562,250	2.5
Kansas	29,062,990	17,825,505	-11,237,485	-38.7
Kentucky	33,547,362	31,612,873	-1,934,489	-5.8
Louisiana	272,895,836	120,989,248	-151,906,588	-55.7
Maine	9,510,067	7,472,416	-2,037,651	-21.4
Maryland	11,842,873	12,273,039	430,166	3.6
Massachusetts	10,268,854	8,618,704	-1,650,150	-16.1
Michigan	75,149,291	79,274,017	4,124,726	5.5
Minnesota	22,449,157	19,820,156	-2,629,001	-11.7
Mississippi	101,489,318	113,572,311	12,082,993	11.9
Missouri	48,572,671	45,261,106	-3,311,565	-6.8
Montana	44,660,078	46,428,463	1,768,385	4.0
Nebraska	9,673,034	8,148,145	-1,524,889	-15.8
Nevada	7,807,738	3,009,347	-4,798,391	-61.5
New Hampshire	3,235,073	2,362,034	-873,039	-27.0
New Jersey	15,380,343	13,565,119	-1,815,224	-11.8
New Mexico	23,023,257	17,140,215	-5,883,042	-25.6
New York	39,749,207	33,460,345	-6,288,862	-15.8
North Carolina	78,684,672	80,168,094	1,483,422	1.9
North Dakota	906,881	925,658	18,777	2.1
Ohio	103,026,054	99,136,216	-3,889,838	-3.8
Oklahoma	16,962,391	15,018,525	-1,943,866	-11.5
Oregon	15,661,480	15,492,799	-168,681	-1.1
Pennsylvania	47,510,980	47,732,279	221,299	0.5
Puerto Rico	10,747,848	9,175,214	-1,572,634	-14.6
Rhode Island	3,326,066	2,879,940	-446,126	-13.4
South Carolina	47,554,397	44,857,708	-2,696,689	-5.7
South Dakota	1,881,545	1,953,496	71,951	3.8
Tennessee	140,696,468	146,796,177	6,099,709	4.3
Texas	217,934,330	214,203,015	-3,731,315	-1.7
Utah	91,212,717	70,976,752	-20,235,965	-22.2
Vermont	634,992	610,448	-24,544	-3.9
Virgin Islands	1,579,504	960,560	-618,944	-39.2
Virginia	48,642,085	46,784,956	-1,857,129	-3.8
Washington	19,300,009	22,196,444	2,896,435	15.0
West Virginia	20,012,881	19,645,371	-367,510	-1.8
Wisconsin	31,197,686	30,341,283	-856,403	-2.7
Wyoming	12,189,263	18,683,124	6,493,861	53.3
Total	2,174,739,686	1,988,432,013	-186,307,673	-8.6

⑩ Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

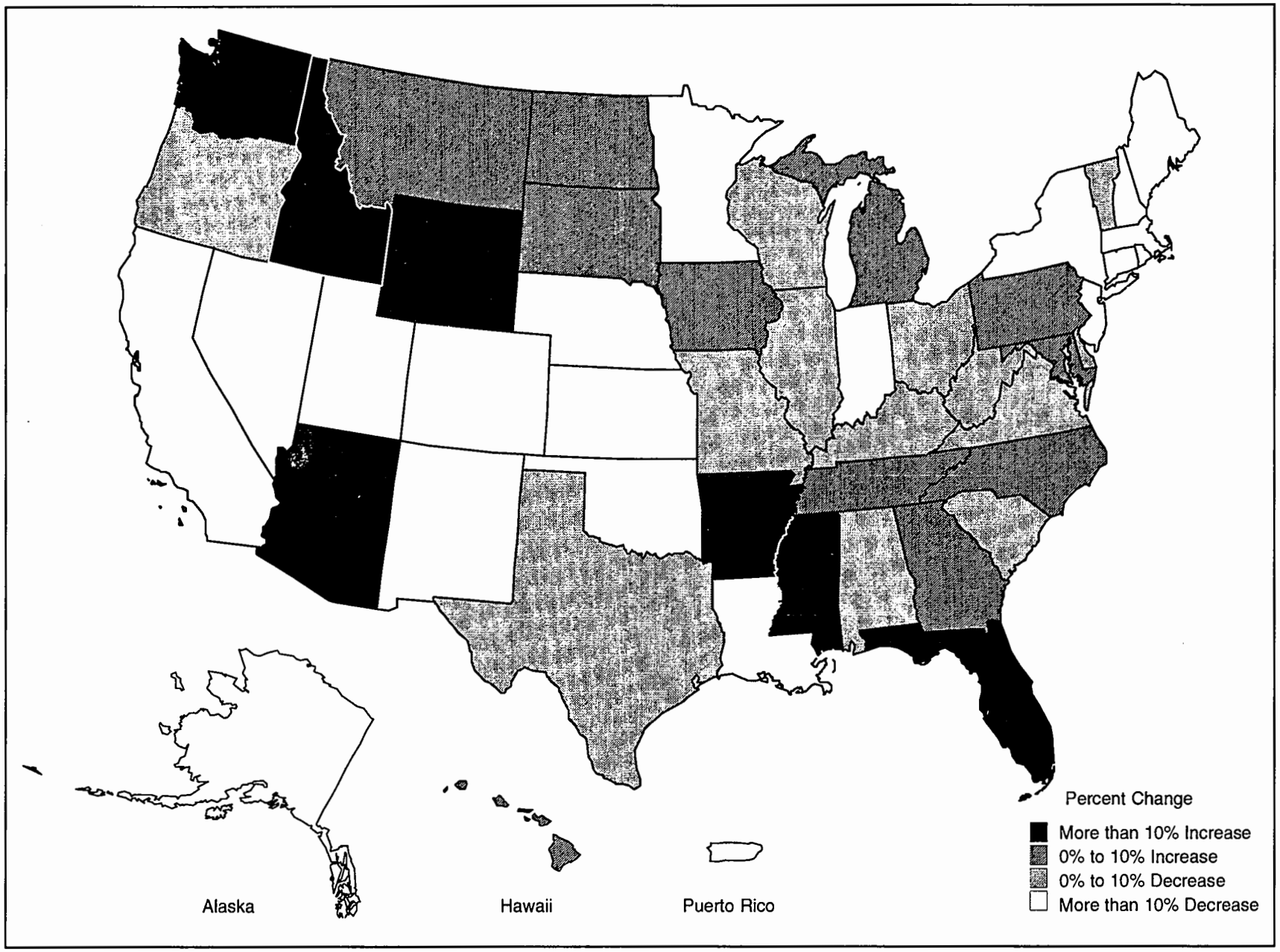

Figure 3-4. Percent Change in Total TRI Releases by State, 1993-1994.

Table 3-10. Change in Total TRI Releases by State, 1988-1994.⓫

State	Total Releases 1988 Pounds	1992 Pounds	1993 Pounds	1994 Pounds	1988-1994 Change Pounds	Percent
Alabama	110,190,351	101,014,797	96,337,032	88,255,736	-21,934,615	-19.9
Alaska	6,202,969	5,298,529	2,774,493	1,666,926	-4,536,043	-73.1
American Samoa	0	0	23	0	0	—
Arizona	66,056,724	44,748,765	11,899,434	30,481,566	-35,575,158	-53.9
Arkansas	40,676,039	28,088,385	28,767,563	32,123,196	-8,552,843	-21.0
California	97,587,329	57,346,879	43,442,395	35,042,391	-62,544,938	-64.1
Colorado	13,764,589	4,648,168	4,112,882	3,743,684	-10,020,905	-72.8
Connecticut	32,538,115	15,680,273	12,345,085	10,148,215	-22,389,900	-68.8
Delaware	7,824,996	4,896,079	4,400,174	4,131,537	-3,693,459	-47.2
District of Columbia	500	0	0	23,791	23,291	4,658.2
Florida	96,971,689	68,233,803	56,871,468	82,451,588	-14,520,101	-15.0
Georgia	81,660,530	45,447,128	41,746,384	45,248,317	-36,412,213	-44.6
Hawaii	934,888	567,839	497,296	511,642	-423,246	-45.3
Idaho	7,897,545	3,037,401	1,837,747	2,421,895	-5,475,650	-69.3
Illinois	118,262,723	105,305,100	88,264,892	86,492,880	-31,769,843	-26.9
Indiana	169,719,507	111,617,976	86,829,355	70,230,589	-99,488,918	-58.6
Iowa	36,349,251	25,456,090	22,004,922	22,592,325	-13,756,926	-37.8
Kansas	104,566,611	66,757,717	28,283,695	17,656,450	-86,910,161	-83.1
Kentucky	82,349,308	64,657,971	32,015,256	30,368,433	-51,980,875	-63.1
Louisiana	435,022,400	254,513,997	271,665,005	120,016,789	-315,005,611	-72.4
Maine	16,017,141	11,986,873	9,245,317	7,472,416	-8,544,725	-53.3
Maryland	19,586,600	11,462,763	11,823,154	12,267,170	-7,319,430	-37.4
Massachusetts	27,009,031	13,432,030	10,108,060	8,579,439	-18,429,592	-68.2
Michigan	98,791,863	74,940,426	74,620,758	79,026,472	-19,765,391	-20.0
Minnesota	54,771,818	28,729,490	22,281,974	19,698,919	-35,072,899	-64.0
Mississippi	94,356,620	97,213,545	100,713,527	112,958,196	18,601,576	19.7
Missouri	87,440,536	51,907,320	48,492,823	45,252,423	-42,188,113	-48.2
Montana	35,718,989	43,330,780	44,660,078	46,428,463	10,709,474	30.0
Nebraska	13,889,359	10,883,615	9,669,469	8,148,145	-5,741,214	-41.3
Nevada	2,316,380	3,422,255	7,781,338	3,009,347	692,967	29.9
New Hampshire	12,287,173	5,269,300	3,205,250	2,361,779	-9,925,394	-80.8
New Jersey	36,676,671	16,339,961	14,836,154	12,826,607	-23,850,064	-65.0
New Mexico	30,251,617	19,523,465	22,957,346	17,140,073	-13,111,544	-43.3
New York	95,608,577	50,423,575	39,476,384	33,387,071	-62,221,506	-65.1
North Carolina	125,148,109	99,431,248	77,887,808	79,652,099	-45,496,010	-36.4
North Dakota	1,130,649	1,077,896	906,881	925,658	-204,991	-18.1
Ohio	166,274,307	109,710,531	102,171,162	98,556,174	-67,718,133	-40.7
Oklahoma	34,084,754	18,823,038	16,920,597	15,017,647	-19,067,107	-55.9
Oregon	17,599,713	16,369,413	15,630,067	15,459,895	-2,139,818	-12.2
Pennsylvania	99,845,415	61,148,329	47,203,231	47,589,065	-52,256,350	-52.3
Puerto Rico	12,367,527	11,836,490	10,312,921	8,962,176	-3,405,351	-27.5
Rhode Island	6,351,321	3,365,035	3,325,316	2,879,190	-3,472,131	-54.7
South Carolina	61,846,536	53,632,254	47,433,370	44,785,797	-17,060,739	-27.6
South Dakota	2,313,572	2,813,495	[illegible]370,305	1,953,496	-360,076	-15.6
Tennessee	159,647,465	139,070,032	140,373,722	146,697,619	-12,949,846	-8.1
Texas	310,984,718	250,575,592	215,849,946	213,061,076	-97,923,642	-31.5
Utah	134,108,351	94,386,937	91,140,797	70,974,458	-63,133,893	-47.1
Vermont	1,597,565	729,638	618,742	610,448	-987,117	-61.8
Virgin Islands	1,847,998	1,144,281	1,579,504	960,560	-887,438	-48.0
Virginia	115,320,445	50,805,878	48,113,216	46,243,051	-69,077,394	-59.9
Washington	26,132,977	21,431,843	19,209,586	22,139,919	-3,993,058	-15.3
West Virginia	33,152,240	19,966,301	19,655,231	19,323,581	-13,828,659	-41.7
Wisconsin	50,777,033	35,033,236	30,996,980	30,272,414	-20,504,619	-40.4
Wyoming	42,221,138	12,110,228	12,189,263	18,683,124	-23,538,014	-55.7
Total	3,536,050,272	2,449,643,990	2,157,355,378	1,976,911,917	-1,559,138,355	-44.1

⓫ Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

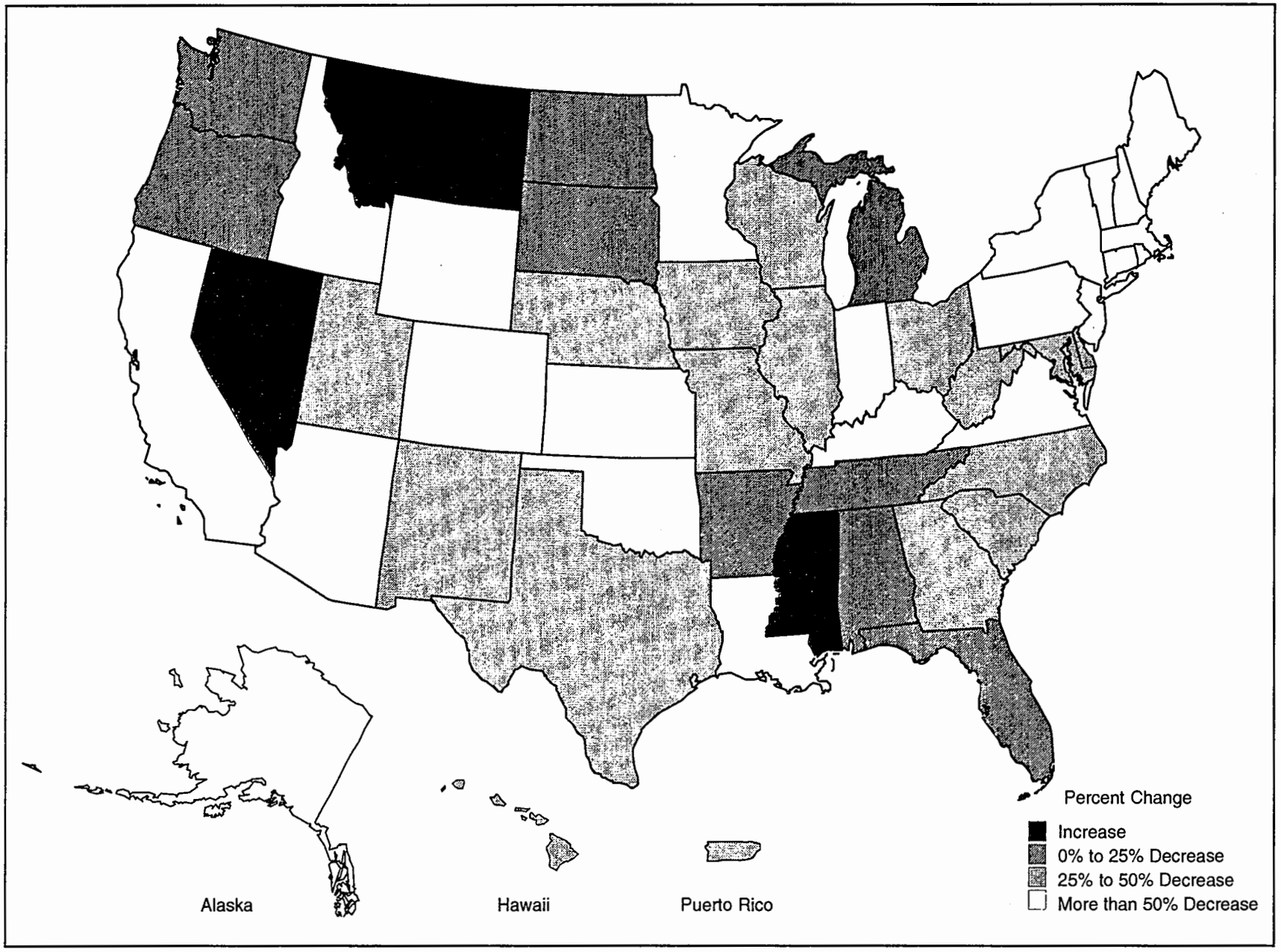

Figure 3-5. Percent Change in Total TRI Releases by State, 1988-1994.

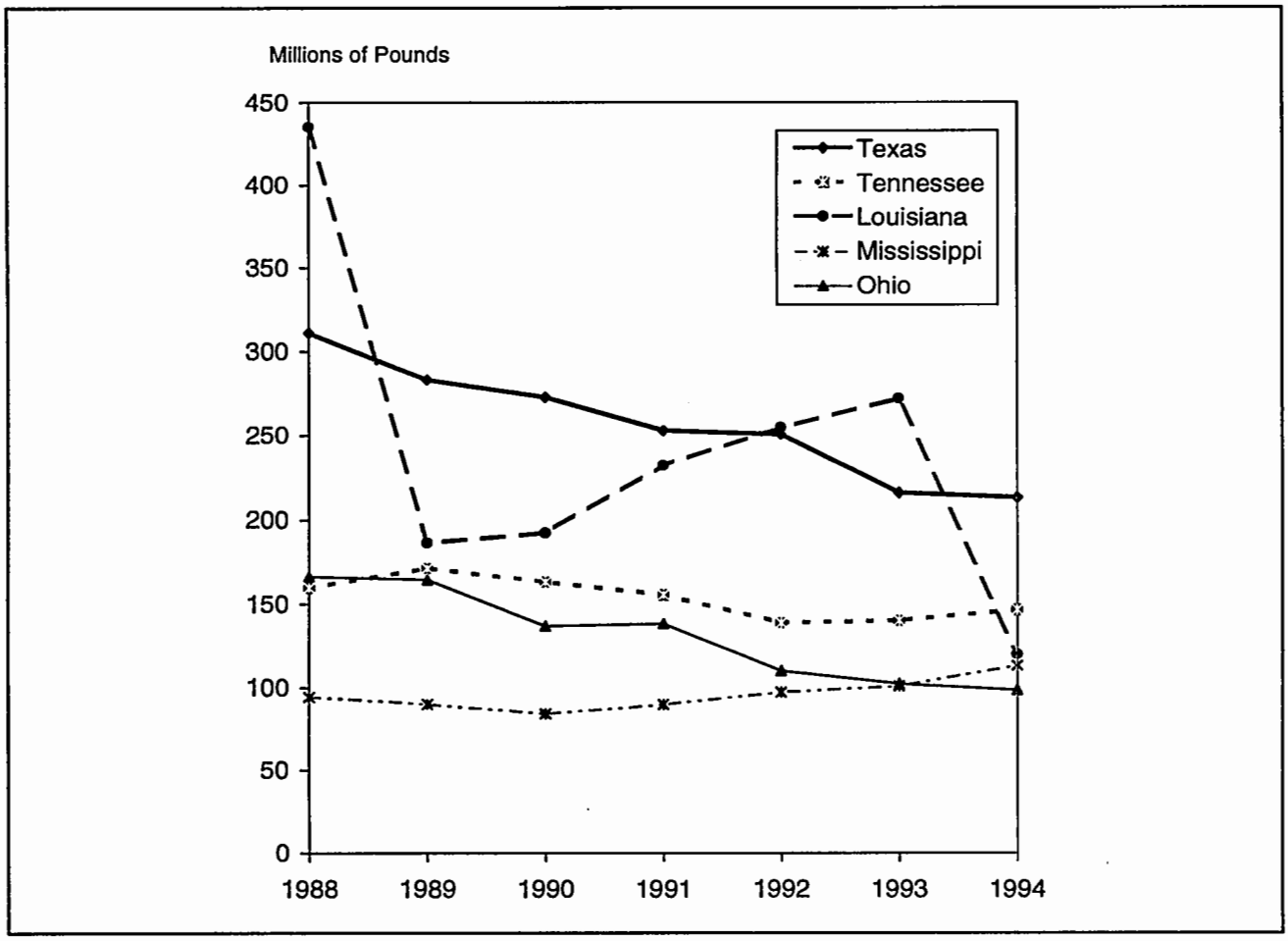

Figure 3-6. Total TRI Releases, 1988-1994, of Top Five States for Total Releases in 1994.⑫

reduced their releases by more than 50% since 1988. Five of these states (Kansas, New Hampshire, Alaska, Colorado, and Louisiana) have reduced their releases by more than 70%. Only three states (Montana, Nevada, and Mississippi) and the District of Columbia reported increased TRI releases between 1988 and 1994.

Figure 3-6 shows the change in total TRI releases from 1988 through 1994 for the five states with the greatest quantity of TRI releases in 1994.

Texas, currently ranked first in the nation for total TRI releases, has reduced its releases by 98 million pounds since 1988, a decline of 31.5%. Air emissions have decreased by 74 million pounds; land releases have decreased by 20 million pounds, and underground injection has decreased by nearly 4 million pounds. Surface water discharges have increased slightly.

Tennessee, now ranked second in the nation for total releases, has reduced its releases by 13 million pounds since 1988, a decrease of only 8.1%. Air releases have decreased by 15 million pounds and land releases have decreased by 8 million pounds. Underground injection has increased by 11 million pounds. Surface water discharges have decreased by 0.6 million pounds.

⑫ Does not include delisted chemicals, chemicals added in 1990, 1991 and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

Louisiana, now ranked third in the nation for total releases, has reduced its releases by 315 million pounds since 1988, a decrease of 72.4%. This is the largest decrease of any state in terms of pounds. Louisiana's underground injection has decreased by 205 million pounds, water discharges have decreased by 107 million pounds, and air releases have decreased by 5 million pounds. Land releases have increased.

Mississippi's TRI releases have increased from 94 million pounds in 1988 to 113 million pounds in 1994, an increase of 19.7%. Because of this, Mississippi has moved from 17th in the nation for total TRI releases in 1988 to fourth in the nation in 1994. Underground injection has increased by more than 16 million pounds, and air emissions have increased by 5 million pounds. Land and water releases have decreased.

Fifth-ranked Ohio has reduced its releases by 68 million pounds since 1988, a decrease of 40.7%. Air releases have decreased by 55 million pounds, land releases by 8 million pounds, and underground injection by 4 million pounds. Releases to surface water also decreased.

Table 3-11 presents the complete release and transfer information for each state for 1988 and 1992-1994. No reports were received from Guam or the Northern Mariana Islands for any year 1988-1994. No reports were received from the District of Columbia for any year 1990-1993.

CHANGE IN RELEASES AND TRANSFERS BY INDUSTRY

1993-1994 Comparisons

Between 1993 and 1994, 17 of the 20 industry groups covered by TRI reported decreased releases. Only three industry groups (apparel, lumber, and paper) reported increases. Facilities reporting more than one major industry group ("multiple codes") also reported increased releases. Table 3-12 presents the 1993-to-1994 change in TRI total releases by industry group.

The chemical industry accounted for the largest decrease in total releases between 1993 and 1994, nearly 176 million pounds. Industries reporting the highest reductions in percentage terms were measurement/photographic instruments (-30.5%), chemicals (-19.9%), and leather (-19.2%).

1988-1994 Comparisons

Between 1988 and 1994, the chemical industry accounted for 622 million pounds of total TRI release reductions. Facilities reporting "multiple codes" accounted for nearly 304 million pounds of release reductions. Primary metals followed, with 202 million pounds of reductions between 1988 and 1994. Table 3-13 presents the 1988-through-1994 changes in total TRI releases by industry group.

The largest decreases in percentage terms between 1988 and 1994 were reported by the electrical equipment (75.0%), leather (69.9%), and measurement/photographic instruments (68.5%) industries, as well as by facilities reporting "multiple codes" (68.0%). The chemical industry has reduced its releases by 47.0% since 1988, compared to the overall rate of 44.1% for all industry groups. The primary metals industry, which accounted for the second largest quantity of TRI releases in 1994, has reported decreases of 40.8% since 1988, somewhat below the average. The paper industry, which accounted for the third largest quantity of TRI releases in 1994, has reduced its releases just 4.0% since 1988.

Table 3-14 presents the complete release and transfer data by industry group for 1988 through 1994.

Table 3-11. TRI Releases and Transfers by State, 1988, 1992-1994 (Alphabetically Ordered).[13]

State	Year	Facilities Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Alabama	94	493	82,388,173	1,723,708	251	4,143,604	88,255,736
	93	480	88,504,979	3,312,051	145,613	4,374,389	96,337,032
	92	472	89,229,229	3,707,604	2,268,746	5,809,218	101,014,797
	88	382	102,412,902	1,508,962	1,734,717	4,533,770	110,190,351
Alaska	94	13	843,495	821,080	35	2,316	1,666,926
	93	8	1,269,626	1,503,050	42	1,775	2,774,493
	92	6	2,104,619	3,193,531	42	337	5,298,529
	88	6	2,074,739	4,125,752	1,018	1,460	6,202,969
American Samoa	94	1	0	0	0	0	0
	93	2	18	5	0	0	23
	92	1	0	0	0	0	0
	88	1	0	0	0	0	0
Arizona	94	170	5,337,105	39	11	25,144,411	30,481,566
	93	177	4,074,255	47	18	7,825,114	11,899,434
	92	184	7,038,537	5	0	37,710,223	44,748,765
	88	173	12,776,419	2,250	0	53,278,055	66,056,724
Arkansas	94	367	20,614,807	275,467	9,175,393	2,057,529	32,123,196
	93	364	21,131,317	264,581	4,924,516	2,447,149	28,767,563
	92	362	20,683,869	383,513	4,795,448	2,225,555	28,088,385
	88	316	30,659,151	613,447	7,480,769	1,922,672	40,676,039
California	94	1,443	29,806,526	3,776,397	458,806	1,000,662	35,042,391
	93	1,580	36,031,314	2,538,099	3,763,312	1,109,670	43,442,395
	92	1,709	46,409,993	9,404,853	4,793	1,527,240	57,346,879
	88	1,784	81,047,636	9,503,104	76,653	6,959,936	97,587,329
Colorado	94	177	3,568,117	21,767	0	153,800	3,743,684
	93	175	3,860,150	27,321	500	224,911	4,112,882
	92	188	4,405,827	27,842	500	213,999	4,648,168
	88	176	10,988,667	14,686	1,000	2,760,236	13,764,589
Connecticut	94	332	8,090,466	2,056,214	0	1,535	10,148,215
	93	364	10,174,631	1,797,346	0	373,108	12,345,085
	92	391	12,956,407	2,719,970	0	3,896	15,680,273
	88	436	25,386,918	5,618,997	250	1,531,950	32,538,115
Delaware	94	63	3,935,971	37,937	0	157,629	4,131,537
	93	68	4,155,746	70,181	0	174,247	4,400,174
	92	64	4,639,958	117,611	0	138,510	4,896,079
	88	61	7,291,843	293,377	0	239,776	7,824,996
District of Columbia	94	5	4,891	1,600	0	17,300	23,791
	88	1	250	250	0	0	500
Florida	94	485	23,377,322	571,558	13,480,599	45,022,109	82,451,588
	93	480	20,578,095	263,918	10,798,164	25,231,291	56,871,468
	92	499	23,231,872	212,833	11,469,163	33,319,935	68,233,803
	88	473	30,836,626	933,309	34,541,216	30,660,538	96,971,689
Georgia	94	672	40,944,197	2,841,881	0	1,462,239	45,248,317
	93	689	37,932,566	2,541,440	0	1,272,378	41,746,384
	92	696	42,047,989	2,313,437	10	1,085,692	45,447,128
	88	604	70,107,026	2,224,347	59,467	9,269,690	81,660,530

Table 3-11.

State	Year	Transfers to Recycling[14] Pounds	Transfers to Energy Recovery[14] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[15] Pounds	Total Transfers[16] Pounds
Alabama	94	36,108,383	13,755,165	39,144,387	188,461	13,210,337	12,054	102,418,787
	93	30,990,298	11,603,645	7,424,038	204,644	7,381,575	0	57,604,200
	92	22,854,936	11,112,868	9,334,606	591,523	6,141,834	3,957,959	53,993,726
	88	NA	NA	8,285,370	943,880	6,161,111	153,541	NA
Alaska	94	353,880	0	112,330	1,265	0	1,450	468,925
	93	450,043	0	2,364	20	20	0	452,447
	92	242,373	0	3,088	20	40	0	245,521
	88	NA	NA	0	1,000	1,750	0	NA
American Samoa	94	0	0	0	0	0	0	0
	93	0	0	7	0	0	0	7
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Arizona	94	36,695,158	655,103	2,412,158	261,946	282,475	0	40,306,840
	93	46,127,284	557,905	2,326,760	254,110	201,435	0	49,467,494
	92	24,751,359	634,565	2,158,428	228,846	140,183	0	27,913,381
	88	NA	NA	982,495	1,478,834	614,911	4,300	NA
Arkansas	94	73,518,266	5,604,842	1,382,781	174,748	2,023,857	150	82,704,644
	93	43,629,143	5,504,062	1,269,760	147,948	1,090,099	5	51,641,017
	92	27,323,354	4,626,855	1,358,843	116,709	5,043,896	57,427	38,527,084
	88	NA	NA	2,439,797	749,666	5,089,647	286,634	NA
California	94	62,505,925	7,551,005	5,999,724	8,037,816	8,379,267	53,045	92,526,782
	93	65,502,932	8,275,561	5,376,859	11,311,102	9,090,119	61,320	99,617,893
	92	57,810,813	11,240,432	5,810,933	11,231,039	4,742,175	27,343	90,862,735
	88	NA	NA	16,024,681	9,305,018	18,968,732	4,011,443	NA
Colorado	94	10,523,776	3,542,793	1,689,133	225,328	312,368	14,082	16,307,480
	93	9,517,638	2,280,172	3,578,217	273,640	436,815	4,050	16,090,532
	92	9,233,097	1,470,789	2,965,298	162,494	219,109	250	14,051,037
	88	NA	NA	2,331,230	388,033	2,570,860	76,836	NA
Connecticut	94	24,056,781	2,033,601	5,725,522	562,982	874,356	710	33,253,952
	93	23,552,106	3,906,411	5,954,352	532,142	889,615	926	34,835,552
	92	20,697,536	4,299,417	4,713,862	771,963	938,089	202,827	31,623,694
	88	NA	NA	9,719,180	1,997,330	5,341,323	329,123	NA
Delaware	94	13,264,644	2,287,856	775,737	2,781,574	454,131	0	19,563,942
	93	15,054,760	422,921	972,410	2,907,102	119,692	0	19,476,885
	92	7,074,824	1,312,216	671,586	2,323,026	42,014	0	11,423,666
	88	NA	NA	2,427,914	2,737,652	1,711,169	19,894	NA
District of Columbia	94	66,611	0	0	113,832	30,012	0	210,455
	88	NA	NA	250	250	0	0	NA
Florida	94	17,969,309	2,080,706	3,126,444	3,541,973	1,034,830	212,822	27,966,084
	93	17,633,861	3,029,480	3,409,241	8,821,649	1,494,269	223,315	34,611,815
	92	15,714,817	4,420,677	3,917,171	11,943,109	1,768,496	1,500	37,765,770
	88	NA	NA	5,944,189	15,451,583	1,709,848	1,550,157	NA
Georgia	94	48,264,523	7,827,011	2,554,773	1,164,608	3,817,045	323	63,628,283
	93	50,627,458	6,627,886	2,094,328	2,276,556	3,365,442	504	64,992,174
	92	52,007,573	6,522,264	2,771,499	3,038,722	7,785,116	668,510	72,793,684
	88	NA	NA	8,369,342	6,523,447	19,286,232	768,201	NA

Table 3-11. TRI Releases and Transfers by State, 1988, 1992-1994 (Alphabetically Ordered),® Continued.

State	Year	Facilities Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Hawaii	94	15	506,864	1,250	1,023	2,505	511,642
	93	15	494,006	1,000	530	1,760	497,296
	92	18	564,985	1,010	334	1,510	567,839
	88	25	716,843	2,500	12,300	203,245	934,888
Idaho	94	58	1,562,729	19,704	0	839,462	2,421,895
	93	57	1,297,563	11,993	0	528,191	1,837,747
	92	50	2,047,650	88,983	0	900,768	3,037,401
	88	47	3,067,646	31,450	0	4,798,449	7,897,545
Illinois	94	1,284	55,569,873	134,687	10,163,485	20,624,835	86,492,880
	93	1,312	55,772,254	165,112	12,551,415	19,776,111	88,264,892
	92	1,344	66,345,658	182,080	20,918,170	17,859,192	105,305,100
	88	1,278	99,007,360	508,835	7,230,184	11,516,344	118,262,723
Indiana	94	992	63,827,962	221,066	3,916,906	2,264,655	70,230,589
	93	996	67,142,340	455,451	6,482,416	12,749,148	86,829,355
	92	1,012	74,806,661	485,160	2,847,581	33,478,574	111,617,976
	88	818	100,520,954	1,930,704	6,430,899	60,836,950	169,719,507
Iowa	94	390	20,822,390	412,169	0	1,357,766	22,592,325
	93	393	19,209,914	507,697	0	2,287,311	22,004,922
	92	398	23,646,336	302,547	0	1,507,207	25,456,090
	88	358	35,519,742	196,273	5	633,231	36,349,251
Kansas	94	264	14,718,183	337,715	2,299,694	300,858	17,656,450
	93	268	16,389,603	688,782	10,996,016	209,294	28,283,695
	92	270	19,368,615	684,852	46,217,879	486,371	66,757,717
	88	218	26,295,954	593,123	77,206,210	471,324	104,566,611
Kentucky	94	396	29,321,466	242,435	0	804,532	30,368,433
	93	415	30,834,652	167,748	0	1,012,856	32,015,256
	92	422	34,275,375	200,935	29,039,810	1,141,851	64,657,971
	88	335	46,181,846	416,123	30,000,250	5,751,089	82,349,308
Louisiana	94	303	60,216,454	21,418,818	34,418,965	3,962,552	120,016,789
	93	292	54,264,212	177,968,358	35,701,844	3,730,591	271,665,005
	92	299	60,550,213	148,761,005	43,453,270	1,749,509	254,513,997
	88	283	65,301,397	128,119,143	239,821,209	1,780,651	435,022,400
Maine	94	92	6,381,156	449,473	0	641,787	7,472,416
	93	95	7,325,329	543,900	0	1,376,088	9,245,317
	92	98	10,063,928	470,882	5	1,452,058	11,986,873
	88	97	14,806,286	271,995	0	938,860	16,017,141
Maryland	94	185	9,501,112	398,119	500	2,367,439	12,267,170
	93	180	9,339,847	274,976	0	2,208,331	11,823,154
	92	200	9,600,549	279,398	0	1,582,816	11,462,763
	88	185	17,212,475	527,847	2	1,846,276	19,586,600
Massachusetts	94	499	8,553,454	7,025	0	18,960	8,579,439
	93	538	10,030,592	25,549	0	51,919	10,108,060
	92	591	13,321,016	15,712	0	95,302	13,432,030
	88	634	26,060,100	44,550	0	904,381	27,009,031
Michigan	94	903	61,575,318	796,505	6,938,853	9,715,796	79,026,472
	93	929	61,045,186	475,877	4,281,194	8,818,501	74,620,758
	92	945	59,726,833	437,145	4,822,772	9,953,676	74,940,426
	88	884	87,148,476	978,289	5,012,024	5,653,074	98,791,863

Table 3-11, Cont.

State	Year	Transfers to Recycling[14] Pounds	Transfers to Energy Recovery[14] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[15] Pounds	Total Transfers[16] Pounds
Hawaii	94	45,146	6,220	4,820	50,000	17,371	5,000	128,557
	93	39,148	0	790	5,000	14,982	0	59,920
	92	26,749	0	15	30,000	163,500	0	220,264
	88	NA	NA	0	3,250	13,682	0	NA
Idaho	94	423,532	56,534	103,761	214,827	12,735	0	811,389
	93	318,850	151,454	45,275	311,931	4,222	0	831,732
	92	345,717	173,948	69,895	87,298	20,519	0	697,377
	88	NA	NA	16,069	352,627	65,184	750	NA
Illinois	94	90,341,416	29,933,462	13,699,946	23,036,311	16,063,963	13,170	173,088,268
	93	79,595,067	33,289,443	15,015,489	24,949,516	15,984,551	22,844	168,856,910
	92	106,900,082	29,478,599	13,084,963	34,776,956	14,068,328	777,646	199,086,574
	88	NA	NA	24,023,870	29,897,200	26,349,825	3,586,065	NA
Indiana	94	194,506,886	13,166,847	28,030,463	1,852,448	15,827,056	254	253,383,954
	93	158,587,595	15,329,051	29,181,215	948,539	14,102,092	750	218,149,242
	92	805,012,013	16,936,710	36,643,766	1,813,206	13,553,956	925,056	874,884,707
	88	NA	NA	19,505,473	6,105,169	24,177,842	932,098	NA
Iowa	94	41,594,654	5,180,063	1,332,756	6,958,444	2,765,831	7,817	57,839,565
	93	23,242,589	4,460,117	1,742,186	6,369,608	1,248,316	750	37,063,566
	92	17,531,205	3,146,253	1,271,794	6,238,178	1,813,915	68,865	30,070,210
	88	NA	NA	1,056,010	5,737,942	4,430,321	201,088	NA
Kansas	94	45,265,275	2,448,075	1,297,557	1,938,708	5,984,124	0	56,933,739
	93	38,712,575	1,970,629	1,328,948	2,233,532	9,245,334	632	53,491,650
	92	36,731,793	2,287,730	1,271,238	3,114,967	9,137,763	62,957	52,606,448
	88	NA	NA	1,870,215	2,327,174	1,720,063	171,596	NA
Kentucky	94	53,964,183	6,815,348	5,635,355	1,020,357	2,895,482	46,960	70,377,685
	93	48,464,041	7,612,023	7,695,618	1,205,077	2,880,194	510	67,857,463
	92	45,624,121	5,829,696	8,685,842	1,487,767	3,032,408	671,808	65,331,642
	88	NA	NA	14,228,847	2,103,538	16,750,624	1,462,073	NA
Louisiana	94	50,759,307	6,729,653	4,827,535	336,794	2,796,815	0	65,450,104
	93	43,706,732	6,338,669	5,196,421	136,994	2,438,202	0	57,817,018
	92	31,213,533	6,889,970	4,615,762	60,537	3,427,292	250	46,207,344
	88	NA	NA	3,249,099	3,533,503	9,994,462	184,152	NA
Maine	94	2,802,353	470,705	231,128	221,365	808,320	0	4,533,871
	93	3,030,202	578,605	230,109	169,651	200,455	0	4,209,022
	92	2,536,206	410,715	211,932	168,893	873,971	4,320	4,206,037
	88	NA	NA	292,808	524,964	705,438	30,883	NA
Maryland	94	8,656,609	1,072,056	1,560,854	2,742,195	914,763	206,000	15,152,477
	93	22,960,220	2,214,534	1,635,396	3,429,130	323,450	0	30,562,730
	92	9,763,841	982,303	1,668,389	3,466,755	374,311	1,830	16,257,429
	88	NA	NA	2,991,124	3,407,425	2,019,710	130,866	NA
Massachusetts	94	26,251,690	6,208,403	5,230,669	3,743,631	1,374,026	2,710	42,811,129
	93	19,179,923	6,243,163	3,895,570	4,220,878	1,241,354	22,612	34,803,500
	92	19,641,723	7,013,560	5,010,355	4,085,384	1,742,847	177,624	37,671,493
	88	NA	NA	12,097,543	8,037,929	5,903,014	941,039	NA
Michigan	94	143,392,284	78,147,044	15,533,571	9,281,838	27,030,022	425,984	273,810,743
	93	168,418,082	69,335,744	11,578,937	7,381,287	27,207,289	26,328	283,947,667
	92	116,329,209	65,644,311	12,351,011	9,533,439	18,179,510	56,118	222,093,598
	88	NA	NA	24,880,265	10,653,341	45,453,929	6,293,497	NA

Table 3-11. TRI Releases and Transfers by State, 1988, 1992-1994 (Alphabetically Ordered),⑬ Continued.

State	Year	Facilities Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Minnesota	94	486	18,590,703	155,237	0	952,979	19,698,919
	93	502	20,255,983	47,198	48	1,978,745	22,281,974
	92	525	27,328,139	97,923	0	1,303,428	28,729,490
	88	420	51,680,793	360,857	0	2,730,168	54,771,818
Mississippi	94	296	50,221,565	904,931	57,032,511	4,799,189	112,958,196
	93	289	38,981,658	1,109,800	56,052,146	4,569,923	100,713,527
	92	281	39,597,336	892,493	52,002,744	4,720,972	97,213,545
	88	249	45,220,153	1,846,391	40,506,563	6,783,513	94,356,620
Missouri	94	547	27,928,204	973,320	0	16,350,899	45,252,423
	93	566	29,581,991	998,110	0	17,912,722	48,492,823
	92	572	33,749,013	908,547	250	17,249,510	51,907,320
	88	530	46,426,443	1,554,612	500	39,458,981	87,440,536
Montana	94	21	2,865,577	77,797	0	43,485,089	46,428,463
	93	22	2,040,660	12,747	0	42,606,671	44,660,078
	92	21	2,363,961	20,344	0	40,946,475	43,330,780
	88	25	2,779,129	33,264	0	32,906,596	35,718,989
Nebraska	94	148	7,719,925	107,159	0	321,061	8,148,145
	93	155	9,294,776	112,584	0	262,109	9,669,469
	92	163	10,519,753	277,645	0	86,217	10,883,615
	88	141	13,684,215	165,660	0	39,484	13,889,359
Nevada	94	39	708,096	0	0	2,301,251	3,009,347
	93	39	676,225	0	0	7,105,113	7,781,338
	92	44	743,109	250	0	2,678,896	3,422,255
	88	34	604,909	250	0	1,711,221	2,316,380
New Hampshire	94	100	2,316,049	34,482	5	11,243	2,361,779
	93	110	3,141,075	55,639	0	8,536	3,205,250
	92	119	5,203,812	57,409	0	8,079	5,269,300
	88	146	11,869,436	36,122	0	381,615	12,287,173
New Jersey	94	636	12,366,619	281,183	5	178,800	12,826,607
	93	667	13,468,210	724,619	0	643,325	14,836,154
	92	724	15,424,878	333,380	750	580,953	16,339,961
	88	844	32,837,471	980,325	2,950	2,855,925	36,676,671
New Mexico	94	43	1,194,155	2,913	0	15,943,005	17,140,073
	93	41	971,752	5,614	0	21,979,980	22,957,346
	92	43	1,127,790	6	0	18,395,669	19,523,465
	88	32	1,421,730	255	0	28,829,632	30,251,617
New York	94	720	30,960,032	691,682	760	1,734,597	33,387,071
	93	796	37,357,894	993,668	5	1,124,817	39,476,384
	92	854	47,899,220	951,991	0	1,572,364	50,423,575
	88	908	91,217,143	1,385,294	251	3,005,889	95,608,577
North Carolina	94	841	61,735,440	636,677	0	17,279,982	79,652,099
	93	885	61,773,330	371,889	0	15,742,589	77,887,808
	92	899	78,350,775	465,641	0	20,614,832	99,431,248
	88	838	109,172,020	453,182	0	15,522,907	125,148,109
North Dakota	94	32	925,120	23	0	515	925,658
	93	32	905,835	514	0	532	906,881
	92	36	1,046,866	271	0	30,759	1,077,896
	88	29	1,097,294	93	0	33,262	1,130,649

Table 3-11, Cont.

State	Year	Transfers to Recycling[14] Pounds	Transfers to Energy Recovery[14] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[15] Pounds	Total Transfers[16] Pounds
Minnesota	94	16,996,430	2,628,385	1,964,339	5,983,343	1,119,916	0	28,692,413
	93	15,130,573	4,779,276	1,853,146	4,029,773	600,873	0	26,393,641
	92	17,151,988	4,480,765	2,311,249	4,004,474	664,362	22,495	28,635,333
	88	NA	NA	3,719,549	4,330,371	1,605,719	11,611	NA
Mississippi	94	30,461,713	3,499,239	1,977,951	674,978	1,416,905	5,772	38,036,558
	93	24,970,483	3,742,764	770,780	588,075	1,163,188	4,200	31,239,490
	92	31,051,595	3,232,805	1,349,449	541,616	1,251,182	555	37,427,202
	88	NA	NA	3,538,654	1,066,361	3,554,970	447,895	NA
Missouri	94	61,260,318	16,716,104	15,069,398	1,736,662	5,138,465	52,936	99,973,883
	93	45,168,453	7,609,137	17,233,762	2,564,151	3,797,347	4,905	76,377,755
	92	183,396,073	8,093,673	6,752,714	2,718,311	2,670,603	54,977	203,686,351
	88	NA	NA	5,529,427	5,029,067	5,488,635	2,034,835	NA
Montana	94	2,406,947	43,953	7,871	633	111,198	0	2,570,602
	93	1,941,469	73,105	10,595	2,522	58,019	0	2,085,710
	92	2,480,412	117,029	10,962	1,298	152,430	0	2,762,131
	88	NA	NA	4,456	1,312	42,914	0	NA
Nebraska	94	44,837,589	679,798	233,642	269,060	5,723,874	0	51,743,963
	93	23,340,834	756,829	170,101	225,153	3,827,754	260	28,320,931
	92	22,960,400	1,079,925	173,550	387,281	3,880,779	242,726	28,724,661
	88	NA	NA	434,449	268,602	3,427,994	25,850	NA
Nevada	94	378,351	5,950	7,899	9,049	67,203	0	468,452
	93	414,092	4,579	17,275	7,029	78,090	0	521,065
	92	419,922	12,816	24,033	9,734	89,085	0	555,590
	88	NA	NA	387,825	13,755	63,875	0	NA
New Hampshire	94	9,636,464	323,433	390,197	145,259	140,072	12,168	10,647,593
	93	7,675,152	279,391	400,933	202,054	454,824	120,322	9,132,676
	92	6,699,320	394,580	509,474	257,916	354,323	1,000	8,216,613
	88	NA	NA	1,448,099	346,762	1,667,347	479,009	NA
New Jersey	94	58,326,088	28,312,534	11,141,248	25,275,231	1,848,981	250	124,904,332
	93	55,414,637	24,768,922	8,806,777	28,322,383	2,294,787	19,028	119,626,534
	92	42,612,975	24,263,637	10,140,673	33,254,329	2,347,307	195,187	112,814,108
	88	NA	NA	26,442,952	45,273,797	35,542,318	2,604,680	NA
New Mexico	94	195,476	147,266	89,484	319,249	98,520	11,000	860,995
	93	410,078	159,460	77,083	239,926	34,619	0	921,166
	92	297,832	157,425	67,985	132,118	11,984	0	667,344
	88	NA	NA	67,790	25,606	149,017	0	NA
New York	94	82,181,492	8,244,490	6,591,965	5,319,280	8,027,076	500	110,364,803
	93	79,920,576	6,265,593	6,264,165	5,230,649	5,615,214	18,673	103,314,870
	92	57,848,381	8,637,399	7,360,207	6,286,714	5,088,943	254,438	85,476,082
	88	NA	NA	17,326,159	12,907,383	11,986,128	571,843	NA
North Carolina	94	95,988,523	7,666,326	11,745,340	1,634,651	2,616,183	6,841	119,657,864
	93	93,563,539	9,463,795	3,736,218	1,564,154	4,758,714	263	113,086,683
	92	110,392,335	9,476,979	4,693,302	1,674,975	4,536,743	744,742	131,519,076
	88	NA	NA	7,670,608	4,060,363	10,401,552	426,740	NA
North Dakota	94	404,050	10,140	93,975	198,863	11,281	0	718,309
	93	219,148	44,377	61,618	166,136	3,753	0	495,032
	92	114,470	60,934	48,296	191,497	40,358	0	455,555
	88	NA	NA	79,047	25,503	65,740	0	NA

Table 3-11. TRI Releases and Transfers by State, 1988, 1992-1994 (Alphabetically Ordered),[13] Continued.

State	Year	Facilities Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Ohio	94	1,629	63,407,946	657,323	12,305,911	22,184,994	98,556,174
	93	1,642	68,638,403	583,993	12,178,789	20,769,977	102,171,162
	92	1,676	76,931,756	816,720	8,819,515	23,142,540	109,710,531
	88	1,504	118,546,816	1,235,032	16,058,548	30,433,911	166,274,307
Oklahoma	94	261	13,447,458	130,053	1,039,031	401,105	15,017,647
	93	248	12,502,119	295,627	1,086,343	3,036,508	16,920,597
	92	252	16,422,426	370,458	1,752,102	278,052	18,823,038
	88	205	28,642,048	203,968	4,029,574	1,209,164	34,084,754
Oregon	94	246	14,746,354	252,382	0	461,159	15,459,895
	93	249	13,840,619	286,111	0	1,503,337	15,630,067
	92	254	13,725,510	193,714	0	2,450,189	16,369,413
	88	210	16,557,580	183,428	1	858,704	17,599,713
Pennsylvania	94	1,178	45,376,354	380,497	0	1,832,214	47,589,065
	93	1,202	45,610,136	427,234	750	1,165,111	47,203,231
	92	1,258	55,571,658	604,250	250	4,972,171	61,148,329
	88	1,109	81,426,219	1,671,835	750	16,746,611	99,845,415
Puerto Rico	94	157	8,960,021	2,130	4	21	8,962,176
	93	166	10,305,399	2,115	0	5,407	10,312,921
	92	169	11,786,271	17,211	250	32,758	11,836,490
	88	177	12,204,353	60,349	0	102,825	12,367,527
Rhode Island	94	139	2,878,312	808	0	70	2,879,190
	93	151	3,304,246	21,070	0	0	3,325,316
	92	158	3,317,352	35,303	0	12,380	3,365,035
	88	183	6,248,239	58,245	0	44,837	6,351,321
South Carolina	94	463	43,487,884	587,237	0	710,676	44,785,797
	93	463	46,309,175	554,069	0	570,126	47,433,370
	92	470	51,591,820	480,956	0	1,559,478	53,632,254
	88	372	60,076,357	661,655	0	1,108,524	61,846,536
South Dakota	94	63	1,770,192	3,205	0	180,099	1,953,496
	93	65	1,697,813	18	0	172,474	1,870,305
	92	63	2,813,485	5	0	5	2,813,495
	88	50	2,311,821	1,500	0	251	2,313,572
Tennessee	94	643	85,332,285	573,099	55,465,257	5,326,978	146,697,619
	93	660	84,128,848	369,711	49,652,761	6,222,402	140,373,722
	92	643	87,388,977	445,597	47,688,970	3,546,488	139,070,032
	88	544	100,299,476	1,195,266	44,651,370	13,501,353	159,647,465
Texas	94	1,150	115,666,296	2,077,161	82,131,900	13,185,719	213,061,076
	93	1,161	124,889,206	559,656	75,343,238	15,057,846	215,849,946
	92	1,187	140,696,217	12,694,186	80,058,471	17,126,718	250,575,592
	88	1,106	190,233,034	1,617,294	85,993,041	33,141,349	310,984,718
Utah	94	150	61,497,321	7,184	0	9,469,953	70,974,458
	93	143	79,659,656	6,804	0	11,474,337	91,140,797
	92	132	84,487,982	4,067	0	9,894,888	94,386,937
	88	120	120,275,480	129,605	0	13,703,266	134,108,351
Vermont	94	32	609,938	250	0	260	610,448
	93	40	618,232	250	0	260	618,742
	92	47	719,527	2,363	0	7,748	729,638
	88	55	1,485,266	87,958	0	24,341	1,597,565

Table 3-11, Cont.

State	Year	Transfers to Recycling[14] Pounds	Transfers to Energy Recovery[14] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[15] Pounds	Total Transfers[16] Pounds
Ohio	94	217,627,558	37,109,116	20,406,544	7,070,864	29,650,338	34,731	311,899,151
	93	190,606,668	28,169,470	28,066,116	9,687,259	25,946,724	41,700	282,517,937
	92	175,606,385	34,398,305	27,097,634	11,941,168	21,688,511	1,633,425	272,365,428
	88	NA	NA	36,372,829	14,941,721	52,853,616	5,579,128	NA
Oklahoma	94	22,144,932	2,141,268	964,405	128,999	3,909,483	0	29,289,087
	93	21,033,942	2,551,210	970,299	116,756	4,937,118	1,500	29,610,825
	92	13,522,930	1,158,988	1,348,882	102,419	3,814,022	6,575	19,953,816
	88	NA	NA	2,742,546	217,312	5,099,713	260,835	NA
Oregon	94	21,900,125	622,970	587,897	8,990,272	1,044,337	0	33,145,601
	93	19,793,491	507,694	643,361	4,212,596	923,018	0	26,080,160
	92	15,933,714	546,850	780,841	3,692,202	2,915,172	0	23,868,779
	88	NA	NA	1,216,323	6,697,674	3,729,924	12,879	NA
Pennsylvania	94	141,403,265	18,253,584	17,049,681	7,732,961	52,622,788	2,266,855	239,329,134
	93	144,227,763	19,514,650	16,997,698	7,914,137	60,848,056	1,016,364	250,518,668
	92	119,088,943	17,404,022	18,487,590	11,278,079	18,785,465	64,848	185,108,947
	88	NA	NA	35,412,500	10,891,304	38,895,129	619,103	NA
Puerto Rico	94	10,166,282	9,577,095	5,403,816	2,714,290	309,957	0	28,171,440
	93	14,570,958	5,528,623	5,333,524	2,309,552	347,466	250	28,090,373
	92	12,161,802	7,330,854	4,508,287	2,606,119	425,285	45,188	27,077,535
	88	NA	NA	4,317,036	5,093,060	159,616	26,200	NA
Rhode Island	94	15,414,355	490,836	491,977	1,469,073	3,747,726	0	21,613,967
	93	11,729,618	434,830	518,803	1,716,245	2,631,298	5	17,030,799
	92	10,659,501	384,987	554,675	246,375	2,127,856	11,628	13,985,022
	88	NA	NA	1,390,084	1,401,923	1,426,430	18,608	NA
South Carolina	94	85,838,006	9,988,420	6,810,715	2,953,500	4,696,615	0	110,287,256
	93	112,313,971	8,978,876	7,252,736	2,000,914	2,835,648	0	133,382,145
	92	69,579,558	7,569,639	6,514,122	2,436,252	3,437,675	421,713	89,958,959
	88	NA	NA	4,845,463	2,391,914	5,304,411	5,973,334	NA
South Dakota	94	637,674	99,166	37,362	251,356	73,118	0	1,098,676
	93	347,785	213,793	46,057	123,526	46,269	0	777,430
	92	299,902	271,863	96,307	50,317	43,716	44,644	806,749
	88	NA	NA	193,764	147,289	81,170	250	NA
Tennessee	94	54,228,823	8,059,979	2,340,901	4,369,874	17,950,265	750	86,950,592
	93	42,292,664	8,067,519	2,784,346	4,886,158	8,622,671	434	66,653,792
	92	48,460,375	10,614,062	2,752,589	4,188,591	16,213,427	49,981	82,279,025
	88	NA	NA	6,234,730	8,458,859	11,345,513	204,066	NA
Texas	94	128,539,686	74,824,591	26,712,946	18,157,289	16,130,998	132,339	264,497,849
	93	112,800,780	82,102,557	22,480,008	16,291,214	16,110,925	28,458	249,813,942
	92	113,369,088	80,626,217	26,711,323	23,482,224	14,217,267	1,038,735	259,444,854
	88	NA	NA	44,691,493	38,202,117	18,928,681	1,022,263	NA
Utah	94	6,385,468	129,217	853,796	275,970	1,504,728	250	9,149,429
	93	4,681,733	190,102	677,393	369,663	6,929,851	0	12,848,742
	92	5,746,012	206,640	356,235	449,136	3,991,859	0	10,749,882
	88	NA	NA	1,407,181	737,046	529,429	19,437	NA
Vermont	94	1,240,337	120,690	274,631	4,461	21,234	0	1,661,353
	93	3,978,943	177,002	303,264	16,713	22,787	0	4,498,709
	92	4,317,515	530,150	139,418	50,012	34,738	0	5,071,833
	88	NA	NA	575,620	69,411	140,511	5,227	NA

Table 3-11. TRI Releases and Transfers by State, 1988, 1992-1994 (Alphabetically Ordered),⑬ Continued.

State	Year	Facilities Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Virgin Islands	94	3	891,291	10,766	0	58,503	960,560
	93	3	1,550,195	4,076	0	25,233	1,579,504
	92	3	1,139,285	4,632	0	364	1,144,281
	88	1	1,705,156	2,500	0	140,342	1,847,998
Virginia	94	429	44,836,665	363,603	0	1,042,783	46,243,051
	93	438	45,154,925	692,944	0	2,265,347	48,113,216
	92	443	47,882,088	492,052	0	2,431,738	50,805,878
	88	420	107,460,419	1,621,313	1,373	6,237,340	115,320,445
Washington	94	287	21,053,986	991,714	0	94,219	22,139,919
	93	299	18,568,109	607,930	0	33,547	19,209,586
	92	313	20,599,548	784,227	0	48,068	21,431,843
	88	314	25,055,858	827,983	0	249,136	26,132,977
West Virginia	94	142	18,645,979	329,913	301	347,388	19,323,581
	93	146	18,975,382	375,213	11	304,625	19,655,231
	92	143	19,443,511	290,048	0	232,742	19,966,301
	88	115	30,715,272	1,602,961	0	834,007	33,152,240
Wisconsin	94	828	28,518,603	211,344	1	1,542,466	30,272,414
	93	856	29,154,851	179,385	0	1,662,744	30,996,980
	92	858	33,291,188	356,892	300	1,384,856	35,033,236
	88	766	43,947,203	281,881	250	6,547,699	50,777,033
Wyoming	94	25	854,090	1,086	17,821,524	6,424	18,683,124
	93	25	1,228,080	98	10,887,276	73,809	12,189,263
	92	24	1,771,341	106	10,333,601	5,180	12,110,228
	88	24	2,281,844	8,350	25,113,877	14,817,067	42,221,138
Total	94	21,336	1,340,980,491	47,011,773	306,651,731	282,267,922	1,976,911,917
	93	21,938	1,385,442,978	203,003,168	294,846,947	274,062,285	2,157,355,378
	92	22,593	1,560,000,713	195,589,595	366,495,726	327,557,956	2,449,643,990
	88	21,046	2,252,904,433	176,726,741	625,967,221	480,451,877	3,536,050,272

Table 3-11, Cont.

State	Year	Transfers to Recycling[14] Pounds	Transfers to Energy Recovery[14] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[15] Pounds	Total Transfers[16] Pounds
Virgin Islands	94	42,563	47,629	414,075	0	77	0	504,344
	93	682,955	125	7,261	0	1	0	690,342
	92	703	0	176	0	57,180	0	58,059
	88	NA	NA	0	0	0	0	NA
Virginia	94	28,623,045	8,801,974	1,618,798	12,633,199	1,671,524	250	53,348,790
	93	26,260,669	6,842,929	2,476,022	11,636,937	1,640,360	0	48,856,917
	92	23,572,152	8,057,722	2,001,505	15,436,427	1,237,236	54	50,305,096
	88	NA	NA	5,444,295	12,607,310	2,634,796	69,161	NA
Washington	94	11,434,303	812,179	415,089	420,770	722,255	120	13,804,716
	93	11,037,175	604,995	764,412	357,075	949,548	0	13,713,205
	92	10,852,648	784,634	590,449	308,544	1,005,886	16,173	13,558,334
	88	NA	NA	3,766,608	332,182	2,396,209	214,952	NA
West Virginia	94	45,293,917	10,707,872	3,872,589	1,464,975	2,817,919	0	64,157,272
	93	31,507,015	15,081,097	5,782,540	1,094,929	2,445,975	250	55,911,806
	92	35,591,158	9,791,317	2,181,112	1,308,787	2,314,413	21,812	51,208,599
	88	NA	NA	10,859,013	2,604,437	8,389,408	1,000	NA
Wisconsin	94	58,215,119	17,070,406	12,159,730	1,780,644	10,359,169	10	99,585,078
	93	51,634,407	20,114,833	9,996,343	2,380,927	9,610,092	93,938	93,830,540
	92	45,808,802	6,446,648	10,397,445	3,643,444	10,008,589	494,897	76,799,825
	88	NA	NA	9,181,729	6,944,047	12,264,259	569,797	NA
Wyoming	94	64,368	2,123	4,090	4,518	5,285	0	80,384
	93	65,584	4,029	18,013	283	35,996	0	123,905
	92	70,017	138	5,162	502	66,981	0	142,800
	88	NA	NA	127,102	250	1,481	0	NA
Total	94	2,233,603,858	462,709,225	290,143,755	180,440,724	280,466,676	3,527,303	3,450,891,541
	93	2,057,075,702	446,763,037	254,474,939	186,346,945	266,530,507	1,715,096	3,212,906,226
	92	2,609,433,782	430,564,881	256,555,922	225,951,692	216,682,649	13,028,083	3,752,217,009
	88	NA	NA	396,163,102	297,347,493	437,216,182	42,332,939	NA

[13] Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

[14] NA: Transfers for recycling or energy recovery were not required to be reported for 1988.

[15] For 1992, 1993, and 1994, transfers reported with no waste management codes or invalid codes. For 1988, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988.

[16] Because transfers for recycling or energy recovery were not required to be reported in 1988, total transfers in 1988 are not comparable to total transfers reported for 1992, 1993, or 1994.

Table 3-12. Change in Total TRI Releases by Industry, 1993-1994.⑰

SIC Code	Industry	Total Releases 1993 Pounds	Total Releases 1994 Pounds	1993-1994 Change Pounds	1993-1994 Change Percent
20	Food	12,233,254	10,438,019	-1,795,235	-14.7
21	Tobacco	1,012,356	981,252	-31,104	-3.1
22	Textiles	17,597,507	15,883,998	-1,713,509	-9.7
23	Apparel	993,856	1,317,902	324,046	32.6
24	Lumber	30,866,633	32,870,820	2,004,187	6.5
25	Furniture	54,004,195	50,558,559	-3,445,636	-6.4
26	Paper	179,832,257	218,563,179	38,730,922	21.5
27	Printing	35,914,944	34,180,472	-1,734,472	-4.8
28	Chemicals	881,954,140	706,344,744	-175,609,396	-19.9
29	Petroleum	51,151,648	44,033,222	-7,118,426	-13.9
30	Plastics	112,740,002	111,730,764	-1,009,238	-0.9
31	Leather	4,446,455	3,593,727	-852,728	-19.2
32	Stone/Clay/Glass	14,339,574	12,405,053	-1,934,521	-13.5
33	Primary Metals	304,801,571	293,919,141	-10,882,430	-3.6
34	Fabr. Metals	88,846,144	86,076,229	-2,769,915	-3.1
35	Machinery	26,720,702	23,512,822	-3,207,880	-12.0
36	Electrical Equip.	35,444,429	31,277,968	-4,166,461	-11.8
37	Transportation Equip.	124,165,486	119,717,888	-4,447,598	-3.6
38	Measure./Photo.	24,158,528	16,782,946	-7,375,582	-30.5
39	Miscellaneous	15,350,621	13,836,935	-1,513,686	-9.9
	Multiple codes 20-39⑱	137,943,198	143,288,515	5,345,317	3.9
	No codes 20-39⑲	20,222,186	17,117,858	-3,104,328	-15.4
	Total	2,174,739,686	1,988,432,013	-186,307,673	-8.6

⑰ Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), or sulfuric acid.
⑱ Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g. paper (26) and chemicals (28)].
⑲ Facilities/forms that did not report an SIC code or reported only SIC codes outside the 20-to-39 range.

Table 3-13. Change in Total TRI Releases by Industry, 1988-1994.[20]

SIC Code	Industry	Total Releases 1988 Pounds	1992 Pounds	1993 Pounds	1994 Pounds	1988-1994 Change Pounds	Percent
20	Food	9,083,059	11,875,556	12,035,217	10,331,647	1,248,588	13.7
21	Tobacco	1,234,137	587,465	624,687	961,490	-272,647	-22.1
22	Textiles	34,263,690	19,085,562	17,597,507	15,883,998	-18,379,692	-53.6
23	Apparel	922,129	1,295,999	993,856	1,317,902	395,773	42.9
24	Lumber	31,071,415	30,032,938	29,801,001	31,708,108	636,693	2.0
25	Furniture	61,375,663	53,184,323	54,003,212	50,557,746	-10,817,917	-17.6
26	Paper	227,691,631	199,101,295	179,820,695	218,561,679	-9,129,952	-4.0
27	Printing	60,696,901	40,433,179	35,914,944	34,180,472	-26,516,429	-43.7
28	Chemicals	1,322,843,065	991,274,771	874,385,217	700,661,936	-622,181,129	-47.0
29	Petroleum	67,688,694	61,724,046	50,890,492	43,788,475	-23,900,219	-35.3
30	Plastics	146,553,210	121,075,219	111,008,765	111,567,646	-34,985,564	-23.9
31	Leather	11,927,006	7,226,034	4,446,455	3,593,727	-8,333,279	-69.9
32	Stone/Clay/Glass	27,114,265	14,253,632	14,333,491	12,402,951	-14,711,314	-54.3
33	Primary Metals	496,230,439	341,208,204	304,643,166	293,821,842	-202,408,597	-40.8
34	Fabr. Metals	131,776,782	100,590,898	88,632,622	86,070,784	-45,705,998	-34.7
35	Machinery	59,614,797	32,950,966	26,538,049	23,494,565	-36,120,232	-60.6
36	Electrical Equip.	115,881,290	47,065,785	32,888,321	28,995,280	-86,886,010	-75.0
37	Transportation Equip.	191,020,185	125,292,532	123,825,742	119,694,903	-71,325,282	-37.3
38	Measure./Photo.	49,925,650	29,051,522	22,477,951	15,749,077	-34,176,573	-68.5
39	Miscellaneous	28,563,975	16,887,490	15,248,383	13,712,208	-14,851,767	-52.0
	Multiple codes 20-39[21]	446,595,455	191,818,990	137,189,441	142,918,476	-303,676,979	-68.0
	No codes 20-39[22]	13,976,834	13,627,584	20,056,164	16,937,005	2,960,171	21.2
	Total	3,536,050,272	2,449,643,990	2,157,355,378	1,976,911,917	-1,559,138,355	-44.1

[20] Does not include delisted chemicals, chemicals added in 1990, 1991 or 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

[21] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g. paper (26) and chemicals (28)].

[22] Facilities/forms that did not report an SIC code and facilities that reported SIC codes outside the 20-to-39 range.

Table 3-14. TRI Releases and Transfers by Industry, 1988, 1992-1994.[23]

SIC Code	Industry	Year	Facilities[24] Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
20	Food	94	1,619	8,794,564	62,715	260	1,474,108	10,331,647
		93	1,640	10,138,394	76,298	265	1,820,260	12,035,217
		92	1,599	9,712,904	130,901	65	2,031,686	11,875,556
		88	1,251	5,365,123	1,532,431	12,800	2,172,705	9,083,059
21	Tobacco	94	8	951,616	9,874	0	0	961,490
		93	12	609,515	15,172	0	0	624,687
		92	12	570,678	16,782	0	5	587,465
		88	21	1,222,437	10,950	0	750	1,234,137
22	Textiles	94	345	15,750,221	118,877	4	14,896	15,883,998
		93	369	17,380,460	171,925	0	45,122	17,597,507
		92	372	18,867,989	182,624	0	34,949	19,085,562
		88	343	33,699,348	484,492	0	79,850	34,263,690
23	Apparel	94	32	1,317,874	3	0	25	1,317,902
		93	37	992,247	965	0	644	993,856
		92	43	1,294,937	1,057	0	5	1,295,999
		88	31	881,030	250	0	40,849	922,129
24	Lumber	94	701	31,674,666	23,770	0	9,672	31,708,108
		93	690	29,777,052	19,730	0	4,219	29,801,001
		92	689	29,984,274	15,037	11	33,616	30,032,938
		88	684	30,970,899	50,737	0	49,779	31,071,415
25	Furniture	94	533	50,482,601	266	0	74,879	50,557,746
		93	554	53,754,456	616	0	248,140	54,003,212
		92	568	52,793,005	317	0	391,001	53,184,323
		88	500	61,300,363	3,051	0	72,249	61,375,663
26	Paper	94	492	204,931,795	8,917,444	0	4,712,440	218,561,679
		93	522	165,927,812	9,168,952	0	4,723,931	179,820,695
		92	537	175,209,284	18,472,479	3,507	5,416,025	199,101,295
		88	597	201,214,300	16,216,623	0	10,260,708	227,691,631
27	Printing	94	277	34,178,259	843	0	1,370	34,180,472
		93	310	35,905,200	587	0	9,157	35,914,944
		92	379	40,423,719	678	0	8,782	40,433,179
		88	357	60,583,994	32,091	40,000	40,816	60,696,901
28	Chemicals	94	3,828	307,894,283	33,477,511	294,920,590	64,369,552	700,661,936
		93	3,895	339,578,590	188,871,797	278,196,871	67,737,959	874,385,217
		92	3,958	399,494,621	171,488,512	354,177,015	66,114,623	991,274,771
		88	3,823	603,137,567	148,536,628	457,813,203	113,355,667	1,322,843,065
29	Petroleum	94	396	41,958,368	465,688	710,581	653,838	43,788,475
		93	404	48,882,887	572,296	672,959	762,350	50,890,492
		92	417	54,915,329	695,247	1,014,164	5,099,306	61,724,046
		88	380	63,833,512	754,734	527,819	2,572,629	67,688,694
30	Plastics	94	1,834	111,302,207	31,639	0	233,800	111,567,646
		93	1,835	110,571,427	44,403	0	392,935	111,008,765
		92	1,863	120,513,743	76,464	5	485,007	121,075,219
		88	1,498	146,359,642	31,181	754	161,633	146,553,210
31	Leather	94	100	3,575,701	1,967	0	16,059	3,593,727
		93	118	4,432,962	4,095	0	9,398	4,446,455
		92	130	7,183,335	5,397	0	37,302	7,226,034
		88	140	11,692,517	2,552	0	231,937	11,927,006
32	Stone/Clay/Glass	94	595	10,995,080	45,200	58,000	1,304,671	12,402,951
		93	610	12,480,487	87,823	45,000	1,720,181	14,333,491
		92	624	12,772,912	41,048	85,000	1,354,672	14,253,632
		88	581	23,004,691	104,678	280,000	3,724,896	27,114,265

Table 3-14.

SIC Code	Industry	Year	Transfers to Recycling[25] Pounds	Transfers to Energy Recovery[25] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[26] Pounds	Total Transfers[27] Pounds
20	Food	94	977,533	144,835	715,937	11,612,788	529,635	5,004	13,985,732
		93	1,200,001	91,945	573,232	11,250,006	697,474	1,755	13,814,413
		92	1,421,405	75,377	411,961	10,953,003	678,020	0	13,539,766
		88	NA	NA	237,511	16,514,598	1,091,527	99,933	NA
21	Tobacco	94	0	0	5	0	0	0	5
		93	139,622	3,800	1,020	18	2,149	0	146,609
		92	810	3,159	3,161	18	2,997	0	10,145
		88	NA	NA	120,996	104,807	0	0	NA
22	Textiles	94	719,188	1,283,596	519,115	2,204,815	737,445	0	5,464,159
		93	712,872	1,194,430	485,570	2,706,180	962,165	0	6,061,217
		92	553,632	1,002,033	553,617	3,095,546	535,247	467,721	6,207,796
		88	NA	NA	1,373,980	9,771,029	1,645,099	109,478	NA
23	Apparel	94	88,230	125,515	121,699	2,636	69,673	0	407,753
		93	139,113	165,968	76,039	53,139	46,717	0	480,976
		92	139,371	176,303	60,531	71,942	40,162	0	488,309
		88	NA	NA	67,425	276,730	103,568	5,351	NA
24	Lumber	94	627,071	2,486,066	226,407	22,448	423,597	250	3,785,839
		93	833,661	2,416,522	567,677	7,807	535,331	4,300	4,365,298
		92	962,416	2,614,458	537,954	25,987	457,194	8,934	4,606,943
		88	NA	NA	2,438,178	79,544	1,932,477	395,167	NA
25	Furniture	94	4,198,144	6,351,652	1,741,262	134,130	283,715	12,613	12,721,516
		93	6,210,771	6,475,921	1,270,935	96,323	374,350	5,458	14,433,758
		92	3,951,906	6,344,886	1,618,272	140,359	3,541,286	4,405	15,601,114
		88	NA	NA	3,738,641	305,630	980,987	1,143,394	NA
26	Paper	94	1,777,705	8,856,860	8,823,288	40,478,432	2,712,673	20	62,648,978
		93	1,953,688	7,602,025	8,255,097	36,396,706	2,574,812	0	56,782,328
		92	1,466,639	6,600,383	10,247,259	45,365,034	3,403,521	53	67,082,889
		88	NA	NA	11,890,136	51,551,858	6,163,408	110,559	NA
27	Printing	94	6,227,224	3,301,701	529,195	229,844	59,490	22,740	10,370,194
		93	5,317,673	3,993,983	353,566	284,421	176,319	3,189	10,129,151
		92	5,627,969	4,821,438	801,038	294,349	156,184	48,542	11,749,520
		88	NA	NA	4,505,946	2,486,937	493,727	396,671	NA
28	Chemicals	94	259,598,654	348,557,947	170,384,809	96,756,021	33,164,210	475,389	908,937,030
		93	251,243,672	329,406,403	137,653,009	104,552,123	35,586,437	134,961	858,576,605
		92	269,113,891	321,004,699	133,598,522	131,405,664	39,027,847	1,627,441	895,778,064
		88	NA	NA	182,293,467	155,495,146	102,410,530	16,194,453	NA
29	Petroleum	94	20,329,873	1,391,435	1,253,196	3,273,157	3,475,955	0	29,723,616
		93	20,525,057	1,129,985	725,252	4,235,470	2,685,652	0	29,301,416
		92	7,704,442	2,215,476	651,333	2,788,957	2,356,926	104,957	15,822,091
		88	NA	NA	2,565,385	6,087,561	4,327,282	906,249	NA
30	Plastics	94	21,261,494	8,169,876	3,230,588	1,058,912	12,303,337	1,628	46,025,835
		93	16,648,600	9,555,615	4,370,977	838,697	10,218,779	13,642	41,646,310
		92	17,023,957	9,092,664	5,018,603	1,065,800	9,522,500	190,330	41,913,854
		88	NA	NA	9,312,755	1,375,658	11,839,206	425,215	NA
31	Leather	94	515,713	265,177	21,770	629,324	1,458,515	0	2,890,499
		93	261,464	317,902	62,133	627,750	2,014,127	0	3,283,376
		92	861,379	856,894	92,444	706,906	1,738,139	41,766	4,297,528
		88	NA	NA	1,151,152	803,773	1,143,426	4,715	NA
32	Stone/Clay/Glass	94	2,934,320	4,316,847	2,358,970	485,958	5,881,586	5	15,977,686
		93	3,505,921	6,733,606	3,034,633	512,083	8,398,334	265	22,184,842
		92	3,666,015	3,083,579	3,491,339	1,787,302	6,698,860	677,446	19,404,541
		88	NA	NA	2,651,613	721,064	16,443,337	39,823	NA

Table 3-14. TRI Releases and Transfers by Industry, 1988, 1992-1994, Continued.[23]

SIC Code	Industry	Year	Facilities[24] Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
33	Primary Metals	94	1,780	110,308,314	1,748,440	10,089,873	171,675,215	293,821,842
		93	1,837	124,777,369	1,244,262	11,949,177	166,672,358	304,643,166
		92	1,863	141,648,376	1,744,428	7,675,296	190,140,104	341,208,204
		88	1,601	220,481,697	3,974,167	7,553,854	264,220,721	496,230,439
34	Fabr. Metals	94	2,985	85,316,209	72,461	2,135	679,979	86,070,784
		93	3,052	87,964,463	61,073	943	606,143	88,632,622
		92	3,128	99,674,324	83,579	1,715	831,280	100,590,898
		88	2,904	126,690,176	774,813	166,933	4,144,860	131,776,782
35	Machinery	94	1,015	23,232,953	106,120	0	155,492	23,494,565
		93	1,060	26,260,652	204,137	750	72,510	26,538,049
		92	1,125	32,699,931	20,062	250	230,723	32,950,966
		88	1,042	59,181,596	216,814	0	216,387	59,614,797
36	Electrical Equip.	94	1,222	28,785,531	54,661	0	155,088	28,995,280
		93	1,326	32,307,649	124,126	269	456,277	32,888,321
		92	1,468	46,521,968	77,788	489	465,540	47,065,785
		88	1,658	114,870,685	385,627	37,000	587,978	115,881,290
37	Transport. Equip.	94	1,233	119,459,831	65,042	5	170,025	119,694,903
		93	1,256	122,324,722	69,861	505	1,430,654	123,825,742
		92	1,253	123,479,931	74,640	1,250	1,736,711	125,292,532
		88	1,164	188,293,705	274,096	76,185	2,376,199	191,020,185
38	Measure./Photo.	94	294	15,422,201	319,552	0	7,324	15,749,077
		93	348	21,923,588	549,106	0	5,257	22,477,951
		92	408	28,548,498	489,183	0	13,841	29,051,522
		88	375	49,148,385	436,362	250	340,653	49,925,650
39	Miscellaneous	94	353	13,703,952	1,224	0	7,032	13,712,208
		93	374	15,233,916	1,184	0	13,283	15,248,383
		92	369	16,883,750	803	250	2,687	16,887,490
		88	402	28,294,977	8,576	1	260,421	28,563,975
Multiple codes 20-39[29]		94	1,462	109,379,451	1,260,937	424,751	31,853,337	142,918,476
		93	1,532	112,715,607	1,521,727	14,728	22,937,379	137,189,441
		92	1,613	137,190,707	1,629,961	3,467,829	49,530,493	191,818,990
		88	1,431	210,503,682	2,690,631	159,457,610	73,943,532	446,595,455
No codes 20-39[30]		94	232	11,564,814	227,539	445,532	4,699,120	16,937,005
		93	157	11,503,523	193,033	3,965,480	4,394,128	20,056,164
		92	175	9,616,498	342,608	68,880	3,599,598	13,627,584
		88	263	12,174,107	205,257	812	1,596,658	13,976,834
Total		94	21,336	1,340,980,491	47,011,773	306,651,731	282,267,922	1,976,911,917
		93	21,938	1,385,442,978	203,003,168	294,846,947	274,062,285	2,157,355,378
		92	22,593	1,560,000,713	195,589,595	366,495,726	327,557,956	2,449,643,990
		88	21,046	2,252,904,433	176,726,741	625,967,221	480,451,877	3,536,050,272

Table 3-14, Cont.

SIC Code	Industry	Year	Transfers to Recycling[25] Pounds	Transfers to Energy Recovery[25] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[26] Pounds	Total Transfers[27] Pounds
33	Primary Metals	94	856,534,390	12,328,649	44,647,093	4,492,691	165,654,095	431,539	1,084,088,457
		93	837,555,790	11,972,138	42,436,177	3,298,030	141,255,211	178,402	1,036,695,748
		92	743,630,811	8,183,257	41,309,032	3,196,884	82,256,820	4,560,874	883,137,678
		88	NA	NA	52,908,931	6,675,220	165,167,921	8,932,343	NA
34	Fabr. Metals	94	270,511,472	13,496,309	13,554,609	2,014,837	16,198,984	240,424	316,016,635
		93	244,521,721	13,766,253	13,169,724	2,035,996	16,345,129	160,414	289,999,237
		92	227,695,104	12,672,737	15,392,942	2,775,595	19,864,356	1,835,762	280,236,496
		88	NA	NA	24,870,561	9,283,400	34,210,391	5,457,405	NA
35	Machinery	94	58,444,235	2,956,126	1,729,806	1,343,877	3,058,178	21,252	67,553,474
		93	52,096,849	2,920,799	2,157,331	1,489,468	3,226,821	34,750	61,926,018
		92	48,492,912	3,323,666	1,997,174	1,821,077	3,711,714	215,330	59,561,873
		88	NA	NA	8,501,628	1,675,698	10,137,833	1,175,205	NA
36	Electrical Equip.	94	346,508,718	9,349,918	9,070,374	3,075,706	7,823,763	13,832	375,842,311
		93	291,341,895	9,079,322	9,646,738	3,207,818	9,048,032	125,458	322,449,263
		92	293,169,175	9,592,701	10,077,619	3,043,236	8,979,936	1,489,311	326,351,978
		88	NA	NA	17,914,585	7,980,872	17,411,950	1,312,057	NA
37	Transportation Equip.	94	158,451,906	16,366,030	6,165,636	3,232,983	9,098,564	2,261,013	195,576,132
		93	143,073,570	17,483,074	7,012,419	3,574,311	10,826,347	1,008,267	182,977,988
		92	828,116,588	18,756,903	7,089,729	3,576,622	11,289,329	97,534	868,926,705
		88	NA	NA	24,644,357	4,192,950	19,877,717	3,632,942	NA
38	Measure./Photo.	94	13,804,104	3,058,893	4,246,948	701,114	811,088	0	22,622,147
		93	13,795,826	3,312,140	2,922,809	828,649	771,749	0	21,631,173
		92	15,824,938	3,472,416	3,707,759	922,281	830,524	21,065	24,778,983
		88	NA	NA	6,849,332	2,311,238	10,912,978	186,048	NA
39	Miscellaneous	94	18,792,735	2,742,912	846,130	519,060	1,329,177	19,107	24,249,121
		93	20,818,344	2,786,851	1,013,049	550,209	3,279,205	5	28,447,663
		92	9,224,237	1,780,507	1,214,418	351,715	3,366,429	124,820	16,062,126
		88	NA	NA	5,060,326	310,537	4,139,648	369,598	NA
Multiple codes 20-39[28]		94	187,108,297	16,270,219	17,649,821	7,757,217	14,294,503	20,287	243,100,344
		93	140,961,009	15,728,643	18,424,117	9,418,237	17,282,609	43,931	201,858,546
		92	125,417,794	14,350,148	17,533,754	11,812,336	17,562,628	1,416,044	188,092,704
		88	NA	NA	29,678,410	18,427,848	26,010,514	1,402,088	NA
No codes 20-39[29]		94	4,192,852	888,662	2,307,097	414,774	1,098,493	2,200	8,904,078
		93	4,218,583	625,712	263,435	383,504	222,758	299	5,714,291
		92	5,368,391	541,197	1,147,461	751,079	662,030	95,748	8,565,906
		88	NA	NA	3,387,787	915,395	772,656	34,245	NA
Total		94	2,233,603,858	462,709,225	290,143,755	180,440,724	280,466,676	3,527,303	3,450,891,541
		93	2,057,075,702	446,763,037	254,474,939	186,346,945	266,530,507	1,715,096	3,212,906,226
		92	2,609,433,782	430,564,881	256,555,922	225,951,692	216,682,649	13,028,083	3,752,217,009
		88	NA	NA	396,163,102	297,347,493	437,216,182	10,619,334	NA

23 Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

24 Facilities have been assigned to the "multiple" category according to all the SIC codes they reported. Forms and amounts in pounds have been assigned to single category SIC codes if only one SIC code was reported for a particular chemical form from the facility.

25 NA: Transfers for recycling or energy recovery were not required to be reported for 1988.

26 For 1992, 1993, and 1994, transfers reported with no waste management codes or invalid codes. For 1988, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988.

27 Because transfers for recycling or energy recovery were not required to be reported in 1988, total transfers in 1988 are not comparable to total transfers reported for 1992, 1993, or 1994.

28 Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

29 Facilities/forms that did not report an SIC code or reported only SIC codes outside the 20-to-39 range.

Facilities with Greatest Changes in Releases

This section examines the facilities which account for the greatest increases and decreases in air/water/land releases and in underground injection from 1993 to 1994. Facilities that reported voluntarily or reported for one year but not the other are not included in this section. The comparisons do not include any delisted chemicals, chemicals newly added for 1994, ammonia, ammonium sulfate (solution), or sulfuric acid. EPA has contacted a number of the top facilities in each category to better understand the reasons for the increases and decreases. Box 3-1 provides a general discussion of reasons that a facility's release and transfer estimates may change from one year to another.

1994 TRI Top Decreasers in Air/Water/Land Releases

Table 3-15 lists the 50 TRI facilities with the greatest reported decreases in combined releases to air, water, and land from 1993 to 1994, ranked by the magnitude of their decrease. Together, these 50 facilities accounted for reported reductions totaling 253.0 million pounds.

IMC-Agrico Co., St. James, LA: Reported releases of phosphoric acid to the Mississippi River decreased from 113.7 million pounds to 6.4 million pounds in 1994. This facility makes phosphoric acid, which is one of the primary ingredients to produce fertilizer. Gypsum, a byproduct of phosphate fertilizer production, is stored in large stacks on site. The gypsum stacks contain residual phosphoric acid, which rain can flush from the stacks if left uncovered. In December 1993, a $27 million project to cover the inactive stacks was completed at IMC-Agrico's St. James and Uncle Sam plants. The stacks were overlain with eight inches of grass-covered clay. Evaporation ponds atop the inactive stacks were fitted with synthetic liners to prevent water from entering the stack and recharging the stack water system. An under-drain network was installed to collect water from within the stacks for recycling into the production process. This project resulted in a dramatic decrease in water releases of phosphoric acid in 1994.

IMC-Agrico Co., Uncle Sam, LA: Reported releases of phosphoric acid to the Mississippi River decreased from 49.8 million pounds in 1993 to 2.8 million pounds in 1994. This was also the result of the project to cover inactive gypsum storage stacks as described above for IMC-Agrico's St. James facility. In November 1994, the Louisiana Department of Environmental Quality presented the IMC-Agrico Uncle Sam plant with the Louisiana Environmental Leadership Award commending its efforts related to the gypsum stack cover project and several other recent pollution reduction projects.

Magnesium Corp. of America, Rowley, UT: Reported stack air releases of chlorine decreased from 67 million pounds in 1993 to 50 million pounds in 1994. Similarly, hydrochloric acid stack air releases decreased from 6.1 million to 5.6 million pounds. These compounds are released during the manufacture of chlorine gas and magnesium. The facility was identified as a top increaser for 1993 based on stack releases of chlorine and hydrochloric acid. Overall, production was lower in 1994, and the plant reported better equipment performance. The problems with chlorine reduction burners, to which higher chlorine air releases were attributed in 1993, were corrected in 1994. Furthermore, the 1993 estimate of hydrochloric acid releases was based on elevated readings from an emission test, which could not be reproduced in further testing.

Reasons Facility Release and Transfer Estimates Change

Some reported increases and decreases are real—that is, they reflect changes in the amounts of TRI chemicals actually released or transferred. Other reported increases and decreases are accounting or "paper" changes that do not reflect any actual change in releases and transfers. Some examples follow.

Real Changes

Source reduction activities, such as process changes, elimination of spills and leaks, inventory control, improved maintenance, chemical substitution, and alternative methods of cleaning and degreasing can cause real reductions in TRI releases and transfers.

Installation of ***pollution control equipment*** may lead to real reductions in TRI releases/transfers. However, if the pollution control does not destroy the reported chemical, it may merely shift waste from one type of release or disposal to another.

Increased ***recycling and reuse*** of waste or sale of waste as raw materials or products will result in real decreases in TRI releases and/or transfers for treatment and disposal.

Production changes can cause real changes in the quantities of TRI chemicals released or transferred by facilities. Releases/transfers are likely to increase when production increases and decrease when production decreases, although the relationship is not necessarily linear.

One-time events unrelated to normal production processes, such as accidental releases or clean-up operations, can cause a real but anomalous increase in the reporting year in which they occur and then a decrease from that abnormally high level the following year.

"Paper" Changes

Changes in estimation or calculation techniques can cause a change in the amount reported without a corresponding change in actual releases or transfers.

Clarifications of reporting instructions or changes in the way a facility interprets those instructions may cause a change in reported amounts without an actual change in releases or transfers. For example, revised guidance concerning the *de minimis* exemption and beneficiation activities which was issued by EPA for 1991 may have resulted in lower reported releases for some facilities.

Similarly, a facility's reported releases may go down without an actual reduction in releases if the facility begins to take advantage of a ***reporting exemption or optional reporting method*** for the first time. One large source of this type of paper change is the optional reporting method for ammonium sulfate (solution), which is discussed in detail in Box 1-3.

Apparent increases or decreases can occur if a facility makes a ***reporting error*** one year and does not submit a revision for that year, but does not repeat the error the following year.

Box 3-1. Reasons Facility Release and Transfer Estimates Change.

Table 3-15. Top 50 TRI Facilities with the Largest Decrease in Total Air/Water/Land Releases, 1993-1994.

Facility Name	City	State	Net Change from 1993 to 1994		
			Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds
IMC-Agrico Co.	Saint James	LA	16,715	-107,344,265	158,251
IMC-Agrico Co.	Uncle Sam	LA	0	-47,028,220	112,596
Magnesium Corp. of America	Rowley	UT	-17,524,000	0	0
Inland Steel Co.	East Chicago	IN	-241,143	-243,344	-9,856,812
Courtaulds Fibers Inc.	Axis	AL	-9,690,005	18,250	452,500
Phelps Dodge Hidalgo Inc.	Playas	NM	-23,436	0	-5,058,884
Coastal Chem Inc.	Battle Mountain	NV	-125,594	0	-4,686,832
Zinc Corp. of America	Bartlesville	OK	-31,654	0	-2,689,387
Doe Run Co.	Boss	MO	15,871	495	-2,542,400
American Chrome & Chemicals	Corpus Christi	TX	-150	1,850	-2,100,000
Kennecott Utah Copper	Magna	UT	80,700	-200	-1,973,440
Eastman Kodak Co.	Rochester	NY	-1,571,628	-226,075	584
Arcadian Fertilizer L.P.	Geismar	LA	-72,885	-1,691,785	31,039
Tippecanoe Labs.	Shadeland	IN	-1,660,266	772	0
Champion Intl. Corp.	Courtland	AL	124,987	-1,755,669	-1,396
Clinton Labs.	Clinton	IN	-1,349,900	11,390	-121,060
USS/Kobe Steel Co.	Lorain	OH	8,690	-11,000	-1,341,270
Nashua Corp.	Omaha	NE	-1,274,500	0	0
Abex	Winchester	VA	12,172	0	-1,246,768
3M	Hartford City	IN	-1,230,244	0	0
Quantum Chemical Corp.	La Porte	TX	-1,219,820	597	-1
Purolator Products Inc.	Fayetteville	NC	-1,216,633	0	0
Hoechst Celanese Polyester	Wilmington	NC	-1,143,390	7,947	6,824
Viskase Corp.	Osceola	AR	-1,112,990	0	0
Glenbrook Nickel Co.	Riddle	OR	-7,885	137	-1,102,514
Honda of America Mfg. Inc.	Marysville	OH	-1,086,323	0	0
Magma Metals Co.	San Manuel	AZ	-42,932	0	-1,031,500
Sun Refining & Marketing Co.	Tulsa	OK	-1,060,100	-115	-13
Chevron Chemical Co.	Baytown	TX	-1,055,778	0	0
General Motors Corp.	Moraine	OH	-1,047,504	0	0
Chino Mines Co.	Hurley	NM	-63,011	0	-978,282
Chevron USA Prods. Co.	Port Arthur	TX	-976,428	-11,803	-45,422
Mobil Oil Beaumont Refinery	Beaumont	TX	-1,005,901	0	-22,589
North Star Recycling	Saint Paul	MN	0	0	-1,023,600
Avesta Sheffield East Inc.	Baltimore	MD	-2,480	0	-1,010,739
Custom Cupboards Inc.	Wichita	KS	-997,087	0	0
Bayer Corp.	Orange	TX	-984,820	-733	-70
Autoalliance Intl. Inc.	Flat Rock	MI	-969,754	7,172	0
ARCO Chemical Co.	Pasadena	TX	-937,431	0	-3,675
Georgia-Pacific Corp.	Monticello	MS	-756,000	-175,280	-8,000
Alaska Pulp Corp.	Sitka	AK	-798,255	-80,250	0
Bayer Corp.	New Martinsville	WV	-875,781	7,579	7,220
Alabama River Pulp Co. Inc.	Claiborne	AL	-941,045	83,950	-2,430
Lenzing Fibers Corp.	Lowland	TN	-850,000	-1,650	0
Ringier America Inc.	Corinth	MS	-850,560	0	0
Westvaco Corp.	North Charleston	SC	-868,608	31,091	0
Koch Refining Co. L.P.	Corpus Christi	TX	-822,973	8,822	0
3M	Hutchinson	MN	-789,705	0	0
Hercules Inc.	Magna	UT	-788,327	0	0
Carolina Eastman	Columbia	SC	-735,656	-47,656	5,121
Total			-58,543,447	-158,437,993	-36,072,949

Table 3-15.

Facility Name	City	State	1993 Total Air/ Water/Land Releases Pounds	1994 Total Air/ Water/Land Releases Pounds	1993 to 1994 Change in Total Air/Water/Land Releases Pounds
IMC-Agrico Co.	Saint James	LA	114,188,834	7,019,535	-107,169,299
IMC-Agrico Co.	Uncle Sam	LA	50,091,619	3,175,995	-46,915,624
Magnesium Corp. of America	Rowley	UT	73,300,250	55,776,250	-17,524,000
Inland Steel Co.	East Chicago	IN	10,550,048	208,749	-10,341,299
Courtaulds Fibers Inc.	Axis	AL	42,655,255	33,436,000	-9,219,255
Phelps Dodge Hidalgo Inc.	Playas	NM	14,291,065	9,208,745	-5,082,320
Coastal Chem Inc.	Battle Mountain	NV	4,812,926	500	-4,812,426
Zinc Corp. of America	Bartlesville	OK	2,722,871	1,830	-2,721,041
Doe Run Co.	Boss	MO	2,577,839	51,805	-2,526,034
American Chrome & Chemicals	Corpus Christi	TX	12,007,355	9,909,055	-2,098,300
Kennecott Utah Copper	Magna	UT	11,427,315	9,534,375	-1,892,940
Eastman Kodak Co.	Rochester	NY	9,615,959	7,818,840	-1,797,119
Arcadian Fertilizer L.P.	Geismar	LA	13,613,956	11,880,325	-1,733,631
Tippecanoe Labs.	Shadeland	IN	2,198,814	539,320	-1,659,494
Champion Intl. Corp.	Courtland	AL	2,671,613	1,039,535	-1,632,078
Clinton Labs.	Clinton	IN	1,894,580	435,010	-1,459,570
USS/Kobe Steel Co.	Lorain	OH	1,416,160	72,580	-1,343,580
Nashua Corp.	Omaha	NE	1,291,500	17,000	-1,274,500
Abex	Winchester	VA	1,341,788	107,192	-1,234,596
3M	Hartford City	IN	2,269,065	1,038,821	-1,230,244
Quantum Chemical Corp.	La Porte	TX	3,407,351	2,188,127	-1,219,224
Purolator Products Inc.	Fayetteville	NC	1,490,075	273,442	-1,216,633
Hoechst Celanese Polyester	Wilmington	NC	2,632,868	1,504,249	-1,128,619
Viskase Corp.	Osceola	AR	1,113,500	510	-1,112,990
Glenbrook Nickel Co.	Riddle	OR	1,123,708	13,446	-1,110,262
Honda of America Mfg. Inc.	Marysville	OH	3,424,402	2,338,079	-1,086,323
Magma Metals Co.	San Manuel	AZ	1,195,782	121,350	-1,074,432
Sun Refining & Marketing Co.	Tulsa	OK	2,110,945	1,050,717	-1,060,228
Chevron Chemical Co.	Baytown	TX	2,000,895	945,117	-1,055,778
General Motors Corp.	Moraine	OH	1,573,650	526,146	-1,047,504
Chino Mines Co.	Hurley	NM	7,944,258	6,902,965	-1,041,293
Chevron USA Prods. Co.	Port Arthur	TX	2,366,187	1,332,534	-1,033,653
Mobil Oil Beaumont Refinery	Beaumont	TX	3,581,699	2,553,209	-1,028,490
North Star Recycling	Saint Paul	MN	1,955,000	931,400	-1,023,600
Avesta Sheffield East Inc.	Baltimore	MD	1,015,999	2,780	-1,013,219
Custom Cupboards Inc.	Wichita	KS	1,010,938	13,851	-997,087
Bayer Corp.	Orange	TX	2,371,236	1,385,613	-985,623
Autoalliance Intl. Inc.	Flat Rock	MI	3,009,116	2,046,534	-962,582
ARCO Chemical Co.	Pasadena	TX	1,669,470	728,364	-941,106
Georgia-Pacific Corp.	Monticello	MS	2,480,560	1,541,280	-939,280
Alaska Pulp Corp.	Sitka	AK	878,505	0	-878,505
Bayer Corp.	New Martinsville	WV	1,413,435	552,453	-860,982
Alabama River Pulp Co. Inc.	Claiborne	AL	2,343,555	1,484,030	-859,525
Lenzing Fibers Corp.	Lowland	TN	22,258,010	21,406,360	-851,650
Ringier America Inc.	Corinth	MS	2,734,080	1,883,520	-850,560
Westvaco Corp.	North Charleston	SC	4,562,389	3,724,872	-837,517
Koch Refining Co. L.P.	Corpus Christi	TX	1,324,856	510,705	-814,151
3M	Hutchinson	MN	3,064,242	2,274,537	-789,705
Hercules Inc.	Magna	UT	2,035,230	1,246,903	-788,327
Carolina Eastman	Columbia	SC	2,284,791	1,506,600	-778,191
Total			465,315,544	212,261,155	-253,054,389

Inland Steel Co., East Chicago, IN: Reported releases to land of manganese compounds decreased from 7.5 million pounds to zero and of zinc compounds from 2 million pounds to zero. These metal compounds are found in waste products (slag, dust, and sludge) from the facility's blast furnaces and basic oxygen furnaces. Until recently, the waste products were released to an on-site landfill. Participation in the EPA's 33/50 Program coupled with high landfill and waste-handling costs prompted the facility to investigate ways to reduce releases. Now the slag is sold for use in the manufacture of concrete and other products. The sludge is dewatered and sent with the dust to a briquetting facility. It is blended with other materials and formed into briquettes which can then be reintroduced into the blast and basic oxygen furnaces. Hence, land releases of these and other metal compounds (chromium, lead, copper and nickel) have now been reduced to zero.

Courtaulds Fibers, Inc., Axis, AL: Reported carbon disulfide air releases decreased from 43 million to 33 million pounds. Carbon disulfide is used as a reactant in the manufacture of cellulose fiber. During processing, some carbon disulfide is released and some is converted to hydrogen sulfide. Reduced carbon disulfide releases are attributed to the following: Production was down in 1994 from 1993 levels; the amount of carbon disulfide used as a raw material was reduced; the amount of carbon disulfide converted to hydrogen sulfide increased; and more carbon disulfide vapor was recovered via condensation. The facility is in the process of installing technology that modifies the manufacturing process so that carbon disulfide releases will be further reduced in the future.

Phelps Dodge Hidalgo Inc., Playas, NM: Reported land releases of copper compounds decreased from 14 million to 9 million pounds in 1994. Copper compounds are contained in the waste stream (slag) from a copper smelter which produces anode copper for commercial sale. The facility reduced the amount of copper remaining in the smelter slag by increasing the efficiency of the furnace.

Coastal Chemical Inc., Battle Mountain, NV: Reported stack air releases of ammonium nitrate (solution) decreased from 126,000 pounds to zero and reported land releases decreased from 4.7 million pounds to zero. The facility produces inorganic chemicals including ammonia, urea, and ammonium nitrate. In its processing, the facility releases ammonium nitrate particulate which in 1993 was reported erroneously as an air release of ammonium nitrate solution. Waste ammonium nitrate (solution) from the production process is sent to evaporation ponds. This was reported as a release to land in 1993. Since 1994, the ammonium nitrate solution in the ponds has been further processed and sold as fertilizer; therefore, there are no 1994 reported land releases.

Zinc Corp. of America, Bartlesville, OK: Reported land releases of zinc compounds decreased from 2.26 million pounds to 600 pounds. Land releases of other metal compounds (lead, copper, manganese, and cadmium) were similarly reduced as 90% of the plant shut down in November 1993. These compounds are contained in slag from a smelting operation. Stock piles of slag material are being cleaned up due to reclassification as a landfill in 1993.

Doe Run Company (Buick Smelter), Boss, MO: Reported land releases of lead compounds decreased from 2.3 million pounds in 1993 to zero in 1994. Land releases of zinc compounds were reduced from 210,000 pounds in 1993 to zero in 1994. These compounds are contained in the slag material from a secondary smelting operation which used to be sent to landfill. 1994

was the first year the smelter slag from this facility was sent to another Doe Run plant where it is reused in a primary lead smelting operation. The slag has a high silica content which allows it to be used as a flux material.

American Chrome & Chemicals, Corpus Christi, TX: Reported land releases of chromium compounds decreased from 12 million to 10 million pounds. The facility extracts chrome from chromite ores; the non-extractable material containing residual chromium compounds is further processed and sent to a landfill. The reduction in the amount of chromium compounds landfilled is attributed to the plant being down for a month in 1994 for refurbishing. During the down time, the furnaces were upgraded, improving their recovery efficiency. This further reduced the amount of chromium compounds losses to landfill.

Kennecott Utah Copper, Magna, UT: Reported land releases of arsenic compounds decreased from 1.6 million pounds to 790,000 pounds; reported land releases of copper compounds decreased from 4.8 million pounds to 4.2 million pounds; reported land releases of lead compounds decreased from 1.7 million pounds to 1.3 million pounds; reported land releases of zinc compounds decreased from 2.8 million pounds to 2.6 million pounds. These compounds are found in waste (predominantly dust) from copper smelting. The decreases in land releases are attributed to variations in the ore and to stockpiling of dust in inventory while projects to modernize the facility were underway. Also, a process change in refining operations now enables the facility to recover lead, thereby reducing lead releases to landfill. The facility added a hydrometallurgical process in 1995 to recover copper, silver, and gold from the smelter dust. Further reductions in copper land releases are expected in the future due to the addition of this process.

Eastman Kodak Co., Rochester, NY: Reported air releases decreased for dichloromethane from 3.3 million to 2.5 million pounds and for methanol from 2 million to 1.5 million pounds. These chemicals are released in the manufacture of cellulose triacetate film. Decreased releases were achieved through elimination of equipment leaks to reduce fugitive releases and increased capture of solvent vapors through the use of cryogenic condensers. By the end of 1994, the facility reported exceeding an overall 99% recovery and recycling of dichloromethane. Further reductions are under investigation through additional process changes and add-on technology. These efforts have resulted in a similar reduction in methanol releases. Furthermore, a production unit of the Eastman Chemical Division accounted for 10% of Kodak's reported methanol releases in 1993. When Kodak divested in 1994, this unit became part of Eastman Chemical Company and reported as a separate facility.

Arcadian Fertilizer L.P., Geismar, LA: Reported releases of phosphoric acid to the Mississippi River decreased from 12 million to 10.5 million pounds. The source of phosphoric acid is rainfall run-off from phosphogypsum storage stacks. The decrease is attributed, in part, to revised phosphoric acid calculations which account for the amount of acid which is neutralized prior to release to surface waters. In addition, the plant's management of contaminated rainwater has resulted in lower releases. The amount of contaminated rainwater collected in ponds around the gypsum stacks typically exceeds the amount of process water needed by the plant. The collected water is segregated based on the level of phosphoric acid contamination, and the more highly contaminated water is recycled as process water. The least contaminated water is released. The plant also has a continuous program to cover the gypsum stacks which reduces the amount of contamination in the collected rainwater.

Tippecanoe Labs (Eli Lilly), Shadeland, IN: Reported air releases of dichloromethane decreased from 1.5 million to 320,000 pounds. The facility manufactures bulk pharmaceuticals, and dichloromethane is a common solvent used for chemical synthesis in pharmaceutical manufacturing. The decrease is attributed to the facility's efforts in the reduction of dichloromethane air releases, including the investment of $230 million over the last seven years in environmental control systems. This includes: installation of solvent recovery equipment (cryogenic condensers); installation of emission control equipment; recycling/reuse of dichloromethane in the facility's processes; installation of control systems at the point of use (nitrogen purge units); installation of "state-of-the-art" solvent storage facilities; detection and repair of leaks to reduce fugitive releases. The facility is seeking to reduce the use of dichloromethane in the making of future products by evaluating alternative non-toxic solvents in its research and development efforts. The plant site received the 1995 Indiana Governor's Pollution Prevention Award for pharmaceutical product development efforts that led to the elimination of dichloromethane from a new health care product.

Champion International Corporation, Courtland, AL: Reported water releases of methanol decreased from 1.8 million to 43,000 pounds. The facility is a pulp and paper mill, the largest manufacturer of "fine white" grade paper in the world. The decrease does not reflect an actual reduction in water releases. Methanol release data reported in 1993 was based on limited monitoring data. In 1994, however, the facility performed more extensive quarterly testing for use in preparing release estimates. This provided more definitive data and resulted in a lower release estimate for 1994.

1994 TRI Top Increasers in Air/Water/Land Releases

Table 3-16 lists the 50 TRI facilities with the greatest reported increases in total releases to air, water and land from 1993 to 1994, ranked by the magnitude of their increase. Together, these 50 facilities accounted for reported increases totaling 108.3 million pounds.

IMC-Agrico, Mulberry, FL: Reported land releases of phosphoric acid increased from 6.8 million pounds in 1993 to 25.1 million pounds in 1994. In the production of phosphate fertilizer, the facility produces gypsum as a byproduct. The gypsum is collected on site in large stacks. The land releases are estimates of phosphoric acid that has seeped into the groundwater below the stacks. In 1993, this facility was a top decreaser of land releases of phosphoric acid. In 1994, however, a sink hole developed under the center of a gypsum stack. This caused a large increase in land releases as the gypsum lost in the sinkhole contained dilute phosphoric acid solution that would have normally been recovered and recycled.

ASARCO Inc., Hayden, AZ: Reported land releases increased for zinc compounds from zero to 7.6 million pounds, for copper compounds from zero to 6.4 million pounds, and for lead compounds from zero to 1.9 million pounds. These compounds are contained in the slag from a primary copper smelter. In 1993, the slag was stockpiled on site and recycled. In 1994, reduced quantities of the smelter slag were recycled due to economics; the majority of the slag was released to landfill.

International Paper, Redwood, MS: Reported methanol air releases increased from 1.0 million to 14.0 million pounds. Methanol is a byproduct of the paper mill's wood pulping and chemical recovery processes. The increase in releases is attributed to a change in the basis for calculating

methanol releases and does not reflect a real increase. Methanol emission factors published by the National Council of the Paper Industry for Air and Stream Improvement (NCASI) were revised in 1994. The new factors are based on a study of pulp and paper facilities that showed higher emission levels than predicted by previous emission factors and included additional emission sources that had not previously been counted in methanol release calculations.

Quantum Chemical Co., Clinton, IA: Reported air releases increased for ethylene from 1.3 million to 3.0 million pounds and for propylene from 55,000 to 765,000 pounds. The increases are attributed to a change in the basis for calculating releases and do not reflect real increases. Ethylene and propylene are compressed in large compressors in the facility's chemical manufacturing process. The lubricating oil in the compressors becomes contaminated and is vented to the atmosphere causing ethylene and propylene air releases. Releases reported for 1994 were based on release data supplied by a compressor manufacturer. This data resulted in a higher estimate than the approach used to estimate air releases for 1987 through 1993. The facility has now initiated a program to base release estimates on measurements at the compressors. Emission reduction measures are currently being put in place which should reduce actual releases by 1996.

Champion International Corp., Canton, NC: Reported air releases increased for methanol from 1.4 million to 3.1 million pounds and for hydrochloric acid from 230,000 to 810,000 pounds. The increase in methanol releases was not a real increase, but resulted from a change in the basis for estimating releases. This pulp and paper manufacturing facility used the old NCASI emission factors to estimate methanol releases in 1993. In 1994, the methanol release estimates were based on actual stack testing at the facility. The testing showed that the majority of the methanol releases were from the black liquor oxidation process and had been substantially underestimated by the old NCASI factors. The increase in hydrochloric acid releases resulted from changes in fuel combustion. Hydrochloric acid is formed from chlorides contained in coal burned in a coal-fired boiler. The chlorine content of the coal, which is measured in monthly coal samples, was higher in 1994. Also, more coal was burned in 1994 than in 1993.

GM Powertrain Defiance, Defiance, OH: Reported land releases of zinc compounds increased from 1.7 million to 4.2 million pounds, and stack air releases of zinc compounds increased from 31,000 to 62,000 pounds. The facility is an iron foundry which makes automotive castings by recycling 100% scrap metal. Due to the emphasis on corrosion-resistant metals in car bodies, the zinc content of the scrap metal has increased in recent years. Zinc compounds are contained in the slag from the foundry cupolas used for casting. This slag goes to landfill. Production increased in 1994, contributing to increased slag generation.

International Paper, Mansfield, LA: Reported methanol air releases increased from 152,000 to 2.3 million pounds. The facility is a paper mill and attributes this increase to the change in methanol emission factors published by NCASI described above for International Paper's facility in Redwood, MS.

Mobil Chemical Co., Beaumont, TX: Reported air releases increased for ethylene from 535,000 pounds to 1.9 million pounds and for propylene from 420,000 pounds to 1.4 million pounds. Ethylene and propylene are released from the distillation of petroleum-based products. Increases in these releases are attributed to malfunctions in the distillation

Table 3-16. Top 50 TRI Facilities with the Largest Increase in Total Air/Water/Land Releases, 1993-1994.

Facility Name	City	State	Net Change from 1993 to 1994		
			Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds
IMC-Agrico Co.	Mulberry	FL	-5	0	18,300,000
ASARCO Inc.	Hayden	AZ	93,433	0	17,081,434
International Paper	Redwood	MS	13,052,950	-85,950	0
Quantum Chemical Co.	Clinton	IA	2,571,275	0	0
Champion Intl. Corp.	Canton	NC	2,442,916	87,163	0
GM Powertrain Defiance	Defiance	OH	281,507	-3,528	2,236,356
International Paper	Mansfield	LA	2,500,849	-91	1,882
Mobil Chemical Co.	Beaumont	TX	2,258,079	3	-13,032
Autostyle Plastics Inc.	Grand Rapids	MI	2,221,218	0	0
Louisiana-Pacific Corp.	Samoa	CA	286,449	1,821,300	0
Weyerhaeuser Co.	Longview	WA	1,868,657	221,413	0
Weyerhaeuser Co.	Springfield	OR	1,685,712	-4,764	-265
Cyprus Miami Mining Corp.	Claypool	AZ	3,500	-5	1,536,000
Stone Southwest Corp.	Snowflake	AZ	1,743,489	0	-255,205
PCS Phosphate Co. Inc.	Aurora	NC	37,200	0	1,367,650
International Paper	Pineville	LA	1,364,039	-220	1,918
Container Corp. of America	Fernandina Beach	FL	1,294,550	688	9,577
Champion Intl. Corp.	Cantonment	FL	1,184,558	97,220	0
Mead Coated Board Inc.	Cottonton	AL	1,273,691	-5,622	5,270
GMC Truck & Bus Group	Flint	MI	1,183,149	-2,239	0
Federal Paper Board Co. Inc.	Riegelwood	NC	1,179,129	-879	-4,300
Mobil Mining & Minerals Co.	Pasadena	TX	-20	1,100,000	3,200
World Color Press Inc.	Salem	IL	1,078,100	0	0
Cadillac Luxury Car Div.	Detroit	MI	1,076,003	0	0
International Paper Co.	Erie	PA	1,060,980	5,510	1,175
Container Corp. of America	Brewton	AL	1,011,575	40,415	455
Doe Run Co.	Herculaneum	MO	-1,943	-1,956	1,048,960
Roll Coater Inc.	Greenfield	IN	1,022,826	-4	0
Riverwood Intl. Inc.	West Monroe	LA	903,710	-54,250	172,425
Elkem Metals Co.	Marietta	OH	239,104	37,000	728,000
Phibro Energy USA Inc.	Houston	TX	984,445	4,465	1,918
Piper Impact Inc.	New Albany	MS	972,224	0	0
American Synthetic Rubber	Louisville	KY	962,480	0	0
SCM Chemicals	Baltimore	MD	-40,059	100,049	900,000
Inland Container Corp.	Orange	TX	580,305	-5,460	354,045
Great Southern Paper	Cedar Springs	GA	725,300	109,600	81,251
International Paper	Georgetown	SC	907,573	2,611	0
Wheeling-Pittsburgh Steel Corp	Follansbee	WV	909,069	-8,156	0
CF Ind. Inc.	Plant City	FL	0	0	900,000
Ford Motor Co.	Hazelwood	MO	899,111	0	0
ASARCO Inc.	East Helena	MT	16,963	0	879,017
Packaging Corp. of America	Tomahawk	WI	929,928	-7,238	-33,157
Reynolds Metals Co.	Sheffield	AL	883,390	0	0
Ringier America Inc.	Evans	GA	878,825	0	0
General Foam Corp.	Bridgeview	IL	865,970	0	0
Aquaglass Corp.	Adamsville	TN	860,743	0	0
Packaging Corp. of America	Counce	TN	865,940	-274	-18,000
Inland Container Corp.	New Johnsonville	TN	840,250	5	0
Cabot Corp.	Ville Platte	LA	828,853	0	0
Steelcase Inc.	Grand Rapids	MI	794,239	0	0
Total			59,582,229	3,446,806	45,286,574

Table 3-16.

Facility Name	City	State	1993 Total Air/ Water/Land Releases Pounds	1994 Total Air/ Water/Land Releases Pounds	1993 to 1994 Change in Total Air/Water/Land Releases Pounds
IMC-Agrico Co.	Mulberry	FL	6,800,005	25,100,000	18,299,995
ASARCO Inc.	Hayden	AZ	611,074	17,785,941	17,174,867
International Paper	Redwood	MS	1,234,400	14,201,400	12,967,000
Quantum Chemical Co.	Clinton	IA	1,514,175	4,085,450	2,571,275
Champion Intl. Corp.	Canton	NC	2,053,581	4,583,660	2,530,079
GM Powertrain Defiance	Defiance	OH	3,439,463	5,953,798	2,514,335
International Paper	Mansfield	LA	395,863	2,898,503	2,502,640
Mobil Chemical Co.	Beaumont	TX	1,082,352	3,327,402	2,245,050
Autostyle Plastics Inc.	Grand Rapids	MI	258,587	2,479,805	2,221,218
Louisiana-Pacific Corp.	Samoa	CA	1,934,066	4,041,815	2,107,749
Weyerhaeuser Co.	Longview	WA	1,199,170	3,289,240	2,090,070
Weyerhaeuser Co.	Springfield	OR	713,229	2,393,912	1,680,683
Cyprus Miami Mining Corp.	Claypool	AZ	6,116,305	7,655,800	1,539,495
Stone Southwest Corp.	Snowflake	AZ	894,174	2,382,458	1,488,284
PCS Phosphate Co. Inc.	Aurora	NC	8,842,010	10,246,860	1,404,850
International Paper	Pineville	LA	987,602	2,353,339	1,365,737
Container Corp. of America	Fernandina Beach	FL	1,365,957	2,670,772	1,304,815
Champion Intl. Corp.	Cantonment	FL	1,472,724	2,754,502	1,281,778
Mead Coated Board Inc.	Cottonton	AL	1,500,507	2,773,846	1,273,339
GMC Truck & Bus Group	Flint	MI	862,140	2,043,050	1,180,910
Federal Paper Board Co. Inc.	Riegelwood	NC	1,314,561	2,488,511	1,173,950
Mobil Mining & Minerals Co.	Pasadena	TX	7,621	1,110,801	1,103,180
World Color Press Inc.	Salem	IL	524,100	1,602,200	1,078,100
Cadillac Luxury Car Div.	Detroit	MI	1,376,872	2,452,875	1,076,003
International Paper Co.	Erie	PA	1,247,669	2,315,334	1,067,665
Container Corp. of America	Brewton	AL	1,392,540	2,444,985	1,052,445
Doe Run Co.	Herculaneum	MO	8,194,307	9,239,368	1,045,061
Roll Coater Inc.	Greenfield	IN	406,407	1,429,229	1,022,822
Riverwood Intl. Inc.	West Monroe	LA	727,980	1,749,865	1,021,885
Elkem Metals Co.	Marietta	OH	10,752,322	11,756,426	1,004,104
Phibro Energy USA Inc.	Houston	TX	889,345	1,880,173	990,828
Piper Impact Inc.	New Albany	MS	11,250	983,474	972,224
American Synthetic Rubber	Louisville	KY	2,000,802	2,963,282	962,480
SCM Chemicals	Baltimore	MD	1,000,840	1,960,830	959,990
Inland Container Corp.	Orange	TX	405,280	1,334,170	928,890
Great Southern Paper	Cedar Springs	GA	2,408,020	3,324,171	916,151
International Paper	Georgetown	SC	2,053,151	2,963,335	910,184
Wheeling-Pittsburgh Steel Corp	Follansbee	WV	1,385,419	2,286,332	900,913
CF Ind. Inc.	Plant City	FL	1,500,010	2,400,010	900,000
Ford Motor Co.	Hazelwood	MO	1,820,840	2,719,951	899,111
ASARCO Inc.	East Helena	MT	42,704,241	43,600,221	895,980
Packaging Corp. of America	Tomahawk	WI	581,571	1,471,104	889,533
Reynolds Metals Co.	Sheffield	AL	381,788	1,265,178	883,390
Ringier America Inc.	Evans	GA	547,291	1,426,116	878,825
General Foam Corp.	Bridgeview	IL	925	866,895	865,970
Aquaglass Corp.	Adamsville	TN	253,474	1,114,217	860,743
Packaging Corp. of America	Counce	TN	1,292,418	2,140,084	847,666
Inland Container Corp.	New Johnsonville	TN	0	840,255	840,255
Cabot Corp.	Ville Platte	LA	4,416,847	5,245,700	828,853
Steelcase Inc.	Grand Rapids	MI	1,215,053	2,009,292	794,239
Total			134,090,328	242,405,937	108,315,609

process. The facility experienced more malfunctions in 1994 than in 1993. The facility plans to eliminate releases due to abnormal operations in distillation columns by installing add-on emission control devices.

Autostyle Plastics Inc., Grand Rapids, MI: Reported toluene air releases increased from 20,000 to 2.0 million pounds. The facility manufactures plastic auto parts for the automotive industry. Toluene is contained in the solvent-based paints and primers used to coat finished products. The increase in toluene releases (as well as releases of other paint solvents such as methyl ethyl ketone, xylenes, and methyl isobutyl ketone) is attributed to increased production and coating application in 1994.

Louisiana-Pacific Corp., Samoa, CA: Reported water releases of methanol increased from 1.8 million to 3.5 million pounds, and methanol air releases increased from 132,000 to 405,000 pounds. Methanol is a byproduct in the wood pulping and chemical recovery processes. Releases increased in 1994 because the plant was down for most of 1993. The facility doubled the amount of pulp produced in 1994 relative to 1993 levels. Since 1994, a steam stripping system has been installed to reduce future methanol releases.

Weyerhaeuser Co., Longview, WA: Reported methanol air releases increased from 447,000 pounds to 2.0 million pounds. The facility is a paper mill, and methanol is a byproduct of its wood pulping and chemical recovery processes. Reported releases increased due to the change in emission factors published by NCASI (described previously for International Paper's facility in Redwood, MS) and does not reflect an actual increase in releases.

Weyerhaeuser Co., Springfield, OR: Reported methanol air releases increased from 391,000 pounds in 1993 to 1.7 million pounds in 1994. The facility is a paperboard mill, and methanol is produced as a byproduct in the wood pulping and chemical recovery processes. Reported releases for 1994 were higher because a stack testing program conducted in preparation for an air pollution permit identified additional emission sources of methanol. These sources were not previously identified or accounted for by NCASI emission factors.

Cyprus Miami Mining Corp., Claypool, AZ: Reported land releases of copper compounds increased from 5.6 million pounds to 6.8 million pounds. The copper compounds are contained in furnace slag from a copper smelter. An extensive modernization project was completed in 1992. In 1993, no significant changes in production occurred. However, in 1994 the facility realized a significant increase in throughput as a result of this modernization. Smelter throughput increased from 450,000 tons per year to 650,000 tons per year. While the unit operates more efficiently, leaving a smaller percentage of copper in the smelter slag, the total amount of slag produced is significantly greater than in previous years.

Stone Southwest Corp., Snowflake, AZ: Reported methanol air releases increased from 79,000 pounds to 1.7 million pounds. The facility is a pulp and paper mill, and methanol is released from the wood pulping and chemical recovery processes. Ten percent of the increase in releases is attributed to increased production in 1994. The remaining 90% of the increase is attributed to the change in the NCASI emission factors for paper mills (described previously for International Paper's facility in Redwood, MS) and does not reflect a real increase in releases.

PCS Phosphate Co. Inc., Aurora, NC: Reported land releases of phosphoric acid increased from 8.8 million pounds in 1993 to 10.2 million pounds in 1994. The increase was due to phosphoric acid concentration increases experienced in the process cooling water. In 1994, the facility completed a program of lining process cooling water return ditches, which should reduce the 1995 phosphoric acid releases. In addition, the facility lined a second gypsum stack in 1995, which should also reduce phosphoric acid releases. Programs to further reduce phosphoric acid releases are being studied.

1994 TRI Top Decreasers in Underground Injection

Table 3-17 lists the 50 TRI facilities with the greatest reported decreases in underground injection from 1993 to 1994, ranked by the magnitude of their decrease. Together, these 50 facilities accounted for reported reductions totaling 26.6 million pounds.

Vulcan Chemicals, Wichita, KS: Reported underground injection of hydrochloric acid decreased from nearly 10 million pounds in 1993 to 1.5 million pounds in 1994 due to the reprocessing of a hydrochloric acid waste stream to produce calcium chloride. The decrease in 1994 reflects an entire year of this reprocessing operation after only a partial year in 1993.

Cabot Corp., Tuscola, IL: Reported underground injection of hydrochloric acid decreased from 10.7 million to 8.2 million pounds. The decrease in underground injection is due to an increased market share for the sale of hydrochloric acid, a byproduct in the manufacture of fumed silica. With increased sales, less material was sent to the deepwell.

Hoechst Celanese Chemical, Pasadena, TX: Reported underground injection of ethylene glycol decreased from 5.6 million to 3.7 million pounds in 1994. This is a result of a process modification that reduced the volume of waste from ethylene glycol production that was being sent to the deepwell.

Cytec Industries Inc., Westwego, LA: Reported underground injection of methanol decreased from 7.0 million to 1.4 million pounds in 1994. Methanol exists in an acid waste stream generated from methyl methacrylate production. The waste stream goes to a regeneration plant for reprocessing into sulfuric acid. This process destroys the methanol. 1994 was the first full year of operation of Cytec's sulfuric acid regeneration plant, which yielded a significant decrease in disposal of the acid-methanol waste stream to the deepwell.

National Steel Corp., Portage, IN: Reported underground injection of hydrochloric acid decreased from 4.6 million to 2.6 million pounds in 1994. More waste pickle liquor containing hydrochloric acid was sent for off-site recycling, resulting in less acid being injected into the deepwell during 1994. The pickle liquor is used to remove scale from steel.

DuPont, Victoria, TX: Reported underground injection of nitric acid decreased from 16.1 million pounds in 1993 to 15.2 million pounds in 1994. Nitric acid is used in the production of adipic acid. Water is used to remove residual nitric acid creating a waste stream with low acid concentration. This stream goes through an acid recovery distillation column. Acid that is not recovered goes to the deepwell. The decrease in reported releases was attributed to improvements in the efficiency of the recovery process and to pollution prevention changes made in operating practices to reduce the number of purges of nitric acid waste to the sumps.

Table 3-17. Top 50 TRI Facilities with the Largest Decrease in Underground Injection, 1993-1994.

Facility Name	City	State	1993 Underground Injection Pounds	1994 Underground Injection Pounds	1993-1994 Change in Underground Injection Pounds
Vulcan Chemicals	Wichita	KS	10,934,747	2,131,658	-8,803,089
Cabot Corp.	Tuscola	IL	10,749,360	8,259,080	-2,490,280
Hoechst Celanese Chemical	Pasadena	TX	6,593,610	4,463,350	-2,130,260
Cytec Ind. Inc.	Westwego	LA	18,818,250	16,762,750	-2,055,500
National Steel Corp.	Portage	IN	4,606,300	2,587,000	-2,019,300
DuPont	Victoria	TX	18,264,769	16,712,229	-1,552,540
Hoechst Celanese	Bay City	TX	2,221,864	891,946	-1,329,918
Uniroyal Chemical Co. Inc.	Geismar	LA	1,868,520	784,820	-1,083,700
Sterling Chemicals Inc.	Texas City	TX	4,368,003	3,533,373	-834,630
UOP	Blanchard	LA	1,200,927	550,660	-650,267
ISP Techs. Inc.	Texas City	TX	2,722,200	2,126,220	-595,980
Great Lakes Chemical Corp.	El Dorado	AR	1,194,966	631,772	-563,194
Bethlehem Steel Corp.	Burns Harbor	IN	1,876,000	1,329,800	-546,200
Jetco Chemicals Inc.	Corsicana	TX	589,825	291,339	-298,486
Aristech Chemical Corp.	Haverhill	OH	1,252,482	1,011,504	-240,978
Witco Corp.	Harvey	LA	1,600,000	1,390,000	-210,000
BP Chemicals Inc.	Lima	OH	7,406,300	7,216,400	-189,900
Zeneca Specialties	Mount Pleasant	TN	652,506	465,007	-187,499
Sandoz Agro Inc.	Beaumont	TX	743,072	560,355	-182,717
ICI Americas Inc.	Bucks	AL	145,600	0	-145,600
Terra Nitrogen	Catoosa	OK	121,000	0	-121,000
Total Petroleum Inc.	Alma	MI	125,363	53,307	-72,056
Celanese Eng. Resins Inc.	Bishop	TX	1,393,250	1,322,750	-70,500
Cytec Ind. Inc.	Milton	FL	128,885	72,005	-56,880
Phillips 66 Co.	Borger	TX	51,015	20,033	-30,982
Morton Intl. Inc.	Moss Point	MS	52,146	32,511	-19,635
Witco Corp.	Marshall	TX	152,100	137,900	-14,200
Diamond Shamrock Inc.	Sunray	TX	74,403	60,346	-14,057
Zinc Corp. of America	Bartlesville	OK	13,848	2,474	-11,374
Arkansas Chemicals Inc.	El Dorado	AR	1,300,000	1,290,775	-9,225
QO Chemical Inc.	Belle Glade	FL	28,000	19,400	-8,600
Elf Atochem N.A. Inc.	Crosby	TX	656,023	650,005	-6,018
Witco Corp.	Houston	TX	18,290	15,348	-2,942
Rexene Corp.	Odessa	TX	118,928	117,076	-1,852
BASF Corp.	Holland	MI	2,350	1,000	-1,350
Sherwin-Williams Co.	Coffeyville	KS	1,424	604	-820
Hazleton Pumps Inc.	Hazleton	PA	750	0	-750
ABC Rail Corp.	Pueblo	CO	500	0	-500
Oxy Petrochemicals Inc.	Corpus Christi	TX	1,250	750	-500
Harris Semiconductor	Palm Bay	FL	269	0	-269
Cabot Corp.	Pampa	TX	250	0	-250
Reynolds Metals Co.	Kapolei	HI	250	8	-242
Quantum Chemical Co.	Tuscola	IL	200	8	-192
Arrow Tank & Eng. Co.	Cambridge	MN	48	0	-48
Bayer Corp.	Elkhart	IN	28	0	-28
Criterion Catalyst Co. L.P.	Michigan City	IN	20	0	-20
Unocal Agricultural Prods.	Kenai	AK	42	35	-7
Pimalco	Chandler	AZ	18	11	-7
Zeneca Inc.	Saint Gabriel	LA	8	1	-7
LL&E Petroleum Marketing Inc.	Saraland	AL	7	0	-7
Total			102,049,966	75,495,610	-26,554,356

Hoechst Celanese, Bay City, TX: Reported underground injection of acetaldehyde decreased from 1.2 million to 206,000 pounds due to the shutdown of the acetaldehyde production unit in February 1994.

Uniroyal Chemical Company, Inc., Geismar, LA: Reported underground injection of methanol decreased from 1.0 million to 260,000 pounds and toluene from 450,000 to 89,000 pounds. Uniroyal is a manufacturer of specialty rubber chemicals and synthetic rubber. There were two factors contributing to the decrease in underground injection in 1994: First, process modifications eliminated some of their aqueous waste streams containing methanol and toluene. Second, a steam stripper was installed to recover waste methanol and toluene from the remaining waste streams for recycling back into the process.

Sterling Chemicals Inc., Texas City, TX: Three chemicals accounted for the majority of reported decreases in underground injection in 1994. Acetaldehyde decreased from 1.0 million to 96,000 pounds; acetonitrile decreased from 772,000 to 508,000 pounds; and methanol decreased from 1.7 million to 1.5 million pounds. These chemicals are contained in waste streams that are injected underground through a deepwell. The decrease in underground injection was attributed to fluctuations in analytical data not representative of an actual decrease. Discharges from all production units and collected rainwater create a large volume deepwell stream that contains very low, varying concentrations of reported chemicals. The facility is looking for ways to improve its estimating procedures, including improved analytical methods and sampling strategies.

UOP, Blanchard, LA: Reported underground injection of ammonium nitrate (solution) decreased from 1.2 million pounds in 1993 to 550,000 pounds in 1994 due to a change in its product mix. Two of the products manufactured in this facility are washed with an ammonium nitrate solution. The waste stream from this operation goes to the deepwell. Production of these two products decreased in 1994, resulting in decreased underground injection.

ISP Technologies Inc., Texas City, TX: Reported underground injection of methanol decreased from 1.7 million to 1.4 million pounds. Waste methanol is generated in the manufacture of formaldehyde. In 1994, a program was instituted to improve data quality through more frequent sampling of the deepwell stream. This provided better analytical data and resulted in lower release estimates for 1994. This decrease does not represent an actual reduction, but rather an improvement in release estimation.

Great Lakes Chemical Corp., El Dorado, AR: Reported underground injection of hydrochloric acid decreased from 1.2 million to 620,000 pounds because less hydrochloric acid was needed in 1994 to acidify existing deepwells used for disposal of non-hazardous process water. Older wells become less porous and require acidify with hydrochloric acid to reduce solids and increase flow. Although there were three existing active wells, all of the material injected underground went to a new well, which did not require acidifying.

Bethlehem Steel Corp., Burns Harbor, IN: Reported underground injection of hydrochloric acid decreased from 1.8 million pounds in 1993 to 1.2 million pounds in 1994. Hydrochloric acid is used in a pickling operation to remove scale from sheet steel before further processing. The amount of acid sent to the deepwell depends on the amount of waste acid from the pickling tanks (pickle liquor) which was not sold for reuse. In 1994, Bethlehem Steel was able to sell more of its pickle liquor, reducing the amount sent to the deepwell. The waste

material from the pickling tanks can be reused in wastewater treatment and in the processing of iron.

Jetco Chemicals Inc., Corsicana, TX: Reported underground injection of methanol decreased from 580,000 to 290,000 pounds. Jetco is a manufacturer of organic chemicals. Waste methanol, generated in an amide production process, is sent to a recovery process. Waste methanol that is not recovered had been sent to a deepwell until the well was shut down in April 1994. The waste stream was then sent off-site for treatment at a POTW.

Witco Corp., Harvey, LA: Reported underground injection of methanol decreased from 1.6 million to 1.4 million pounds. The decrease was attributed to the use of quality management teams to track and monitor processes and engineering controls to reduce releases. A pressurized vent system was installed to reduce vaporization of methanol. Methanol is used in the manufacture of sulfonates.

1994 TRI Top Increasers in Underground Injection

Table 3-18 lists the 50 TRI facilities with the greatest reported increases in underground injection from 1993 to 1994, ranked by the magnitude of their increase. Together, these 50 facilities accounted for reported increases totaling 41.3 million pounds.

DuPont, Beaumont, TX: Reported underground injection of ammonium nitrate (solution) increased from 15.5 million pounds in 1993 to 24.1 million pounds in 1994. An ammonium nitrate waste stream is generated as a byproduct in the aniline production unit. There were two factors responsible for the increase in underground injection: One was an increase in production. The other factor was substituting ammonia for sodium hydroxide previously used in aniline production. The use of ammonia eliminated plugging in the process equipment. The increased use of ammonia generated more ammonium nitrate going to the deepwell stream.

Coastal Chemical Inc., Cheyenne, WY: Reported underground injection of ammonium nitrate (solution) increased from 10.9 million pounds in 1993 to 17.8 million pounds in 1994. Ammonium nitrate waste is generated during the production of inorganic chemicals. The increase in underground injection resulted from a secondary evaporator being taken out of service due to air emissions concerns. A new secondary vacuum evaporator was put on line in January 1995. Underground injection of ammonium nitrate (solution) is expected to decrease for the 1995 reporting year.

DuPont, New Johnsonville, TN: Reported underground injection of hydrochloric acid increased from 49.0 million to 55.0 million pounds. This increase was primarily due to increased production in 1994, from which hydrochloric acid is generated as a byproduct. Some increase was attributed to the variability of the raw materials used to produce titanium dioxide.

Great Lakes Chemical Corp. (Central Plant), El Dorado, AR: Reported underground injection increased for methanol from 540,000 to 3.8 million pounds and for hydrochloric acid from 800,000 to 1.5 million pounds as a result of increased production. Waste methanol is generated in the manufacture of flame retardants. Waste hydrochloric acid is generated in the production of bromine and bromine derivatives, for which there was an increased worldwide demand in 1994.

Upjohn Company, Portage, MI: Reported underground injection of methanol increased from 940,000 to 3.4 million pounds in 1994. In previous years, Upjohn sent methanol waste

Table 3-18. Top 50 TRI Facilities with the Largest Increase in Underground Injection, 1993-1994.

Facility Name	City	State	1993 Underground Injection Pounds	1994 Underground Injection Pounds	1993-1994 Change in Underground Injection Pounds
DuPont	Beaumont	TX	18,249,206	27,664,275	9,415,069
Coastal Chem Inc.	Cheyenne	WY	10,887,276	17,821,000	6,933,724
DuPont	New Johnsonville	TN	49,000,000	55,000,000	6,000,000
Great Lakes Chemical Corp.	El Dorado	AR	1,878,740	6,011,918	4,133,178
Upjohn Co.	Portage	MI	1,522,156	3,797,750	2,275,594
BP Chemicals Inc.	Port Lavaca	TX	6,460,246	8,612,640	2,152,394
Monsanto Co.	Cantonment	FL	5,764,657	7,622,143	1,857,486
Chevron Chemical Co.	Belle Chasse	LA	282,655	1,318,156	1,035,501
Monsanto Co.	Luling	LA	2,986,400	4,008,070	1,021,670
DuPont	Pass Christian	MS	56,000,000	57,000,000	1,000,000
ARCO Chemical Co.	Channelview	TX	874,612	1,548,237	673,625
Kaiser Aluminum & Chemical	Mulberry	FL	4,876,348	5,482,541	606,193
AK Steel Corp.	Middletown	OH	3,520,000	4,110,000	590,000
Albemarle Corp.	Magnolia	AR	430,810	924,755	493,945
Warner-Lambert Co.	Holland	MI	2,586,033	3,028,490	442,457
Merichem Co.	Houston	TX	3,772,600	4,214,300	441,700
Rubicon Inc.	Geismar	LA	2,560,300	2,985,500	425,200
DuPont	La Porte	TX	2,338,980	2,762,493	423,513
Shell Oil Co.	Deer Park	TX	14,295	424,000	409,705
Great Lakes Chemical Corp.	Magnolia	AR	120,000	316,173	196,173
Air Products Mfg. Corp.	Wichita	KS	59,595	166,905	107,310
LTV Steel Co.	Hennepin	IL	1,800,250	1,900,250	100,000
Angus Chemical Co.	Sterlington	LA	5,500,000	5,600,000	100,000
Wil-Gro Fertilizer	Pryor	OK	945,100	1,027,440	82,340
Amoco Petroleum Prods.	Texas City	TX	466,000	544,800	78,800
Monsanto Co.	Alvin	TX	4,164,600	4,234,400	69,800
DuPont	La Place	LA	778,597	831,167	52,570
DuPont	Orange	TX	1,091,718	1,136,934	45,216
Calumet Lubricants Co. L.P.	Princeton	LA	284	29,564	29,280
ASARCO Inc.	Amarillo	TX	132,635	159,870	27,235
Cominco Fertilizers U.S. Inc.	Borger	TX	596	19,972	19,376
Martin Marietta Magnesia	Manistee	MI	45,000	58,000	13,000
Texaco Refining & Marketing	Bakersfield	CA	794	13,685	12,891
Allied-Signal Inc.	Danville	IL	1,617	4,159	2,542
Petrolite Corp.	Barnsdall	OK	6,000	8,000	2,000
Borden Chemicals & Plastics	Geismar	LA	853	1,763	910
Jameco Ind. Inc.	Wyandanch	NY	0	760	760
BHP Petroleum Americas	Kapolei	HI	30	765	735
Macklanburg-Duncan Co.	Oklahoma City	OK	395	1,117	722
BASF Corp.	Freeport	TX	200	800	600
Mineral Pigments Corp.	Beltsville	MD	0	500	500
Hampshire Chemical Corp.	Deer Park	TX	1,511	1,842	331
Farmland Ind. Inc.	Dodge City	KS	0	330	330
Plasma Processing Corp.	Millwood	WV	11	301	290
Ampex Recording Media Corp.	Opelika	AL	6	251	245
Dow Chemical Co.	Plaquemine	LA	0	47	47
Hoskins Mfg. Co.	New Paris	IN	68	106	38
Texaco Refining & Marketing	Bakersfield	CA	78	114	36
Hoskins Mfg. Co.	Mio	MI	42	56	14
Witco Corp.	Perth Amboy	NJ	0	5	5
Total			189,121,294	230,396,344	41,275,050

streams to a POTW for treatment. The facility was unable to continue this method of disposal and had to revert to deepwell injection. Methanol has also replaced other solvents, increasing its usage.

BP Chemicals Inc., Port Lavaca, TX: Reported underground injection increased for acetonitrile from 3.8 million to 4.6 million pounds, for acrylamide from 930,000 to 1.5 million pounds, for acrylonitrile from 620,000 to 1.0 million pounds, and for cyanide compounds from 170,000 to 590,000 pounds. These chemicals are byproducts from the acrylonitrile manufacturing process. The increase in underground injection was primarily due to increased production and improved analytical methods which affected estimates. Increased underground injection of acetonitrile was also attributed in part to higher purity production runs. Releases of cyanide compounds increased due to lower pH operations.

Monsanto Co., Cantonment, FL: Reported underground injection of ammonium nitrate (solution) increased from 4.7 million to 5.9 million pounds primarily due to increased production. Nitric acid, a raw material used in the production of adipic acid, is collected in a process waste stream and neutralized with ammonia. This generates ammonium nitrate which goes to the deepwell. A smaller amount of ammonium nitrate is also generated from neutralization of nitric acid from a nitric acid production process. This waste stream also goes to the deepwell.

Chevron Chemical Co., Belle Chasse, LA: Reported underground injection of ethylene glycol increased from 266,000 to 1.2 million pounds due to increased production and a change in the method of calculating the amount injected. A project to expand the capacity to recover ethylene glycol was completed in late 1995 and should result in decreased underground injection in the future. The facility's deepwell elimination project is targeted for completion in early 1998.

Monsanto Co., Luling, LA: Reported underground injection of formaldehyde increased from 2.9 million to 3.9 million pounds due to increased production in 1994. Monsanto is a manufacturer of agricultural products, pharmaceuticals, ammonia, and other industrial chemicals and generates production waste containing formaldehyde.

DuPont, Pass Christian, MS: Reported underground injection of hydrochloric acid increased from 56.0 million to 57.0 million pounds. This was due to increased production and variability in the ore processed. Hydrochloric acid is used in the production of inorganic pigments.

ARCO Chemical Co., Channelview, TX: Reported underground injection of ethyl benzene, methanol, and styrene increased from 609,000 pounds in 1993 to 1.2 million pounds in 1994. The increase was due to increased production and to cleaning activities during a planned major shutdown which enabled a detailed equipment inspection. Wastewater from the cleaning activities went to the deepwell.

Kaiser Aluminum & Chemical, Mulberry, FL: Reported underground injection of hydrochloric acid increased from 4.9 million pounds in 1993 to 5.5 million pounds in 1994 due to increased production. The acid waste stream is generated in the production of sodium fluorosilicate.

AK Steel Corp., Middletown, OH: The reported increase in underground injection of hydrochloric acid from 3.5 million to 4.1 million pounds was due to increased production. Hydrochloric acid is used in pickling lines for steel processing.

Albemarle Corp., Magnolia, AR: Reported underground injection of hydrochloric acid increased from 388,000 pounds in 1993 to 910,000 pounds in 1994. Brine pumped from deepwells is processed to remove bromine. Debrominated brine is then reinjected into the same formation through a well which is acidified with hydrochloric acid. The amount of acid used is driven by what is needed to maintain flow in the deepwell field. Increased underground injection resulted from increased acidifying activity in 1994.

Warner-Lambert Co., Holland, MI: Reported underground injection of methanol increased from 2.5 million pounds in 1993 to 2.8 million pounds in 1994. Methanol is used in the production of bulk pharmaceuticals. The increase in waste methanol resulted from increased production. In 1993, two processes were operating at pilot plant levels. By 1994, these units were up to full-scale production. Products from these two processes nearly tripled in 1994.

RELATIONSHIP OF TRI RELEASES TO CHANGES IN PRODUCTION

Environmental releases of TRI chemicals have declined significantly since 1988. There are several potential explanations for such a decrease. One is that facilities have undertaken actions to reduce releases, and are instead using more preferable waste management options or are eliminating pollution at the source. Another possible explanation is that production has decreased in the manufacturing sector as a result of an economic downturn, causing a concomitant decrease in releases. One way to determine the cause of the change is to compare the value of goods produced from manufacturing facilities to the quantity of TRI chemicals released. Decreases in the ratio over time would connote progress, since this would indicate that releases were declining relative to production.

The value of production is calculated here as the value of shipments for an industry plus the change in inventory from the previous year. The data are adjusted for inflation using the producer price indices for each industry, and are expressed in constant 1988 dollars. The value of production for an industry is not a perfect measure of the actual quantity produced. The most serious limitation is that the available figures for value of production cover an entire industry, and not just the small fraction of facilities that report to TRI. Also, value of production data do not cover the production of intermediates that are not sold. In addition, to the extent that the product mix at firms reporting to TRI is not representative of the product mix for their industry as a whole and the prices of these products change at rates different from the rate of inflation for the industry as a whole, then the value of production data will reflect not only changes in production but also changes in prices. Despite these limitations, value of production data constitute the best data readily available to represent production for this type of comparison.

Table 3-19 and 3-20 present the production and releases for the manufacturing sector, and the ratio between the two. Between 1988 and 1994, releases fell 44% at the same time that production increased 9%. From 1993 to 1994, releases decreased 8% while production rose 5%. The ratio of releases to the value of production declined from 1.31 in 1988 to 0.77 in 1993, and then to 0.67 in 1994. This evidence supports the hypothesis that the reductions in releases reported to TRI are due to changes in how wastes are created and managed, and not because of changes in the economy.

Table 3-19. Ratio of Releases to Value of Production, by Industry, 1988, 1993, 1994.[30]

SIC Code	Industry	Value of Production $ Billion, 1988			Total Releases Million Pounds			Ratio of Releases to Value of Production Million Pounds/$ Billion		
		1988	1993	1994	1988	1993	1994	1988	1993	1994
20	Food	352	381	384	9.1	12.0	10.3	0.03	0.03	0.03
21	Tobacco	23	19	23	1.2	0.6	1.0	0.05	0.03	0.04
22	Textiles	65	70	74	34.3	17.6	15.9	0.53	0.25	0.22
23	Apparel	65	67	69	0.9	1.0	1.3	0.01	0.01	0.02
24	Lumber	72	70	73	31.1	29.8	31.7	0.43	0.43	0.43
25	Furniture	39	42	43	61.4	54.0	50.6	1.57	1.29	1.18
26	Paper	123	126	132	227.7	179.8	218.6	1.85	1.43	1.66
27	Printing	145	140	139	60.7	35.9	34.2	0.42	0.26	0.25
28	Chemicals	260	280	290	1,322.8	874.4	700.7	5.09	3.12	2.42
29	Petroleum	131	126	131	67.7	50.9	43.8	0.52	0.40	0.33
30	Plastics	95	114	123	146.6	111.0	111.6	1.54	0.97	0.91
31	Leather	10	9	8	11.9	4.4	3.6	1.19	0.49	0.45
32	Stone/Clay/Glass	63	60	63	27.1	14.3	12.4	0.43	0.24	0.20
33	Primary Metals	150	145	157	496.2	304.6	293.8	3.31	2.10	1.87
34	Fabr. Metals	159	159	171	131.8	88.6	86.1	0.83	0.56	0.50
35	Machinery	246	255	288	59.6	26.5	23.5	0.24	0.10	0.08
36	Electrical Equip.	188	220	241	115.9	32.9	29.0	0.62	0.15	0.12
37	Transportation Equip.	359	351	374	191.0	123.8	119.7	0.53	0.35	0.32
38	Measure./Photo.	115	121	120	49.9	22.5	15.7	0.43	0.19	0.13
39	Miscellaneous	35	38	39	28.6	15.2	13.7	0.82	0.40	0.35
	Multiple codes 20-39[31]	—	—	—	446.6	137.2	142.9	—	—	—
	Total	2,695	2,793	2,942	3,522.1	2,137.0	1,960.1	1.31	0.77	0.67

[30] Value of production equals value of shipments and change in inventory from previous year. Amounts in pounds have been assigned to single-category SIC codes if only one SIC code was reported for a particular chemical form from the facility. Facilities that did not report any SIC codes in 20-39 are excluded. Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

[31] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

Table 3-20. Growth Rates in Ratio of Releases to Production, by Industry, 1988-1994 and 1993-1994.[32]

SIC Code	Industry	Percent Change in Value of Production		Percent Change in TRI Releases		Percent Change in Ratio of Releases to Production	
		1988 -1994 Percent	1993-1994 Percent	1988-1994 Percent	1993-1994 Percent	1988-1994 Percent	1993-1994 Percent
20	Food	9.1	0.8	13.2	-14.2	3.8	-12.9
21	Tobacco	0.0	21.1	-16.7	66.7	-17.3	34.4
22	Textiles	13.8	5.7	-53.6	-9.7	-59.3	-14.3
23	Apparel	6.2	3.0	44.4	30.0	35.7	26.7
24	Lumber	1.4	4.3	1.9	6.4	0.5	1.9
25	Furniture	10.3	2.4	-17.6	-6.3	-25.2	-8.5
26	Paper	7.3	4.8	-4.0	21.6	-10.5	16.0
27	Printing	-4.1	-0.7	-43.7	-4.7	-41.3	-3.9
28	Chemicals	11.5	3.6	-47.0	-19.9	-52.5	-22.6
29	Petroleum	0.0	4.0	-35.3	-13.9	-35.4	-17.3
30	Plastics	29.5	7.9	-23.9	0.5	-41.2	-6.9
31	Leather	-20.0	-11.1	-69.7	-18.2	-62.2	-8.0
32	Stone/Clay/Glass	0.0	5.0	-54.2	-13.3	-54.2	-17.2
33	Primary Metals	4.7	8.3	-40.8	-3.5	-43.4	-10.9
34	Fabr. Metals	7.5	7.5	-34.7	-2.8	-39.2	-9.5
35	Machinery	17.1	12.9	-60.6	-11.3	-66.1	-21.2
36	Electrical Equip.	28.2	9.5	-75.0	-11.9	-80.5	-20.0
37	Transportation Equip.	4.2	6.6	-37.3	-3.3	-39.8	-9.3
38	Measure./Photo.	4.3	-0.8	-68.5	-30.2	-69.8	-29.6
39	Miscellaneous	11.4	2.6	-52.1	-9.9	-57.0	-12.3
	Multiple codes 20-39[33]	—	—	-68.0	4.2	—	—
	Total	9.2	5.3	-44.3	-8.3	-49.0	-12.9

[32] Value of production equals value of shipments and change in inventory from previous year. Amounts in pounds have been assigned to single-category SIC codes if only one SIC code was reported for a particular chemical form from the facility. Facilities that did not report any SIC codes in 20-39 are excluded. Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

[33] Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

CHANGES IN RELEASES AND TRANSFERS BY CHEMICAL

1993-1994 Comparisons

Table 3-21 presents TRI total release data for the 20 chemicals with the largest decreases in total releases from 1993 to 1994. Phosphoric acid releases declined by nearly 134 million pounds, or 63.0%, due to decreased releases from two fertilizer facilities in Louisiana. TRI releases of 1,1,1-trichloroethane, an ozone-depleting chemical, decreased by nearly 27 million pounds since 1993, a decline of 41.3%. The number of TRI reporting forms submitted for this chemical dropped by 42.8% between 1993 and 1994, from 2,111 to 1,207.

Table 3-22 presents TRI total release data for the 20 chemicals with the largest increase in releases between 1993 and 1994. TRI releases of methanol increased by 39 million pounds, or 18.1%, since 1993. Releases of zinc compounds increased by nearly 12 million pounds, or 16.9%.

1988-1994 Changes

Table 3-23 presents the TRI total release data for the 20 chemicals with the largest decreases between 1988 and 1994. Table 3-24 presents the decrease in number of forms submitted for the 20 chemicals with the greatest decrease in number of forms between 1988 and 1994.

Releases of hydrochloric acid have decreased by nearly 267 million pounds since 1988, a decline of 55.4%. Releases of 1,1,1-trichloroethane have decreased by nearly 143 million pounds, a decline of 79.0% since 1988. Releases of toluene have decreased by 132 million pounds, or 43.9%, since 1988.

Table 3-25 presents the TRI total release data for the 20 chemicals with the largest increase in total releases between 1988 and 1994. Table 3-26 presents the 20 chemicals with the largest increase in number of forms submitted since 1988.

Table 3-27 presents the change in total TRI releases to air, water, and land for ozone-depleting chemicals between 1988 and 1994. Production of ozone-depleting chemicals is being phased out under the Clean Air Act Amendments of 1990. Freon 113 and 1,1,1-trichloroethane, both of which can no longer be produced as of January 1, 1996, have experienced very high rates of decline in releases in recent years.

Table 3-28 presents the change in combined TRI releases to air, water, and land for the 25 carcinogens with the largest releases to air, water, and land from 1988 to 1994. Releases of only two of these carcinogens, styrene and acetaldehyde, have increased since 1988. However, releases of eight of them increased between 1993 and 1994.

Table 3-29 presents the complete release and transfer information for all TRI chemicals for which reports have been received in at least one year between 1988 and 1994.

Table 3-21. Top 20 TRI Chemicals for Decreases in Total Releases, 1993-1994.[34]

CAS Number[35]	Chemical	Total Releases 1993 Pounds	Total Releases 1994 Pounds	1993-1994 Change Pounds	1993-1994 Change Percent
7664-38-2	Phosphoric acid	212,654,866	78,766,375	-133,888,491	-63.0
71-55-6	1,1,1-Trichloroethane	64,824,511	38,056,891	-26,767,620	-41.3
7782-50-5	Chlorine	76,154,785	60,432,224	-15,722,561	-20.6
7647-01-0	Hydrochloric acid	227,843,779	214,951,882	-12,891,897	-5.7
108-88-3	Toluene	181,268,431	168,958,681	-12,309,750	-6.8
75-15-0	Carbon disulfide	93,895,972	83,384,729	-10,511,243	-11.2
—	Manganese compounds	50,447,303	41,504,786	-8,942,517	-17.7
78-93-3	Methyl ethyl ketone	86,796,215	79,360,966	-7,435,249	-8.6
76-13-1	Freon 113	9,871,141	5,077,542	-4,793,599	-48.6
1330-20-7	Xylene (mixed isomers)	113,188,013	108,936,037	-4,251,976	-3.8
75-69-4	Trichlorofluoromethane (CFC-11)	6,146,802	2,994,474	-3,152,328	-51.3
7439-92-1	Lead	4,058,477	929,682	-3,128,795	-77.1
67-66-3	Chloroform	14,374,674	11,377,517	-2,997,157	-20.9
75-71-8	Dichlorodifluoromethane (CFC-12)	7,518,793	4,872,594	-2,646,199	-35.2
—	Barium compounds	3,334,349	694,221	-2,640,128	-79.2
75-09-2	Dichloromethane	66,001,356	63,774,566	-2,226,790	-3.4
107-21-1	Ethylene glycol	18,676,415	16,450,662	-2,225,753	-11.9
7440-66-6	Zinc (fume or dust)	12,203,536	10,155,449	-2,048,087	-16.8
—	Chromium compounds	23,359,274	21,340,317	-2,018,957	-8.6
110-82-7	Cyclohexane	10,694,422	8,920,323	-1,774,099	-16.6

Table 3-22. Top 20 TRI Chemicals for Increases in Total Releases, 1993-1994.[34]

CAS Number[35]	Chemical	Total Releases 1993 Pounds	Total Releases 1994 Pounds	1993-1994 Change Pounds	1993-1994 Change Percent
67-56-1	Methanol	216,526,620	255,766,934	39,240,314	18.1
—	Zinc compounds	69,934,091	81,764,720	11,830,629	16.9
6484-52-2	Ammonium nitrate (solution)	50,346,341	60,545,892	10,199,551	20.3
100-42-5	Styrene	33,728,167	40,156,848	6,428,681	19.1
75-07-0	Acetaldehyde	9,288,052	13,052,168	3,764,116	40.5
79-10-7	Acrylic acid	4,105,731	6,915,166	2,809,435	68.4
463-58-1	Carbonyl sulfide	14,361,687	17,146,171	2,784,484	19.4
—	Glycol ethers	46,465,874	48,991,927	2,526,053	5.4
100-41-4	Ethylbenzene	10,841,583	12,802,139	1,960,556	18.1
108-95-2	Phenol	10,035,090	11,944,178	1,909,088	19.0
74-85-1	Ethylene	33,573,354	35,297,774	1,724,420	5.1
—	Lead compounds	14,390,839	16,113,050	1,722,211	12.0
75-05-8	Acetonitrile	16,944,181	18,264,054	1,319,873	7.8
50-00-0	Formaldehyde	18,567,066	19,755,899	1,188,833	6.4
1319-77-3	Cresol (mixed isomers)	1,432,977	2,618,085	1,185,108	82.7
79-06-1	Acrylamide	4,041,746	5,217,625	1,175,879	29.1
107-13-1	Acrylonitrile	5,255,853	6,379,861	1,124,008	21.4
115-07-1	Propylene	19,340,724	20,456,432	1,115,708	5.8
—	Cyanide compounds	3,367,458	4,382,509	1,015,051	30.1
95-63-6	1,2,4-Trimethylbenzene	6,918,335	7,765,787	847,452	12.2

[34] Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.
[35] Compound categories do not have CAS numbers (—).

Table 3-23. Top 20 TRI Chemicals for Decreases in Total Releases, 1988-1994.[36]

CAS Number[37]	Chemical	Total Releases 1988 Pounds	1992 Pounds	1993 Pounds	1994 Pounds	1988-1994 Change Pounds	Percent
7647-01-0	Hydrochloric acid	481,644,875	288,550,871	227,843,779	214,951,882	-266,692,993	-55.4
71-55-6	1,1,1-Trichloroethane	180,951,709	117,708,080	64,824,511	38,056,891	-142,894,818	-79.0
108-88-3	Toluene	301,048,797	198,869,733	181,268,431	168,958,681	-132,090,116	-43.9
7664-38-2	Phosphoric acid	177,279,686	206,649,560	212,654,866	78,766,375	-98,513,311	-55.6
7782-50-5	Chlorine	141,426,877	87,411,253	76,154,785	60,432,224	-80,994,653	-57.3
75-09-2	Dichloromethane	131,090,918	76,212,915	66,001,356	63,774,566	-67,316,352	-51.4
76-13-1	Freon 113	70,643,730	24,955,220	9,871,141	5,077,542	-65,566,188	-92.8
78-93-3	Methyl ethyl ketone	141,264,638	93,910,362	86,796,215	79,360,966	-61,903,672	-43.8
67-56-1	Methanol	312,020,490	257,562,314	216,526,620	255,766,934	-56,253,556	-18.0
—	Manganese compounds	93,522,014	66,631,637	50,447,303	41,504,786	-52,017,228	-55.6
1330-20-7	Xylene (mixed isomers)	159,455,302	114,996,795	113,188,013	108,936,037	-50,519,265	-31.7
75-15-0	Carbon disulfide	124,206,241	92,957,584	93,895,972	83,384,729	-40,821,512	-32.9
—	Zinc compounds	121,846,602	82,277,108	69,934,091	81,764,720	-40,081,882	-32.9
6484-52-2	Ammonium nitrate (solution)	95,223,692	48,285,423	50,346,341	60,545,892	-34,677,800	-36.4
127-18-4	Tetrachloroethylene	36,310,255	12,727,669	11,815,905	10,214,401	-26,095,854	-71.9
79-01-6	Trichloroethylene	55,963,013	30,481,655	30,478,172	29,878,249	-26,084,764	-46.6
71-43-2	Benzene	33,216,298	13,790,881	11,456,240	9,763,105	-23,453,193	-70.6
7440-66-6	Zinc (fume or dust)	30,066,456	17,062,898	12,203,536	10,155,449	-19,911,007	-66.2
79-10-7	Acrylic acid	23,094,652	5,052,802	4,105,731	6,915,166	-16,179,486	-70.1
67-66-3	Chloroform	27,206,543	17,822,568	14,374,674	11,377,517	-15,829,026	-58.2

Table 3-24. Top 20 TRI Chemicals for Decreases in Number of Forms Submitted, 1988-1994.[36]

CAS Number[37]	Chemical	Forms 1988 Number	1992 Number	1993 Number	1994 Number	1988-1994 Change Number	Percent
71-55-6	1,1,1-Trichloroethane	3,915	3,210	2,111	1,207	-2,708	-69.2
76-13-1	Freon 113	1,440	872	468	237	-1,203	-83.5
75-09-2	Dichloromethane	1,673	1,140	1,081	1,030	-643	-38.4
108-88-3	Toluene	3,999	3,822	3,643	3,566	-433	-10.8
7782-50-5	Chlorine	1,800	1,543	1,510	1,449	-351	-19.5
127-18-4	Tetrachloroethylene	746	519	490	459	-287	-38.5
7440-66-6	Zinc (fume or dust)	646	458	423	410	-236	-36.5
584-84-9	Toluene-2,4-diisocyanate	257	84	76	76	-181	-70.4
79-01-6	Trichloroethylene	951	681	790	783	-168	-17.7
—	Cyanide compounds	393	261	256	247	-146	-37.2
91-08-7	Toluene-2,6-diisocyanate	189	52	44	47	-142	-75.1
78-93-3	Methyl ethyl ketone	2,527	2,512	2,473	2,389	-138	-5.5
107-21-1	Ethylene glycol	1,450	1,358	1,343	1,321	-129	-8.9
—	Mixtures and other trade names	174	62	49	54	-120	-69.0
1330-20-7	Xylene (mixed isomers)	3,464	3,497	3,419	3,346	-118	-3.4
1336-36-3	Polychlorinated biphenyls (PCBs)	121	19	16	13	-108	-89.3
7697-37-2	Nitric acid	1,917	1,847	1,858	1,827	-90	-4.7
7440-39-3	Barium	142	67	65	57	-85	-59.9
132-64-9	Dibenzofuran	110	44	45	34	-76	-69.1
120-12-7	Anthracene	139	86	83	68	-71	-51.1

[36] Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

[37] Compound categories do not have CAS numbers (—).

Table 3-25. Top 20 TRI Chemicals for Increases in Total Releases, 1988-1994.[38]

CAS Number[39]	Chemical	Total Releases 1988 Pounds	1992 Pounds	1993 Pounds	1994 Pounds	1988-1994 Change Pounds	Percent
—	Copper compounds	33,191,298	41,121,405	47,605,063	47,115,388	13,924,090	42.0
100-42-5	Styrene	34,276,173	31,971,246	33,728,167	40,156,848	5,880,675	17.2
100-41-4	Ethylbenzene	7,990,410	10,639,198	10,841,583	12,802,139	4,811,729	60.2
75-07-0	Acetaldehyde	9,342,141	8,968,987	9,288,052	13,052,168	3,710,027	39.7
95-63-6	1,2,4-Trimethylbenzene	4,421,702	6,069,703	6,918,335	7,765,787	3,344,085	75.6
79-06-1	Acrylamide	2,227,899	4,228,828	4,041,746	5,217,625	2,989,726	134.2
103-23-1	Bis(2-ethylhexyl)adipate	104,217	468,917	771,374	844,594	740,377	710.4
108-39-4	m-Cresol	19,170	506,999	556,762	668,142	648,972	3,385.4
1634-04-4	Methyl tert-butyl ether	2,624,516	3,217,131	3,774,957	3,223,885	599,369	22.8
95-48-7	o-Cresol	91,908	513,504	727,480	677,434	585,526	637.1
101-68-8	Methylenebis(phenyl-isocyanate)	334,755	542,226	587,467	846,938	512,183	153.0
60-35-5	Acetamide	0	100,821	1,089,016	466,028	466,028	—
1163-19-5	Decabromodiphenyloxide	51,846	570,715	711,918	469,811	417,965	806.2
74-90-8	Hydrogen cyanide	2,851,188	3,146,900	3,056,314	3,143,253	292,065	10.2
—	Selenium compounds	63,906	136,068	200,864	189,350	125,444	196.3
123-31-9	Hydroquinone	393,475	268,235	499,186	506,235	112,760	28.7
—	Cobalt compounds	177,532	316,131	233,306	274,589	97,057	54.7
105-67-9	2,4-Dimethylphenol	37,174	94,356	86,647	122,702	85,528	230.1
107-02-8	Acrolein	103,102	139,285	126,122	170,087	66,985	65.0
84-66-2	Diethyl phthalate	99,889	94,736	159,386	160,070	60,181	60.2

Table 3-26. Top 20 TRI Chemicals for Increases in Number of Forms Submitted, 1988-1994.[38]

CAS Number[39]	Chemical	Forms 1988 Number	1992 Number	1993 Number	1994 Number	1988-1994 Change Number	Percent
—	Zinc compounds	1,646	2,442	2,498	2,458	812	49.3
7440-50-8	Copper	1,946	2,447	2,539	2,537	591	30.4
7440-02-0	Nickel	1,162	1,653	1,706	1,739	577	49.7
—	Glycol ethers	1,620	2,232	2,209	2,157	537	33.1
7440-47-3	Chromium	1,233	1,638	1,768	1,766	533	43.2
95-63-6	1,2,4-Trimethylbenzene	288	652	708	753	465	161.5
7439-96-5	Manganese	931	1,267	1,339	1,385	454	48.8
101-68-8	Methylenebis(phenyl-isocyanate)	430	789	842	879	449	104.4
—	Manganese compounds	540	961	1,000	986	446	82.6
100-41-4	Ethylbenzene	563	904	945	969	406	72.1
—	Copper compounds	1,033	1,482	1,444	1,412	379	36.7
—	Nickel compounds	567	795	831	834	267	47.1
—	Antimony compounds	270	523	506	520	250	92.6
100-42-5	Styrene	1,247	1,445	1,448	1,489	242	19.4
—	Chromium compounds	1,203	1,496	1,438	1,416	213	17.7
7664-38-2	Phosphoric acid	2,531	2,709	2,719	2,710	179	7.1
75-07-0	Acetaldehyde	65	94	107	227	162	249.2
98-82-8	Cumene	117	219	236	237	120	102.6
—	Lead compounds	730	897	870	845	115	15.8
91-20-3	Naphthalene	420	479	489	527	107	25.5

[38] Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

[39] Compounds categories do not have CAS numbers (—).

Table 3-27. Change in TRI Total Air/Water/Land Releases for Ozone Depleters, 1988-1994.

CAS Number	Chemical	Total Air/Water/Land Releases 1988[40] Pounds	1992 Pounds	1993 Pounds	1994 Pounds	1988-1994 Change Pounds	Percent
353-59-3	Bromochlorodifluoromethane (Halon 1211)	NA	16,747	9,273	970	—	—
74-83-9	Bromomethane	2,784,795	3,050,082	3,224,204	2,669,788	-115,007	-4.1
75-63-8	Bromotrifluoromethane (Halon 1301)	NA	110,151	40,885	22,335	—	—
56-23-5	Carbon tetrachloride	3,808,981	1,394,918	2,235,691	620,150	-3,188,831	-83.7
124-73-2	Dibromotetrafluoroethane (Halon 2402)	NA	768	0	0	—	—
75-71-8	Dichlorodifluoromethane (CFC-12)	NA	11,650,585	7,518,792	4,872,540	—	—
76-14-2	Dichlorotetrafluoroethane (CFC-114)	NA	1,079,479	1,112,303	1,368,794	—	—
76-13-1	Freon 113	70,637,765	24,955,006	9,871,137	5,077,542	-65,560,223	-92.8
76-15-3	Monochloropentafluoroethane (CFC-115)	NA	421,692	560,753	328,164	—	—
71-55-6	1,1,1-Trichloroethane	180,950,709	117,707,519	64,821,983	38,056,789	-142,893,920	-79.0
75-69-4	Trichlorofluoromethane (CFC-11)	NA	9,483,683	6,146,791	2,994,463	—	—

[40] NA: Halons and CFCs were not reportable until 1991.

Table 3-28. Change in TRI Total Air/Water/Land Releases for Carcinogens with Largest 1994 Total Air/Water/Land Releases, 1988-1994.

CAS Number[41]	Chemical	Total Air/Water/Land Releases 1988 Pounds	1992 Pounds	1993 Pounds	1994 Pounds	Change 1988-1994 Pounds	Percent
75-09-2	Dichloromethane	129,612,085	75,029,048	65,045,258	62,813,624	-66,798,461	-51.5
100-42-5	Styrene	34,276,008	31,888,076	33,595,560	39,905,987	5,629,979	16.4
75-07-0	Acetaldehyde	7,123,036	7,063,128	6,664,718	12,450,001	5,326,965	74.8
50-00-0	Formaldehyde	13,658,845	12,005,481	12,254,641	12,016,389	-1,642,456	-12.0
67-66-3	Chloroform	27,170,543	17,772,328	14,336,635	11,297,515	-15,873,028	-58.4
127-18-4	Tetrachloroethylene	36,238,005	12,714,889	11,800,864	10,210,350	-26,027,655	-71.8
71-43-2	Benzene	32,391,263	13,435,198	11,099,580	9,540,002	-22,851,261	-70.5
106-99-0	1,3-Butadiene	7,532,529	3,894,618	3,228,505	2,711,287	-4,821,242	-64.0
107-06-2	1,2-Dichloroethane	4,657,872	3,257,325	2,332,567	1,878,367	-2,779,505	-59.7
7440-47-3	Chromium	9,920,727	1,636,645	1,531,821	1,804,579	-8,116,148	-81.8
—	Nickel compounds	2,786,930	1,523,248	3,112,070	1,609,954	-1,176,976	-42.2
107-13-1	Acrylonitrile	4,217,126	1,624,109	1,432,472	1,485,374	-2,731,752	-64.8
8001-58-9	Creosote[42]	NA	1,410,730	1,198,339	1,356,306	—	—
75-01-4	Vinyl chloride	1,445,649	1,123,111	1,020,471	1,066,618	-379,031	-26.2
75-56-9	Propylene oxide	3,798,316	1,413,227	1,181,950	1,054,684	-2,743,632	-72.2
7440-02-0	Nickel	1,767,809	3,240,697	840,929	981,388	-786,421	-44.5
7439-92-1	Lead	7,839,400	2,544,037	4,058,477	929,682	-6,909,718	-88.1
75-21-8	Ethylene oxide	4,731,285	1,319,349	1,078,502	717,828	-4,013,457	-84.8
56-23-5	Carbon tetrachloride	3,808,981	1,394,918	2,235,691	620,150	-3,188,831	-83.7
117-81-7	Di-(2-ethylhexyl) phthalate	1,240,837	1,011,556	674,111	560,325	-680,512	-54.8
123-91-1	1,4-Dioxane	827,655	1,135,121	1,234,968	538,929	-288,726	-34.9
106-89-8	Epichlorohydrin	714,548	527,473	390,129	490,967	-223,581	-31.3
1332-21-4	Asbestos (friable)	2,171,075	247,308	546,441	294,368	-1,876,707	-86.4
106-46-7	1,4-Dichlorobenzene	1,898,872	340,589	360,268	259,883	-1,638,989	-86.3
140-88-5	Ethyl acrylate	247,458	207,314	187,191	173,355	-74,103	-29.9

[41] Compounds categories do not have CAS numbers (—).

[42] NA: Creosote was not reportable until 1990.

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered).[43]

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
75-07-0	Acetaldehyde	94	227	1,277,627	10,869,272	282,750	602,167	20,352	13,052,168
		93	107	1,733,349	4,882,597	47,771	2,623,334	1,001	9,288,052
		92	94	1,991,766	4,990,256	80,682	1,905,859	424	8,968,987
		88	65	2,595,538	4,236,011	96,536	2,219,105	194,951	9,342,141
60-35-5	Acetamide	94	4	8	19	1	466,000	0	466,028
		93	4	7	8	1	1,089,000	0	1,089,016
		92	4	3	17	1	100,800	0	100,821
		88	1	0	0	0	0	0	0
75-05-8	Acetonitrile	94	86	786,855	353,711	14,580	17,105,679	3,229	18,264,054
		93	78	884,529	336,456	15,283	15,707,895	18	16,944,181
		92	74	782,302	394,612	48,976	20,111,640	29	21,337,559
		88	67	1,408,588	786,151	42,223	16,739,010	1,790	18,977,762
107-02-8	Acrolein	94	17	6,342	55,306	440	107,999	0	170,087
		93	15	11,765	12,022	0	102,335	0	126,122
		92	17	12,775	12,830	0	113,680	0	139,285
		88	12	17,352	16,300	0	68,950	500	103,102
79-06-1	Acrylamide	94	76	8,815	7,164	2,677	5,198,814	155	5,217,625
		93	78	24,241	4,317	2,511	4,010,509	168	4,041,746
		92	74	24,406	4,180	10,599	4,188,680	963	4,228,828
		88	59	17,298	8,721	3,124	2,198,000	756	2,227,899
79-10-7	Acrylic acid	94	185	254,532	222,593	1,928	6,436,000	113	6,915,166
		93	185	339,678	257,400	1,528	3,507,000	125	4,105,731
		92	179	285,236	264,012	19,147	4,484,000	407	5,052,802
		88	158	585,041	215,005	16,646	22,262,010	15,950	23,094,652
107-13-1	Acrylonitrile	94	114	333,620	1,131,099	20,377	4,894,487	278	6,379,861
		93	118	355,997	1,066,463	3,078	3,823,381	6,934	5,255,853
		92	116	346,665	1,267,890	1,483	3,861,550	8,071	5,485,659
		88	113	1,006,698	3,201,787	6,491	4,562,713	2,150	8,779,839
107-05-1	Allyl chloride	94	20	149,565	51,919	7	0	2	201,493
		93	19	75,867	30,573	0	0	2	106,442
		92	19	96,328	25,306	5	833	0	122,472
		88	20	93,811	55,558	430	250	200	150,249
7429-90-5	Aluminum (fume or dust)	94	297	375,561	1,549,068	24,574	301	1,143,448	3,092,952
		93	291	287,968	2,090,879	36,376	11	922,602	3,337,836
		92	322	498,013	2,010,765	82,140	250	1,167,093	3,758,261
		88	358	1,226,731	2,458,667	91,518	250	3,177,625	6,954,791
60-09-3	4-Aminoazobenzene	94	1	0	1	0	350	0	351
		93	1	0	1	0	370	0	371
		92	1	0	1	0	250	0	251
		88	1	0	0	0	537	0	537
92-67-1	4-Aminobiphenyl	94	1	0	0	0	5	0	5
		93	1	0	0	0	3	0	3
		92	1	0	0	0	3	0	3
		88	1	0	10	0	4	0	14
6484-52-2	Ammonium nitrate (solution)	94	227	92,657	715,856	6,978,376	51,190,858	1,568,145	60,545,892
		93	224	179,196	1,099,038	7,399,387	35,211,208	6,457,512	50,346,341
		92	225	60,599	1,273,889	6,793,287	37,531,805	2,625,843	48,285,423
		88	217	419,038	2,527,869	8,439,431	67,941,000	15,896,354	95,223,692
62-53-3	Aniline	94	67	148,063	153,841	8,835	1,664,033	1,554	1,976,326
		93	72	232,358	196,005	4,588	1,365,557	1,381	1,799,889
		92	74	181,632	227,372	16,261	1,195,676	1,173	1,622,114
		88	68	323,900	388,869	16,105	3,582,975	12,822	4,324,671

Table 3-29.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Acetaldehyde	94	28,005	260,259	432,543	444,126	992	0	1,165,925
	93	8,600	226,932	212,800	270,561	1,211	0	720,104
	92	9,750	170,728	270,925	157,031	553	0	608,987
	88	NA	NA	161,761	160,438	24,930	0	NA
Acetamide	94	0	0	846	0	0	0	846
	93	0	0	889	0	0	0	889
	92	0	0	421	0	0	0	421
	88	NA	NA	0	0	250	0	NA
Acetonitrile	94	1,741,949	5,549,674	3,841,987	1,046,438	66,890	0	12,246,938
	93	1,926,290	5,648,422	4,490,557	1,001,871	156,291	0	13,223,431
	92	3,010,317	4,496,042	2,940,465	477,782	37,041	0	10,961,647
	88	NA	NA	3,772,221	600,450	416,333	214,260	NA
Acrolein	94	0	11,893	3,857	0	0	0	15,750
	93	0	8,152	8	0	0	0	8,160
	92	0	4,316	255	0	0	0	4,571
	88	NA	NA	250	250	0	0	NA
Acrylamide	94	0	41,953	50,620	82,086	3,891	0	178,550
	93	171	57,337	78,461	85,857	6,623	0	228,449
	92	171	123,891	48,955	88,303	37,317	0	298,637
	88	NA	NA	14,458	13,540	97,582	0	NA
Acrylic acid	94	71,070	5,351,737	485,395	37,103	57,642	0	6,002,947
	93	62,354	7,922,205	243,914	37,546	40,274	47	8,306,340
	92	5,899	4,198,882	200,466	37,927	29,659	0	4,472,833
	88	NA	NA	108,914	23,262	134,139	0	NA
Acrylonitrile	94	100	425,040	835,031	169,644	8,738	0	1,438,553
	93	0	784,832	769,225	201,949	15,285	0	1,771,291
	92	0	1,508,156	822,783	224,271	26,153	140	2,581,503
	88	NA	NA	935,641	955,739	162,349	0	NA
Allyl chloride	94	0	15,149	462,055	14	37	0	477,255
	93	0	8,121	459,481	14	149	0	467,765
	92	0	31,300	380,035	9	166	0	411,510
	88	NA	NA	208,328	14,900	747	0	NA
Aluminum (fume or dust)	94	27,911,571	245,466	147,542	9,167	12,394,364	0	40,708,110
	93	72,005,385	178,718	96,722	7,123	6,905,635	255	79,193,838
	92	22,625,311	174,247	1,742,539	13,691	3,540,537	27,678	28,124,003
	88	NA	NA	2,457,125	15,217	14,368,041	12,756	NA
4-Aminoazobenzene	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
4-Aminobiphenyl	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Ammonium nitrate (solution)	94	848,307	10,328	99,014	4,546,684	3,972,929	0	9,477,262
	93	603,690	0	33,294	4,757,198	2,867,117	0	8,261,299
	92	250	0	70,170	6,856,667	2,394,025	0	9,321,112
	88	NA	NA	671,001	7,678,062	1,539,188	1,670	NA
Aniline	94	0	1,124,207	592,205	1,542,912	126,195	0	3,385,519
	93	3,400	931,875	523,651	1,483,800	400,252	0	3,342,978
	92	5	942,577	501,482	1,130,509	671,195	0	3,245,768
	88	NA	NA	468,311	2,106,510	346,206	16,050	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),(43) Continued.

CAS Number(44)	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
90-04-0	o-Anisidine	94	7	891	63	80	0	30	1,064
		93	7	865	12	81	0	116	1,074
		92	8	405	16	107	0	2,167	2,695
		88	6	501	1,792	285	0	250	2,828
104-94-9	p-Anisidine	94	2	0	10	5	0	0	15
		93	2	5	7	5	0	5	22
		92	3	5	6	5	0	0	16
		88	2	0	10	250	0	250	510
120-12-7	Anthracene	94	68	31,565	49,038	341	0	5,864	86,808
		93	83	21,764	51,987	589	0	7,149	81,489
		92	86	20,127	46,871	1,034	0	3,070	71,102
		88	139	146,223	55,952	4,382	0	10,856	217,413
7440-36-0	Antimony	94	120	3,760	16,211	98,466	0	10,226	128,663
		93	134	3,529	15,732	10,074	0	81,529	110,864
		92	119	4,994	16,779	7,879	0	10,246	39,898
		88	152	10,789	59,127	11,114	2,100	903,916	987,046
—	Antimony compounds	94	520	41,285	51,604	45,682	40,224	1,266,727	1,445,522
		93	506	33,261	55,377	27,574	3,707	878,961	998.880
		92	523	91,289	123,969	45,505	3,773	1,201,003	1,465,539
		88	270	58,941	106,837	31,178	9,200	1,935,018	2,141,174
7440-38-2	Arsenic	94	89	9,272	7,937	890	0	4,883	22,982
		93	100	2,492	31,497	1,643	0	311,263	346,895
		92	41	1,217	4,439	1,236	0	1,820,282	1,827,174
		88	78	2,608	5,079	1,282	0	181,267	190,236
—	Arsenic compounds	94	294	12,285	67,765	7,602	60,400	1,543,924	1,691,976
		93	306	8,845	85,243	5,756	52,000	2,250,594	2,402,438
		92	361	10,688	127,132	6,602	33,000	2,452,141	2,629,563
		88	273	43,461	223,791	6,243	27,400	4,946,184	5,247,079
1332-21-4	Asbestos (friable)	94	85	3,080	2,882	260	0	288,146	294,368
		93	95	3,904	4,499	255	0	537,783	546,441
		92	101	5,284	5,874	250	0	235,900	247,308
		88	145	11,043	37,453	10,699	0	2,111,880	2,171,075
7440-39-3	Barium	94	57	76,327	5,845	6,064	0	267,704	355,940
		93	65	68,179	31,880	5,259	0	291,141	396,459
		92	67	61,958	32,286	5,514	0	232,547	332,305
		88	142	174,401	92,410	18,650	0	6,721,686	7,007,147
—	Barium compounds	94	618	101,713	216,455	53,206	250	322,597	694,221
		93	990	242,456	410,543	73,347	2,491	2,605,512	3,334,349
		92	1,030	237,263	406,693	121,717	1,251	4,938,922	5,705,846
		88	626	153,142	873,030	99,439	2,773	5,651,655	6,780,039
98-87-3	Benzal chloride	94	3	163	12	0	0	0	175
		93	3	322	11	0	0	0	333
		92	3	956	17	0	0	0	973
		88	3	5,252	6	0	0	0	5,258
55-21-0	Benzamide	94		No Reports Received					
		93		No Reports Received					
		92		No Reports Received					
		88	1	250	250	250	250	0	1,000
71-43-2	Benzene	94	491	5,266,338	4,226,037	22,256	223,103	25,371	9,763,105
		93	474	6,802,701	4,246,167	19,497	356,660	31,215	11,456,240
		92	476	7,857,879	5,209,338	25,745	355,683	342,236	13,790,881
		88	482	20,574,341	11,642,018	46,983	825,035	127,921	33,216,298

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
o-Anisidine	94	0	0	0	2,171	1	0	2,172
	93	0	0	0	0	0	0	0
	92	0	0	0	6,811	7	0	6,818
	88	NA	NA	0	768	3	0	NA
p-Anisidine	94	0	0	0	5	0	0	5
	93	0	0	0	2	0	0	2
	92	0	0	0	15	0	0	15
	88	NA	NA	0	0	0	0	NA
Anthracene	94	38,652	65,121	9,487	630	60,186	0	174,076
	93	9,151	139,833	21,348	609	66,249	0	237,190
	92	0	394,934	150,337	598	504,548	250	1,050,667
	88	NA	NA	73,023	20,419	204,665	1,250	NA
Antimony	94	3,088,258	3,165	22,943	55,605	104,519	0	3,274,490
	93	3,993,235	1,932	4,957	31,110	220,719	0	4,251,953
	92	2,055,778	1,325	53,993	11,617	201,035	2,021	2,325,769
	88	NA	NA	22,979	40,228	568,925	500	NA
Antimony compounds	94	3,815,342	31,974	552,611	82,033	4,270,334	951	8,753,245
	93	1,971,878	33,440	276,797	67,847	2,774,049	254	5,124,265
	92	5,699,113	11,509	384,689	85,127	2,371,975	664	8,553,077
	88	NA	NA	138,456	67,358	2,186,238	1,450	NA
Arsenic	94	836,449	0	10,738	181	47,647	0	895,015
	93	266,578	25	85,025	353	95,348	0	447,329
	92	17,175	5	133,828	457	43,298	0	194,763
	88	NA	NA	1,020	1,928	62,664	35	NA
Arsenic compounds	94	296,314	3	1,044,606	306	1,702,452	0	3,043,681
	93	305,484	8	656,974	683	2,728,771	260	3,692,180
	92	2,610,435	0	630,354	899	1,640,990	28,376	4,911,054
	88	NA	NA	11,887	3,126	1,402,790	9,573	NA
Asbestos (friable)	94	0	0	260	2	3,979,953	0	3,980,215
	93	0	0	94,250	757	5,294,318	0	5,389,325
	92	0	0	250	783	6,999,482	0	7,000,515
	88	NA	NA	170,934	68,148	12,135,457	1,010,000	NA
Barium	94	127,098	19	6,050	5,925	222,758	0	361,850
	93	45,113	90	3,116	4,528	394,093	0	446,940
	92	31,506	4,516	15,634	4,247	671,494	0	727,397
	88	NA	NA	89,045	205,209	1,663,835	10,412	NA
Barium compounds	94	1,674,218	96,833	1,510,614	205,006	5,088,056	11,332	8,586,059
	93	1,542,499	216,268	2,731,127	342,279	10,501,510	676	15,334,359
	92	846,379	163,365	1,664,758	501,356	16,103,035	1,014,069	20,292,962
	88	NA	NA	820,370	823,073	16,355,890	290,982	NA
Benzal chloride	94	0	54,000	0	0	0	0	54,000
	93	0	44,000	0	0	0	0	44,000
	92	0	34,000	4,343	0	0	0	38,343
	88	NA	NA	95,878	0	7,308	0	NA
Benzamide	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	0	0	750	0	NA
Benzene	94	555,346	1,657,785	2,142,148	210,714	203,939	250	4,770,182
	93	1,101,028	1,094,388	1,785,870	308,621	94,173	0	4,384,080
	92	421,221	2,309,511	2,233,356	418,050	93,539	931,612	6,407,289
	88	NA	NA	1,891,649	1,164,722	396,880	7,430	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
92-87-5	Benzidine[48]	94	1	31,606	0	0	0	0	31,606
		93	1	16	0	0	0	0	16
		92	No Reports Received						
		88	No Reports Received						
98-07-7	Benzoic trichloride	94	5	2,832	36	0	0	0	2,868
		93	3	5,907	228	0	0	0	6,135
		92	4	5,851	228	0	0	0	6,079
		88	4	24,542	421	0	0	0	24,963
98-88-4	Benzoyl chloride	94	20	11,719	1,972	0	0	0	13,691
		93	19	11,339	2,147	0	0	11	13,497
		92	19	11,738	1,900	5	0	0	13,643
		88	22	28,295	4,719	0	130,000	250	163,264
94-36-0	Benzoyl peroxide	94	62	946	1,021	5	0	3,635	5,607
		93	57	744	1,250	5	0	2,070	4,069
		92	61	837	1,827	5	0	6,200	8,869
		88	50	4,063	2,231	0	5,350	36,050	47,694
100-44-7	Benzyl chloride	94	48	16,851	6,282	49	23	126	23,331
		93	48	14,196	6,933	41	35	61	21,266
		92	50	25,008	10,099	15	50	43	35,215
		88	51	30,689	12,640	640	0	500	44,469
7440-41-7	Beryllium	94	10	1	898	36	0	22,860	23,795
		93	9	3	900	24	0	14,594	15,521
		92	8	1	1,867	39	0	21,358	23,265
		88	12	550	2,213	74	0	37,000	39,837
—	Beryllium compounds	94	8	0	610	2	0	17,000	17,612
		93	8	2	361	4	0	8,087	8,454
		92	6	0	511	5	0	48,000	48,516
		88	5	1	861	17	0	12,000	12,879
92-52-4	Biphenyl	94	131	535,976	79,414	3,733	48,302	5,198	672,623
		93	150	615,673	154,101	4,673	46,966	6,803	828,216
		92	157	668,415	183,667	9,703	49,127	4,622	915,534
		88	181	631,591	579,701	88,197	82,760	222,297	1,604,546
111-44-4	Bis(2-chloroethyl) ether	94	11	2,835	395	7	0	0	3,237
		93	12	12,783	408	6	0	0	13,197
		92	12	2,673	514	5	0	0	3,192
		88	8	4,322	600	1,351	0	0	6,273
542-88-1	Bis(chloromethyl) ether	94	2	5	250	0	0	0	255
		93	2	5	250	0	0	0	255
		92	3	3	306	0	0	0	309
		88	2	1	0	0	0	0	1
108-60-1	Bis(2-chloro-1-methyl-ethyl) ether	94	2	1,800	3,090	3,026	0	1	7,917
		93	2	2,670	2,886	3,000	0	84	8,640
		92	2	8,000	1,430	1,900	0	0	11,330
		88	2	7,944	15	30,000	0	0	37,959
103-27-1	Bis(2-ethylhexyl) adipate	94	148	204,494	491,309	1,226	0	147,565	844,594
		93	147	147,622	439,324	887	0	183,541	771,374
		92	124	66,321	293,677	1,628	0	107,291	468,917
		88	73	25,789	66,788	10,440	0	1,200	104,217
75-25-2	Bromoform	94	No Reports Received						
		93	No Reports Received						
		92	1	11,120	5	0	4,500	0	15,625
		88	2	0	0	8,600	0	0	8,600

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Benzidine	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	No Reports Received						
	88	No Reports Received						
Benzoic trichloride	94	0	12	0	0	0	0	12
	93	0	0	251	0	0	0	251
	92	0	0	0	0	0	0	0
	88	NA	NA	12,795	0	9,777	0	NA
Benzoyl chloride	94	0	0	496,694	75	250	0	497,019
	93	0	4,906	956,298	400	250	0	961,854
	92	0	0	385,832	175	0	0	386,007
	88	NA	NA	358,570	180	2,399	0	NA
Benzoyl peroxide	94	9,000	2,097	24,166	21,318	11,185	0	67,766
	93	5,050	2,842	9,141	19,504	11,966	0	48,503
	92	6,400	2,422	16,834	38,327	9,337	0	73,320
	88	NA	NA	38,600	69,946	23,954	0	NA
Benzyl chloride	94	0	401,125	538	6,342	246	0	408,251
	93	0	305,877	5,599	11,106	210	0	322,792
	92	0	260,011	38,381	25,331	220	0	323,943
	88	NA	NA	89,160	41,553	9,687	0	NA
Beryllium	94	13,751	0	19	0	9,617	0	23,387
	93	121,104	0	539	0	4,619	0	126,262
	92	7,282	0	743	0	14,094	0	22,119
	88	NA	NA	3	4	3,155	0	NA
Beryllium compounds	94	312,617	0	1,060	1	1,850	0	315,528
	93	31,655	0	883	0	2,359	0	34,897
	92	18,485	0	438	250	4,050	0	23,223
	88	NA	NA	1,391	3	6,900	0	NA
Biphenyl	94	161,084	309,207	389,864	296,466	29,060	0	1,185,681
	93	134,519	354,373	159,793	771,852	31,969	0	1,452,506
	92	421,966	412,944	226,022	964,201	32,822	0	2,057,955
	88	NA	NA	252,521	1,446,614	227,492	0	NA
Bis(2-chloroethyl) ether	94	186,472	162,623	5,045	2,846	0	0	356,986
	93	170,971	100	10,381	7,089	180	0	188,721
	92	0	140	57,031	10,949	3	0	68,123
	88	NA	NA	27,265	9,621	0	0	NA
Bis(chloromethyl) ether	94	0	0	0	0	5	0	5
	93	0	0	0	0	2	0	2
	92	0	0	0	0	1	0	1
	88	NA	NA	0	0	0	0	NA
Bis(2-chloro-1-methyl-ethyl) ether	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Bis(2-ethylhexyl) adipate	94	176,148	149,329	29,135	22,167	617,807	0	994,586
	93	164,476	164,269	20,758	12,413	554,490	0	916,406
	92	135,434	274,379	24,070	20,456	311,026	0	765,365
	88	NA	NA	97,289	49,659	79,800	29,617	NA
Bromoform	94	No Reports Received						
	93	No Reports Received						
	92	0	0	6,400	0	195,005	0	201,405
	88	NA	NA	0	0	0	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
74-83-9	Bromomethane	94	48	472,663	2,197,112	13	0	0	2,669,788
		93	52	661,670	2,561,774	760	1,100	0	3,225,304
		92	51	539,321	2,510,371	390	1,000	0	3,051,082
		88	36	428,777	2,356,018	0	1,546	0	2,786,341
106-99-0	1,3-Butadiene	94	177	1,614,141	1,089,632	7,118	0	396	2,711,287
		93	176	2,204,869	1,015,686	7,600	1,000	350	3,229,505
		92	183	2,258,960	1,633,922	1,364	1,000	372	3,895,618
		88	157	4,056,939	2,945,269	522,504	1,500	7,817	7,534,029
141-32-2	Butyl acrylate	94	166	124,645	139,080	218	0	52	263,995
		93	167	159,397	155,536	779	0	57	315,769
		92	164	184,462	158,966	2,261	0	834	346,523
		88	166	165,186	246,676	3,528	0	602	415,992
71-36-3	n-Butyl alcohol	94	1,145	6,412,269	21,838,819	50,681	1,777,216	2,161	30,081,146
		93	1,165	6,762,251	22,367,650	49,172	1,942,044	17,057	31,138,174
		92	1,188	7,260,382	23,191,145	35,933	2,324,731	57,220	32,869,411
		88	1,107	8,980,092	28,701,891	128,130	3,006,660	175,819	40,992,592
78-92-2	sec-Butyl alcohol	94	112	485,968	508,969	5,902	143,443	5	1,144,287
		93	110	209,498	493,970	4,724	0	9	708,201
		92	120	211,057	460,573	15,705	25,450	762	713,547
		88	92	400,126	697,037	122,291	0	2,600	1,222,054
75-65-0	tert-Butyl alcohol	94	81	632,095	377,091	179,786	690,183	111	1,879,266
		93	67	1,196,495	372,729	174,289	635,700	349	2,379,562
		92	75	1,246,893	427,449	147,629	640,123	14	2,462,108
		88	54	1,207,440	366,697	14,989	674,798	818	2,264,742
106-88-7	1,2-Butylene oxide	94	15	5,341	4,702	210	0	0	10,253
		93	15	14,277	6,019	26	0	0	20,322
		92	18	67,756	15,024	5,773	0	0	88,553
		88	18	34,973	64,958	3,500	0	250	103,681
123-72-8	Butyraldehyde	94	28	133,044	146,824	875	87,047	0	367,790
		93	30	170,227	168,053	559	189,447	8,606	536,892
		92	26	214,563	283,946	470	128,051	256	627,286
		88	26	691,404	1,527,288	3,812	1,997	31	2,224,532
569-64-2	C.I. Basic Green 4	94	1	0	10	0	0	0	10
		93	3	0	5	0	0	0	5
		92	6	5	5	40	0	0	50
		88	6	500	250	0	0	0	750
989-38-8	C.I. Basic Red 1	94	2	4	4	0	0	0	8
		93	2	0	0	0	0	0	0
		92	2	0	26	0	0	0	26
		88	No Reports Received						
2832-40-8	C.I. Disperse Yellow 3	94	3	238	0	26	0	0	264
		93	2	399	0	28	0	9,199	9,626
		92	3	428	0	23	0	780	1,231
		88	1	398	0	302	0	0	700
81-88-9	C.I. Food Red 15	94	1	0	0	0	0	0	0
		93	2	0	1	0	0	0	1
		92	3	0	2	0	0	0	2
		88	2	250	0	0	0	0	250
3118-97-6	C.I. Solvent Orange 7	94	2	0	0	0	0	0	0
		93	1	0	0	0	0	0	0
		92	No Reports Received						
		88	No Reports Received						

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Bromomethane	94	0	100	750	0	0	0	850
	93	0	3,300	500	0	5	0	3,805
	92	0	3,500	255	0	250	0	4,005
	88	NA	NA	0	0	0	0	NA
1,3-Butadiene	94	7,328,960	166,970	400,339	537	6,846	0	7,903,652
	93	7,473,983	6,574	102,713	5,892	4,893	0	7,594,055
	92	2,106,640	177,839	194,778	20,583	7,666	0	2,507,506
	88	NA	NA	178,855	44,874	185,398	1,934	NA
Butyl acrylate	94	107,082	182,031	85,812	107,496	74,565	0	556,986
	93	67,843	70,791	80,493	114,605	69,966	0	403,698
	92	12,572	34,905	59,628	190,144	23,350	0	320,599
	88	NA	NA	585,394	34,604	18,766	525	NA
n-Butyl alcohol	94	2,647,121	7,765,803	2,210,978	1,818,779	201,799	297	14,644,777
	93	2,233,973	9,216,360	2,093,588	1,518,910	314,791	250	15,377,872
	92	2,555,470	8,161,797	3,086,753	2,070,983	501,385	19,503	16,395,891
	88	NA	NA	6,841,199	4,524,613	924,519	424,570	NA
sec-Butyl alcohol	94	44,064	5,307,090	75,307	37,320	32,287	0	5,496,068
	93	62,960	5,305,314	37,156	45,684	155,290	0	5,606,404
	92	3,025	4,844,222	100,598	11,880	6,662	0	4,966,387
	88	NA	NA	74,574	41,108	21,351	134,802	NA
tert-Butyl alcohol	94	1,356	29,854,068	1,201,904	743,825	70,079	0	31,871,232
	93	18,324	30,784,513	1,022,218	1,074,364	274,832	0	33,174,251
	92	3,058	27,916,993	353,220	2,040,472	63,908	0	30,377,651
	88	NA	NA	328,523	1,539,726	56,502	110,250	NA
1,2-Butylene oxide	94	2,650	364,065	0	10	0	0	366,725
	93	0	373,210	16	0	0	0	373,226
	92	0	354,320	0	6,059	0	0	360,379
	88	NA	NA	250	0	898	0	NA
Butyraldehyde	94	0	17,281	6,555	203,094	1,038	0	227,968
	93	450	479,072	7,079	132,237	1,716	0	620,554
	92	5,850	3,839	3,804	250,480	11	0	263,984
	88	NA	NA	6,197	371,633	117,741	0	NA
C.I. Basic Green 4	94	0	0	499	0	0	0	499
	93	0	0	499	83	0	0	582
	92	0	0	499	3,006	3,025	0	6,530
	88	NA	NA	0	1,320	250	0	NA
C.I. Basic Red 1	94	0	114	132	274	668	0	1,188
	93	0	230	0	24	670	0	924
	92	0	309	0	26	382	0	717
	88	No Reports Received						
C.I. Disperse Yellow 3	94	0	0	0	2,488	2,597	0	5,085
	93	0	0	0	3,150	1,658	0	4,808
	92	0	0	0	755	286	0	1,041
	88	NA	NA	0	0	899	0	NA
C.I. Food Red 15	94	0	0	0	0	0	0	0
	93	0	0	0	1,100	0	0	1,100
	92	0	0	0	1,700	0	0	1,700
	88	NA	NA	0	0	0	0	NA
C.I. Solvent Orange 7	94	0	0	0	284	350	0	634
	93	0	0	0	0	250	0	250
	92	No Reports Received						
	88	No Reports Received						

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
97-56-3	C.I. Solvent Yellow 3	94	No Reports Received						
		93	1	0	0	0	0	0	0
		92	No Reports Received						
		88	1	250	0	0	0	0	250
842-07-9	C.I. Solvent Yellow 14	94	No Reports Received						
		93	No Reports Received						
		92	1	0	0	0	0	0	0
		88	2	0	0	0	0	0	0
7440-43-9	Cadmium	94	45	2,651	7,412	1,264	0	4,146	15,473
		93	53	2,031	13,259	412	0	56,677	72,379
		92	55	2,295	6,461	638	0	11,739	21,133
		88	90	9,300	13,130	2,598	0	94,602	119,630
—	Cadmium compounds	94	113	6,290	43,216	765	170	54,326	104,767
		93	125	7,109	38,876	657	977	66,699	114,318
		92	132	11,367	49,142	781	1,211	65,407	127,908
		88	115	23,099	77,163	1,549	2,409	294,877	399,097
156-62-7	Calcium cyanamide	94	5	0	5	0	0	0	5
		93	6	0	5	0	0	5	10
		92	7	8,000	405	0	0	30,005	38,410
		88	3	12,000	600	0	0	66,000	78,600
133-06-2	Captan	94	18	1,522	6,971	5	0	5	8,503
		93	17	2,146	5,025	5	0	5	7,181
		92	20	1,647	5,189	10	5,000	10	11,856
		88	18	4,066	10,803	750	5,100	1,000	21,719
63-25-2	Carbaryl	94	24	2,668	4,749	10	0	255	7,682
		93	25	3,024	6,202	15	0	265	9,506
		92	24	2,525	7,182	15	0	265	9,987
		88	23	2,515	5,408	877	0	500	9,300
75-15-0	Carbon disulfide	94	82	3,735,747	79,582,068	62,529	4,305	80	83,384,729
		93	83	3,334,882	90,524,108	34,169	2,805	8	93,895,972
		92	88	2,668,192	90,241,580	45,087	2,704	21	92,957,584
		88	88	3,139,255	120,970,649	39,501	13,400	43,436	124,206,241
56-23-5	Carbon tetrachloride	94	69	226,057	392,870	1,223	12,654	0	632,804
		93	75	585,481	1,648,678	1,453	34,332	79	2,270,023
		92	90	418,556	973,585	2,444	45,984	333	1,440,902
		88	95	1,084,548	2,694,047	15,627	98,050	14,759	3,907,031
463-58-1	Carbonyl sulfide	94	53	77,490	17,068,681	0	0	0	17,146,171
		93	42	8,998	14,352,689	0	0	0	14,361,687
		92	41	4,460	19,483,125	0	0	0	19,487,585
		88	38	7,643	25,946,460	0	0	0	25,954,103
120-80-9	Catechol	94	117	1,169	1,877	28,005	0	1,331	32,382
		93	122	601	1,572	52,793	0	4,861	59,827
		92	133	9,944	917	218,170	3,507	49,656	282,194
		88	113	2,448	1,341	397,548	0	84,331	485,668
133-90-4	Chloramben	94	No Reports Received						
		93	No Reports Received						
		92	No Reports Received						
		88	1	250	1,168	250	0	0	1,668
57-74-9	Chlordane	94	1	1,300	0	13	0	0	1,313
		93	1	51	0	15	0	0	66
		92	2	1,713	0	1	0	0	1,714
		88	2	2,695	3	4	4,262	0	6,964

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
C.I. Solvent Yellow 3	94	No Reports Received						
	93	0	0	0	0	0	0	0
	92	No Reports Received						
	88	NA	NA	0	0	0	0	NA
C.I. Solvent Yellow 14	94	No Reports Received						
	93	No Reports Received						
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Cadmium	94	773,739	0	9,628	599	59,259	0	843,225
	93	709,561	0	34,162	2,160	42,434	0	788,317
	92	227,783	0	76,146	2,502	101,049	107	407,587
	88	NA	NA	83,296	7,894	131,879	2,441	NA
Cadmium compounds	94	2,304,441	2,717	160,927	2,414	1,863,630	0	4,334,129
	93	1,412,983	1,142	157,551	2,788	3,138,540	0	4,713,004
	92	1,819,291	3,302	435,418	43,316	280,162	11,527	2,593,016
	88	NA	NA	86,534	13,719	982,168	500	NA
Calcium cyanamide	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Captan	94	0	0	2,410	26	1,237	0	3,673
	93	0	0	6,434	29	2,436	0	8,899
	92	0	0	4,095	255	5,087	0	9,437
	88	NA	NA	511	250	12,434	750	NA
Carbaryl	94	0	0	5,222	1	16,491	0	21,714
	93	0	0	18,834	1	16,031	0	34,866
	92	0	0	10,777	0	30,268	0	41,045
	88	NA	NA	27,582	171	6,198	0	NA
Carbon disulfide	94	426	205,993	31,113	359,388	1,677	0	598,597
	93	5,098	248,766	64,510	226,215	1,329	0	545,918
	92	0	209,574	16,535	193,442	1,718	0	421,269
	88	NA	NA	154,315	159,369	58,473	0	NA
Carbon tetrachloride	94	850,623	17,314	1,172,726	574	50,710	0	2,091,947
	93	111,626	4,109	920,808	1,675	121,363	0	1,159,581
	92	345,452	24,455	839,388	1,054	11,955	0	1,222,304
	88	NA	NA	1,300,058	5,014	49,703	250	NA
Carbonyl sulfide	94	0	0	18,000	0	0	0	18,000
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Catechol	94	0	9,318	2,805	83,355	1,568	0	97,046
	93	0	33,825	6,151	64,122	841	0	104,939
	92	31	1,526	76,354	154,358	29,092	0	261,361
	88	NA	NA	14,744	245,399	89,474	250	NA
Chloramben	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	0	0	1,159	0	NA
Chlordane	94	0	0	6	100	0	0	106
	93	0	0	11	51	0	0	62
	92	0	0	638	86	0	0	724
	88	NA	NA	74,170	23	0	6,639	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
7782-50-5	Chlorine	94	1,449	1,276,642	58,502,168	516,005	74,311	63,098	60,432,224
		93	1,510	1,250,155	74,144,319	590,541	120,758	49,012	76,154,785
		92	1,543	1,647,670	84,679,340	987,615	48,252	48,376	87,411,253
		88	1,800	4,704,674	129,562,095	6,622,437	107,624	430,047	141,426,877
10049-04-4	Chlorine dioxide	94	125	16,909	1,484,132	0	0	0	1,501,041
		93	132	27,090	1,646,827	251	0	0	1,674,168
		92	129	60,495	3,014,566	761	0	6	3,075,828
		88	122	1,277,546	12,076,241	2,350	0	41,000	13,397,137
79-11-8	Chloroacetic acid	94	32	5,983	710	10,178	0	950	17,821
		93	29	5,796	767	8,719	0	750	16,032
		92	31	10,778	1,024	3,199	0	0	15,001
		88	37	21,660	5,159	850	10	0	27,679
108-90-7	Chlorobenzene	94	65	746,013	702,484	2,206	72,000	16	1,522,719
		93	70	1,037,054	1,022,083	3,511	71,000	678	2,134,326
		92	64	1,126,328	1,188,651	20,799	72,000	817	2,408,595
		88	66	2,032,791	2,343,096	98,354	84,457	4,127	4,562,825
75-00-3	Chloroethane	94	49	1,285,717	1,525,244	767	110	142	2,811,980
		93	53	1,219,353	1,441,896	2,231	110	33	2,663,623
		92	50	1,515,860	1,224,260	1,957	210	0	2,742,287
		88	49	2,148,225	2,555,010	27,448	1,510	0	4,732,193
67-66-3	Chloroform	94	167	3,450,479	7,472,557	362,812	80,002	11,667	11,377,517
		93	175	4,562,449	9,289,998	451,262	38,039	32,926	14,374,674
		92	181	6,112,455	10,977,091	654,214	50,240	28,568	17,822,568
		88	169	7,695,273	18,275,242	1,131,484	36,000	68,544	27,206,543
74-87-3	Chloromethane	94	109	949,731	4,115,002	59,463	50,707	34	5,174,937
		93	94	1,219,122	4,095,061	59,565	93,947	266	5,467,961
		92	94	1,341,333	4,353,845	41,750	86,709	0	5,823,637
		88	81	3,515,698	8,051,949	115,985	165,250	0	11,848,882
107-30-2	Chloromethyl methyl ether	94	3	11	2,728	5	0	0	2,744
		93	4	20	2,221	5	0	0	2,246
		92	3	35	1,186	10	0	0	1,231
		88	4	33	3,000	0	0	0	3,033
—	Chlorophenols	94	10	1,991	6,630	39	94,236	1	102,897
		93	6	1,964	7,942	34	106,436	0	116,376
		92	9	3,239	6,057	290	133,204	0	142,790
		88	9	2,154	419	272	71,554	0	74,399
126-99-8	Chloroprene	94	14	125,385	968,771	2	59,600	3,997	1,157,755
		93	14	191,316	799,794	47	29,000	3,018	1,023,175
		92	11	152,543	1,344,852	47	54,000	1,811	1,553,253
		88	13	234,228	1,713,780	287	68,792	0	2,017,087
1897-45-6	Chlorothalonil	94	22	1,472	2,668	21	0	250	4,411
		93	21	1,295	4,920	9	0	250	6,474
		92	16	3,185	2,695	6	0	12,250	18,136
		88	10	19,455	9,021	250	0	— 0	28,726
7440-47-3	Chromium	94	1,766	472,348	163,254	20,486	48	1,148,491	1,804,627
		93	1,768	311,802	144,725	24,227	269	1,051,067	1,532,090
		92	1,638	365,136	119,638	23,324	333	1,128,547	1,636,978
		88	1,233	369,199	195,479	75,192	2,249	9,280,857	9,922,976
—	Chromium compounds	94	1,416	174,722	332,632	158,795	38,061	20,636,107	21,340,317
		93	1,438	118,657	279,537	229,917	42,493	22,688,670	23,359,274
		92	1,496	130,753	379,394	276,391	32,137	23,198,349	24,017,024
		88	1,203	256,613	505,293	325,027	52,653	30,934,406	32,073,992

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Chlorine	94	2,833,114	4,310	345,447	883,757	15,133	5,005	4,086,766
	93	1,413,177	10,514	318,102	966,133	15,866	0	2,723,792
	92	714,632	23	228,440	813,510	30,705	0	1,787,310
	88	NA	NA	2,995,507	3,100,947	1,003,531	0	NA
Chlorine dioxide	94	0	0	0	296	2	0	298
	93	0	0	0	880	0	0	880
	92	0	0	0	1,083	0	0	1,083
	88	NA	NA	0	2,650	41,750	0	NA
Chloroacetic acid	94	0	250	5,406	1,015	603	0	7,274
	93	0	400	1,026	1,433	793	0	3,652
	92	0	0	502	1,792	1,080	1,565	4,939
	88	NA	NA	6,900	10,727	2,506	0	NA
Chlorobenzene	94	1,084,976	625,394	1,120,085	1,922	94,629	0	2,927,006
	93	1,401,667	643,725	2,612,970	8,553	4,965	0	4,671,880
	92	845,468	849,084	3,733,223	22,055	51,985	0	5,501,815
	88	NA	NA	4,925,431	578,774	117,624	0	NA
Chloroethane	94	174,502	58,709	360,204	760	8	0	594,183
	93	161,718	21,933	395,391	255	0	0	579,297
	92	221,447	15,655	172,176	10	1	0	409,289
	88	NA	NA	430,600	0	32,260	0	NA
Chloroform	94	351,182	101,775	1,969,035	437,920	68,693	0	2,928,605
	93	435,332	69,463	1,817,227	603,550	73,353	0	2,998,925
	92	1,417,848	765,445	919,304	553,650	41,510	3	3,697,760
	88	NA	NA	1,204,786	1,226,573	144,771	20,365	NA
Chloromethane	94	0	7,239	358,585	2,242	1,565	0	369,631
	93	0	57,355	163,661	3,442	1,446	0	225,904
	92	7,000	31,308	225,152	84,895	1,323	0	349,678
	88	NA	NA	45,292	54,223	59,140	0	NA
Chloromethyl methyl ether	94	0	0	0	0	70	0	70
	93	0	0	0	0	70	0	70
	92	0	0	0	0	70	0	70
	88	NA	NA	0	0	0	0	NA
Chlorophenols	94	17,232	0	26,914	1,494	383	0	46,023
	93	0	0	36,088	279	751	0	37,118
	92	0	0	3,988	580	250	0	4,818
	88	NA	NA	1,970,910	2,650	2	0	NA
Chloroprene	94	1,155,305	96,000	50,800	16,571	6,391	0	1,325,067
	93	500,444	121,297	200,869	18,506	5,295	0	846,411
	92	1,384,119	19,200	193,907	22,912	2,709	0	1,622,847
	88	NA	NA	18,749	62,000	0	0	NA
Chlorothalonil	94	0	15	7,551	505	227,473	0	235,544
	93	625	0	3,632	281	206,386	0	210,924
	92	1,100	0	4,119	269	175,978	0	181,466
	88	NA	NA	3,660	541	396,274	0	NA
Chromium	94	106,988,736	26,279	503,018	71,283	4,808,805	86,213	112,484,334
	93	89,884,909	3,577	859,335	97,329	6,754,986	44,173	97,644,309
	92	73,136,214	2,325	1,341,547	147,696	4,498,527	525,595	79,651,904
	88	NA	NA	1,218,879	414,876	10,394,992	709,086	NA
Chromium compounds	94	39,743,319	68,536	4,904,303	356,493	10,939,269	0	56,011,920
	93	42,173,569	27,479	2,570,919	357,384	10,600,753	17,893	55,747,997
	92	28,551,476	88,080	2,467,827	811,981	10,220,441	68,353	42,208,158
	88	NA	NA	2,660,429	1,666,728	11,496,554	386,281	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
7440-48-4	Cobalt	94	236	21,233	23,242	6,819	0	35,030	86,324
		93	246	18,627	15,547	7,288	0	19,988	61,450
		92	219	17,075	13,855	2,239	500	16,615	50,284
		88	176	22,439	21,566	16,744	0	213,204	273,953
—	Cobalt compounds	94	218	10,473	22,290	106,474	1,750	133,602	274,589
		93	204	6,160	20,341	96,644	2,375	107,786	233,306
		92	209	7,888	23,810	99,289	18,420	166,724	316,131
		88	149	11,081	45,329	63,662	18,500	38,960	177,532
7440-50-8	Copper	94	2,537	407,878	728,901	56,467	19,944	990,842	2,204,032
		93	2,539	278,196	915,819	44,251	23,677	1,486,609	2,748,552
		92	2,447	464,950	1,039,416	41,010	16,736	12,764,376	14,326,488
		88	1,946	320,276	1,204,071	115,631	15,651	10,466,175	12,121,804
—	Copper compounds	94	1,412	3,236,400	2,131,573	83,187	214,308	41,449,920	47,115,388
		93	1,444	4,000,784	3,200,406	92,540	228,924	40,082,409	47,605,063
		92	1,482	3,606,567	2,738,465	81,456	201,431	34,493,486	41,121,405
		88	1,033	2,335,930	820,767	185,287	165,957	29,683,357	33,191,298
120-71-8	p-Cresidine	94	5	881	130	81	0	50	1,142
		93	5	285	125	5	0	85	500
		92	5	240	100	5	0	255	600
		88	6	5,400	1,680	250	0	750	8,080
1319-77-3	Cresol (mixed isomers)	94	155	358,770	1,433,980	11,607	808,900	4,828	2,618,085
		93	118	201,449	323,764	2,931	903,402	1,431	1,432,977
		92	117	200,192	298,625	2,747	614,578	1,097	1,117,239
		88	110	400,427	378,678	6,764	1,804,060	4,512	2,594,441
108-39-4	m-Cresol	94	24	35,097	18,973	4,072	610,000	0	668,142
		93	20	30,178	5,958	626	520,000	0	556,762
		92	19	51,679	5,100	220	450,000	0	506,999
		88	15	5,860	12,572	283	0	455	19,170
95-48-7	o-Cresol	94	25	12,085	3,359	1,990	660,000	0	677,434
		93	22	13,201	153,999	158	560,000	122	727,480
		92	22	20,426	3,061	14	490,000	3	513,504
		88	28	45,557	44,236	448	0	1,667	91,908
106-44-5	p-Cresol	94	27	34,350	31,783	2,020	301,900	0	370,053
		93	21	21,473	3,831	293	262,000	24	287,621
		92	22	36,611	3,777	943	232,900	1,513	275,744
		88	18	6,286	634,417	1,143	152,000	62,291	856,137
98-82-8	Cumene	94	237	831,912	1,209,112	6,363	8,940	942	2,057,269
		93	236	1,245,686	1,300,413	1,148	17,062	950	2,565,259
		92	219	1,418,004	2,480,809	2,250	15,100	783	3,916,946
		88	117	2,156,139	2,910,301	3,201	30,165	8,591	5,108,397
80-15-9	Cumene hydroperoxide	94	41	78,787	57,791	176	280,000	2,500	419,254
		93	39	74,360	21,794	196	380,000	4,271	480,621
		92	38	66,077	13,221	217	259,000	1,839	340,354
		88	40	178,787	13,736	1,784	371,000	250	565,557
135-20-6	Cupferron	94	2	2	9	0	0	0	11
		93	2	28	31	0	0	0	59
		92	1	0	10	0	0	0	10
		88	4	140	780	0	0	0	920
—	Cyanide compounds	94	247	125,190	901,313	102,633	3,239,418	13,955	4,382,509
		93	256	56,685	918,194	97,666	2,288,870	6,043	3,367,458
		92	261	80,916	974,494	83,929	2,963,579	12,936	4,115,854
		88	393	525,618	721,774	195,244	3,707,326	107,208	5,257,170

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Cobalt	94	8,928,654	0	848,427	21,592	142,241	0	9,940,914
	93	7,745,565	0	33,269	16,811	133,385	0	7,929,030
	92	5,759,941	4,111	24,374	12,169	115,408	250	5,916,253
	88	NA	NA	27,673	8,843	226,686	17,000	NA
Cobalt compounds	94	1,989,331	1,893	112,916	8,191	407,852	250	2,520,433
	93	2,022,301	517	74,904	22,785	498,888	0	2,619,395
	92	1,446,823	11,289	80,374	14,398	351,041	76	1,904,001
	88	NA	NA	88,079	28,369	253,578	263	NA
Copper	94	519,843,303	38,402	1,085,388	132,657	13,873,204	8,274	534,981,228
	93	474,184,273	48,571	801,628	151,468	6,307,705	9,473	481,503,118
	92	369,780,813	2,015	1,786,813	147,245	13,326,766	2,272,566	387,316,218
	88	NA	NA	4,066,439	312,671	15,112,460	1,403,027	NA
Copper compounds	94	147,039,786	64,628	2,126,732	146,348	9,839,385	199,764	159,416,643
	93	120,010,201	59,568	2,453,263	217,460	11,948,913	294,142	134,983,547
	92	108,183,171	131,897	3,812,207	246,836	6,493,034	325,897	119,193,042
	88	NA	NA	5,931,394	436,813	9,283,012	1,523,862	NA
p-Cresidine	94	0	0	2,200	28,896	3,000	0	34,096
	93	0	0	1,400	28,223	0	0	29,623
	92	0	0	0	23,780	4,500	0	28,280
	88	NA	NA	0	37,750	4,700	0	NA
Cresol (mixed isomers)	94	337,998	577,126	253,925	62,226	71,546	0	1,302,821
	93	155,838	385,999	163,672	46,325	25,072	1,000	777,906
	92	38,462	329,156	207,196	40,759	22,891	0	638,464
	88	NA	NA	847,303	358,242	483,488	8,738	NA
m-Cresol	94	684,191	21,207	48,433	14,624	15,923	0	784,378
	93	270,000	9,373	51,380	9,654	15,386	0	355,793
	92	888	45,117	20,963	7,496	23,021	0	97,485
	88	NA	NA	125,737	7,165	13,503	0	NA
o-Cresol	94	4,178	11,520	27,062	99,457	8,335	0	150,552
	93	0	7,205	11,706	40,942	6,632	0	66,485
	92	0	28,607	4,529	33,565	13,382	0	80,083
	88	NA	NA	75,565	40,703	12,458	2,500	NA
p-Cresol	94	450,009	44,592	32,831	1,723,189	10,617	0	2,261,238
	93	160,000	79,736	23,124	868,509	8,086	0	1,139,455
	92	0	163,747	21,716	672,069	12,310	0	869,842
	88	NA	NA	26,377	744,568	643	250	NA
Cumene	94	96,410	621,205	193,873	24,194	25,761	0	961,443
	93	90,372	879,000	83,245	69,289	12,089	0	1,133,995
	92	49,393	661,008	60,702	42,645	18,072	0	831,820
	88	NA	NA	126,382	203,279	80,075	0	NA
Cumene hydroperoxide	94	0	738	2,353	768	71,597	0	75,456
	93	0	706	4,316	592	15,687	0	21,301
	92	0	255	1,790	260	42,686	0	44,991
	88	NA	NA	2,572	5,250	22,944	0	NA
Cupferron	94	0	17,811	0	78	0	0	17,889
	93	0	0	2,300	56	0	0	2,356
	92	0	0	0	69	0	0	69
	88	NA	NA	4,275	780	0	0	NA
Cyanide compounds	94	27,418	8,094	404,259	164,181	156,894	8,854	769,700
	93	24,600	2,008	325,901	99,991	149,070	500	602,070
	92	94,518	250	378,690	100,241	254,652	2,200	830,551
	88	NA	NA	1,964,387	1,162,387	581,430	150,909	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
110-82-7	Cyclohexane	94	374	3,532,751	5,145,330	31,695	192,409	18,138	8,920,323
		93	341	4,877,425	5,511,015	26,919	266,045	13,018	10,694,422
		92	357	5,329,818	8,510,090	26,753	230,985	109,348	14,206,994
		88	301	5,256,849	8,705,419	20,071	334,471	38,190	14,355,000
94-75-7	2,4-D (acetic acid)	94	29	5,797	3,772	133	250	300	10,252
		93	29	5,596	3,218	184	750	55	9,803
		92	28	3,292	3,498	262	1,200	15,302	23,554
		88	28	3,289	3,731	549	3,789	38,000	49,358
1163-19-5	Decabromodiphenyl oxide	94	126	16,151	153,471	1,958	40	298,191	469,811
		93	127	23,363	179,555	2,176	39	506,785	711,918
		92	128	12,190	25,027	3,873	285	529,340	570,715
		88	58	7,500	22,104	500	292	21,450	51,846
615-05-4	2,4-Diaminoanisole	94	No Reports Received						
		93	No Reports Received						
		92	No Reports Received						
		88	1	0	0	0	0	0	0
39156-41-7	2,4-Diaminoanisole sulfate	94	No Reports Received						
		93	No Reports Received						
		92	No Reports Received						
		88	1	0	0	0	0	0	0
101-80-4	4,4'-Diaminodiphenyl ether	94	5	14	102	1,653	0	12	1,781
		93	5	8	111	2,137	0	5	2,261
		92	5	5	264	312	0	0	581
		88	5	0	216	585	0	0	801
25376-45-8	Diaminotoluene (mixed isomers)	94	11	15,213	6,500	3,666	7,700	57	33,136
		93	12	12,501	4,863	989	28,000	113	46,466
		92	11	13,913	4,570	695	10,000	85	29,263
		88	13	15,202	5,895	3,288	174,000	295	198,680
95-80-7	2,4-Diaminotoluene	94	4	250	1,767	0	0	0	2,017
		93	4	263	1,527	0	0	0	1,790
		92	4	1,150	755	5	0	0	1,910
		88	2	2,900	88	250	0	0	3,238
132-64-9	Dibenzofuran	94	34	15,416	9,070	41	0	1,589	26,116
		93	45	16,309	14,143	10	0	910	31,372
		92	44	16,622	13,456	260	0	211	30,549
		88	110	46,687	24,406	1,510	0	9,929	82,532
96-12-8	1,2-Dibromo-3-chloropropane	94	No Reports Received						
		93	No Reports Received						
		92	2	294	0	0	0	0	294
		88	No Reports Received						
106-93-4	1,2-Dibromoethane	94	16	11,417	3,995	2,788	12	325	18,537
		93	19	17,439	7,760	80	26	254	25,559
		92	16	10,921	21,941	106	1,823	6	34,797
		88	34	34,119	29,223	1,011	6,882	259	71,494
84-74-2	Dibutyl phthalate	94	126	26,767	43,349	2,327	280,000	750	353,193
		93	129	107,047	74,204	3,593	140,000	1,000	325,844
		92	133	104,440	72,971	5,991	110,000	764	294,166
		88	126	169,836	34,222	14,339	350,000	6,395	574,792
25321-22-6	Dichlorobenzene (mixed isomers)	94	7	316	3,726	0	0	0	4,042
		93	8	475	6,411	0	1	30	6,917
		92	9	725	3,796	0	4	0	4,525
		88	15	20,169	143,515	40	0	0	163,724

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Cyclohexane	94	1,532,738	2,689,509	2,416,381	17,638	25,364	0	6,681,630
	93	1,385,099	2,907,123	815,048	12,103	20,271	0	5,139,644
	92	437,349	2,985,891	1,025,480	17,458	32,254	0	4,498,432
	88	NA	NA	2,691,889	146,667	211,575	37,400	NA
2,4-D (acetic acid)	94	0	0	45,410	38	96,785	0	142,233
	93	0	0	51,521	574	18,728	0	70,823
	92	0	0	28,201	300	51,900	5	80,406
	88	NA	NA	23,335	27,952	68,422	0	NA
Decabromodiphenyl oxide	94	159,003	30,860	24,923	394,637	951,231	0	1,560,654
	93	25,105	8,129	27,725	202,671	855,820	0	1,119,450
	92	21,032	7,406	53,759	126,872	721,583	0	930,652
	88	NA	NA	76,150	19,090	555,181	1,284	NA
2,4-Diaminoanisole	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	0	250	0	0	NA
2,4-Diaminoanisole sulfate	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	0	250	0	0	NA
4,4'-Diaminodiphenyl ether	94	0	0	9,574	10	122	0	9,706
	93	0	0	23,548	7	119	0	23,674
	92	0	0	4,226	5	1,193	0	5,424
	88	NA	NA	0	179	142	0	NA
Diaminotoluene (mixed isomers)	94	321	354,950	507,953	160,640	9,719	0	1,033,583
	93	0	376,100	479,489	58,575	1,646	0	915,810
	92	0	367,800	428,171	33,575	2,793	0	832,339
	88	NA	NA	456,114	2,951	289,591	250	NA
2,4-Diaminotoluene	94	0	480	64,350	0	0	0	64,830
	93	0	0	57,902	0	0	0	57,902
	92	0	0	10,388	0	0	0	10,388
	88	NA	NA	0	1,200	0	0	NA
Dibenzofuran	94	26,485	0	135	508	26,616	0	53,744
	93	3,609	19,988	1,272	505	30,141	0	55,515
	92	0	800	3,701	255	68,640	250	73,646
	88	NA	NA	51,985	47,726	181,799	250	NA
1,2-Dibromo-3-chloropropane	94	No Reports Received						
	93	No Reports Received						
	92	0	0	0	0	0	0	0
	88	No Reports Received						
1,2-Dibromoethane	94	116	2	73,737	0	251	0	74,106
	93	1	255	502,946	0	67	0	503,269
	92	0	2,353	66,160	0	1,005	0	69,518
	88	NA	NA	5,937	253	27,924	0	NA
Dibutyl phthalate	94	23,901	237,232	159,616	3,978	68,507	0	493,234
	93	12,896	200,186	117,592	8,948	74,055	0	413,677
	92	1,345	117,926	140,581	8,829	77,181	8	345,870
	88	NA	NA	157,156	36,523	113,068	1,618	NA
Dichlorobenzene (mixed isomers)	94	0	2,566	211	0	9	0	2,786
	93	0	14,828	14,540	0	0	0	29,368
	92	0	92	212	250	11	0	565
	88	NA	NA	104,706	182,663	19,672	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
95-50-1	1,2-Dichlorobenzene	94	33	98,035	147,114	2,812	2,900	24,287	275,148
		93	31	168,572	176,072	2,174	14,000	6,947	367,765
		92	38	182,216	169,843	2,436	3,700	6,469	364,664
		88	45	206,072	324,463	11,624	20,000	13,354	575,513
541-73-1	1,3-Dichlorobenzene	94	9	1,925	8,270	547	0	0	10,742
		93	7	1,339	8,682	139	0	0	10,160
		92	8	1,102	3,033	877	0	0	5,012
		88	6	5,782	9,500	1,281	0	0	16,563
106-46-7	1,4-Dichlorobenzene	94	23	114,912	142,276	1,595	2,000	1,100	261,883
		93	22	95,363	262,528	1,265	2,000	1,112	362,268
		92	23	74,313	263,633	2,021	2,000	622	342,589
		88	24	103,870	1,787,549	6,153	4,000	1,300	1,902,872
91-94-1	3,3'-Dichlorobenzidine	94	5	5	5	0	0	0	10
		93	5	5	5	0	0	0	10
		92	6	5	5	0	0	0	10
		88	14	250	5	752	0	0	1,007
75-27-4	Dichlorobromomethane	94	1	0	0	0	0	0	0
		93	1	180	0	0	0	0	180
		92	2	15,294	0	0	0	0	15,294
		88	1	13,440	0	0	0	0	13,440
107-06-2	1,2-Dichloroethane	94	79	660,811	1,210,095	7,446	34,296	15	1,912,663
		93	76	617,074	1,705,374	9,816	5,198	303	2,337,765
		92	89	672,901	2,569,806	12,760	6,927	1,858	3,264,252
		88	110	1,574,325	3,040,854	40,527	1,452,084	2,166	6,109,956
540-59-0	1,2-Dichloroethylene	94	9	7,796	7,813	23	0	0	15,632
		93	12	19,923	11,447	28	0	0	31,398
		92	11	15,623	9,204	7	24	1	24,859
		88	10	16,552	109,926	95	0	1	126,574
75-09-2	Dichloromethane	94	1,030	25,022,843	37,687,647	52,289	960,942	50,845	63,774,566
		93	1,081	24,227,024	40,677,058	62,909	956,098	78,267	66,001,356
		92	1,140	27,757,860	46,958,094	233,786	1,183,867	79,308	76,212,915
		88	1,673	49,639,037	79,465,932	349,960	1,478,833	157,156	131,090,918
120-83-2	2,4-Dichlorophenol	94	5	3,045	794	61	10,860	0	14,760
		93	3	270	318	61	7,677	0	8,326
		92	3	274	303	0	9,735	0	10,312
		88	8	535	868	107	17,700	2	19,212
78-87-5	1,2-Dichloropropane	94	13	303,857	405,690	3,609	215	12	713,383
		93	12	262,040	315,399	4,749	0	19	582,207
		92	11	205,467	414,450	6,755	0	1,206	627,878
		88	12	315,478	1,079,826	23,785	0	3,400	1,422,489
542-75-6	1,3-Dichloropropylene	94	11	21,509	3,161	86	0	0	24,756
		93	10	27,698	5,650	2	0	0	33,350
		92	9	31,499	6,212	69	0	0	37,780
		88	8	39,790	14,800	250	0	0	54,840
62-73-7	Dichlorvos	94	5	768	513	5	0	0	1,286
		93	5	807	500	5	0	250	1,562
		92	8	546	558	5	0	0	1,109
		88	7	1,050	0	0	0	0	1,050
115-32-2	Dicofol	94	3	255	0	0	0	0	255
		93	5	255	10	5	0	250	520
		92	6	255	256	0	0	0	511
		88	8	593	750	0	0	0	1,343

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
1,2-Dichlorobenzene	94	2,518,203	777,347	2,153,033	20,607	38,095	0	5,507,285
	93	3,145,376	404,460	1,538,389	30,791	99,113	0	5,218,129
	92	1,904,907	787,666	1,897,592	29,799	64,587	0	4,684,551
	88	NA	NA	1,947,856	64,118	38,266	53,683	NA
1,3-Dichlorobenzene	94	7,632	0	1,858	1,800	0	0	11,290
	93	6,764	450	5,048	1,537	0	0	13,799
	92	950	0	4,626	480	18	0	6,074
	88	NA	NA	250	40	290	0	NA
1,4-Dichlorobenzene	94	7,531	2,730	272,689	3,303	0	0	286,253
	93	6,278	0	102,521	3,631	213	0	112,643
	92	3	0	132,587	1,603	751	77	135,021
	88	NA	NA	138,132	37,997	750	0	NA
3,3'-Dichlorobenzidine	94	0	12,000	14,500	260	1,255	0	28,015
	93	0	3,300	11,250	10	5,005	0	19,565
	92	0	250	16,600	260	5,850	0	22,960
	88	NA	NA	14,420	617	209,785	0	NA
Dichlorobromomethane	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
1,2-Dichloroethane	94	15,625,934	636,747	1,178,962	11,853	75,392	0	17,528,888
	93	8,858,152	271,519	2,255,677	20,407	61,675	0	11,467,430
	92	18,429,536	82,186	2,146,043	20,044	20,530	0	20,698,339
	88	NA	NA	1,617,555	1,477,242	166,131	228.000	NA
1,2-Dichloroethylene	94	2,400	0	28	0	6	0	2,434
	93	2,101	0	522	0	0	0	2,623
	92	2,330	0	312	0	3	0	2,645
	88	NA	NA	125,744	0	87,614	0	NA
Dichloromethane	94	20,785,487	3,755,198	11,458,743	835,117	296,536	9,517	37,140,598
	93	21,058,873	3,272,177	9,786,544	825,299	109,056	33,584	35,085,533
	92	28,927,441	4,076,559	12,530,708	1,300,148	190,299	80,549	47,105,704
	88	NA	NA	11,191,522	1,831,154	10,154,983	1,089,604	NA
2,4-Dichlorophenol	94	0	0	0	0	1,815	0	1,815
	93	0	0	0	0	250	0	250
	92	0	0	0	0	0	0	0
	88	NA	NA	12,559	6	350	0	NA
1,2-Dichloropropane	94	0	1	2,037	253	699	0	2,990
	93	11,000	7	110,468	252	567	0	122,294
	92	0	0	53	1,389	1,952	0	3,394
	88	NA	NA	3,782	136,775	1,131	0	NA
1,3-Dichloropropylene	94	5,007	1,703	11,934	0	0	0	18,644
	93	5,432	1	2,257	0	0	0	7,690
	92	0	0	2,818	0	0	0	2,818
	88	NA	NA	2,738	0	0	0	NA
Dichlorvos	94	0	250	755	0	7,037	0	8,042
	93	0	250	3,660	0	750	0	4,660
	92	0	250	2,350	1	1,251	0	3,852
	88	NA	NA	1,011	0	505	0	NA
Dicofol	94	0	0	250	0	0	0	250
	93	0	0	2,271	0	250	0	2,521
	92	0	0	1,750	0	500	0	2,250
	88	NA	NA	9,380	0	15,786	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
111-42-2	Diethanolamine	94	358	189,175	140,171	221,037	81,164	169,713	801,260
		93	365	197,805	114,131	282,871	60,284	67,023	722,114
		92	354	175,979	86,589	403,774	55,526	179,011	900,879
		88	332	443,507	198,081	438,213	238,317	133,456	1,451,574
117-81-7	Di-(2-ethylhexyl) phthalate	94	307	124,650	330,957	962	0	103,756	560,325
		93	334	149,801	430,305	1,118	0	92,887	674,111
		92	344	149,613	761,839	947	35	99,157	1,011,591
		88	303	181,545	1,035,768	2,776	3,091	20,748	1,243,928
84-66-2	Diethyl phthalate	94	63	24,803	133,712	752	0	803	160,070
		93	63	26,703	131,596	337	0	750	159,386
		92	59	10,827	83,144	260	0	505	94,736
		88	32	6,239	82,378	11,272	0	0	99,889
64-67-5	Diethyl sulfate	94	33	6,305	622	10	0	5	6,942
		93	35	5,159	16,857	5	0	5	22,026
		92	37	3,284	9,952	5	0	5	13,246
		88	24	8,436	2,191	0	0	250	10,877
119-90-4	3,3'-Dimethoxybenzidine	94	3	3	0	5	0	0	8
		93	2	0	0	4	0	0	4
		92	3	0	0	8	0	0	8
		88	No Reports Received						
57-14-7	1,1-Dimethyl hydrazine	94	3	721	26	0	0	0	747
		93	4	99	95	0	0	0	194
		92	4	83	286	0	0	5	374
		88	4	2,206	2,117	10	0	0	4,333
105-67-9	2,4-Dimethylphenol	94	21	17,252	40,496	704	64,000	250	122,702
		93	18	16,323	14,990	84	55,000	250	86,647
		92	20	19,952	8,390	4	66,000	10	94,356
		88	13	1,661	9,927	484	24,703	399	37,174
131-11-3	Dimethyl phthalate	94	75	67,703	199,555	266	1,200	5	268,729
		93	69	21,010	71,529	329	1,300	5	94,173
		92	57	11,570	67,385	419	855	5	80,234
		88	57	113,841	421,215	4,335	390	504	540,285
77-78-1	Dimethyl sulfate	94	37	5,351	1,416	300	0	0	7,067
		93	36	4,556	1,199	0	0	5	5,760
		92	34	6,050	973	161	0	0	7,184
		88	33	9,176	1,630	610	0	50	11,466
534-52-1	4,6-Dinitro-o-cresol	94	6	6	84	5	0	0	95
		93	6	6	65	10	0	0	81
		92	6	2	31	20	0	0	53
		88	10	259	15	266	0	2	542
51-28-5	2,4-Dinitrophenol	94	6	121	2	2,312	36,900	9	39,344
		93	5	1	2	142	27,408	4	27,557
		92	8	14,680	5,632	128	18,925	6	39,371
		88	11	12,386	8,439	98,692	86,200	257	205,974
121-14-2	2,4-Dinitrotoluene	94	2	1,848	51	399	0	0	2,298
		93	4	1,846	33	319	0	0	2,198
		92	8	1,707	57	105	0	0	1,869
		88	13	15,533	77,724	12,055	106,400	14,961	226,673
606-20-2	2,6-Dinitrotoluene	94	1	503	13	374	0	0	890
		93	1	463	8	212	0	0	683
		92	1	422	3	126	0	0	551
		88	7	6,074	81,523	957	27,000	0	115,554

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Diethanolamine	94	268,541	88,600	295,008	1,503,177	349,362	0	2,504,688
	93	364,972	93,015	565,007	2,247,216	104,498	0	3,374,708
	92	271,869	114,264	331,933	1,020,511	344,631	0	2,083,208
	88	NA	NA	733,874	2,002,497	372,707	221,811	NA
Di-(2-ethylhexyl) phthalate	94	5,889,207	277,414	211,095	30,123	2,090,391	0	8,498,230
	93	5,435,703	232,312	442,172	26,921	2,888,883	0	9,025,991
	92	3,322,337	388,952	194,936	30,321	2,808,626	1,660	6,746,832
	88	NA	NA	825,367	169,896	3,629,163	117,050	NA
Diethyl phthalate	94	569,800	14,224	127,523	235,024	2,767	0	949,338
	93	357,899	117,137	60,812	302,115	13,930	0	851,893
	92	297,764	57,808	54,635	474,534	47,671	250	932,662
	88	NA	NA	97,952	37,600	6,572	1,400	NA
Diethyl sulfate	94	6,180,000	76	1,892	4,565	0	0	6,186,533
	93	5,370,550	54	1,775	457	0	0	5,372,836
	92	4,942,698	33	815	547	172	0	4,944,265
	88	NA	NA	0	890	0	0	NA
3,3'-Dimethoxybenzidine	94	0	0	0	33	0	0	33
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	No Reports Received						
1,1-Dimethyl hydrazine	94	46	0	3,308	0	5	0	3,359
	93	5	0	2,914	0	6	0	2,925
	92	22	0	7,005	0	0	0	7,027
	88	NA	NA	0	0	8,855	0	NA
2,4-Dimethylphenol	94	46,074	43,599	28,001	6,161	1,448	0	125,283
	93	22,356	27,443	16,314	5,700	885	0	72,698
	92	304	72,669	10,351	5,445	1,503	0	90,272
	88	NA	NA	1,250	7,964	1,500	0	NA
Dimethyl phthalate	94	5,276	87,747	14,290	95,851	3,802	0	206,966
	93	250	28,987	25,816	131,086	4,597	0	190,736
	92	500	47,843	38,402	108,641	3,497	0	198,883
	88	NA	NA	44,454	508,821	93,358	0	NA
Dimethyl sulfate	94	35,803	0	0	10	0	0	35,813
	93	39,542	0	0	265	0	0	39,807
	92	48,266	0	0	10	0	0	48,276
	88	NA	NA	0	1,000	0	0	NA
4,6-Dinitro-o-cresol	94	0	74	10,186	640	5,953	0	16,853
	93	0	1,376	6,122	357	6,630	0	14,485
	92	0	210	2,166	4,910	5,550	0	12,836
	88	NA	NA	259,448	19	46,648	0	NA
2,4-Dinitrophenol	94	0	0	12,375	0	70	0	12,445
	93	0	0	9,000	0	20	0	9,020
	92	0	1	6,410	5	0	0	6,416
	88	NA	NA	567,365	1,000	110,285	0	NA
2,4-Dinitrotoluene	94	0	1,187	0	0	255	0	1,442
	93	0	300	0	0	10	0	310
	92	0	0	0	0	0	0	0
	88	NA	NA	2,055	700,000	124,281	0	NA
2,6-Dinitrotoluene	94	0	156	0	0	0	0	156
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	703	170,000	30,882	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),(43) Continued.

CAS Number(44)	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
123-91-1	1,4-Dioxane	94	55	121,132	109,760	305,771	0	2,266	538,929
		93	65	421,047	159,389	652,296	0	2,236	1,234,968
		92	85	410,560	274,198	447,066	0	3,297	1,135,121
		88	73	361,259	251,374	203,320	0	11,702	827,655
106-89-8	Epichlorohydrin	94	68	263,624	223,103	3,486	0	754	490,967
		93	71	282,451	101,680	3,642	0	2,356	390,129
		92	73	402,097	120,556	3,165	0	1,655	527,473
		88	78	506,142	200,965	4,917	68,750	2,524	783,298
110-80-5	2-Ethoxyethanol	94	40	77,973	149,612	104	0	2	227,691
		93	49	109,436	208,789	1,952	0	0	320,177
		92	56	117,783	280,671	18	0	35	398,507
		88	110	281,053	2,150,257	120,164	0	52	2,551,526
140-88-5	Ethyl acrylate	94	107	85,517	87,567	253	0	18	173,355
		93	103	92,551	93,419	1,200	2,400	21	189,591
		92	100	108,017	97,449	734	3,200	1,114	210,514
		88	105	126,521	119,461	1,211	0	265	247,458
100-41-4	Ethylbenzene	94	969	3,258,605	8,844,428	10,978	633,842	54,286	12,802,139
		93	945	3,153,025	7,310,430	15,461	333,957	28,710	10,841,583
		92	904	3,262,925	6,877,160	15,793	193,882	289,438	10,639,198
		88	563	3,160,208	4,539,206	15,970	72,914	202,112	7,990,410
541-41-3	Ethyl chloroformate	94	5	3,106	435	5	0	5	3,551
		93	5	1,918	485	5	0	5	2,413
		92	6	2,231	1,138	26	0	5	3,400
		88	5	11,880	2,023	0	0	0	13,903
74-85-1	Ethylene	94	276	14,668,769	20,601,567	27,438	0	0	35,297,774
		93	277	15,014,375	18,534,200	24,779	0	0	33,573,354
		92	283	16,663,512	20,085,503	13,413	0	0	36,762,428
		88	272	22,744,675	26,839,540	15,214	17,203	13,250	49,629,882
107-21-1	Ethylene glycol	94	1,321	5,300,772	4,354,999	784,402	4,958,550	1,051,939	16,450,662
		93	1,343	2,464,064	7,813,427	1,189,650	5,943,528	1,265,746	18,676,415
		92	1,358	3,230,999	7,063,962	1,345,386	4,923,321	682,783	17,246,451
		88	1,450	4,093,387	9,124,052	3,739,120	7,927,570	736,344	25,620,473
151-56-4	Ethyleneimine	94	1	0	0	0	0	0	0
		93	1	0	0	0	0	0	0
		92	1	0	0	0	0	0	0
		88	1	250	250	0	0	0	500
75-21-8	Ethylene oxide	94	155	393,005	321,950	2,088	8,100	785	725,928
		93	162	479,314	585,332	2,634	28,000	11,222	1,106,502
		92	174	670,668	645,995	1,849	120,000	837	1,439,349
		88	202	923,731	3,708,003	44,851	11,125	54,700	4,742,410
96-45-7	Ethylene thiourea	94	10	5	524	0	0	0	529
		93	7	5	265	0	0	0	270
		92	10	5	280	0	0	0	285
		88	6	0	500	0	0	0	500
2164-17-2	Fluometuron	94	7	290	542	0	0	0	832
		93	7	296	347	0	0	0	643
		92	5	301	303	5	0	0	609
		88	2	250	250	0	0	0	500
50-00-0	Formaldehyde	94	781	1,803,777	9,674,746	388,750	7,739,510	149,116	19,755,899
		93	788	2,016,047	9,401,876	418,498	6,312,425	418,220	18,567,066
		92	778	1,844,893	9,544,917	441,247	4,916,248	174,424	16,921,729
		88	821	3,104,302	9,155,886	904,546	9,608,524	494,111	23,267,369

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
1,4-Dioxane	94	23,697	619,260	75,177	311,650	16,115	0	1,045,899
	93	20,107	738,584	200,994	258,084	61,762	0	1,279,531
	92	37,925	589,673	388,364	269,319	47,275	0	1,332,556
	88	NA	NA	199,402	203,103	10,954	925	NA
Epichlorohydrin	94	0	183,888	880,789	38,615	183	0	1,103,475
	93	0	17,837	947,707	29,201	851	0	995,596
	92	0	41,275	880,794	4,709	276	0	927,054
	88	NA	NA	690,257	73,385	307	0	NA
2-Ethoxyethanol	94	304,696	310,524	34,027	355,198	0	0	1,004,445
	93	359,015	267,599	35,069	391,233	3	0	1,052,919
	92	13,688	206,073	73,093	404,046	250	2	697,152
	88	NA	NA	366,979	196,286	71,142	250	NA
Ethyl acrylate	94	46,359	1,613,608	49,894	26,959	20,056	0	1,756,876
	93	38,620	1,417,133	244,897	21,310	9,493	0	1,731,453
	92	0	1,275,919	123,262	15,836	19,268	0	1,434,285
	88	NA	NA	101,345	27,656	7,110	250	NA
Ethylbenzene	94	5,019,955	9,057,150	1,936,211	59,381	304,318	0	16,377,015
	93	3,945,186	9,310,027	1,331,205	57,017	131,894	250	14,775,579
	92	3,271,166	8,929,359	1,336,714	100,169	144,021	12,476	13,793,905
	88	NA	NA	2,358,965	511,285	415,533	269,164	NA
Ethyl chloroformate	94	0	10	761	0	0	0	771
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	69,600	0	0	0	NA
Ethylene	94	0	9,961,635	25,854	563	17	0	9,988,069
	93	0	11,708,800	61,073	19	128	0	11,770,020
	92	0	10,774,417	92,714	5	329	0	10,867,465
	88	NA	NA	29,887	250	11,432	0	NA
Ethylene glycol	94	120,231,084	7,683,312	16,044,270	16,326,235	1,657,669	0	161,942,570
	93	109,654,382	8,774,329	9,125,791	15,111,275	1,408,174	0	144,073,951
	92	102,221,954	7,361,177	6,993,722	19,840,454	999,079	137,804	137,554,190
	88	NA	NA	14,505,355	17,399,131	2,594,372	465,625	NA
Ethyleneimine	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Ethylene oxide	94	6,177	1	6,630	103,723	5,421	0	121,952
	93	0	1	1,063	95,140	3,589	0	99,793
	92	21,866	0	14,288	94,860	1,650	0	132,664
	88	NA	NA	1,250	362,521	20,663	0	NA
Ethylene thiourea	94	780	0	8,240	5	2,819	0	11,844
	93	2,054	0	5,585	5	1,260	0	8,904
	92	0	1,682	6,042	12	7,060	0	14,796
	88	NA	NA	250	500	2,250	0	NA
Fluometuron	94	0	0	2,009	255	2,335	0	4,599
	93	0	0	3,460	30,030	9,364	0	42,854
	92	0	0	7,205	11,851	3,037	0	22,093
	88	NA	NA	19,100	2,300	3,700	0	NA
Formaldehyde	94	49,281	283,343	707,840	2,698,561	266,426	0	4,005,451
	93	60,093	146,580	1,092,275	3,594,354	367,264	0	5,260,566
	92	173,167	178,066	905,798	5,631,384	322,888	29,766	7,241,069
	88	NA	NA	1,326,663	4,382,254	1,409,999	3,580	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
76-13-1	Freon 113	94	237	3,337,957	1,738,081	1,504	0	0	5,077,542
		93	468	6,914,660	2,950,969	4,271	4	1,237	9,871,141
		92	872	17,899,940	7,044,122	1,916	214	9,028	24,955,220
		88	1,440	47,169,422	23,407,650	32,894	5,965	27,799	70,643,730
—	Glycol ethers	94	2,157	10,455,326	38,065,248	292,472	128,096	50,785	48,991,927
		93	2,209	10,128,141	35,782,872	363,984	114,415	76,462	46,465,874
		92	2,232	10,881,855	36,431,343	360,138	194,386	161,656	48,029,378
		88	1,620	10,525,203	38,338,442	280,271	362,198	105,185	49,611,299
76-44-8	Heptachlor	94	1	830	0	3	0	0	833
		93	1	31	0	2	0	0	33
		92	2	460	250	1	0	0	711
		88	2	54,292	3	2	0	0	54,297
118-74-1	Hexachlorobenzene	94	9	323	112	269	204	0	908
		93	10	304	332	476	548	0	1,660
		92	9	4,138	333	227	794	0	5,492
		88	9	3,602	443	4	410	0	4,459
87-68-3	Hexachloro-1,3-butadiene	94	7	1,189	221	351	201	0	1,962
		93	8	1,190	557	1,200	520	0	3,467
		92	7	1,916	2,218	1,911	738	0	6,783
		88	9	2,043	465	153	220	0	2,881
77-47-4	Hexachlorocyclo-pentadiene	94	4	7,675	1,248	1	250	0	9,174
		93	4	2,857	908	1	250	0	4,016
		92	4	7,112	1,268	0	5	0	8,385
		88	5	77,902	415	6	2,131	0	80,454
67-72-1	Hexachloroethane	94	19	4,736	30,260	447	326	0	35,769
		93	24	1,030	48,677	291	1,081	0	51,079
		92	20	1,738	19,284	3	1,670	0	22,695
		88	22	2,949	16,128	11	520	1	19,609
302-01-2	Hydrazine	94	46	11,539	4,846	292	250	29	16,956
		93	46	12,267	4,185	784	0	5	17,241
		92	43	13,033	6,238	842	0	10	20,123
		88	55	24,368	7,689	2,149	0	29	34,235
10034-93-2	Hydrazine sulfate	94	3	0	2	0	230,000	0	230,002
		93	3	0	1	0	220,000	0	220,001
		92	3	0	2	0	120,000	0	120,002
		88	4	290	882	0	355,000	0	356,172
7647-01-0	Hydrochloric acid	94	3,300	3,489,997	69,181,592	25,991	141,990,565	263,737	214,951,882
		93	3,318	4,320,756	76,047,122	719,541	146,397,099	359,261	227,843,779
		92	3,338	4,412,221	73,984,938	1,927,193	207,793,749	432,770	288,550,871
		88	3,264	6,233,671	69,936,603	3,861,789	396,089,339	5,523,473	481,644,875
74-90-8	Hydrogen cyanide	94	45	73,812	2,208,155	712	860,568	6	3,143,253
		93	41	53,123	2,180,968	396	821,815	12	3,056,314
		92	36	65,822	2,275,468	3,947	801,646	17	3,146,900
		88	35	131,604	977,673	2,300	1,737,850	1,761	2,851,188
7664-39-3	Hydrogen fluoride	94	521	2,720,617	4,661,457	28,129	2,924	27,643	7,440,770
		93	513	3,081,226	4,653,919	10,340	3,520	28,560	7,777,565
		92	526	4,379,551	5,834,729	3,400	1	27,886	10,245,567
		88	527	3,788,142	9,642,646	189,928	250	13,002	13,633,968
123-31-9	Hydroquinone	94	60	16,113	28,861	4,457	456,762	42	506,235
		93	60	3,950	16,125	8,994	470,000	117	499,186
		92	56	4,533	8,985	3,967	250,750	0	268,235
		88	61	3,601	6,733	7,211	375,400	530	393,475

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Freon 113	94	1,943,928	163,558	960,119	39,023	42,431	0	3,149,059
	93	3,070,364	210,179	417,205	37,045	12,278	750	3,747,821
	92	5,666,546	393,733	787,466	23,211	102,065	5,116	6,978,137
	88	NA	NA	4,037,767	104,441	1,925,997	300,965	NA
Glycol ethers	94	4,280,494	14,471,517	4,222,175	11,140,741	703,449	14,682	34,833,058
	93	4,150,569	13,887,475	3,498,330	12,090,077	796,501	25,678	34,448,630
	92	3,605,195	11,824,386	3,041,810	10,634,891	685,013	22,666	29,813,961
	88	NA	NA	5,837,188	9,045,411	1,547,090	539,894	NA
Heptachlor	94	0	0	4,300	77	0	0	4,377
	93	0	0	77,287	42	0	0	77,329
	92	0	0	93,737	69	0	0	93,806
	88	NA	NA	51,935	37	0	0	NA
Hexachlorobenzene	94	1	0	64,568	250	940,478	0	1,005,297
	93	1	0	88,709	250	648,010	0	736,970
	92	1	0	62,543	8	28,380	0	90,932
	88	NA	NA	521,558	160	443,541	0	NA
Hexachloro-1,3-butadiene	94	0	0	60,084	6	430	0	60,520
	93	0	0	21,416	14	12	0	21,442
	92	0	0	14,441	7	5	0	14,453
	88	NA	NA	3,513,001	300	19,640	0	NA
Hexachlorocyclo-pentadiene	94	0	1,250	27,672	1,303	0	0	30,225
	93	0	910	9,620	656	0	0	11,186
	92	0	1,000	33,818	653	2,740	0	38,211
	88	NA	NA	590,845	852	28,470	0	NA
Hexachloroethane	94	0	61,000	18,745	0	352,309	0	432,054
	93	0	41,000	49,801	0	1,954	0	92,755
	92	0	21,000	10,187	0	206	0	31,393
	88	NA	NA	532,352	260	128,504	0	NA
Hydrazine	94	46	0	3,661	4,960	4,600	0	13,267
	93	8	30,005	72,162	1,408	4,136	0	107,719
	92	22	455	131,085	1,308	2,559	0	135,429
	88	NA	NA	36,582	1,468	6,541	0	NA
Hydrazine sulfate	94	0	0	0	2,300	0	0	2,300
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Hydrochloric acid	94	57,794,473	8,667,665	43,869,984	19,241,520	12,238,039	60,055	141,871,736
	93	61,089,390	8,501,213	47,553,857	19,850,744	13,581,451	77,495	150,654,150
	92	59,673,320	5,109,001	43,694,332	29,261,941	12,822,339	255,991	150,816,924
	88	NA	NA	25,633,047	34,773,433	48,946,973	213,017	NA
Hydrogen cyanide	94	0	250	770	7,033	802	0	8,855
	93	0	253	492	281	2,065	0	3,091
	92	0	250	470	330	874	0	1,924
	88	NA	NA	21,200	337	1,001	250	NA
Hydrogen fluoride	94	212,513	0	2,519,974	349,379	761,422	0	3,843,288
	93	281,413	0	2,254,508	269,976	856,706	250	3,662,853
	92	289,178	0	2,539,160	276,044	1,269,429	10,030	4,383,841
	88	NA	NA	2,841,628	508,939	3,467,471	64,252	NA
Hydroquinone	94	0	3,900	29,043	150,987	3,396	0	187,326
	93	9,700	881	47,558	110,898	34,105	0	203,142
	92	8,316	5,139	28,737	162,175	8,646	250	213,263
	88	NA	NA	303,106	512,180	6,835	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
78-84-2	Isobutyraldehyde	94	20	167,790	207,317	472	72,553	0	448,132
		93	20	131,296	255,098	650	34,783	0	421,827
		92	22	114,601	289,205	351	3,840	1	407,998
		88	15	178,740	507,178	773	60	1	686,752
67-63-0	Isopropyl alcohol (manufacturing)	94	85	287,148	708,275	0	0	250	995,673
		93	117	331,981	926,521	0	0	750	1,259,252
		92	112	382,054	989,591	15	0	330	1,371,990
		88	91	790,482	1,210,915	1,900	0	14	2,003,311
80-05-7	4,4'-Isopropylidene-diphenol	94	114	136,826	100,086	18,265	99,184	394,032	748,393
		93	109	105,696	94,784	8,366	44,339	695,804	948,989
		92	109	109,292	76,437	7,463	41,000	287,138	521,330
		88	79	119,870	107,056	126,385	0	424,117	777,428
7439-92-1	Lead	94	817	97,304	317,870	12,268	0	502,240	929,682
		93	817	236,956	460,003	24,591	0	3,336,927	4,058,477
		92	815	165,905	303,214	12,084	0	2,062,834	2,544,037
		88	862	484,033	644,630	61,791	5	6,648,946	7,839,405
—	Lead compounds	94	845	507,374	894,106	53,431	1,263	14,656,876	16,113,050
		93	870	237,908	800,902	50,467	1,768	13,299,794	14,390,839
		92	897	450,522	1,001,320	62,440	2,888	11,924,326	13,441,496
		88	730	354,957	1,177,289	180,363	2,755	20,035,109	21,750,473
58-89-9	Lindane	94	8	280	299	5	0	5	589
		93	8	277	298	0	0	5	580
		92	11	507	531	0	0	0	1,038
		88	3	251	7	0	0	0	258
108-31-6	Maleic anhydride	94	212	76,903	171,186	312	5	2,288	250,694
		93	206	61,297	311,050	403	5	4,062	376,817
		92	200	101,129	355,296	405	5	2,327	459,162
		88	199	111,640	550,604	12,580	240,000	250	915,074
12427-38-2	Maneb	94	6	255	17	0	0	0	272
		93	6	510	520	0	0	0	1,030
		92	7	510	535	0	0	250	1,295
		88	6	1,000	1,265	250	0	0	2,515
7439-96-5	Manganese	94	1,385	551,291	229,593	88,895	10	8,484,764	9,354,553
		93	1,339	312,745	496,883	243,568	504	7,582,541	8,636,241
		92	1,267	405,492	308,283	235,301	304	6,543,600	7,492,980
		88	931	1,045,620	538,621	321,992	255	20,229,826	22,136,314
—	Manganese compounds	94	986	1,125,401	1,842,932	733,537	5,930	37,796,986	41,504,786
		93	1,000	773,527	1,428,654	565,653	8,740	47,670,729	50,447,303
		92	961	613,679	1,371,441	733,723	22,569	63,890,225	66,631,637
		88	540	582,452	1,215,549	681,469	6,816,070	84,226,474	93,522,014
7439-97-6	Mercury	94	21	7,745	2,859	175	0	1,351	12,130
		93	22	9,114	2,528	267	0	1,801	13,710
		92	24	9,462	4,760	273	0	3,122	17,617
		88	37	15,791	7,114	1,397	0	13,279	37,581
—	Mercury compounds	94	9	2,012	704	146	7	0	2,869
		93	13	2,507	914	179	15	11	3,626
		92	15	2,488	761	302	9	17	3,577
		88	15	1,006	1,370	9	27	0	2,412
67-56-1	Methanol	94	2,439	32,088,254	185,724,754	11,007,879	24,343,351	2,602,696	255,766,934
		93	2,461	30,811,305	144,889,244	10,136,033	28,839,963	1,850,075	216,526,620
		92	2,498	34,523,682	174,487,807	18,148,522	27,084,182	3,318,121	257,562,314
		88	2,502	48,262,319	208,601,632	16,906,967	26,555,436	11,694,136	312,020,490

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Isobutyraldehyde	94	1,696	626,772	53,037	45,433	69,306	0	796,244
	93	200	703,266	44,236	10,402	0	0	758,104
	92	400	1,096,087	35,010	3,265	250	0	1,135,012
	88	NA	NA	30,260	713	0	0	NA
Isopropyl alcohol (manufacturing)	94	39,579	313,270	30,670	1,570	1,550	0	386,639
	93	214,276	232,241	116,009	6,514	27,137	0	596,177
	92	225,917	238,766	99,174	68,302	1,318	8,099	641,576
	88	NA	NA	319,961	161,751	247,039	129,407	NA
4,4'-Isopropylidene-diphenol	94	297,938	54,939	100,729	19,360	672,051	0	1,145,017
	93	0	34,556	40,193	32,719	365,436	0	472,904
	92	18,865	34,510	29,037	34,485	370,428	4	487,329
	88	NA	NA	995,810	31,135	444,560	1,000	NA
Lead	94	55,772,470	12,540	705,129	28,528	1,647,537	200,000	58,366,204
	93	40,952,648	7,789	522,472	27,960	2,142,380	750	43,653,999
	92	32,472,983	19,860	775,040	31,384	3,016,749	109,071	36,425,087
	88	NA	NA	2,901,988	122,469	10,728,210	254,573	NA
Lead compounds	94	293,561,113	72,421	5,369,225	61,189	20,542,170	250	319,606,368
	93	250,120,864	75,387	2,497,608	111,055	20,547,453	299	273,352,666
	92	372,504,132	39,419	3,209,472	326,798	13,358,808	413,737	389,852,366
	88	NA	NA	2,254,781	90,956	14,252,634	668,019	NA
Lindane	94	0	0	2,462	5	42	0	2,509
	93	0	0	3,992	6	67	0	4,065
	92	0	0	51,355	5	73	0	51,433
	88	NA	NA	130	0	56	0	NA
Maleic anhydride	94	750	140,954	852,732	4,813	22,012	0	1,021,261
	93	0	112,033	783,929	2,980	25,827	0	924,769
	92	0	62,503	688,345	1,770	34,669	577	787,864
	88	NA	NA	1,725,648	556,373	132,148	1,150	NA
Maneb	94	0	0	1,698	0	13,553	0	15,251
	93	0	0	260	0	125,841	0	126,101
	92	0	0	3,070	5	14,092	0	17,167
	88	NA	NA	2,077	1,470	5,285	0	NA
Manganese	94	87,273,512	900	480,396	52,786	12,965,563	2,293,469	103,066,626
	93	73,062,269	253	504,281	51,213	11,030,769	976,335	85,625,120
	92	33,417,710	323	498,901	67,695	10,703,930	522,006	45,210,565
	88	NA	NA	4,208,789	132,672	17,867,850	3,314,734	NA
Manganese compounds	94	52,720,517	45,052	3,937,739	401,335	22,667,250	5	79,771,898
	93	46,123,938	23,682	3,319,774	378,243	20,023,864	250	69,869,751
	92	38,600,645	29,446	3,365,895	1,001,414	13,594,495	145,350	56,737,245
	88	NA	NA	1,376,268	1,843,019	18,013,696	423,308	NA
Mercury	94	21,223	0	3,813	10	12,590	0	37,636
	93	11,639	0	1,265	15	17,330	0	30,249
	92	14,455	3	13,960	15	29,929	22	58,384
	88	NA	NA	38,548	1,364	218,830	0	NA
Mercury compounds	94	3,685	0	49	5	26,121	0	29,860
	93	12,000	0	486	6	55,549	0	68,041
	92	37,000	1	60,394	7	131,646	0	229,048
	88	NA	NA	256	528	17,133	0	NA
Methanol	94	16,126,765	76,522,836	32,260,230	92,593,278	2,255,577	6,841	219,765,527
	93	15,848,754	67,790,882	36,744,036	96,544,218	3,439,442	388	220,367,720
	92	15,652,368	69,406,552	40,965,551	113,658,323	3,284,731	15,551	242,983,076
	88	NA	NA	40,029,552	121,317,544	15,226,349	3,528,978	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
72-43-5	Methoxychlor	94	3	5	5	0	0	0	10
		93	4	91	5	5	0	0	101
		92	7	261	557	5	0	5	828
		88	12	47,721	83,310	252	0	258	131,541
109-86-4	2-Methoxyethanol	94	58	156,788	461,835	15,898	0	20	634,541
		93	68	498,431	660,857	85,820	0	2	1,245,110
		92	86	899,429	531,326	165,535	0	4	1,596,294
		88	95	1,148,256	4,751,413	40,520	750	7	5,940,946
96-33-3	Methyl acrylate	94	68	93,969	165,346	480	95	89	259,979
		93	64	109,381	82,794	442	130	88	192,835
		92	64	129,531	136,816	1,279	77	705	268,408
		88	61	332,710	110,786	1,687	200	30,260	475,643
1634-04-4	Methyl tert-butyl ether	94	190	898,970	2,202,805	90,240	29,645	2,225	3,223,885
		93	141	924,878	2,747,949	92,315	9,406	409	3,774,957
		92	132	836,254	2,209,275	102,869	68,445	288	3,217,131
		88	90	617,340	1,970,907	21,499	14,400	370	2,624,516
101-14-4	4,4'-Methylenebis (2-chloroaniline)	94	20	10	10	0	0	0	20
		93	17	10	5	0	0	0	15
		92	18	12	5	0	0	2	19
		88	8	250	0	0	0	0	250
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	94		No Reports Received					
		93		No Reports Received					
		92		No Reports Received					
		88	1	250	0	0	0	7,000	7,250
101-68-8	Methylenebis (phenylisocyanate)	94	879	248,941	259,178	15	0	338,804	846,938
		93	842	380,582	166,991	15	0	39,879	587,467
		92	789	307,941	144,341	30	0	89,914	542,226
		88	430	155,166	91,152	1,022	0	87,415	334,755
74-95-3	Methylene bromide	94	6	30,565	41,280	0	5,700	0	77,545
		93	7	42,558	13,759	0	0	0	56,317
		92	6	23,361	14,790	0	250	0	38,401
		88	9	34,468	23,255	0	0	0	57,723
101-77-9	4,4'-Methyenedianiline	94	27	6,669	3,073	725	26,064	0	36,531
		93	27	15,313	2,961	291	9,750	135	28,450
		92	24	6,496	3,890	420	8,865	55	19,726
		88	31	36,804	93,461	2,599	460,250	1,140	594,254
78-93-3	Methyl ethyl ketone	94	2,389	27,184,737	51,440,202	108,385	575,848	51,794	79,360,966
		93	2,473	29,378,455	56,738,332	184,339	360,927	134,162	86,796,215
		92	2,512	32,014,130	61,134,535	154,709	365,395	241,593	93,910,362
		88	2,527	41,669,961	99,080,759	91,426	255,955	166,537	141,264,638
60-34-4	Methyl hydrazine	94	2	250	250	0	0	0	500
		93	2	25	0	0	0	0	25
		92	1	0	0	0	0	0	0
		88	3	2,774	153	1	0	0	2,928
74-88-4	Methyl iodide	94	4	30,383	11	0	0	0	30,394
		93	4	33,233	907	14	0	0	34,154
		92	6	21,980	3,405	11	9,500	0	34,896
		88	3	5,691	3,253	5	250	0	9,199
108-10-1	Methyl isobutyl ketone	94	1,031	6,847,214	18,429,655	80,177	131,600	12,925	25,501,571
		93	1,021	7,810,250	17,477,368	90,214	131,600	76,771	25,586,203
		92	1,038	7,929,834	18,377,272	96,387	129,100	194,986	26,727,579
		88	1,011	13,049,874	18,985,959	762,108	116,650	31,770	32,946,361

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Methoxychlor	94	0	0	5	0	0	0	5
	93	0	0	15	0	5	0	20
	92	0	0	251	0	255	0	506
	88	NA	NA	6,551	0	8	0	NA
2-Methoxyethanol	94	4,300	1,628,616	201,086	1,131,051	58,369	0	3,023,422
	93	320	580,965	327,097	855,415	16,300	0	1,780,097
	92	6,174	727,772	329,524	1,054,043	750	17,845	2,136,108
	88	NA	NA	826,153	622,102	57,362	715	NA
Methyl acrylate	94	25,098	358,071	98,412	3,260	6,318	0	491,159
	93	14,736	255,044	17,229	8,484	1,595	0	297,088
	92	0	409,635	41,241	8,293	1,433	0	460,602
	88	NA	NA	14,040	14,886	4,765	0	NA
Methyl tert-butyl ether	94	17,184	924,149	548,449	95,945	117,753	0	1,703,480
	93	31,756	657,873	33,893	93,942	134,331	0	951,795
	92	17,250	346,394	32,713	80,414	15,329	0	492,100
	88	NA	NA	93,575	7,713	4,602	0	NA
4,4'-Methylenebis (2-chloroaniline)	94	0	5,848	1,069	5	1,300	0	8,222
	93	0	2,148	464	5	750	0	3,367
	92	0	2,559	2,810	5	0	0	5,374
	88	NA	NA	6,250	0	0	0	NA
4,4'-Methylenebis(N,N-dimethyl) benzeneamine	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	0	0	1,150	0	NA
Methylenebis (phenylisocyanate)	94	369,955	119,545	622,830	1,427	433,873	0	1,547,630
	93	400,162	146,804	649,007	1,881	610,492	0	1,808,346
	92	328,874	88,328	552,045	2,305	997,368	47,000	2,015,920
	88	NA	NA	932,648	1,500	1,781,072	7,325	NA
Methylene bromide	94	0	1,300	250	1,114	6,200	0	8,864
	93	0	750	584	2,489	0	0	3,823
	92	33	0	2,284	1,493	0	0	3,810
	88	NA	NA	0	6,097	0	0	NA
4,4'-Methyenedianiline	94	0	6,295	174,060	1,889	24,874	0	207,118
	93	0	8,530	72,400	2,152	33,676	0	116,758
	92	0	26,949	84,836	1,629	9,710	0	123,124
	88	NA	NA	139,349	7,399	141,538	0	NA
Methyl ethyl ketone	94	21,395,064	46,300,997	6,147,170	410,746	417,545	1,000	74,672,522
	93	24,476,161	46,145,068	5,649,597	753,095	418,786	2,573	77,445,280
	92	25,722,371	39,585,028	6,271,887	653,417	614,356	258,615	73,105,674
	88	NA	NA	22,183,425	964,168	5,014,725	2,054,502	NA
Methyl hydrazine	94	0	0	5	0	0	0	5
	93	0	0	74	0	0	0	74
	92	0	0	0	0	0	0	0
	88	NA	NA	1,250	0	1,450	0	NA
Methyl iodide	94	0	250	250	0	2,450	0	2,950
	93	0	350	230	0	27	0	607
	92	0	0	250	0	0	0	250
	88	NA	NA	0	0	250	0	NA
Methyl isobutyl ketone	94	17,951,007	18,854,225	1,626,682	488,749	68,442	4,022	38,993,127
	93	22,886,709	12,055,803	1,406,124	636,214	113,268	2,283	37,100,401
	92	20,232,494	17,385,212	1,500,419	776,557	107,625	205,272	40,207,579
	88	NA	NA	6,075,272	1,509,030	1,966,238	2,467,760	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
624-83-9	Methyl isocyanate	94	4	18,730	1,005	0	0	0	19,735
		93	4	4,490	18,529	0	0	0	23,019
		92	2	6,851	803	0	0	0	7,654
		88	12	9,649	586	0	0	64	10,299
80-62-6	Methyl methacrylate	94	262	718,626	1,740,218	4,669	120,000	74	2,583,587
		93	252	611,062	1,723,141	8,237	260,000	2,606	2,605,046
		92	247	735,650	1,821,342	34,595	220,000	4,003	2,815,590
		88	218	1,346,194	2,284,375	28,437	327,220	8,119	3,994,345
90-94-8	Michler's ketone	94	1	0	814	0	0	0	814
		93	1	100	1,442	0	0	0	1,542
		92	No Reports Received						
		88	4	450	650	0	0	0	1,100
1313-27-5	Molybdenum trioxide	94	152	140,500	37,066	60,848	161,340	71,814	471,568
		93	141	127,593	52,381	61,969	202,775	32,449	477,167
		92	134	52,808	59,996	59,691	162,705	42,651	377,851
		88	100	37,672	73,523	139,021	197,115	97,238	544,569
91-20-3	Naphthalene	94	527	1,744,636	1,322,113	28,179	88,200	47,014	3,230,142
		93	489	1,507,365	1,199,776	31,203	79,814	49,881	2,868,039
		92	479	1,378,132	1,251,466	28,992	78,227	1,667,145	4,403,962
		88	420	3,421,071	1,740,741	22,518	50,946	123,956	5,359,232
134-32-7	alpha-Naphthylamine	94	2	5	5	0	0	0	10
		93	2	5	5	0	0	0	10
		92	2	5	5	0	0	0	10
		88	3	336	254	101	0	0	691
7440-02-0	Nickel	94	1,739	426,442	140,557	31,342	7,080	383,047	988,468
		93	1,706	194,312	156,811	39,597	7,878	450,209	848,807
		92	1,653	543,166	202,137	45,440	5,309	2,449,954	3,246,006
		88	1,162	270,197	181,975	90,386	14,295	1,225,251	1,782,104
—	Nickel compounds	94	834	107,651	132,907	66,981	55,861	1,302,415	1,665,815
		93	831	56,016	132,615	56,908	122,160	2,866,531	3,234,230
		92	795	59,634	100,135	67,078	292,453	1,296,401	1,815,701
		88	567	154,883	115,732	131,983	224,968	2,384,332	3,011,898
7697-37-2	Nitric acid	94	1,827	686,983	1,846,305	167,499	18,269,660	395,050	21,365,497
		93	1,858	817,208	2,329,748	180,513	19,213,898	421,265	22,962,632
		92	1,847	733,779	2,341,512	53,975	22,081,766	662,049	25,873,081
		88	1,917	1,163,493	7,166,450	1,380,565	25,485,680	1,330,695	36,526,883
139-13-9	Nitrilotriacetic acid	94	8	8	5	2,748	500	0	3,261
		93	7	7	5	6,442	500	0	6,954
		92	7	4	0	4,069	2,700	0	6,773
		88	14	1,000	1,500	5,100	0	5,100	12,700
99-59-2	5-Nitro-o-anisidine	94	1	5	5	0	0	0	10
		93	1	5	5	0	0	0	10
		92	2	5	10	0	0	0	15
		88	No Reports Received						
98-95-3	Nitrobenzene	94	14	33,963	6,759	1,999	815,285	226	858,232
		93	15	64,830	7,807	309	309,441	328	382,715
		92	19	38,769	13,798	524	864,949	427	918,467
		88	19	22,616	18,663	7,283	819,000	3,538	871,100
55-63-0	Nitroglycerin	94	19	1,842	34,233	11,544	0	0	47,619
		93	19	2,297	28,232	28,012	0	250	58,791
		92	22	2,059	27,073	12,906	0	16,150	58,188
		88	21	2,280	50,103	2,746	0	11,640	66,769

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Methyl isocyanate	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	314	0	8,400	0	NA
Methyl methacrylate	94	22,185	1,337,112	734,077	285,518	710,303	0	3,089,195
	93	82,310	1,044,464	663,896	265,342	274,425	0	2,330,437
	92	83,571	1,047,331	659,516	252,180	96,628	40,862	2,180,088
	88	NA	NA	2,787,477	191,071	276,567	37,511	NA
Michler's ketone	94	0	145	0	0	0	0	145
	93	0	216	0	0	0	0	216
	92	No Reports Received						
	88	NA	NA	33,519	0	0	0	NA
Molybdenum trioxide	94	3,042,074	0	326,967	62,262	389,598	0	3,820,901
	93	3,270,386	0	78,594	34,806	446,634	0	3,830,420
	92	3,113,348	0	61,487	72,499	350,365	250	3,597,949
	88	NA	NA	7,336	34,044	573,624	20,000	NA
Naphthalene	94	436,139	1,201,671	559,827	15,615	496,506	0	2,709,758
	93	341,922	1,543,575	411,019	24,352	334,485	0	2,655,353
	92	136,187	2,322,051	526,672	88,516	667,306	2,850	3,743,582
	88	NA	NA	536,139	800,227	1,359,184	31,000	NA
alpha-Naphthylamine	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Nickel	94	73,647,516	3,052	1,132,948	94,294	3,280,758	15,930	78,174,498
	93	63,184,206	1,524	976,098	109,994	2,390,645	34,874	66,697,341
	92	735,347,186	13,073	1,157,416	143,156	3,580,177	408,069	740,649,077
	88	NA	NA	1,178,974	252,712	6,406,186	142,258	NA
Nickel compounds	94	30,682,973	1,034	1,542,095	122,576	4,744,220	0	37,092,898
	93	32,046,070	6,593	1,401,445	118,001	5,321,930	18,494	38,912,533
	92	26,993,541	21,561	1,795,081	119,835	5,059,207	43,483	34,032,708
	88	NA	NA	1,886,744	651,832	3,902,835	194,385	NA
Nitric acid	94	3,238,193	3	10,494,546	3,423,791	3,537,114	0	20,693,647
	93	2,484,533	44	11,783,606	2,167,534	2,624,757	250	19,060,724
	92	3,236,744	539	10,641,507	3,806,583	4,004,687	33,614	21,723,674
	88	NA	NA	18,442,846	22,432,957	7,929,318	48,202	NA
Nitrilotriacetic acid	94	0	0	2,080	0	0	0	2,080
	93	0	0	0	0	0	0	0
	92	0	0	8,556	0	0	0	8,556
	88	NA	NA	190,753	254,859	250	0	NA
5-Nitro-o-anisidine	94	0	0	0	5	0	0	5
	93	0	0	0	5	0	0	5
	92	0	0	0	10	250	0	260
	88	No Reports Received						
Nitrobenzene	94	3,603	24,351	459,182	289	2,290	0	489,715
	93	3,370	19,340	288,124	118	790	0	311,742
	92	2,881	27,210	435,854	23	14,297	0	480,265
	88	NA	NA	1,301,075	5,671	69,570	750	NA
Nitroglycerin	94	39,276	0	92,023	263	6	0	131,568
	93	3,551	2	48,379	52	6	0	51,990
	92	3,088	250	68,952	40	0	0	72,330
	88	NA	NA	3,581	53	2	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
88-75-5	2-Nitrophenol	94	4	0	18	67	0	0	85
		93	5	5	24	7	0	0	36
		92	3	5	7	48	0	0	60
		88	4	32,152	1,537	1	0	2	33,692
100-02-7	4-Nitrophenol	94	5	920	81	0	0	0	1,001
		93	5	654	91	33	0	0	778
		92	6	715	105	1,700	0	0	2,520
		88	7	7,642	213	0	6,300	7	14,162
79-46-9	2-Nitropropane	94	7	22,842	14,381	3,300	0	0	40,523
		93	7	39,191	9,137	1,200	0	0	49,528
		92	10	36,262	9,380	900	65,581	0	112,123
		88	15	208,303	181,082	4,300	257,000	0	650,685
156-10-5	p-Nitrosodiphenylamine	94	2	24	0	0	0	0	24
		93	2	24	0	0	5,400	0	5,424
		92	2	24	0	0	4,900	0	4,924
		88	2	15	0	0	2,000	0	2,015
121-69-7	N,N-Dimethylaniline	94	21	5,441	16,651	584	0	0	22,676
		93	23	3,500	17,222	697	0	0	21,419
		92	19	19,616	24,262	2,039	0	0	45,917
		88	20	18,448	80,457	19,967	0	250	119,122
62-75-9	N-Nitrosodimethylamine	94		No Reports Received					
		93		No Reports Received					
		92		No Reports Received					
		88	1	0	0	0	0	0	0
86-30-6	N-Nitrosodiphenylamine	94	1	0	0	0	0	0	0
		93	1	0	0	0	0	0	0
		92	2	0	0	0	0	0	0
		88	2	0	0	27	34,000	0	34,027
56-38-2	Parathion	94	2	1,142	5	0	0	0	1,147
		93	3	1,215	5	5	0	0	1,225
		92	5	10	255	5	0	0	270
		88	13	2,258	1,007	750	0	250	4,265
87-86-5	Pentachlorophenol	94	35	4,511	17,112	1,458	0	250	23,331
		93	39	5,673	5,465	2,541	0	255	13,934
		92	42	7,470	6,224	3,127	0	270	17,091
		88	55	8,133	5,896	2,465	20,000	3,717	40,211
79-21-0	Peracetic acid	94	20	26,364	4,024	15	0	270	30,673
		93	15	847	2,660	53	0	260	3,820
		92	19	2,589	3,379	14	5	520	6,507
		88	8	766	4,687	55	0	0	5,508
108-95-2	Phenol	94	719	2,506,650	5,919,567	121,450	3,224,053	172,458	11,944,178
		93	679	1,927,737	4,784,747	127,891	2,994,279	200,436	10,035,090
		92	688	2,998,934	4,804,130	168,307	5,552,077	190,725	13,714,173
		88	631	4,523,892	6,027,710	258,200	4,661,319	1,882,365	17,353,486
106-50-3	p-Phenylenediamine	94	10	2,845	2,098	1,260	0	2,624	8,827
		93	9	342	3,190	1,004	0	1,051	5,587
		92	10	2,737	2,756	0	0	3	5,496
		88	13	2,210	111,680	826	4,716	0	119,432
90-43-7	2-Phenylphenol	94	18	7,784	35,223	15	0	2	43,024
		93	19	25,409	1,089	57	0	255	26,810
		92	18	6,957	17,865	97	0	5	24,924
		88	15	9,010	1,620	480	0	0	11,110

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
2-Nitrophenol	94	0	0	20,189	180	0	0	20,369
	93	0	4,592	42,430	130	0	0	47,152
	92	0	0	429	0	0	0	429
	88	NA	NA	1,600	149,000	13,100	0	NA
4-Nitrophenol	94	0	0	583,000	186	3	0	583,189
	93	0	0	923,001	245	4	0	923,250
	92	0	0	820,002	411	27	0	820,440
	88	NA	NA	0	560,428	70	0	NA
2-Nitropropane	94	3,300	1,779	29	0	0	0	5,108
	93	3,400	103	12,298	0	0	0	15,801
	92	2,230	0	4,100	0	63,962	4,120	74,412
	88	NA	NA	8,910	3,000	4,785	0	NA
p-Nitrosodiphenylamine	94	0	16,000	0	0	0	0	16,000
	93	0	15,000	0	0	0	0	15,000
	92	0	15,000	0	0	0	0	15,000
	88	NA	NA	0	0	180	0	NA
N,N-Dimethylaniline	94	0	640,609	73,839	145,372	0	0	859,820
	93	0	593,413	37,849	164,986	0	0	796,248
	92	0	1,090,379	132,993	161,693	0	0	1,385,065
	88	NA	NA	465,397	287,483	772	0	NA
N-Nitrosodimethylamine	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	0	0	0	0	NA
N-Nitrosodiphenylamine	94	0	0	200,000	0	0	0	200,000
	93	0	0	474,000	0	0	0	474,000
	92	0	0	498,400	0	0	0	498,400
	88	NA	NA	300	0	0	0	NA
Parathion	94	0	0	1,035	0	15,027	0	16,062
	93	0	0	7,847	0	0	0	7,847
	92	0	0	6,502	0	0	0	6,502
	88	NA	NA	1,321	0	3,959	0	NA
Pentachlorophenol	94	250	24,982	44,970	1,798	24,343	0	96,343
	93	1,010	40,981	69,218	1,133	34,860	0	147,202
	92	1,250	54,457	23,221	900	99,899	0	179,727
	88	NA	NA	27,568	4,728	518,105	0	NA
Peracetic acid	94	0	0	0	2,138	0	0	2,138
	93	0	0	110	3,689	0	0	3,799
	92	0	0	4,553	2,474	0	2,312	9,339
	88	NA	NA	0	0	0	0	NA
Phenol	94	494,671	3,381,500	2,912,978	2,811,469	1,604,425	500	11,205,543
	93	869,280	2,386,612	2,589,383	3,817,033	1,404,237	19,535	11,086,080
	92	808,210	2,699,514	1,681,322	4,548,089	1,175,394	25,087	10,937,616
	88	NA	NA	3,668,466	6,046,640	2,518,461	107,900	NA
p-Phenylenediamine	94	0	0	23,968	3,600	0	0	27,568
	93	0	0	28,693	3,830	7,900	0	40,423
	92	0	0	409	4,298	4,800	0	9,507
	88	NA	NA	53,471	6,277	64,452	0	NA
2-Phenylphenol	94	0	0	121	3,537	1,507	0	5,165
	93	0	260	0	3,687	1,005	0	4,952
	92	0	505	1,500	2,667	515	0	5,187
	88	NA	NA	0	6,400	250	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
75-44-5	Phosgene	94	29	2,826	6,050	0	5	0	8,881
		93	33	3,035	2,660	0	5	0	5,700
		92	32	3,600	1,684	5	5	0	5,294
		88	37	3,839	17,764	500	250	0	22,353
7664-38-2	Phosphoric acid	94	2,710	282,950	751,694	20,900,384	45,616	56,785,731	78,766,375
		93	2,719	502,035	757,304	175,861,627	33,789	35,500,111	212,654,866
		92	2,709	345,546	868,313	158,674,836	35,230	46,725,635	206,649,560
		88	2,531	727,537	1,235,303	122,647,164	53,711	52,615,971	177,279,686
7723-14-0	Phosphorus (yellow or white)	94	52	27,686	4,148	9,391	0	9,543	50,768
		93	52	25,089	5,195	4,987	5	37,505	72,781
		92	50	27,894	2,397	4,808	5	327,970	363,074
		88	73	9,049	11,559	11,322	0	3,893,674	3,925,604
85-44-9	Phthalic anhydride	94	179	98,814	331,805	362	0	0	430,981
		93	181	90,815	395,863	457	0	226	487,361
		92	179	113,917	641,470	5,240	0	1,079	761,706
		88	180	126,906	423,003	1,040	0	1,265	552,214
88-89-1	Picric acid	94	9	2	2	2	43,958	2	43,966
		93	8	2	2	1	64,294	1	64,300
		92	8	2	1	2	1,068,674	2	1,068,681
		88	5	251	1	251	1,362,180	250	1,362,933
—	Polybrominated biphenyls	94	2	0	0	0	0	0	0
		93	1	0	0	0	0	0	0
		92	1	0	250	0	0	5	255
		88	1	250	0	0	0	0	250
1336-36-3	Polychlorinated biphenyls (PCBs)	94	13	0	0	0	0	0	0
		93	16	0	0	0	0	265	265
		92	19	0	0	0	0	1	1
		88	121	6	0	10	0	752	768
1120-71-4	Propane sultone	94	1	0	0	0	0	0	0
		93	1	250	0	0	0	0	250
		92	2	250	0	0	0	0	250
		88	2	0	0	0	0	0	0
123-38-6	Propionaldehyde	94	22	340,111	148,346	21	66,352	0	554,830
		93	21	328,204	130,008	56	63,995	0	522,263
		92	22	396,321	287,069	9	63,940	0	747,339
		88	15	399,253	868,586	1,156	930	0	1,269,925
114-26-1	Propoxur	94	3	0	4	0	0	0	4
		93	4	0	5	0	0	0	5
		92	6	39	386	0	0	0	425
		88	5	250	0	0	0	0	250
115-07-1	Propylene	94	343	12,361,218	8,090,630	4,584	0	0	20,456,432
		93	325	13,384,624	5,780,980	175,120	0	0	19,340,724
		92	331	13,258,086	8,233,048	989	5	0	21,492,128
		88	333	18,460,108	12,021,775	10,003	0	0	30,491,886
75-55-8	Propyleneimine	94	7	216	265	0	0	0	481
		93	7	24	315	0	0	0	339
		92	7	17	386	0	0	0	403
		88	1	250	250	0	0	0	500
75-56-9	Propylene oxide	94	118	357,416	678,422	12,695	22,195	6,151	1,076,879
		93	122	336,408	832,955	6,390	5,151	6,197	1,187,101
		92	126	612,746	790,970	7,260	200	2,251	1,413,427
		88	128	892,841	2,781,342	112,503	1,113,780	11,630	4,912,096

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Phosgene	94	0	0	158	0	0	0	158
	93	0	0	1,000	0	0	0	1,000
	92	0	0	1,538	0	10	0	1,548
	88	NA	NA	1,040	0	480	0	NA
Phosphoric acid	94	9,473,740	45,269	2,183,118	3,869,033	2,603,266	505	18,174,931
	93	8,868,875	1,015	2,208,104	4,280,712	2,162,844	509	17,522,059
	92	9,733,321	913	1,802,151	4,886,399	1,197,508	737,831	18,358,123
	88	NA	NA	3,270,219	13,814,023	5,303,543	743,381	NA
Phosphorus (yellow or white)	94	183,411	0	55,407	258	14,017	0	253,093
	93	165,480	0	27,996	2,355	5,467	0	201,298
	92	166,372	0	36,229	255	259	0	203,115
	88	NA	NA	14,074	646	195,013	946	NA
Phthalic anhydride	94	2,781	4,342,281	243,593	9,483	105,929	0	4,704,067
	93	0	4,003,843	192,250	5,295	157,425	0	4,358,813
	92	4,148	3,659,358	315,500	4,800	251,349	660	4,235,815
	88	NA	NA	2,877,574	53,441	3,976,682	21,803	NA
Picric acid	94	0	13	836	0	0	0	849
	93	0	0	0	0	0	0	0
	92	0	0	34	0	0	0	34
	88	NA	NA	14,000	0	0	0	NA
Polybrominated biphenyls	94	0	0	0	0	250	0	250
	93	0	0	0	0	0	0	0
	92	0	0	0	0	500	0	500
	88	NA	NA	0	0	0	0	NA
Polychlorinated biphenyls (PCBs)	94	0	0	934,464	0	94,962	0	1,029,426
	93	0	4	857,363	265	164,205	0	1,021,837
	92	18,920	0	1,202,571	0	427,320	0	1,648,811
	88	NA	NA	5,149,843	250	488,732	23,550	NA
Propane sultone	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Propionaldehyde	94	0	12,994	1	1,760	26,948	0	41,703
	93	0	13,333	1	1,155	3,167	0	17,656
	92	0	14,339	0	12,906	4,961	0	32,206
	88	NA	NA	1,600	761	0	0	NA
Propoxur	94	0	0	1,805	140	31	0	1,976
	93	0	0	750	250	0	0	1,000
	92	0	0	1,000	250	5	0	1,255
	88	NA	NA	0	0	250	0	NA
Propylene	94	0	2,159,280	280,113	5	269	0	2,439,667
	93	0	2,188,040	388,948	5	482	0	2,577,475
	92	0	2,891,581	580,777	255	34	0	3,472,647
	88	NA	NA	1,521,069	500	3,320	0	NA
Propyleneimine	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	250	0	0	NA
Propylene oxide	94	66	5,164	6,148	374,821	48,801	4	435,004
	93	0	95,414	15,534	25,877	9,597	0	146,422
	92	0	572,206	4,134	33,600	76,669	0	686,609
	88	NA	NA	1,091	386,355	16,626	35	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
110-86-1	Pyridine	94	35	67,605	42,298	1,409	358,200	0	469,512
		93	31	49,402	53,474	899	412,200	49	516,024
		92	35	55,736	78,003	10,203	508,615	9	652,566
		88	31	143,881	107,918	2,158	491,775	1,125	746,857
91-22-5	Quinoline	94	21	7,665	19,757	35	63,000	571	91,028
		93	24	4,281	19,963	50	63,000	195	87,489
		92	28	20,641	17,471	75	59,000	46	97,233
		88	34	31,633	17,717	502	0	896	50,748
106-51-4	Quinone	94	4	9,900	2,101	1,600	0	0	13,601
		93	5	14,000	2,101	1,400	0	0	17,501
		92	4	6,100	18,002	4	27	0	24,133
		88	5	4,600	6,700	140	0	0	11,440
82-68-8	Quintozene	94	12	1,771	787	0	0	0	2,558
		93	10	1,516	778	0	0	0	2,294
		92	11	766	774	0	0	0	1,540
		88	6	750	314	0	0	0	1,064
81-07-2	Saccharin (manufacturing)	94	2	60	20	0	0	0	80
		93	2	50	251	0	0	0	301
		92	3	62	252	0	0	0	314
		88	4	250	500	0	0	0	750
94-59-7	Safrole	94		No Reports Received					
		93		No Reports Received					
		92		No Reports Received					
		88	2	250	250	0	0	0	500
7782-49-2	Selenium	94	12	88	367	113	0	7	575
		93	15	334	1,200	0	0	256	1,790
		92	12	30	1,033	0	0	5	1,068
		88	24	2,251	14,031	1,168	0	127,508	144,958
—	Selenium compounds	94	40	3,519	59,865	2,470	3,410	120,086	189,350
		93	46	2,802	74,934	557	2,300	120,271	200,864
		92	41	4,183	28,406	663	3,700	99,116	136,068
		88	17	2,251	12,255	250	3,400	45,750	63,906
7440-22-4	Silver	94	66	7,047	3,643	421	250	270	11,631
		93	67	4,447	2,653	318	210	1,000	8,628
		92	65	3,262	3,517	140	0	500	7,419
		88	72	11,480	36,508	1,654	0	39,510	89,152
—	Silver compounds	94	60	2,732	15,372	6,580	140	26,743	51,567
		93	56	6,476	15,147	9,069	100	20,376	51,168
		92	55	6,977	22,673	9,639	24	20,318	59,631
		88	46	5,991	9,415	8,684	250	11,550	35,890
100-42-5	Styrene	94	1,489	13,761,915	25,587,630	75,579	250,861	480,863	40,156,848
		93	1,448	12,883,351	20,505,855	28,274	132,607	178,080	33,728,167
		92	1,445	12,002,838	19,557,257	23,502	83,170	304,479	31,971,246
		88	1,247	12,910,160	21,063,838	59,069	165	242,941	34,276,173
96-09-3	Styrene oxide	94	5	1	60	0	0	0	61
		93	5	304	46	0	0	0	350
		92	5	304	64	0	0	0	368
		88	6	511	1,803	0	0	0	2,314

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Pyridine	94	4,178	129,674	176,387	350,839	1,201	0	662,279
	93	3,609	184,027	93,910	309,895	4,977	0	596,418
	92	0	506,275	331,554	199,015	4,541	0	1,041,385
	88	NA	NA	56,729	275,083	40,699	0	NA
Quinoline	94	4,178	7,500	38,602	260	5,054	0	55,594
	93	3,609	16,015	1,952	505	5,997	0	28,078
	92	0	210	5,001	260	2,160	250	7,881
	88	NA	NA	4,945	6,406	6,242	0	NA
Quinone	94	0	0	26,186	0	0	0	26,186
	93	0	0	6,776	0	0	0	6,776
	92	0	0	0	0	0	0	0
	88	NA	NA	280	250	0	0	NA
Quintozene	94	0	0	543,692	1,012	161	0	544,865
	93	0	0	522,354	515	478	0	523,347
	92	170,000	373	452,527	26	50	0	622,976
	88	NA	NA	0	250	12,625	0	NA
Saccharin (manufacturing)	94	0	0	0	10	1,400	0	1,410
	93	0	0	25,625	12	840	0	26,477
	92	0	0	9,550	259	1,100	0	10,909
	88	NA	NA	0	7,900	750	0	NA
Safrole	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	0	250	0	0	NA
Selenium	94	28,325	0	1,200	15	20	0	29,560
	93	27,911	0	2,984	260	3,776	0	34,931
	92	38,463	0	462	57	3,440	5	42,427
	88	NA	NA	3,145	1,250	2,617	500	NA
Selenium compounds	94	136,856	255	31,492	307	25,216	0	194,126
	93	229,327	0	11,002	1,421	39,415	5	281,170
	92	271,338	1,270	26,982	1,341	40,133	0	341,064
	88	NA	NA	1,631	1,860	61,116	0	NA
Silver	94	860,831	0	36,766	591	3,940	0	902,128
	93	796,669	0	8,005	1,935	1,922	0	808,531
	92	1,029,844	0	4,797	1,858	9,802	3,900	1,050,201
	88	NA	NA	23,875	3,624	3,263	0	NA
Silver compounds	94	1,498,528	0	5,876	2,808	10,462	16,232	1,533,906
	93	1,450,290	0	2,229	6,451	14,219	0	1,473,189
	92	976,578	0	1,912	4,235	8,190	500	991,415
	88	NA	NA	8,986	8,078	3,139	2,830	NA
Styrene	94	1,427,391	5,365,111	4,042,166	117,879	4,408,316	47,515	15,408,378
	93	1,109,823	5,215,555	3,106,560	130,897	2,065,268	5	11,628,108
	92	1,070,539	8,588,931	3,213,743	254,681	2,328,509	20,908	15,477,311
	88	NA	NA	5,696,394	479,085	2,009,546	1,260,446	NA
Styrene oxide	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	250	750	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
79-34-5	1,1,2,2-Tetrachloroethane	94	16	10,227	2,257	1,517	26	0	14,027
		93	15	24,640	3,563	2,930	0	1	31,134
		92	17	28,117	20,782	5,164	0	0	54,063
		88	13	25,904	17,961	1,903	0	29	45,797
127-18-4	Tetrachloroethylene	94	459	4,671,751	5,530,378	3,872	4,051	4,349	10,214,401
		93	490	4,538,411	6,634,275	10,152	15,041	618,026	11,815,905
		92	519	5,305,402	7,389,816	10,317	12,780	9,354	12,727,669
		88	746	16,336,282	19,786,265	33,314	72,250	82,144	36,310,255
961-11-5	Tetrachlorvinphos	94	5	10	258	5	0	0	273
		93	4	260	270	5	0	0	535
		92	5	260	2,575	5	0	0	2,840
		88	6	250	1	0	0	0	251
7440-28-0	Thallium	94	1	5	250	0	0	755	1,010
		93	1	5	250	0	0	755	1,010
		92	No Reports Received						
		88	No Reports Received						
—	Thallium compounds	94	1	0	36	0	0	0	36
		93	No Reports Received						
		92	2	255	500	0	0	505	1,260
		88	4	1	252	0	0	250	503
62-55-5	Thioacetamide	94	No Reports Received						
		93	No Reports Received						
		92	No Reports Received						
		88	1	250	250	0	0	0	500
62-56-6	Thiourea	94	27	1,155	2,017	3,539	5,000	250	11,961
		93	26	857	515	2,611	5,300	288	9,571
		92	29	660	557	727	5,300	256	7,500
		88	26	1,504	500	16,951	5,940	750	25,645
1314-20-1	Thorium dioxide	94	1	0	0	0	0	0	0
		93	1	0	0	0	0	0	0
		92	1	0	5	0	0	0	5
		88	3	230	1,350	0	0	0	1,580
7550-45-0	Titanium tetrachloride	94	37	16,051	6,298	0	0	0	22,349
		93	38	19,012	5,610	0	0	100	24,722
		92	41	24,186	4,094	0	0	0	28,280
		88	41	38,614	40,054	0	0	1,400	80,068
108-88-3	Toluene	94	3,566	57,656,473	110,561,812	82,751	496,440	161,205	168,958,681
		93	3,643	62,341,544	117,599,735	119,858	967,496	239,798	181,268,431
		92	3,822	66,454,153	130,047,883	84,327	1,573,901	709,469	198,869,733
		88	3,999	105,716,267	192,930,207	197,208	1,473,666	731,449	301,048,797
584-84-9	Toluene-2,4-diisocyanate	94	76	9,705	25,736	0	0	0	35,441
		93	76	4,861	54,042	0	0	0	58,903
		92	84	6,298	11,481	0	0	250	18,029
		88	257	46,634	118,428	0	0	1,040	166,102
91-08-7	Toluene-2,6-diisocyanate	94	47	3,019	5,484	0	0	0	8,503
		93	44	2,240	4,509	0	0	0	6,749
		92	52	2,477	3,940	0	0	250	6,667
		88	189	153,253	338,939	0	0	510	492,702

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
1,1,2,2-Tetrachloroethane	94	2,227,120	0	40,807	0	52	0	2,267,979
	93	1,737,712	0	32,733	155	80	0	1,770,680
	92	1,446,254	0	65,142	8,113	273	0	1,519,782
	88	NA	NA	74,982	400	128,750	0	NA
Tetrachloroethylene	94	7,415,291	855,782	2,066,219	62,053	73,514	250	10,473,109
	93	6,277,898	823,697	2,397,043	111,002	56,340	9,709	9,675,689
	92	8,001,820	744,395	1,994,929	111,517	113,324	157,406	11,123,391
	88	NA	NA	4,059,045	558,691	1,385,378	138,270	NA
Tetrachlorvinphos	94	0	0	16,904	7	2,948	0	19,859
	93	0	0	4,310	17	8,825	0	13,152
	92	0	0	135,100	29	104,680	0	239,809
	88	NA	NA	40,210	2	9,270	0	NA
Thallium	94	5,040	0	250	5	0	0	5,295
	93	750	0	0	5	0	0	755
	92	No Reports Received						
	88	No Reports Received						
Thallium compounds	94	0	0	0	0	0	0	0
	93	No Reports Received						
	92	75,905	0	3,900	5	250	0	80,060
	88	NA	NA	250	6	1,000	0	NA
Thioacetamide	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	250	0	0	0	NA
Thiourea	94	0	0	1,821	1,860	2,572	0	6,253
	93	0	0	2,645	1,534	2,446	0	6,625
	92	0	0	2,698	25,925	17,087	0	45,710
	88	NA	NA	2,511	26,634	2,303	0	NA
Thorium dioxide	94	0	0	0	0	0	0	0
	93	0	0	0	0	42,000	0	42,000
	92	0	0	0	5	64,000	0	64,005
	88	NA	NA	0	250	677,549	0	NA
Titanium tetrachloride	94	3,500	0	317,482	0	150	0	321,132
	93	0	86	2,958,898	0	16	0	2,959,000
	92	0	0	3,276,833	0	39,000	0	3,315,833
	88	NA	NA	1,667,045	0	0	0	NA
Toluene	94	23,471,806	80,113,663	21,780,558	940,281	936,839	4,020	127,247,167
	93	31,265,466	81,278,013	22,359,287	1,038,026	1,142,544	88,618	137,171,954
	92	30,153,330	79,611,629	19,932,375	1,051,400	943,857	123,419	131,816,010
	88	NA	NA	47,861,070	3,594,036	9,569,460	4,651,820	NA
Toluene-2,4-diisocyanate	94	59,100	26,282	30,181	0	3,523	0	119,086
	93	81,888	16,620	59,063	0	9,938	0	167,509
	92	7,400	1,020	45,644	0	1,499	2,050	57,613
	88	NA	NA	193,439	500	36,178	3	NA
Toluene-2,6-diisocyanate	94	8,922	6,232	1,489	0	935	0	17,578
	93	20,497	4,746	340	0	2,010	0	27,593
	92	1,770	48	15,433	0	475	0	17,726
	88	NA	NA	45,287	250	9,444	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
95-53-4	o-Toluidine	94	23	9,770	2,365	534	30,300	6	42,975
		93	20	15,421	2,980	1,266	24,600	7	44,274
		92	19	5,255	2,237	310	31,800	6,823	46,425
		88	18	19,196	27,726	1,902	250	5,024	54,098
52-68-6	Trichlorfon	94	3	5	2	9	0	0	16
		93	3	5	1	7	0	0	13
		92	4	5	253	9	0	0	267
		88	5	250	3	0	0	0	253
120-82-1	1,2,4-Trichlorobenzene	94	33	30,090	137,190	970	15,200	830	184,280
		93	41	103,567	161,123	1,148	5,118	1,781	272,737
		92	51	219,941	195,606	995	1,200	2,680	420,422
		88	56	438,009	1,094,904	31,628	7,408	3,073	1,575,022
71-55-6	1,1,1-Trichloroethane	94	1,207	20,070,741	17,981,336	1,980	102	2,732	38,056,891
		93	2,111	33,199,831	31,568,263	11,146	2,528	42,743	64,824,511
		92	3,210	57,760,109	59,857,572	13,707	561	76,131	117,708,080
		88	3,915	92,995,587	87,654,575	95,624	1,000	204,923	180,951,709
79-00-5	1,1,2-Trichloroethane	94	23	41,184	268,938	914	0	0	311,036
		93	24	104,452	210,700	2,030	0	5	317,187
		92	24	85,953	476,132	1,163	0	7	563,255
		88	29	618,608	1,122,834	5,303	0	89	1,746,834
79-01-6	Trichloroethylene	94	783	14,788,788	15,083,085	1,671	288	4,417	29,878,249
		93	790	14,524,316	15,939,964	5,220	460	8,212	30,478,172
		92	681	15,585,757	14,866,100	8,606	466	20,726	30,481,655
		88	951	26,168,126	29,759,510	13,801	390	21,186	55,963,013
95-95-4	2,4,5-Trichlorophenol	94		No Reports Received					
		93		No Reports Received					
		92	1	0	0	0	0	0	0
		88	1	1	90	0	0	0	91
88-06-2	2,4,6-Trichlorophenol	94	1	116	83	65	0	0	264
		93	1	0	69	56	0	0	125
		92	1	7	79	1	0	0	87
		88	3	0	250	50	12,000	0	12,300
1582-09-8	Trifluralin	94	19	11,795	3,253	6	0	250	15,304
		93	17	12,185	5,475	10	0	5	17,675
		92	20	10,637	2,672	290	0	10	13,609
		88	17	2,020	1,257	601	0	0	3,878
95-63-6	1,2,4-Trimethylbenzene	94	753	2,618,939	5,122,541	9,163	187	14,957	7,765,787
		93	708	2,473,335	4,372,411	17,552	1,293	53,744	6,918,335
		92	652	2,391,773	3,136,365	8,554	14,409	518,602	6,069,703
		88	288	2,020,818	2,321,249	10,088	7,964	61,583	4,421,702
51-79-6	Urethane	94	4	11,050	0	0	0	0	11,050
		93	3	12,200	0	0	0	0	12,200
		92	5	3,200	0	0	0	0	3,200
		88	11	140,500	4,623	0	0	0	145,123
7440-62-2	Vanadium (fume or dust)	94	12	902	5,421	3,000	0	31,700	41,023
		93	13	4,779	6,411	3,200	0	36,000	50,390
		92	14	2,022	11,933	4,250	0	83,250	101,455
		88	33	3,145	14,033	4,704	0	87,296	109,178

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
o-Toluidine	94	0	110,648	49,767	131,476	302	0	292,193
	93	0	41,913	29,039	86,591	56	0	157,599
	92	0	232,901	11,182	2,412	188	0	246,683
	88	NA	NA	31,500	15,172	670	0	NA
Trichlorfon	94	0	0	174	0	19	0	193
	93	0	0	272	0	0	0	272
	92	0	0	3,109	0	274	0	3,383
	88	NA	NA	1,079	215	487	0	NA
1,2,4-Trichlorobenzene	94	10,715	42,171	29,441,588	101,302	52,908	0	29,648,684
	93	520	30,930	623,111	168,814	18,276	0	841,651
	92	48,070	80,454	1,548,060	183,020	42,753	0	1,902,357
	88	NA	NA	734,243	262,676	164,144	0	NA
1,1,1-Trichloroethane	94	6,983,705	1,845,839	2,323,066	6,439	162,877	72,131	11,394,057
	93	14,617,408	2,329,613	3,620,022	60,463	274,009	1,901	20,903,416
	92	23,438,452	3,649,426	4,211,910	119,263	613,824	166,570	32,199,445
	88	NA	NA	12,119,277	305,358	5,958,322	1,311,943	NA
1,1,2-Trichloroethane	94	11,159,898	135,425	4,706,576	3,100	171	0	16,005,170
	93	12,136,563	23,308	3,995,573	1,600	592	0	16,157,636
	92	8,905,509	1,000	3,221,849	1,200	219	0	12,129,777
	88	NA	NA	239,032	750	19,810	1,000	NA
Trichloroethylene	94	8,304,071	1,183,610	2,369,771	50,325	86,465	363,668	12,357,910
	93	7,012,395	1,206,942	1,691,097	42,987	232,950	207	10,186,578
	92	6,818,377	969,513	1,721,494	70,149	248,714	49,621	9,877,868
	88	NA	NA	4,691,284	85,652	1,466,469	352,114	NA
2,4,5-Trichlorophenol	94	No Reports Received						
	93	No Reports Received						
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	20	0	NA
2,4,6-Trichlorophenol	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	10	0	NA
Trifluralin	94	0	0	13,547	250	20,816	0	34,613
	93	0	0	17,628	67	18,856	0	36,551
	92	250	5	44,573	32	25,332	0	70,192
	88	NA	NA	149,989	371	40,557	0	NA
1,2,4-Trimethylbenzene	94	1,125,561	2,317,836	246,044	110,864	54,271	0	3,854,576
	93	1,475,226	3,017,296	265,493	167,924	43,534	3,052	4,972,525
	92	453,011	2,260,851	233,096	180,857	53,186	4,386	3,185,387
	88	NA	NA	330,046	501,717	200,616	38,117	NA
Urethane	94	0	0	0	6,939	4,274	0	11,213
	93	0	0	0	5,900	46,360	0	52,260
	92	0	0	4,700	6,400	3,200	0	14,300
	88	NA	NA	3,558	260	1,350	0	NA
Vanadium (fume or dust)	94	7,336	0	33,476	0	7,938	0	48,750
	93	43	0	1,080	5	6,405	0	7,533
	92	92	0	849	5	9,769	0	10,715
	88	NA	NA	1,858	0	91,559	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
108-05-4	Vinyl acetate	94	157	1,397,331	2,629,552	1,386	648,667	1,775	4,678,711
		93	156	1,195,872	3,002,623	1,344	1,408,698	1,626	5,610,163
		92	152	1,079,653	3,076,193	7,208	1,616,385	5,249	5,784,688
		88	146	1,470,618	4,450,979	10,021	2,109,851	18,889	8,060,358
593-60-2	Vinyl bromide	94	1	220	2,400	0	0	0	2,620
		93	2	257	1,400	0	0	0	1,657
		92	2	28,300	4,600	0	0	0	32,900
		88	2	4,000	950	400	0	0	5,350
75-01-4	Vinyl chloride	94	43	340,426	725,809	377	1	6	1,066,619
		93	45	312,117	708,071	277	0	6	1,020,471
		92	50	387,719	731,384	902	1	3,106	1,123,112
		88	53	421,882	1,017,307	2,051	53	4,409	1,445,702
75-35-4	Vinylidene chloride	94	22	35,324	130,372	215	0	0	165,911
		93	24	67,777	137,037	192	0	20	205,026
		92	23	65,139	188,781	1,306	0	14	255,240
		88	21	104,552	191,801	3,462	170	429	300,414
1330-20-7	Xylene (mixed isomers)	94	3,346	24,902,804	83,430,835	43,961	313,711	244,726	108,936,037
		93	3,419	26,208,883	86,465,495	53,046	213,157	247,432	113,188,013
		92	3,497	27,046,106	86,330,920	42,898	219,270	1,357,601	114,996,795
		88	3,464	34,814,467	123,733,370	204,480	144,728	558,257	159,455,302
108-38-3	m-Xylene	94	56	691,694	270,742	893	250	2,708	966,287
		93	61	1,266,772	424,684	2,798	5	3,751	1,698,010
		92	70	906,961	387,026	1,397	5	6,189	1,301,578
		88	68	1,480,104	982,939	2,566	0	18,045	2,483,654
95-47-6	o-Xylene	94	74	905,818	485,704	1,148	250	2,959	1,395,879
		93	81	1,331,688	641,434	1,180	5	1,155	1,975,462
		92	85	1,455,884	683,067	1,868	5	5,967	2,146,791
		88	66	1,613,292	628,522	2,786	250	22,461	2,267,311
106-42-3	p-Xylene	94	41	808,400	2,612,682	9,690	250	587	3,431,609
		93	50	1,271,866	3,170,839	749	5	631	4,444,090
		92	46	1,042,431	3,137,671	1,868	5	4,101	4,186,076
		88	48	1,737,827	4,340,922	3,200	0	49,226	6,131,175
87-62-7	2,6-Xylidine	94	5	59	122	66	0	0	247
		93	5	83	27	387	0	0	497
		92	3	33	26	0	0	0	59
		88	2	0	337	1,537	0	0	1,874
7440-66-6	Zinc (fume or dust)	94	410	767,882	896,245	28,373	5	8,462,944	10,155,449
		93	423	832,488	854,213	67,508	0	10,449,327	12,203,536
		92	458	673,588	912,987	47,289	120,000	15,309,034	17,062,898
		88	646	1,944,168	1,515,369	849,544	140,010	25,617,365	30,066,456
—	Zinc compounds	94	2,458	1,891,457	3,063,796	1,438,199	196,498	75,174,770	81,764,720
		93	2,498	1,471,020	2,728,705	1,051,148	175,893	64,507,325	69,934,091
		92	2,442	1,536,611	2,668,560	1,045,355	126,947	76,899,635	82,277,108
		88	1,646	3,243,130	3,999,172	1,201,534	109,555	113,293,211	121,846,602
12122-67-7	Zineb	94		No Reports Received					
		93		No Reports Received					
		92		No Reports Received					
		88	2	250	1,000	0	0	0	1,250

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Vinyl acetate	94	253,854	7,855,391	1,165,477	218,412	111,072	0	9,604,206
	93	826,452	8,465,964	1,484,282	278,715	28,055	34,000	11,117,468
	92	1,139,485	5,898,038	838,232	190,754	395,519	5,600	8,467,628
	88	NA	NA	354,698	2,319,733	21,811	20,015	NA
Vinyl bromide	94	0	0	0	0	0	0	0
	93	0	0	0	0	0	0	0
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Vinyl chloride	94	68,273	14,301	158,536	326	20,740	0	262,176
	93	151,324	11,613	25,360	343	18,091	0	206,731
	92	158,159	2,731	23,926	474	11,694	0	196,984
	88	NA	NA	669,044	17,104	4,555	2,188	NA
Vinylidene chloride	94	140	250	223,917	287	2,031	0	226,625
	93	5	8	162,129	201	1	0	162,344
	92	0	0	104,102	260	0	0	104,362
	88	NA	NA	360,958	3,303	44,281	0	NA
Xylene (mixed isomers)	94	39,649,939	75,959,775	8,576,503	645,816	1,182,194	21,007	126,035,234
	93	36,891,444	70,727,778	6,962,089	655,657	998,167	11,201	116,246,336
	92	39,508,723	64,900,375	6,451,165	804,964	1,257,316	111,864	113,034,407
	88	NA	NA	27,183,380	4,160,974	6,463,942	3,812,882	NA
m-Xylene	94	30,573	45,869	8,847	3,331	150,720	0	239,340
	93	27,264	116,095	23,518	33,378	100,441	0	300,696
	92	10,331	93,296	132,920	156,993	72,851	0	466,391
	88	NA	NA	113,311	19,708	107,746	115	NA
o-Xylene	94	49,741	2,555,757	265,893	61,941	7,030	0	2,940,362
	93	7,223	1,882,351	29,362	22,262	51,219	0	1,992,417
	92	135,247	2,327,216	48,815	53,212	11,067	0	2,575,557
	88	NA	NA	95,764	44,023	52,881	12,864	NA
p-Xylene	94	1,991	19,608	3,669	1,457	3,295	0	30,020
	93	1,427	71,806	16,138	31,980	5,794	0	127,145
	92	215	46,909	8,020	70,927	10,681	0	136,752
	88	NA	NA	48,320	752	31,108	0	NA
2,6-Xylidine	94	0	0	459	263	0	0	722
	93	0	0	625	0	0	0	625
	92	0	0	0	0	0	0	0
	88	NA	NA	0	0	0	0	NA
Zinc (fume or dust)	94	82,615,377	137,918	689,480	38,613	2,984,324	250	86,465,962
	93	76,516,683	101,557	661,883	34,894	2,020,057	500	79,335,574
	92	63,563,398	102,319	1,367,953	156,131	5,579,335	100,499	70,869,635
	88	NA	NA	7,667,102	835,961	29,642,266	4,776,287	NA
Zinc compounds	94	247,420,257	410,019	10,296,543	472,619	92,862,229	72,810	351,534,477
	93	212,080,712	281,395	10,822,561	524,600	88,395,459	2,428	312,107,155
	92	232,532,118	348,629	9,624,879	592,395	46,123,732	3,449,466	292,671,219
	88	NA	NA	16,982,721	1,527,292	66,020,038	1,416,608	NA
Zineb	94	No Reports Received						
	93	No Reports Received						
	92	No Reports Received						
	88	NA	NA	250	0	2,600	0	NA

Table 3-29. Releases and Transfers of TRI Chemicals Reported, 1988, 1992-1994 (Alphabetically Ordered),[43] Continued.

CAS Number[44]	Chemical	Year	Forms	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
—	Mixtures and other trade name products	94	54	201,606	15,070	5	0	3,442	220,123
		93	49	75,687	18,502	0	0	1	94,190
		92	62	41,189	20,460	0	0	32,950	94,599
		88	174	628,029	2,822,591	59,210	0	16,099	3,525,929
	Trade secrets	94	19	630	34,860	0	0	0	35,490
		93	12	0	320	0	0	0	320
		92	14	750	47,900	0	0	0	48,650
		88	5	0	0	0	0	0	0
	Total	94	66,777	350,014,102	990,966,389	47,011,773	306,651,731	282,267,922	1,976,911,917
		93	68,567	379,451,734	1,005,991,244	203,003,168	294,846,947	274,062,285	2,157,355,378
		92	70,238	440,840,803	1,119,159,910	195,589,595	366,495,726	327,557,956	2,449,643,990
		88	66,571	685,997,724	1,566,906,709	176,726,741	625,967,221	480,451,877	3,536,050,272

Table 3-29, Cont.

Chemical	Year	Transfers to Recycling[45] Pounds	Transfers to Energy Recovery[45] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[46] Pounds	Total Transfers[47] Pounds
Mixtures and other trade name products	94	16,656	29,231	259,163	2,006	11,748	1,450	320,254
	93	450,176	7,137	489,404	1,297	66,985	0	1,014,999
	92	350,077	39,536	1,431,749	1,676	1,554,007	0	3,377,045
	88	NA	NA	749,408	186,938	10,661,927	190,046	NA
Trade secrets	94	597,825	750	0	0	0	0	598,575
	93	397,675	0	221,020	0	0	0	618,695
	92	0	0	561,920	0	0	0	561,920
	88	NA	NA	19,000	0	0	0	NA
Total	94	2,233,603,858	462,709,225	290,143,755	180,440,724	280,466,676	3,527,303	3,450,891,541
	93	2,057,075,702	446,763,037	254,474,939	186,346,945	266,530,507	1,715,096	3,212,906,226
	92	2,609,433,782	430,564,881	256,555,922	225,951,692	216,682,649	13,028,083	3,752,217,009
	88	NA	NA	396,163,102	297,347,493	437,216,182	42,332,939	NA

43 Does not include delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

44 Compound categories do not have CAS numbers (—).

45 NA: Transfers for recycling or energy recovery were not required to be reported for 1988.

46 For 1992, 1993, and 1994, transfers reported with no waste management codes or invalid codes. For 1988, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988.

47 Because transfers for recycling or energy recovery were not required to be reported in 1988, total transfers in 1988 are not comparable to total transfers reported for 1992, 1993, or 1994.

48 The quantity of benzidine reported as released to air in 1994 is a reporting error from one facility. The facility intends to revise this estimate to zero.

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Chapter 4

TRI Reporting Profiles for 33/50 Program Chemicals

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TRI REPORTING PROFILES FOR 33/50 PROGRAM CHEMICALS

INTRODUCTION

The 33/50 Program, an EPA voluntary pollution reduction initiative, derives its name from its overall goals—an interim goal of a 33% reduction in 1992 and an ultimate goal of a 50% reduction in 1995 in releases and transfers of 17 high-priority toxic chemicals, using 1988 TRI reporting as a baseline. During 1988, 1.49 billion pounds of the target chemicals were either released to the environment on-site or transferred off-site to waste management facilities. The aim of the 33/50 Program was to reduce this amount by at least 50%—747 million pounds—by 1995, with an interim reduction target of more than 493 million pounds by 1992.

The 33/50 Program, the grandparent of EPA's growing array of voluntary environmental programs, represented at its inception an innovative experiment aimed at demonstrating whether voluntary partnerships can augment the Agency's traditional command-and-control approach by achieving targeted reductions more quickly than would regulations alone. The positive results from this experiment in corporate environmental voluntarism are best

33/50 Hits the Mark!

The 33/50 Program achieved overall reductions of 50.7% in 1994, a full year ahead of the 1995 target date for a 50% reduction. All told, 757 million pounds of releases and transfers have been eliminated since the 1988 baseline year for the program.

Other notable 33/50 achievements include:

- The 1,300 companies participating in 33/50 are projecting continued reductions in 1995 and 1996.
- The 17 chemicals targeted by 33/50 have been reduced at nearly twice the rate of other TRI chemicals, since 1991 when the Program began.
- 33/50 participants have gone well beyond their commitments, achieving 50% more than the amount of reductions originally pledged to the program.
- 33/50 participants are achieving reductions at a much faster rate than other companies—50% vs. 30% from 1991 through 1994 and 60% vs. 35% since 1988.
- Overall generation of production-related waste for the 33/50 chemicals has declined slightly since 1991 and is projected to continue declining, even as waste for all other TRI chemicals increases.
- 33/50 chemicals are more frequently targeted for source reduction than other TRI chemicals.

Box 4-1. 33/50 Program Highlights

reflected in the rapid expansion of EPA voluntary programs since 33/50 was announced in February 1991. The 33/50 Program is now one of 27 voluntary partnership programs and initiatives underway at EPA.

The 33/50 Program is also part of a broad group of EPA activities designed to encourage pollution prevention as the best means of achieving reductions in toxic chemical releases and transfers. The hallmark of 33/50's response to this challenge is its top-down approach. More than 20,000 TRI facilities have reported 33/50 Program chemicals to TRI since 1988. By contacting the chief executives of nearly 9,000 parent companies of these facilities, the Program seeks to instill a pollution prevention ethic throughout the highest echelons of American business.

At the time the 33/50 Program was formulated, 1988 was the most recent year for which national TRI data were available, and the Program's baseline and goals were set accordingly. Reductions that companies achieved between 1988 and 1990 therefore contribute to the 33/50 Program's national reduction goals. However, these prior reductions should not be viewed as resulting from the 33/50 Program, as companies were first informed about the Program in February 1991.

Many states, a number of industry associations, and numerous individual companies include 33/50 Program chemicals within the scope of their own environmental initiatives. Twenty-six states had established toxics use reduction and pollution prevention programs prior to establishment of the 33/50 Program, and these contributed to its design. Others have used the 33/50 Program as a model. EPA views the 33/50 Program as an umbrella under which the federal government, states, industry, and communities work in partnership to achieve common goals. Any progress in reducing releases and transfers of 33/50 Program chemicals reflects the efforts of all these partners.

Analyses of 33/50 Program progress consider only those data elements that facilities were required to report in 1988: environmental releases and transfers off-site for treatment and disposal (including transfers to POTWs). Transfers off-site for energy recovery and for recycling are not included in 33/50 Program goals. These data, along with waste management data (also reported to TRI only since 1991) for the 17 target chemicals, are presented and analyzed in this chapter, but do not contribute to assessments of the 33/50 Program's progress in meeting its national pollution reduction goals.

SUMMARY OF FINDINGS

Findings revealed in the 1994 TRI reporting data are summarized below. The data themselves are presented in subsequent sections.

33/50 Program's National 50% Reduction Goal Achieved Ahead of Schedule

- Releases and transfers of 33/50 Program chemicals were reduced by an additional 62 million pounds (7.8%) in 1994, bringing total reductions since 1988 to 757 million pounds and exceeding the Program's ultimate 1995 50% national pollution reduction goal by more than 10 million pounds a full year ahead of schedule (see Figure 4-1).

- 33/50's interim 1992 33% reduction goal was also achieved a year early, and reductions through 1992 exceeded the interim goal by more than 100 million pounds.

- Facilities are projecting continued reductions in their releases and transfers of

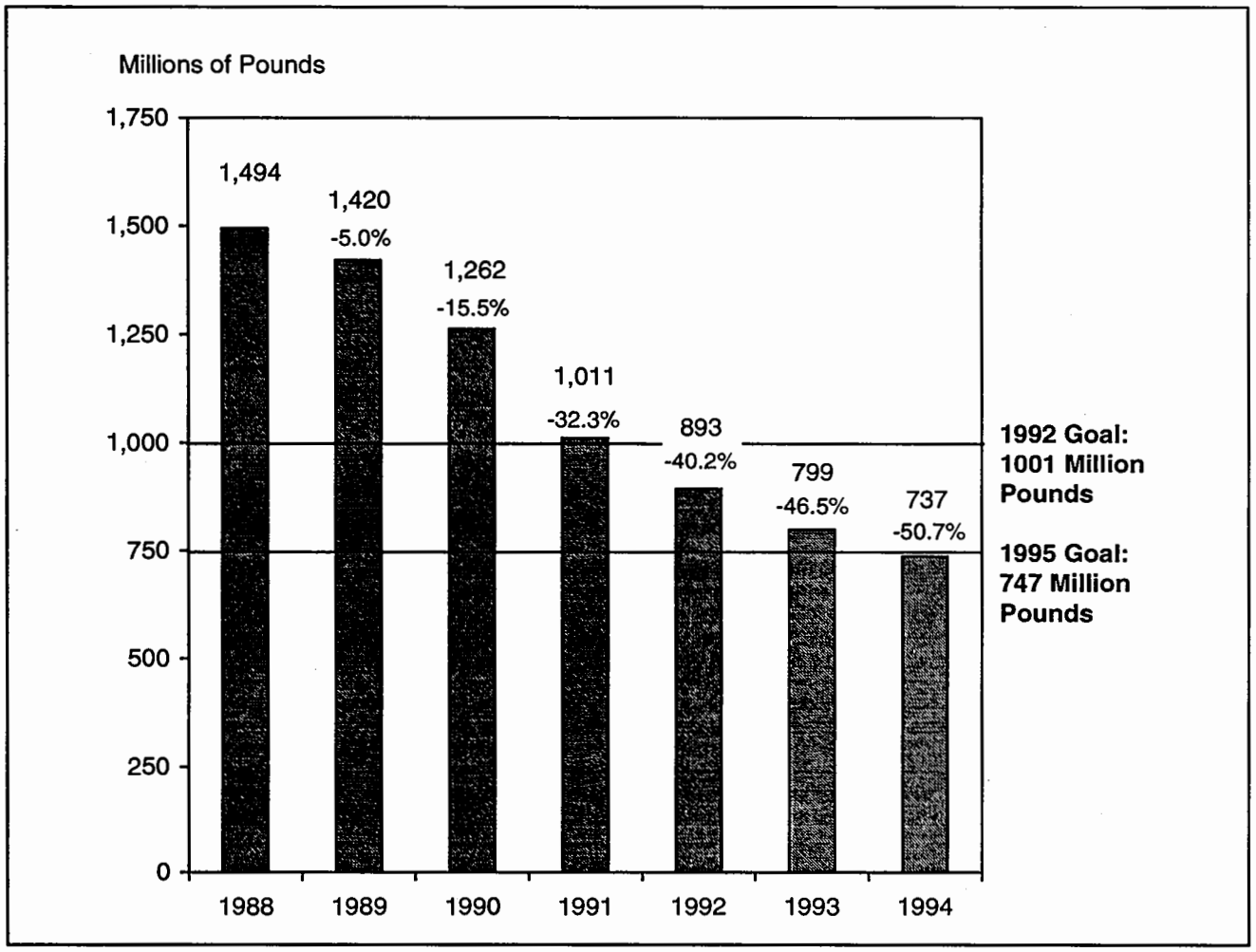


Figure 4-1. TRI Releases and Transfers of 33/50 Program Chemicals, 1988-1994.❶

33/50 Program chemicals in 1995 and 1996, demonstrating that American industry's commitment to voluntary environmental action is not ending with the achievement of the Program's namesake goals.

33/50 Program Chemicals Outpace Other TRI Reductions

- Releases and transfers for treatment and disposal of 33/50 Program chemicals were reduced at more than twice the rate observed for all other TRI chemicals from 1993 to 1994 (7.8% vs. 3.5%).
- Since the Program's announcement in 1991, 33/50 chemical reductions have outpaced reductions for all other TRI chemicals by nearly two to one (41.6% vs. 22.3%).

33/50 Program Participants Account for Most Reductions

- Since the Program began in 1991, facilities owned by companies enrolled as 33/50 participants reduced releases and transfers of the Program's 17 target chemicals by 49.5%, while non-participating companies' facilities

❶ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

achieved only a 30.3% reduction. Since 1988, participants outpaced non-participants 60% vs. 35%.

- 33/50 participants accounted for nearly half (46%) of the total reduction in Program chemical releases and transfers in the last year. Since the Program began in 1991, participants have accounted for 70% of the reductions, and 561 million pounds (74%) of the 757 million pounds reduced since 1988.

Air Emissions Account for Majority of 33/50 Program Reductions

- Nearly three-quarters of the reductions in 33/50 Program releases and transfers since 1988 (557 million pounds) were achieved through reduced air emissions (fugitive and stack).

Organic Chemicals Dominate Inorganics in 33/50 Program Reductions

- The 11 organic chemicals included among 33/50's 17 target chemicals accounted for 93% (706 million pounds) of 33/50 Program reductions between 1988 and 1994, while inorganics accounted for 7%.

- The percentage reduction in releases and transfers of organics was also much larger from 1988 to 1994 than for inorganics (53% vs. 31%).

33/50 Program Chemicals in Production-related Waste Projected to Decline

- Total production-related waste associated with 33/50 Program chemicals increased slightly (1.6%) from 1993 to 1994, but at a significantly lower rate than observed for other TRI chemicals in waste (5.8%) (see Figure 4-2).

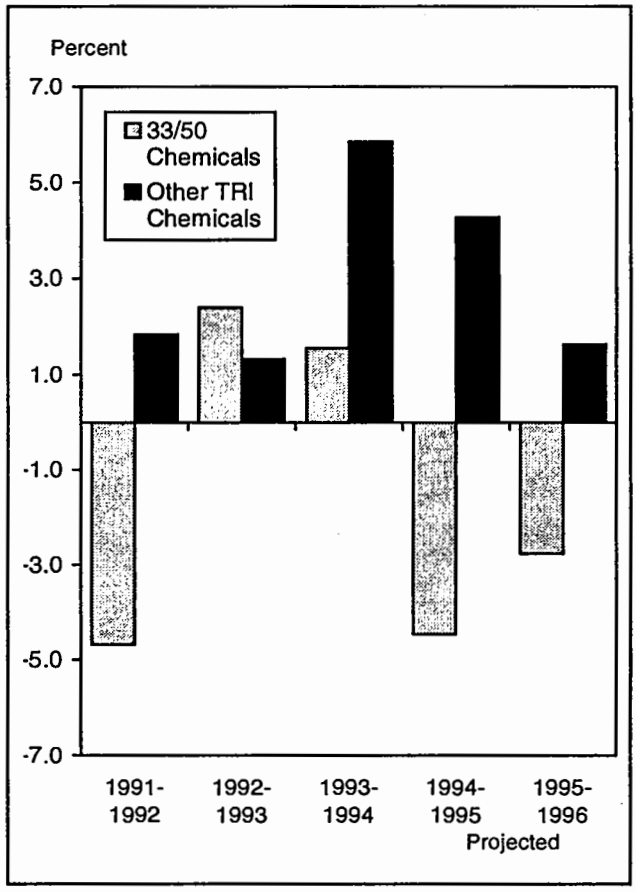


Figure 4-2. Percent Change in Total Production-related Waste, 33/50 Chemicals vs. Other TRI Chemicals, 1991-1996.❷

- Since 1991, 33/50 chemicals in waste have been reduced slightly (1%), compared with an increase of more than 9% for other TRI chemicals in waste.

- 33/50 chemicals in waste are projected to decline by 4.5% in 1995 and more than 7% by 1996, while facilities expect other TRI chemicals in waste to continue increasing (4.3% in 1995 and 6% by 1996).

❷ Data for 1991 as reported on 1991 forms; data for 1992 as reported on 1992 forms; all other years from 1994 forms. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

- Facilities owned by 33/50 Program participating companies reported a slight increase in production-related waste (0.2%) while facilities owned by non-participating parent companies reported a 3.4% increase.

- Participating companies' facilities project a 13.4% decrease in production-related waste of 33/50 chemicals by 1996, compared to a 1.2% increase projected by non-participants.

33/50 Program Chemicals Targeted for Greater Source Reduction Activities

- Nearly a third of the Form Rs submitted for 33/50 Program chemicals reported the occurrence of a source reduction activity in 1994, compared to a fifth of the forms for other TRI chemicals.

- Nearly 7,000 source reduction activity reports were submitted for the seventeen 33/50 chemicals, representing more than 40% of all source reduction activities reported to TRI for 1994.

- Individual 33/50 Program chemicals had some of the highest levels of source reduction activity reporting in 1994. The top three TRI chemicals for number of forms reporting source reduction activities in 1994 were 33/50 Program targets, and several others are among the top 50.

COMPANY PARTICIPATION IN THE 33/50 PROGRAM

While the 33/50 Program did not have a fixed goal for the number of companies electing to participate, the Program nonetheless placed considerable emphasis on outreach to companies in an effort to promote a pollution prevention ethic as widely as possible.

Numbers of Companies Participating

Initial communications about the 33/50 Program were directed to the chief executive officers of the parent companies of the more than 20,000 industrial facilities that reported to TRI any of the Program's 17 target chemicals from 1988 to 1994. At the close of the Program's fifth and final year in February 1996, nearly 9,000 companies had been contacted by EPA with invitations to participate. Of these, nearly 1,300 companies (14.4%) elected to enroll (see Figure 4-3). Releases and transfers reported by facilities belonging to these companies represent 63% of the 1988 releases and transfers of 33/50 Program chemicals and 51% of the 1994 quantities.

The "Top 600" companies with the greatest amounts of releases and transfers were the first to be contacted and were the focus of greater outreach follow-up from the Program's headquarters and Regional Office staffs. This concentration on larger companies proved quite effective, with more than 60% of these companies electing to participate. However, less than 13% of the nearly 7,500 smaller companies chose to enroll.

Reductions Pledged by Participating Companies

While the Program's national goals were targeted for achievement by 1992 and 1995 (and achieved ahead of schedule), companies were encouraged to set their own reduction goals oriented to their own time frames. Nearly 1,100 (85%) of the 1,300 participating companies provided release/transfer reduction targets for 33/50 Program chemicals totalling 385 million pounds. Reduction commitments averaged slightly less than 50% per participating company.

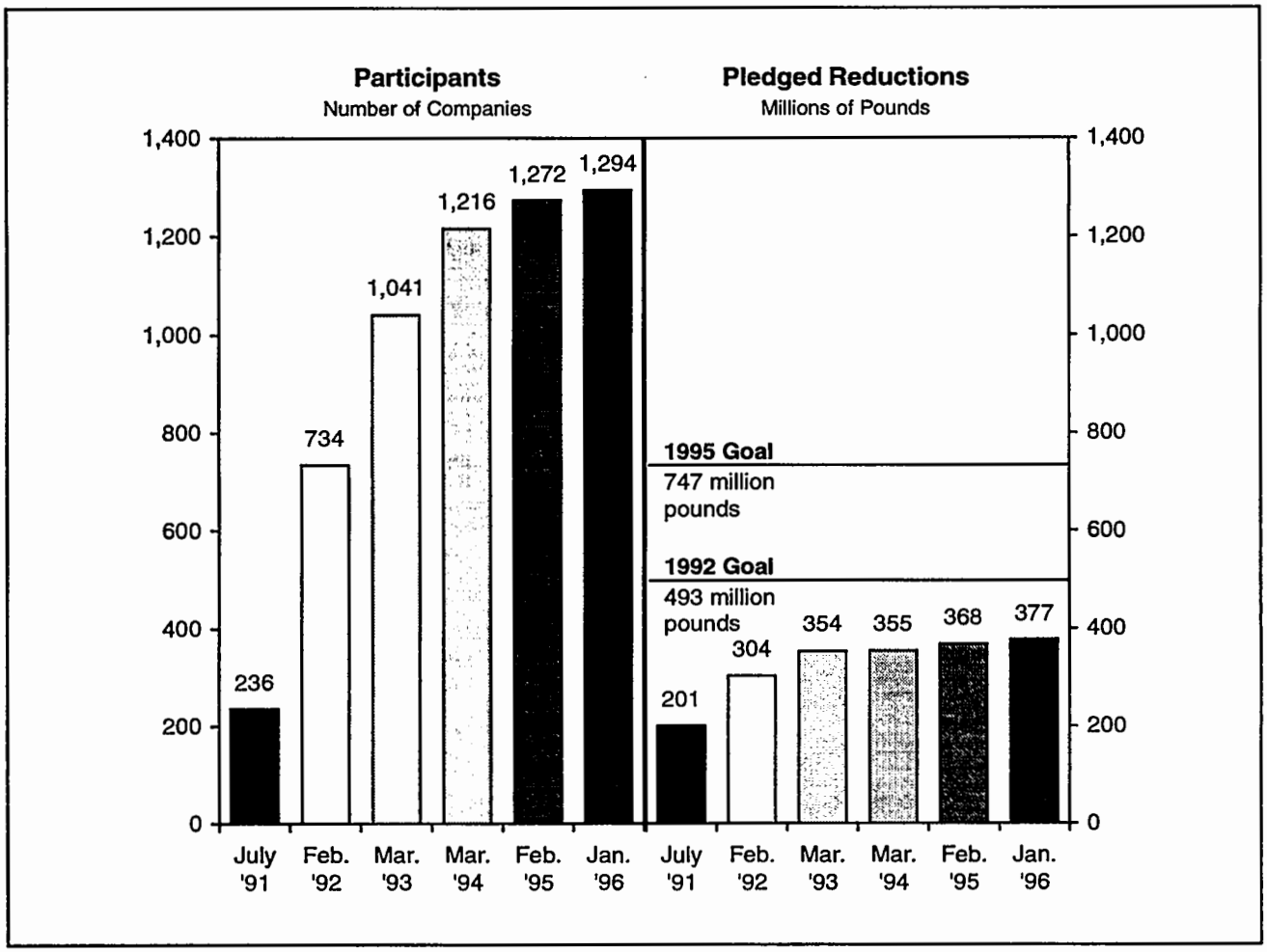


Figure 4-3. 33/50 Program Participant Status, January 1996.

Most of the remaining Program participants also developed reduction targets, but have structured them in ways that are difficult to assess against the 1988 release/transfer baseline. For example, some companies have reduction goals that are indexed to changes in production. If production remains constant throughout the duration of the Program, these can be read as direct reductions targets. However, where production increases or decreases, the absolute impact of the company's reduction pledge cannot be determined in advance. Accordingly, EPA has not factored these commitments into its assessment of total release/transfer reductions anticipated to be obtained through the 33/50 Program.

Other Program participants have developed reduction goals that go beyond the goals of the 33/50 Program. Some have pledged to reduce all TRI releases and transfers by specified amounts or percentages, but have not indicated specific targets for 33/50 Program chemicals. Others have gone beyond targeting end-of-pipe releases or transfers by attempting to reduce their actual use of toxic chemicals, but have not stipulated the impact such pollution prevention initiatives will have on environmental releases of 33/50 Program chemicals. As a result, the 385 million pounds of release/transfer reductions represent a lower bound on the reductions that companies attempted under the 33/50 Program.

Actual Reductions Outpacing Pledges

As evidenced in the TRI reporting data, actual reductions being achieved by companies for the Program's 17 target chemicals are exceeding significantly EPA's conservative interpretation of companies' reduction pledges. The 757 million pounds of 33/50 Program chemical releases and transfers reduced between 1988 and 1994 is more than twice the 385 million pounds pledged by participating companies to be reduced by 1995.

Some of these additional reductions result from decreases being achieved by companies that are not participating in the 33/50 Program [about 196 million pounds (26%) through 1994]. Some are due to the efforts of participating companies whose reduction pledges could not be factored into the national total. Significantly, however, companies that made reduction pledges achieved substantially greater results than they anticipated.

33/50 Program Participants Are Continuing Their Reductions

The 33/50 Program seeks to instill among its participants a commitment to continuous and comprehensive environmental improvement. Many participants targeted additional reductions for after 1995, for other chemicals besides the Program's 17 target chemicals, and for facilities outside of the United States. Altogether, more than 200 participants made extended pollution reduction pledges. As discussed below, participants are also projecting continued significant reductions in 33/50 chemical emissions (17.7% by 1996), further demonstrating a continuing commitment to voluntary pollution reductions.

33/50 PROGRAM RELEASES AND TRANSFERS

Releases and transfers of 33/50 Program chemicals were reduced by 62 million pounds (7.8%) in 1994, bringing total reductions since 1988 to 757 million pounds and exceeding the Program's ultimate 1995 50% national pollution reduction goal by more than 10 million pounds a full year ahead of schedule (see Figure 4-1 presented previously in this chapter).

Table 4-1 presents facilities' reports of on-site releases and off-site transfers to treatment and disposal of 33/50 Program chemicals versus reports for all other TRI chemicals for 1988 (the 33/50 Program's base year), 1990 (the year prior to EPA's initiation of the Program), 1993, and 1994. In order to control for changes in the TRI chemical list over time, year-to-year comparisons for non-33/50 Program chemicals (labelled "TRI Chemicals Less 33/50 Chemicals") are based on a consistent list of chemicals that have been reported under TRI for all years 1988-1994. The trends in reductions for each grouping of chemicals are depicted in Figure 4-4.

Figure 4-5 highlights the dramatic change in the reduction trends for 33/50 Program chemicals versus other TRI chemicals since the 33/50 Program was initiated. In the two years prior to the Program's announcement, reductions in releases and off-site transfers of other TRI chemicals significantly outpaced those for 33/50 Program chemicals: 20.2% vs. 15.5%. However, in the four years following announcement of the 33/50 Program's voluntary reduction goals, releases and transfers of its 17 target chemicals were reduced at nearly twice the rate observed for all other TRI chemicals: a 41.6% reduction between 1990 and 1994 for 33/50 Program chemicals versus a 22.3% reduction for the remaining TRI chemicals. In 1994, 33/50

Table 4-1. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988, 1990, 1993, 1994.❸

Year	All TRI Chemicals (Excluding Additions/ Deletions)	TRI Chemicals Less 33/50 Chemicals	33/50 Chemicals Only
	Pounds	Pounds	Pounds
1988	4,709,109,988	3,215,344,142	1,493,765,846
1990	3,828,286,482	2,566,155,970	1,262,130,512
1993	2,866,422,865	2,067,108,748	799,314,117
1994	2,731,490,375	1,994,449,624	737,040,751
	Percent Change	Percent Change	Percent Change
1988-1990	-18.70%	-20.19%	-15.51%
1990-1994	-28.65%	-22.28%	-41.60%
1993-1994	-4.71%	-3.52%	-7.79%
1988-1994	-42.00%	-37.97%	-50.66%

chemicals outpaced the reduction rate for other TRI chemical emissions by more than two to one (7.8% vs. 3.5%).

Facilities are projecting continued reductions in 33/50 Program emissions in 1995 and 1996. Using waste management data reported in Section 8 of Form R (see next section of this chapter), quantities reported as released (which include off-site disposal) added to quantities reported shipped off-site for treatment provides a reasonable proxy for anticipating future trends in the releases and transfers used to monitor the progress of the 33/50 Program. Facilities project 33/50 Program releases, disposal, and transfers to treatment to decline by 10.7% in 1995 and 16.5% by 1996. Similar projections for other TRI chemicals forecast a 5.4% increase by 1996.

The "leaders-in-reductions" role being played by 33/50 Program participants is also reflected in the reduction performance of the individual TRI facilities that use the target chemicals. Three of the top facilities showing the greatest reductions in direct environmental releases in 1994, and 12 of the top 20, report 33/50 chemicals and are owned by participating parent companies. Of the top 50 reducing facilities, 31 report Program chemicals and are owned by participating parents.

33/50 Program Chemical Releases and Transfers, by Medium/Transfer Type and by Chemical

Releases and off-site transfers of 33/50 Program chemicals are summarized by chemical and release medium/transfer type for 1988 (the 33/50 Program's base year), 1990 (the year prior to EPA's initiation of the Program), 1993, and 1994 in Table 4-2. (Box 4-2 explains the presentation of 33/50 chemicals in these tables.) The "Subtotal" column in the transfers portion of the table represents those transfer types (POTWs, treatment, disposal, and "other"

❸ Does not include amounts for recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

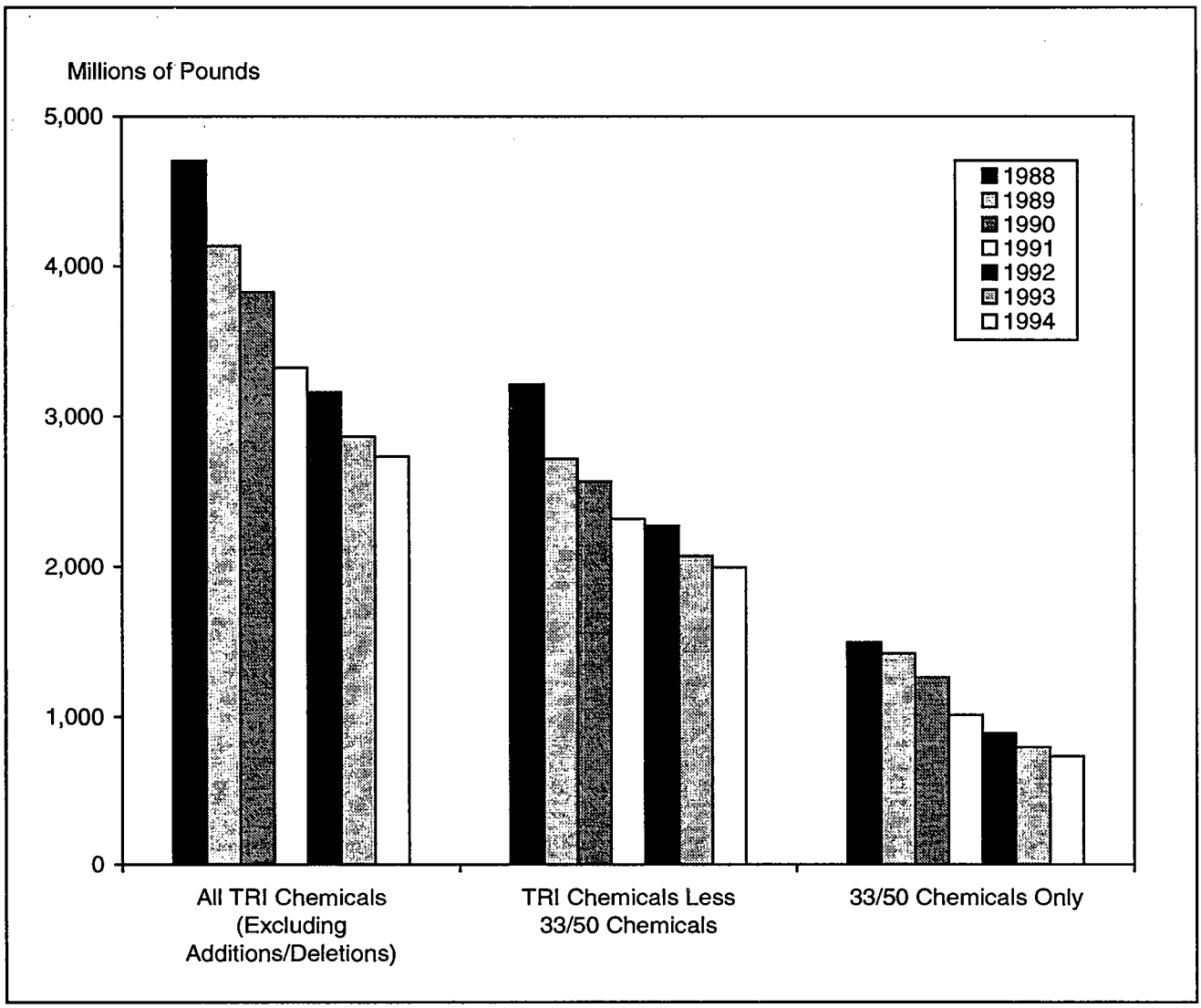


Figure 4-4. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988-1994.❹

transfers) that are included in the 33/50 Program goals. The "Total" column adds in transfers for recycling and energy recovery, which have been reportable to TRI since 1991 but are not included in the 33/50 Program. Figure 4-6 presents a graphical representation of the total releases and transfers (excluding transfers to recycling and energy recovery) for each chemical for these years.

Figure 4-7 shows the percentage reduction for the 11 organic chemicals and the six inorganic chemicals and their compounds, as well as for the total of all 33/50 chemicals. All percentages are calculated from a 1988 baseline. As the figure shows, releases and transfers of organic chemicals have steadily declined from 1988 to 1994 for a total reduction of nearly 53% over the time period. Releases and transfers of inorganic compounds, on the other hand,

❹ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

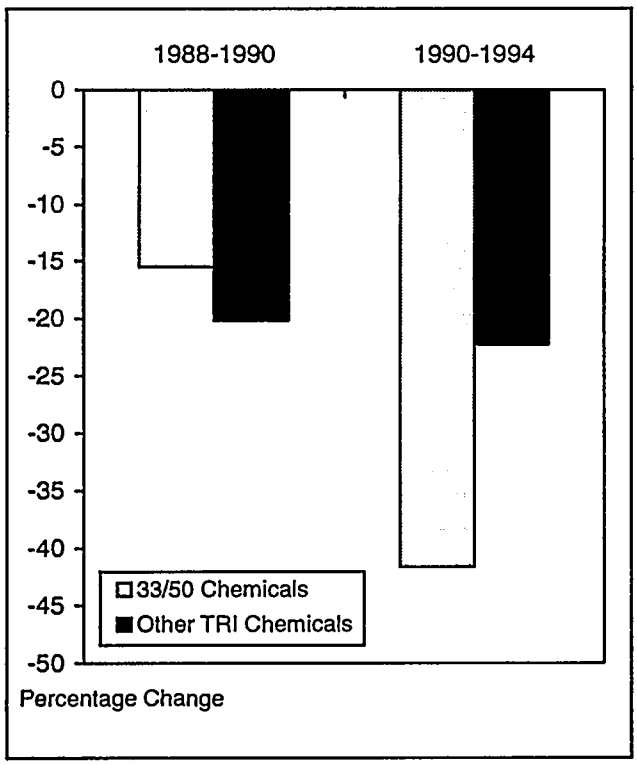


Figure 4-5. Comparison of Reductions in Releases and Transfers of 33/50 Program Chemicals vs. Other TRI Chemicals, 1988-1994.❺

decreased from 1988 to 1989, increased in 1990, decreased significantly in 1991, decreased again in 1992, then increased in 1993 before decreasing again in 1994, resulting in total releases and transfers of inorganics decreasing less than 31% from 1988 to 1994. Because the inorganics account for a much smaller percentage of the total releases and transfers of 33/50 Program chemicals, however, their relatively small percentage decrease has had little impact on the total percentage reduction of 33/50 chemicals.

The 11 organic chemicals accounted for 93% of all reductions in 33/50 chemicals between 1988 and 1994, while inorganics accounted for 7% of total reductions. There are two reasons for this result. First, organics accounted for a much larger percent of total releases and transfers in 1988 than inorganics (89% vs. 11%). Second, the percentage reduction in releases and transfers of organics was much larger from 1988 to 1994 than for inorganics (53% vs. 31%).

Five chemicals accounted for 76% of total reductions in 33/50 Program releases and transfers between 1988 and 1994: toluene (23% of all reductions), 1,1,1-trichloroethane (21%), methyl ethyl ketone (11%), xylenes (11%), and dichloromethane (10%).

These results are not surprising given that these five organic chemicals were the largest source of releases and transfers of 33/50 chemicals in 1988 (74%). These chemicals still comprise nearly 71% of all releases and transfers of 33/50 chemicals. All organics represent 84% of total releases and transfers of 33/50 chemicals. Inorganics, however, are increasing in prominence, representing 16% of total releases and transfers of 33/50 Program chemicals in 1994, up from 11% in 1988. Lead and compounds and chromium and compounds are the most important inorganics, each accounting for 6% of total releases and transfers of 33/50 chemicals in 1994. Releases and transfers of cadmium and compounds increased between 1988 and 1994, primarily from an increase in 1993. Because release and transfer quantities of cadmium compounds are small, however, the impact on total 33/50 releases and transfers was negligible.

Figure 4-8 shows the percent change in releases and transfers of 33/50 Program chemicals from 1988 to 1994 for each chemical. With the exception of mercury and compounds, the inorganic chemicals (presented at the bottom of the figure) show smaller percentage decreases than observed for the 11 organic chemicals

❺ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

between 1988 and 1994, and releases and transfers of one of the inorganics (cadmium and compounds) actually increased.

Figure 4-9 presents a graphical representation of the data in Table 4-2 by release medium and transfer type for the years 1988 to 1994. Figure 4-10 shows the percent change in releases and transfers from 1988 to 1994 by release medium and transfer type. Figure 4-11 shows the contribution of reductions in each release medium and transfer type to total reductions in releases and transfers of 33/50 chemicals from 1988 to 1994. As these diagrams show, the largest quantity reductions in releases and transfers have occurred in air emissions. Reductions in air emissions account for 74% of total reductions in releases and transfers of 33/50 chemicals.

Transfers to Energy Recovery and Recycling

As described in Chapter 2, the Pollution Prevention Act of 1990 (PPA) substantially expanded the scope of TRI to include reporting on additional toxic chemical management activities. Off-site transfers to energy recovery and recycling processes are now reported in Section 6 of Form R in addition to the previously reported transfers to POTWs and other treatment and disposal facilities.

Facilities' reports of transfers to energy recovery and recycling for 1991-1994 are presented after the "Subtotal" column in Table 4-2. The absence of reporting requirements for these activities in 1988 is reflected by "NA." Transfers to energy recovery (233.5 million pounds) and transfers to recycling (751.3 million pounds) in 1994 again substantially exceeded the total for all previously reported types of off-site transfers of 33/50 Program chemicals (134.3 million pounds). Increases

33/50 Program Chemical Identities

In the tables in this chapter, the 33/50 Program chemicals appear in alphabetical order by organic chemicals followed by inorganic chemicals. Xylenes and the inorganic chemicals have been grouped into categories, as shown below. The 10 individual organic chemicals and the seven groups constitute the 17 high-priority chemicals targeted by the 33/50 Program.

Organic chemicals

71-43-2	Benzene
56-23-5	Carbon tetrachloride
67-66-3	Chloroform
75-09-2	Dichloromethane
78-93-3	Methyl ethyl ketone
108-10-1	Methyl isobutyl ketone
127-18-4	Tetrachloroethylene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-01-6	Trichloroethylene

Xylenes

108-38-3	m-Xylene
95-47-6	o-Xylene
106-42-3	p-Xylene
1330-20-7	Xylene (mixed isomers)

Inorganic chemicals [6]

Cadmium and cadmium compounds

7440-43-9	Cadmium
—	Cadmium compounds

Chromium and chromium compounds

7440-47-3	Chromium
—	Chromium compounds

Cyanide compounds

74-90-8	Hydrogen cyanide
—	Cyanide compounds

Lead and lead compounds

7439-92-1	Lead
—	Lead compounds

Mercury and mercury compounds

7439-97-6	Mercury
—	Mercury compounds

Nickel and nickel compounds

7440-02-0	Nickel
—	Nickel compounds

Box 4-2. 33/50 Program Chemical Identities.

[6] Compound categories do not have CAS numbers (—).

Table 4-2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1990, 1993, 1994.❼

CAS Number	Chemical	Year	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
71-43-2	Benzene	94	491	5,266,338	4,226,037	22,256	223,103	25,371	9,763,105
		93	474	6,802,701	4,246,167	19,497	356,660	31,215	11,456,240
		90	503	14,673,280	10,901,492	25,303	689,066	717,007	27,006,148
		88	482	20,574,341	11,642,018	46,983	825,035	127,921	33,216,298
56-23-5	Carbon tetrachloride	94	69	226,057	392,870	1,223	12,654	0	632,804
		93	75	585,481	1,648,678	1,453	34,332	79	2,270,023
		90	100	419,002	1,320,385	4,718	31,557	1,005	1,776,667
		88	95	1,084,548	2,694,047	15,627	98,050	14,759	3,907,031
67-66-3	Chloroform	94	167	3,450,479	7,472,557	362,812	80,002	11,667	11,377,517
		93	175	4,562,449	9,289,998	451,262	38,039	32,926	14,374,674
		90	192	8,443,255	14,593,635	1,005,760	89,560	57,924	24,190,134
		88	169	7,695,273	18,275,242	1,131,484	36,000	68,544	27,206,543
75-09-2	Dichloromethane	94	1,030	25,022,843	37,687,647	52,289	960,942	50,845	63,774,566
		93	1,081	24,227,024	40,677,058	62,909	956,098	78,267	66,001,356
		90	1,451	38,208,293	62,749,754	194,764	850,018	21,024	102,023,853
		88	1,673	49,639,037	79,465,932	349,960	1,478,833	157,156	131,090,918
78-93-3	Methyl ethyl ketone	94	2,389	27,184,737	51,440,202	108,385	575,848	51,794	79,360,966
		93	2,473	29,378,455	56,738,332	184,339	360,927	134,162	86,796,215
		90	2,722	45,850,307	88,727,094	94,393	146,209	50,531	134,868,534
		88	2,527	41,669,961	99,080,759	91,426	255,955	166,537	141,264,638
108-10-1	Methyl isobutyl ketone	94	1,031	6,847,214	18,429,655	80,177	131,600	12,925	25,501,571
		93	1,021	7,810,250	17,477,368	90,214	131,600	76,771	25,586,203
		90	1,125	9,875,727	18,538,178	55,593	52,226	24,738	28,546,462
		88	1,011	13,049,874	18,985,959	762,108	116,650	31,770	32,946,361
127-18-4	Tetrachloro-ethylene	94	459	4,671,751	5,530,378	3,872	4,051	4,349	10,214,401
		93	490	4,538,411	6,634,275	10,152	15,041	618,026	11,815,905
		90	666	9,351,150	13,597,042	21,510	11,012	1,260	22,981,974
		88	746	16,336,282	19,786,265	33,314	72,250	82,144	36,310,255
108-88-3	Toluene	94	3,566	57,656,473	110,561,812	82,751	496,440	161,205	168,958,681
		93	3,643	62,341,544	117,599,735	119,858	967,496	239,798	181,268,431
		90	4,285	87,654,988	161,621,719	201,830	1,432,923	371,482	251,282,942
		88	3,999	105,716,267	192,930,207	197,208	1,473,666	731,449	301,048,797
71-55-6	1,1,1-Trichloro-ethane	94	1,207	20,070,741	17,981,336	1,980	102	2,732	38,056,891
		93	2,111	33,199,831	31,568,263	11,146	2,528	42,743	64,824,511
		90	4,210	85,672,408	83,099,485	16,984	1,586	62,446	168,852,909
		88	3,915	92,995,587	87,654,575	95,624	1,000	204,923	180,951,709
79-01-6	Trichloro-ethylene	94	783	14,788,788	15,083,085	1,671	288	4,417	29,878,249
		93	790	14,524,316	15,939,964	5,220	460	8,212	30,478,172
		90	3,985	37,236,658	111,804,060	49,549	105,399	423,453	149,619,119
		88	951	26,168,126	29,759,510	13,801	390	21,186	55,963,013
95-47-6	Xylenes	94	3,517	27,308,716	86,799,963	55,692	314,461	250,980	114,729,812
		93	3,611	30,079,209	90,702,452	57,773	213,172	252,969	121,305,575
		90	807	19,030,377	20,900,640	14,285	805	12,554	39,958,661
		88	3,646	39,645,690	129,685,753	213,032	144,978	647,989	170,337,442
	Cadmium and cadmium compounds	94	158	8,941	50,628	2,029	170	58,472	120,240
		93	178	9,140	52,135	1,069	977	123,376	186,697
		90	257	31,035	72,265	3,339	1,575	397,523	505,737
		88	205	32,399	90,293	4,147	2,409	389,479	518,727

Table 4-2.

CAS Number	Chemical	Year Pounds	Transfers to POTWs Pounds	Transfers Off-site for Treatment Disposal/Other[8] Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers[9]
71-43-2	Benzene	94	210,714	2,346,337	2,557,051	555,346	1,657,785	4,770,182
		93	308,621	1,880,043	2,188,664	1,101,028	1,094,388	4,384,080
		90	633,978	2,221,358	2,855,336	NA	NA	NA
		88	1,164,722	2,295,959	3,460,681	NA	NA	NA
56-23-5	Carbon tetrachloride	94	574	1,223,436	1,224,010	850,623	17,314	2,091,947
		93	1,675	1,042,171	1,043,846	111,626	4,109	1,159,581
		90	42,050	1,082,188	1,124,238	NA	NA	NA
		88	5,014	1,350,011	1,355,025	NA	NA	NA
67-66-3	Chloroform	94	437,920	2,037,728	2,475,648	351,182	101,775	2,928,605
		93	603,550	1,890,580	2,494,130	435,332	69,463	2,998,925
		90	802,260	1,321,726	2,123,986	NA	NA	NA
		88	1,226,573	1,369,922	2,596,495	NA	NA	NA
75-09-2	Dichloromethane	94	835,117	11,764,796	12,599,913	20,785,487	3,755,198	37,140,598
		93	825,299	9,929,184	10,754,483	21,058,873	3,272,177	35,085,533
		90	1,293,254	9,477,878	10,771,132	NA	NA	NA
		88	1,831,154	22,436,109	24,267,263	NA	NA	NA
78-93-3	Methyl ethyl ketone	94	410,746	6,565,715	6,976,461	21,395,064	46,300,997	74,672,522
		93	753,095	6,070,956	6,824,051	24,476,161	46,145,068	77,445,280
		90	891,591	20,998,202	21,889,793	NA	NA	NA
		88	964,168	29,252,652	30,216,820	NA	NA	NA
108-10-1	Methyl isobutyl ketone	94	488,749	1,699,146	2,187,895	17,951,007	18,854,225	38,993,127
		93	636,214	1,521,675	2,157,889	22,886,709	12,055,803	37,100,401
		90	1,259,294	4,599,709	5,859,003	NA	NA	NA
		88	1,509,030	10,509,270	12,018,300	NA	NA	NA
127-18-4	Tetrachloro-ethylene	94	62,053	2,139,983	2,202,036	7,415,291	855,782	10,473,109
		93	111,002	2,463,092	2,574,094	6,277,898	823,697	9,675,689
		90	450,922	4,548,481	4,999,403	NA	NA	NA
		88	558,691	5,582,693	6,141,384	NA	NA	NA
108-88-3	Toluene	94	940,281	22,721,417	23,661,698	23,471,806	80,113,663	127,247,167
		93	1,038,026	23,590,449	24,628,475	31,265,466	81,278,013	137,171,954
		90	1,771,459	40,546,165	42,317,624	NA	NA	NA
		88	3,594,036	62,082,350	65,676,386	NA	NA	NA
71-55-6	1,1,1-Trichloro-ethane	94	6,439	2,558,074	2,564,513	6,983,705	1,845,839	11,394,057
		93	60,463	3,895,932	3,956,395	14,617,408	2,329,613	20,903,416
		90	173,444	13,099,706	13,273,150	NA	NA	NA
		88	305,358	19,389,542	19,694,900	NA	NA	NA
79-01-6	Trichloroethylene	94	50,325	2,819,904	2,870,229	8,304,071	1,183,610	12,357,910
		93	42,987	1,924,254	1,967,241	7,012,395	1,206,942	10,186,578
		90	1,956,518	25,323,209	27,279,727	NA	NA	NA
		88	85,652	6,509,867	6,595,519	NA	NA	NA
95-47-6	Xylenes	94	712,545	10,219,158	10,931,703	39,732,244	78,581,009	129,244,956
		93	743,277	8,197,929	8,941,206	36,927,358	72,798,030	118,666,594
		90	11,949	3,879,599	3,891,548	NA	NA	NA
		88	4,225,457	37,922,313	42,147,770	NA	NA	NA
	Cadmium and cadmium compounds	94	3,013	2,093,444	2,096,457	3,078,180	2,717	5,177,354
		93	4,948	3,372,687	3,377,635	2,122,544	1,142	5,501,321
		90	13,762	1,320,148	1,333,910	NA	NA	NA
		88	21,613	1,286,818	1,308,431	NA	NA	NA

Table 4-2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1990, 1993, 1994,❼ Continued.

CAS Number	Chemical	Year	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
	Chromium and chromium compounds	94	3,182	647,070	495,886	179,281	38,109	21,784,598	23,144,944
		93	3,206	430,459	424,262	254,144	42,762	23,739,737	24,891,364
		90	3,094	573,628	576,925	451,154	83,237	26,044,284	27,729,228
		88	2,436	625,812	700,772	400,219	54,902	40,215,263	41,996,968
	Cyanide compounds	94	292	199,002	3,109,468	103,345	4,099,986	13,961	7,525,762
		93	297	109,808	3,099,162	98,062	3,110,685	6,055	6,423,772
		90	369	240,698	1,720,830	129,669	4,981,412	19,720	7,092,329
		88	428	657,222	1,699,447	197,544	5,445,176	108,969	8,108,358
	Lead and lead compounds	94	1,662	604,678	1,211,976	65,699	1,263	15,159,116	17,042,732
		93	1,687	474,864	1,260,905	75,058	1,768	16,636,721	18,449,316
		90	1,911	908,323	1,385,134	133,290	1,648	18,959,611	21,388,006
		88	1,592	838,990	1,821,919	242,154	2,760	26,684,055	29,589,878
	Mercury and mercury compounds	94	30	9,757	3,563	321	7	1,351	14,999
		93	35	11,621	3,442	446	15	1,812	17,336
		90	63	14,793	8,756	809	21	4,199	28,578
		88	52	16,797	8,484	1,406	27	13,279	39,993
	Nickel and nickel compounds	94	2,573	534,093	273,464	98,323	62,941	1,685,462	2,654,283
		93	2,537	250,328	289,426	96,505	130,038	3,316,740	4,083,037
		90	2,342	394,500	325,707	152,013	268,958	5,086,279	6,227,457
		88	1,729	425,080	297,707	222,369	239,263	3,609,583	4,794,002
	Total for 33/50 Chemicals	94	22,606	194,497,678	360,750,527	1,222,106	7,001,967	39,279,245	602,751,523
		93	23,884	219,335,891	397,651,622	1,539,107	6,362,598	45,339,609	670,228,827
		90	28,082	358,578,422	591,943,101	2,554,963	8,747,212	52,255,040	1,014,078,738
		88	25,656	417,171,286	694,578,889	4,018,406	10,247,344	73,275,006	1,199,290,931
	All Other TRI Chemicals	94	44,171	155,516,424	630,215,862	45,789,667	299,649,764	242,988,677	1,374,160,394
		93	44,683	160,115,843	608,339,622	201,464,061	288,484,349	228,722,676	1,487,126,551
		90	46,700	213,872,551	742,702,592	113,754,037	358,513,009	360,740,975	1,789,583,164
		88	40,915	268,826,438	872,327,820	172,708,335	615,719,877	407,176,871	2,336,759,341
	Total for All TRI Chemicals	94	66,777	350,014,102	990,966,389	47,011,773	306,651,731	282,267,922	1,976,911,917
		93	68,567	379,451,734	1,005,991,244	203,003,168	294,846,947	274,062,285	2,157,355,378
		90	74,782	572,450,973	1,334,645,693	116,309,000	367,260,221	412,996,015	2,803,661,902
		88	66,571	685,997,724	1,566,906,709	176,726,741	625,967,221	480,451,877	3,536,050,272

Table 4-2, Cont.

CAS Number	Chemical	Year Pounds	Transfers to POTWs Pounds	Transfers Off-site for Treatment Disposal/Other❽ Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers❾
	Chromium and chromium compounds	94	427,776	21,241,608	21,669,384	146,732,055	94,815	168,496,254
		93	454,713	20,848,059	21,302,772	132,058,478	31,056	153,392,306
		90	1,144,161	34,110,840	35,255,001	NA	NA	NA
		88	2,081,604	26,866,221	28,947,825	NA	NA	NA
	Cyanide compounds	94	171,214	571,579	742,793	27,418	8,344	778,555
		93	100,272	478,028	578,300	24,600	2,261	605,161
		90	141,644	1,301,442	1,443,086	NA	NA	NA
		88	1,162,724	2,719,177	3,881,901	NA	NA	NA
	Lead and lead compounds	94	89,717	28,464,311	28,554,028	349,333,583	84,961	377,972,572
		93	139,015	25,710,962	25,849,977	291,073,512	83,176	317,006,665
		90	192,818	56,906,502	57,099,320	NA	NA	NA
		88	213,425	31,060,205	31,273,630	NA	NA	NA
	Mercury and mercury compounds	94	15	42,573	42,588	24,908	0	67,496
		93	21	74,630	74,651	23,639	0	98,290
		90	311	213,305	213,616	NA	NA	NA
		88	1,892	274,767	276,659	NA	NA	NA
	Nickel and nickel compounds	94	216,870	10,715,951	10,932,821	104,330,489	4,086	115,267,396
		93	227,995	10,143,486	10,371,481	95,230,276	8,117	105,609,874
		90	317,644	16,004,257	16,321,901	NA	NA	NA
		88	904,544	13,711,382	14,615,926	NA	NA	NA
	Total for 33/50 Chemicals	94	5,064,068	129,225,160	134,289,228	751,322,459	233,462,120	1,119,073,807
		93	6,051,173	123,034,117	129,085,290	686,703,303	221,203,055	1,036,991,648
		90	11,097,059	236,954,715	248,051,774	NA	NA	NA
		88	19,855,657	274,619,258	294,474,915	NA	NA	NA
	All Other TRI Chemicals	94	175,376,656	444,912,574	620,289,230	1,482,281,399	229,247,105	2,331,817,734
		93	180,295,772	399,686,425	579,982,197	1,370,372,399	225,559,982	2,175,914,578
		90	270,610,724	505,962,082	776,572,806	NA	NA	NA
		88	277,491,836	601,092,965	878,584,801	NA	NA	NA
	Total for All TRI Chemicals	94	180,440,724	574,137,734	754,578,458	2,233,603,858	462,709,225	3,450,891,541
		93	186,346,945	522,720,542	709,067,487	2,057,075,702	446,763,037	3,212,906,226
		90	281,707,783	742,916,797	1,024,624,580	NA	NA	NA
		88	297,347,493	875,712,223	1,173,059,716	NA	NA	NA

❼ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

❽ "Other" indicates: For 1993 and 1994, transfers reported with no waste management codes or invalid codes. For 1988 and 1990, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988 and 1990.

❾ Because transfers for recycling and energy recovery were not required to be reported until 1991, total transfers in 1988 and 1990 are not comparable to total transfers reported for 1993 or 1994.

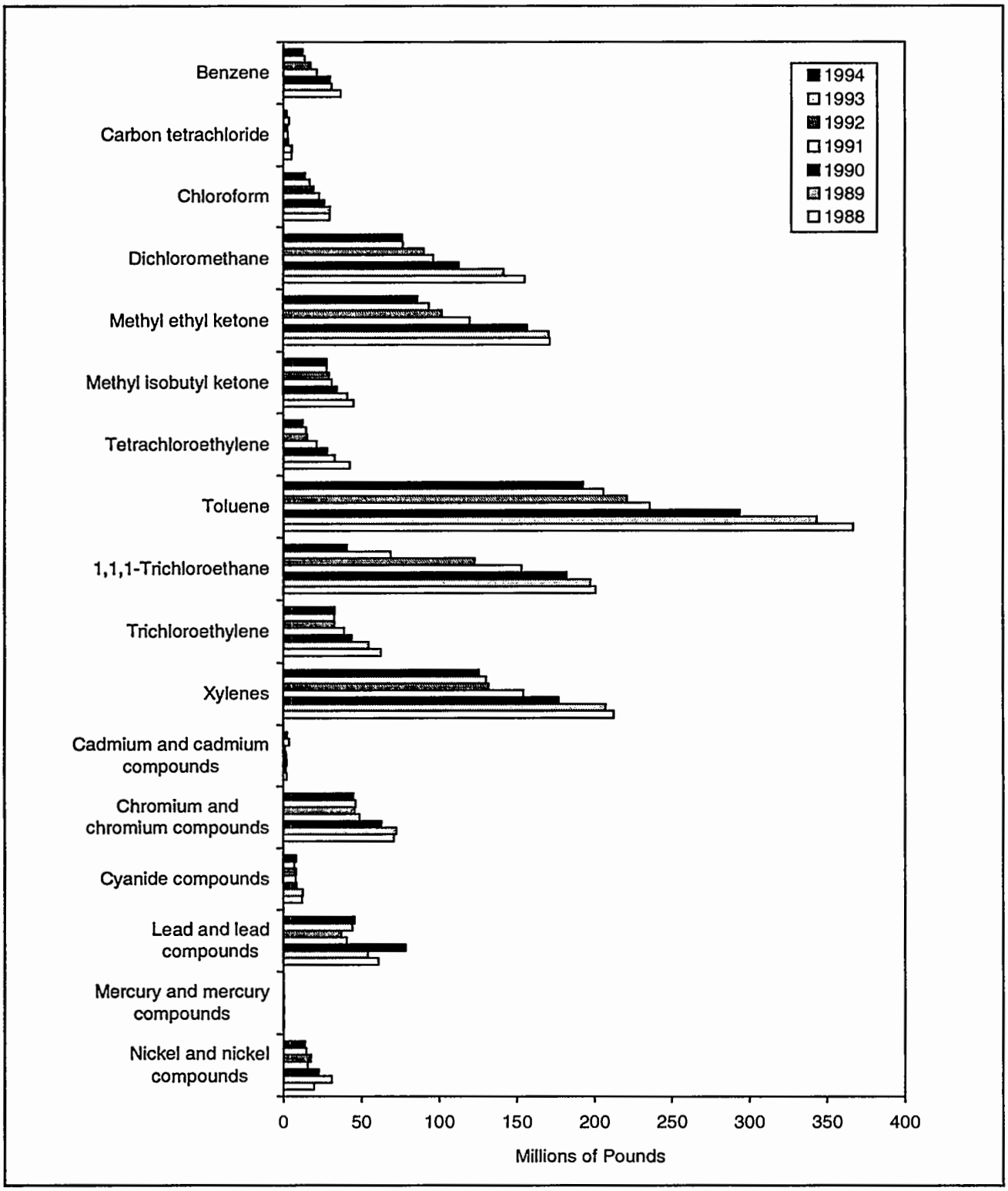


Figure 4-6. TRI Releases and Transfers of 33/50 Program Chemicals, by Chemical, 1988-1994.⑩

⑩ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

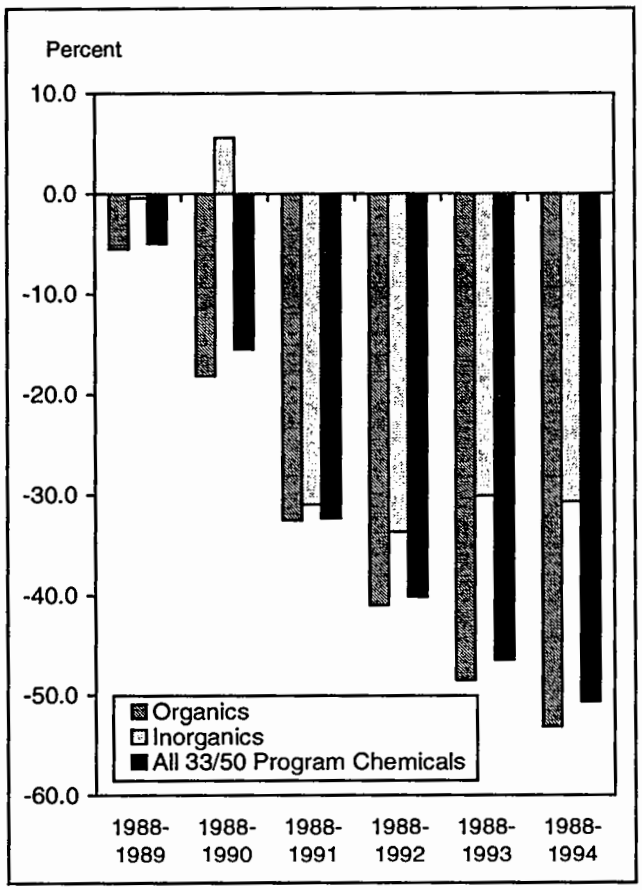


Figure 4-7. Percentage Change in Releases and Transfers of 33/50 Program Chemicals: Organics vs. Inorganics, 1988-1994.⓫

were reported in both of these categories in 1994: 5.6% for energy recovery, 9.4% for recycling.

33/50 PROGRAM CHEMICALS IN WASTE

In Section 8 of Form R, which was made mandatory under the PPA starting with the 1991 reporting year, facilities report the amounts of toxic chemicals:

- recycled or reused in on-site processes and/ or sent off-site for recycling;
- combusted in on-site energy recovery systems and/or sent to off-site systems;
- destroyed in on-site treatment systems and/ or sent to off-site treatment facilities;
- released to the environment as a result of on-site operations plus the amounts shipped off-site for disposal.

Section 8 reporting items described above pertain only to chemical quantities contained in waste that are the result of regular production-related activities. Toxic chemical quantities contained in waste that is generated at the facility through non-routine activities, such as spill clean-ups and catastrophic events, are reported in a separate Section 8 reporting item. Each of the items reported for production-related waste in Section 8 is reported in aggregate, by chemical, for the reporting year (1994) and the prior year (1993) and is forecast by facilities for the two successive years (1995 and 1996).

Throughout this chapter, 1991 data are drawn from facilities' 1991 Form R submissions. 1993 and 1994 data are actual quantities reported on 1994 Form Rs, and 1995 and 1996 data represent facilities' future years' projections reported on 1994 Form Rs.

Table 4-3 presents facilities' reports of total production-related waste for 33/50 Program chemicals versus reports for all other TRI chemicals for 1991-1996. The trends in reductions for each grouping of chemicals are depicted in Figure 4-2, presented at the beginning of this chapter.

⓫ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

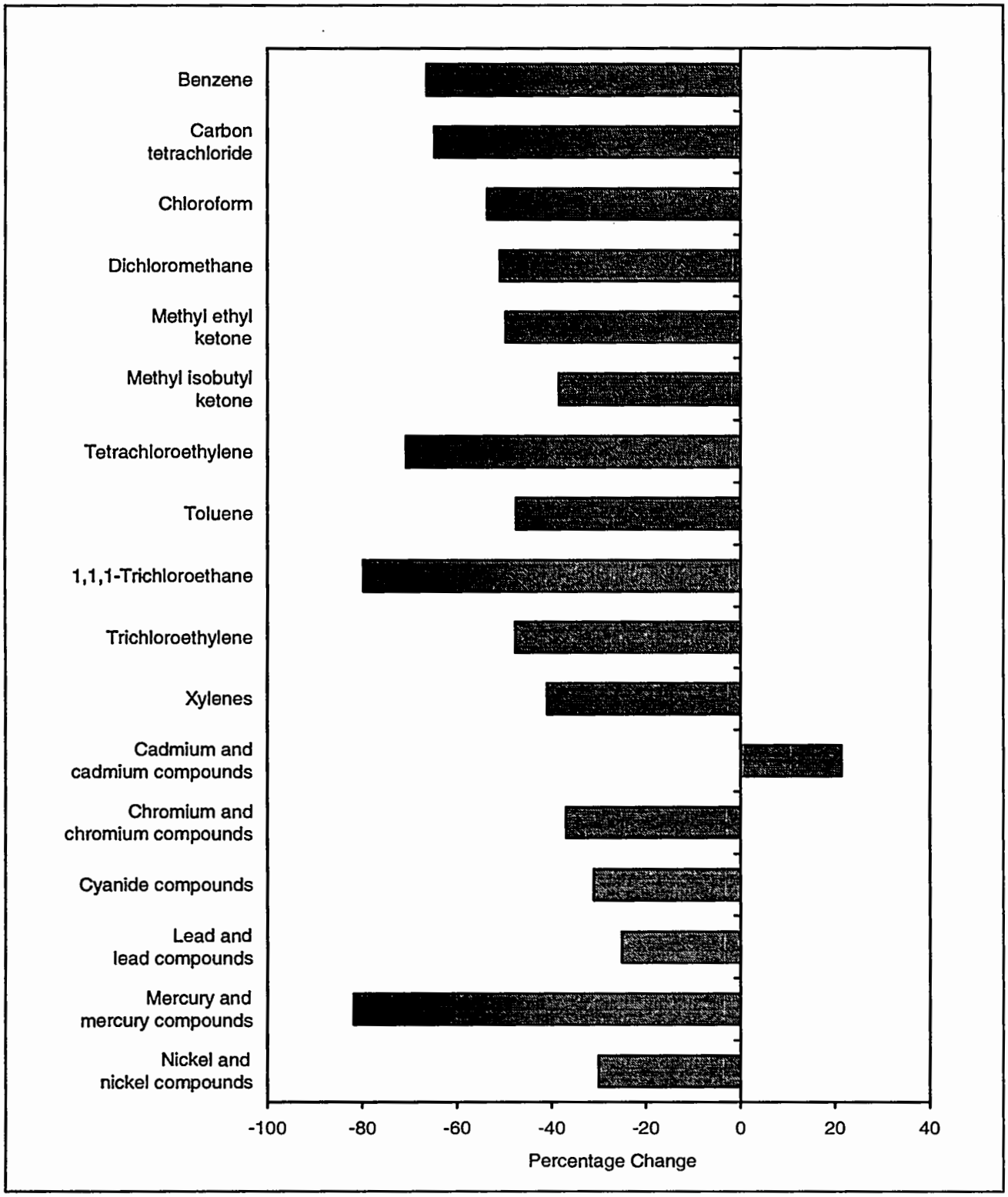


Figure 4-8. Percentage Change in Releases and Transfers of 33/50 Program Chemicals, 1988-1994.⑫

⑫ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

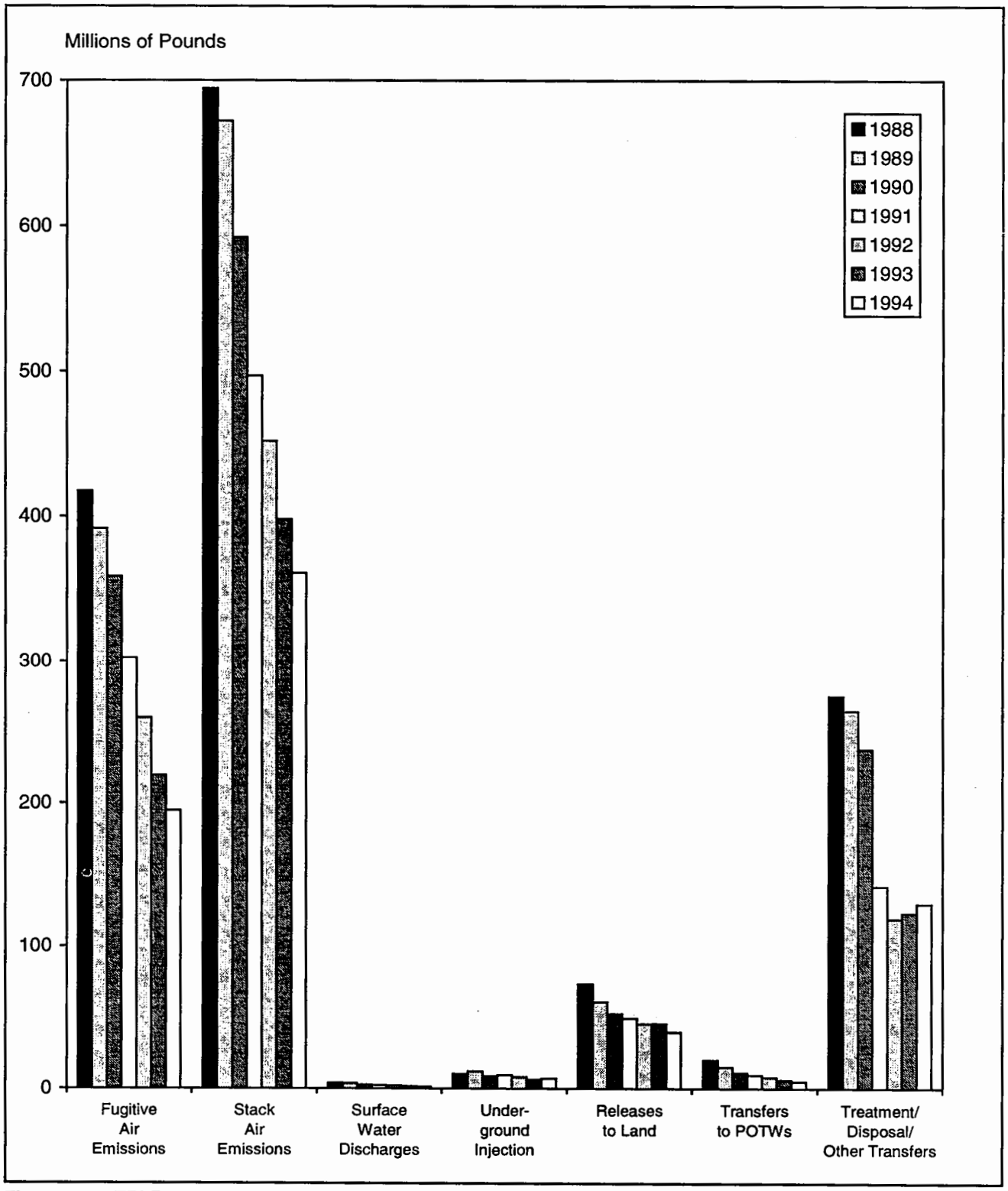


Figure 4-9. TRI Releases and Transfers of 33/50 Program Chemicals, by Release Medium and Transfer Type, 1988-1994.⓭

⓭ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

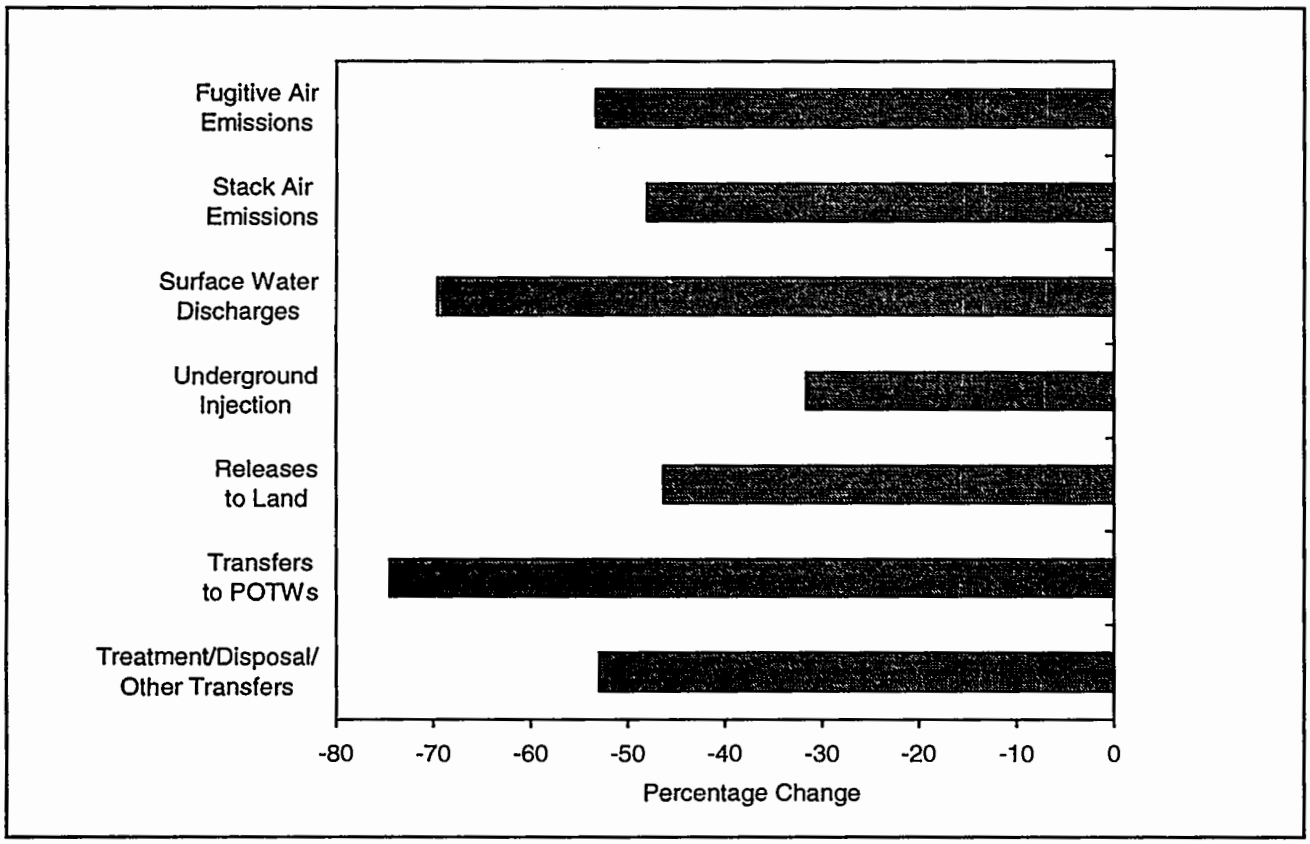


Figure 4-10. Percentage Change in Releases and Transfers of 33/50 Program Chemicals by Release Medium or Transfer Type, 1988-1994.[14]

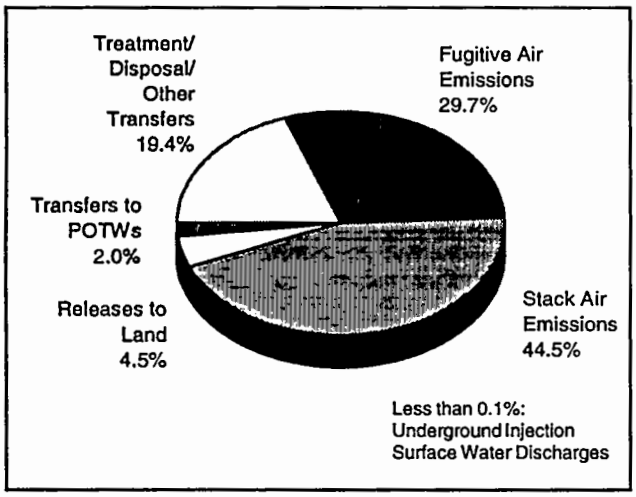


Figure 4-11. Contribution to Reductions in Releases and Transfers of 33/50 Program Chemicals by Release Medium or Transfer Type, 1988-1994.[14]

Total production-related waste associated with 33/50 Program chemicals increased slightly (1.6%) in 1994. Production-related waste for non-Program chemicals also increased in 1994, but by a significantly larger percentage (5.8%). Since 1991, 33/50 chemicals in production waste have decreased slightly (0.9%), while other TRI chemicals in waste have increased significantly (9.2%).

Facilities are projecting a significant reduction in production-related waste of 33/50 Program chemicals in 1995, a 4.5% decline. At the same time, production-related waste for other TRI chemicals is expected to increase again (4.3%). Projections for 1996 suggest an aggregate 7.1% decline from 1994 in 33/50 Program chemical

[14] Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

Table 4-3. Total Production-related Waste for 33/50 Program Chemicals Compared to Other TRI Chemicals, 1991, 1993-1996.[15]

Year	All TRI Chemicals	TRI Chemicals Less 33/50 Chemicals	33/50 Chemicals Only
	Pounds	Pounds	Pounds
1991	20,793,202,032	15,219,391,575	5,573,810,457
1993	21,146,579,814	15,706,293,557	5,440,286,257
1994	22,149,380,646	16,624,256,302	5,525,124,344
1995[16]	22,612,393,439	17,333,515,380	5,278,878,059
1996[16]	22,749,708,079	17,617,205,331	5,132,502,748
	Percent Change	Percent Change	Percent Change
1991-1994	6.5%	9.2%	-0.9%
1993-1994	4.7%	5.8%	1.6%
1994-1996[16]	2.7%	6.0%	-7.1%
1991-1996[16]	9.4%	15.8%	-7.9%

waste, while non-Program chemical waste is forecast to increase by 6.0%.

Analyses of facility projections, particularly as national aggregates, should be viewed with caution. Forecasting waste generation is an imprecise art, and facilities are not bound by their estimates for future years. A review of our analysis of facilities' 1993 TRI reports reinforces this point. On page 281 of the 1993 Public Data Release report, we observed that facilities were projecting a decline of nearly 5.8% in their production-related waste for 33/50 Program chemicals in 1994. Actual data subsequently reported for 1994 showed an increase of nearly 1.6%.

Facilities owned by companies not participating in the 33/50 Program accounted for most (92%) of this increase, reporting a 3.4% increase (78 million pounds) in 1994, and are projected an additional 1.2% increase in production-related waste by 1996. Facilities owned by 33/50 participants, on the other hand, reported only a slight increase in production-related waste in 1994 (0.2%) and are projecting substantial reductions (13.4%) through 1996.

33/50 Program Chemicals in Waste, by Medium/Management Method and by Chemical

Production-related waste for 33/50 Program chemicals is summarized by chemical and waste management method for the period 1991 to 1996 in Tables 4-4 through 4-8. Figure 4-12 presents a graphical representation of the total production-related waste for each chemical for these years.

[15] Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

[16] Projected amounts.

Figure 4-13 shows these data in terms of the percent change in total production-related waste for the periods 1991-1994 (actual change) and 1994-1996 (projected change).

From 1991 to 1994, total production-related waste decreased significantly (over 50 million pounds) for each of five chemicals: 1,1,1-trichloroethane (198 million pounds), methyl ethyl ketone (114 million pounds), methyl isobutyl ketone (65 million pounds), tetrachloreoethylene (61 million pounds), and dichloromethane (54 million pounds). Total production-related waste of three other chemicals—carbon tetrachloride, mercury and compounds, and chloroform—decreased significantly on a percentage basis (over 15%). Production/import of 1,1,1-trichloroethane and carbon tetrachloride is banned in the United States after January 1, 1996.

From 1991 to 1994, total production-related waste increased over 30 million pounds for each of four chemicals: toluene (404 million pounds), chromium and compounds (98 million pounds), cyanide compounds (34 million pounds), and nickel and compounds (40 million pounds). On a percentage basis, total production-related waste increased by over 25% for an additional chemical, cadmium and compounds.

Facilities are projecting that total production-related waste will decrease significantly from 1994 to 1996 for four chemicals: lead and compounds (189 million pounds), trichloroethylene (129 million pounds), 1,1,1-trichloroethane (68 million pounds), and toluene (43 million pounds). Total production-related waste of tetrachloroethylene is also projected to decrease significantly on a percentage basis during this time period. Total production-related waste is also projected to decrease by smaller quantities/percentages for six other chemicals.

Total production-related waste is projected to increase for six chemicals, most notably chromium and compounds and nickel and compounds, which are expected to increase by 26 million pounds and 30 million pounds respectively. Total production-related waste of mercury and mercury compounds is also projected to increase by 12%.

Figure 4-14 shows the total production-related waste for 1991 to 1996 by management method. Figure 4-15 shows these data, in terms of the percent change for the periods 1991-1994 (observed changes) and 1994-1996 (projected changes).

From 1991 to 1994, use of four waste management methods for 33/50 chemicals decreased by a total of 270 million pounds, most notably, on-site releases and off-site disposal, which decreased by 234 million pounds (27%). These decreases were offset by increases in off-site recycling and on-site treatment which increased by 118 million pounds (19%) and 94 million pounds (20%), respectively.

Facilities are projecting that, from 1994 to 1996, on-site releases and off-site disposal of 33/50 Program chemicals will decrease by 108 million pounds (17%) and on-site recycling will decrease by 289 million pounds (11%). Only on-site energy recovery is projected to increase (56 million pounds, 8%).

Table 4-4. Quantity of 33/50 Program Chemicals Recycled On- and Off-site, by Chemical, 1991, 1993-1996.⑰

CAS Number	Chemical	1991 Pounds	1993 Pounds	1994 Pounds	Projected Data 1995 Pounds	Projected Data 1996 Pounds
	Recycled On-site					
71-43-2	Benzene	40,200,807	39,898,335	48,236,739	44,755,812	45,672,260
56-23-5	Carbon tetrachloride	10,538,966	2,511,552	9,615,424	9,291,507	9,141,431
67-66-3	Chloroform	5,707,901	4,964,587	5,502,781	5,281,643	4,890,771
75-09-2	Dichloromethane	79,733,871	58,245,644	60,442,075	68,144,825	67,300,407
78-93-3	Methyl ethyl ketone	155,170,704	74,863,973	66,098,820	70,012,216	70,611,058
108-10-1	Methyl isobutyl ketone	116,883,266	50,415,557	54,877,123	56,167,162	59,902,049
127-18-4	Tetrachloroethylene	121,477,233	68,957,450	56,920,709	49,729,850	48,468,392
108-88-3	Toluene	581,362,098	1,031,238,427	1,022,017,402	1,047,700,045	997,798,959
71-55-6	1,1,1-Trichloroethane	128,309,015	67,219,214	71,974,733	60,662,578	41,156,070
79-01-6	Trichloroethylene	255,206,613	264,418,486	248,092,051	153,474,042	132,094,626
	Xylenes	173,757,537	120,252,943	126,209,629	130,700,430	138,185,872
	Cadmium and cadmium compounds	3,870,686	4,094,064	4,824,783	4,471,867	4,646,364
	Chromium and chromium compounds	74,306,523	71,140,390	73,209,806	86,794,335	92,484,711
	Cyanide compounds	3,815,454	818,711	798,887	832,678	803,568
	Lead and lead compounds	743,819,451	553,402,767	643,169,803	551,661,608	467,200,004
	Mercury and mercury compounds	1,283,330	1,106,229	928,742	997,130	1,054,822
	Nickel and nickel compounds	50,285,107	49,105,873	62,507,384	74,890,668	84,354,323
	Subtotal for 33/50 Chemicals	2,545,728,562	2,462,654,202	2,555,426,891	2,415,568,396	2,265,765,687
	Subtotal for All Other TRI Chemicals	3,635,506,013	4,032,287,959	4,344,908,124	4,680,757,523	4,869,509,815
	Subtotal for All TRI Chemicals	6,181,234,575	6,494,942,161	6,900,335,015	7,096,325,919	7,135,275,502
	Recycled Off-site					
71-43-2	Benzene	1,414,752	1,076,794	560,803	694,052	698,852
56-23-5	Carbon tetrachloride	390,538	101,842	850,623	1,002,700	1,002,700
67-66-3	Chloroform	2,078,744	432,320	350,379	426,362	426,362
75-09-2	Dichloromethane	26,612,121	20,875,089	20,783,673	15,346,271	14,314,794
78-93-3	Methyl ethyl ketone	26,246,204	20,661,858	21,196,120	21,251,476	20,637,229
108-10-1	Methyl isobutyl ketone	17,975,084	22,783,003	16,974,510	15,904,939	15,984,619
127-18-4	Tetrachloroethylene	9,359,426	7,265,438	7,634,068	7,434,205	7,148,237
108-88-3	Toluene	25,206,069	35,878,273	23,356,695	22,257,881	22,507,560
71-55-6	1,1,1-Trichloroethane	29,941,078	8,168,092	6,890,719	3,546,373	1,179,626
79-01-6	Trichloroethylene	7,403,581	6,776,285	8,462,852	7,124,491	5,911,732
	Xylenes	33,608,756	35,700,750	39,600,446	38,047,084	37,606,122
	Cadmium and cadmium compounds	2,047,067	2,120,099	3,093,622	3,028,066	3,123,903
	Chromium and chromium compounds	93,950,740	136,075,547	151,770,873	154,017,112	157,325,292
	Cyanide compounds	38,243	10,181	24,500	26,115	23,213
	Lead and lead compounds	278,459,950	346,547,886	342,379,729	329,625,551	333,974,962
	Mercury and mercury compounds	491,812	21,721	24,937	24,610	25,010
	Nickel and nickel compounds	81,169,458	97,325,047	110,494,613	113,414,259	116,541,137
	Subtotal for 33/50 Chemicals	636,393,623	741,820,225	754,449,162	733,171,547	738,431,350
	Subtotal for All Other TRI Chemicals	1,170,890,338	1,342,214,281	1,504,285,693	1,519,710,657	1,546,280,471
	Subtotal for All TRI Chemicals	1,807,283,961	2,084,034,506	2,258,734,855	2,252,882,204	2,284,711,821
	Total for 33/50 Chemicals	3,182,122,185	3,204,474,427	3,309,876,053	3,148,739,943	3,004,197,037
	Total for All Other TRI Chemicals	4,806,396,351	5,374,502,240	5,849,193,817	6,200,468,180	6,415,790,286
	Total for All TRI Chemicals	7,988,518,536	8,578,976,667	9,159,069,870	9,349,208,123	9,419,987,323

⑰ Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 4-5. Quantity of 33/50 Program Chemicals Used for Energy Recovery On- and Off-site, by Chemical, 1991, 1993-1996.[18]

CAS Number	Chemical	1991 Pounds	1993 Pounds	1994 Pounds	Projected Data 1995 Pounds	Projected Data 1996 Pounds
	Energy Recovery On-site					
71-43-2	Benzene	33,630,440	25,604,578	22,558,478	22,163,863	22,719,300
56-23-5	Carbon tetrachloride	5,964,156	5,070,219	118,200	118,200	119,200
67-66-3	Chloroform	5,499,527	15,990,537	10,972,419	11,176,797	11,486,546
75-09-2	Dichloromethane	14,270,049	10,099,938	12,010,971	13,283,403	14,466,754
78-93-3	Methyl ethyl ketone	98,970,095	97,413,892	94,269,472	102,267,914	107,048,012
108-10-1	Methyl isobutyl ketone	37,048,558	37,188,410	35,412,662	37,274,718	39,617,700
127-18-4	Tetrachloroethylene	4,023,584	11,085,256	10,715,929	11,132,621	11,626,931
108-88-3	Toluene	255,726,051	244,394,756	240,295,525	250,745,793	264,624,695
71-55-6	1,1,1-Trichloroethane	14,001,816	1,495,418	2,893,185	3,413,401	3,966,892
79-01-6	Trichloroethylene	6,188,130	1,012,244	2,379,037	2,609,214	3,044,175
	Xylenes	216,300,956	224,432,760	213,475,938	223,233,646	224,896,953
	Cadmium and cadmium compounds	0	0	0	0	0
	Chromium and chromium compounds	0	69,034	105,472	65,180	65,581
	Cyanide compounds	22,338,436	12,229,599	43,195,554	42,614,408	40,831,945
	Lead and lead compounds	102,675	34,925	46,177	46,177	53,103
	Mercury and mercury compounds	0	0	0	0	0
	Nickel and nickel compounds	0	0	0	0	0
	Subtotal for 33/50 Chemicals	714,064,473	686,121,566	688,449,019	720,145,335	744,567,787
	Subtotal for All Other TRI Chemicals	2,247,444,419	2,182,659,609	2,673,659,466	2,747,882,419	2,671,194,457
	Subtotal for All TRI Chemicals	2,961,508,892	2,868,781,175	3,362,108,485	3,468,027,754	3,415,762,244
	Energy Recovery Off-site					
71-43-2	Benzene	4,931,770	1,660,877	1,657,355	1,376,735	1,311,781
56-23-5	Carbon tetrachloride	10,849	4,731	17,311	22,445	21,445
67-66-3	Chloroform	719,071	51,416	59,270	72,171	78,620
75-09-2	Dichloromethane	6,171,317	3,097,813	3,807,830	2,843,525	2,379,948
78-93-3	Methyl ethyl ketone	38,787,317	46,218,598	47,569,206	45,486,627	45,105,775
108-10-1	Methyl isobutyl ketone	19,383,412	11,904,468	18,886,033	20,391,861	21,950,160
127-18-4	Tetrachloroethylene	1,519,555	710,938	893,544	621,328	663,188
108-88-3	Toluene	87,422,786	83,358,283	81,028,606	78,009,934	77,210,547
71-55-6	1,1,1-Trichloroethane	3,995,774	1,656,206	1,898,289	1,194,847	896,737
79-01-6	Trichloroethylene	963,407	960,864	1,192,486	1,087,512	997,005
	Xylenes	78,466,569	71,668,774	79,163,797	76,763,043	74,587,102
	Cadmium and cadmium compounds	8,337	3,054	2,334	1,511	1,004
	Chromium and chromium compounds	130,304	103,979	148,656	132,620	111,228
	Cyanide compounds	24	1,812	8,145	7,051	7,101
	Lead and lead compounds	62,921	80,735	82,141	74,987	76,449
	Mercury and mercury compounds	3,241	0	0	0	0
	Nickel and nickel compounds	4,449	11,481	10,231	3,188	3,406
	Subtotal for 33/50 Chemicals	242,581,103	221,494,029	236,425,234	228,089,385	225,401,496
	Subtotal for All Other TRI Chemicals	201,330,145	235,132,093	230,721,953	211,886,529	205,371,046
	Subtotal for All TRI Chemicals	443,911,248	456,626,122	467,147,187	439,975,914	430,772,542
	Total for 33/50 Chemicals	956,645,576	907,615,595	924,874,253	948,234,720	969,969,283
	Total for All Other TRI Chemicals	2,448,774,564	2,417,791,702	2,904,381,419	2,959,768,948	2,876,565,503
	Total for All TRI Chemicals	3,405,420,140	3,325,407,297	3,829,255,672	3,908,003,668	3,846,534,786

[18] Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 4-6. Quantity of 33/50 Program Chemicals Treated On- and Off-site, by Chemical, 1991, 1993-1996.⑲

CAS Number	Chemical	1991 Pounds	1993 Pounds	1994 Pounds	Projected Data 1995 Pounds	Projected Data 1996 Pounds
	Treated On-site					
71-43-2	Benzene	32,067,226	40,960,815	32,088,508	33,237,900	33,642,345
56-23-5	Carbon tetrachloride	15,122,884	15,024,261	14,419,837	14,052,167	14,016,793
67-66-3	Chloroform	24,835,406	13,279,372	19,744,218	20,096,998	19,832,960
75-09-2	Dichloromethane	33,975,295	25,060,609	18,927,711	20,799,503	22,067,342
78-93-3	Methyl ethyl ketone	58,025,657	57,262,327	62,307,378	63,308,526	68,730,049
108-10-1	Methyl isobutyl ketone	12,147,639	12,045,137	16,549,233	16,434,674	16,912,537
127-18-4	Tetrachloroethylene	14,684,082	16,466,593	21,514,333	21,641,380	21,612,049
108-88-3	Toluene	128,478,222	112,964,616	155,607,346	133,993,092	137,483,692
71-55-6	1,1,1-Trichloroethane	3,031,986	1,750,504	1,146,568	969,285	837,248
79-01-6	Trichloroethylene	4,886,629	8,031,842	6,004,328	6,189,853	6,328,998
	Xylenes	50,439,940	134,037,114	72,570,751	71,852,159	73,511,239
	Cadmium and cadmium compounds	712,333	533,942	103,760	106,787	102,748
	Chromium and chromium compounds	35,341,390	90,599,323	79,649,625	79,942,563	79,821,608
	Cyanide compounds	16,756,351	30,236,841	32,530,091	28,467,317	28,889,558
	Lead and lead compounds	42,264,696	34,337,601	33,182,059	24,560,560	30,631,408
	Mercury and mercury compounds	35,853	40,900	11,065	8,550	8,550
	Nickel and nickel compounds	2,574,340	3,100,672	2,687,558	1,945,200	1,911,691
	Subtotal for 33/50 Chemicals	475,379,929	595,732,469	569,044,369	537,606,514	556,340,815
	Subtotal for All Other TRI Chemicals	5,613,242,026	5,861,678,865	5,920,503,209	6,268,044,291	6,268,549,140
	Subtotal for All TRI Chemicals	6,088,621,955	6,457,411,334	6,489,547,578	6,805,650,805	6,824,889,955
	Treated Off-site					
71-43-2	Benzene	2,167,000	2,291,840	2,226,836	2,096,811	2,111,608
56-23-5	Carbon tetrachloride	840,947	906,644	929,597	724,586	711,116
67-66-3	Chloroform	2,086,756	2,277,950	2,319,118	1,797,818	1,713,924
75-09-2	Dichloromethane	11,123,271	10,129,769	12,334,437	10,784,901	10,453,219
78-93-3	Methyl ethyl ketone	8,546,040	6,390,031	6,546,417	5,577,728	5,312,026
108-10-1	Methyl isobutyl ketone	2,621,785	2,126,747	2,062,305	1,544,674	1,258,372
127-18-4	Tetrachloroethylene	3,323,435	2,307,221	2,144,993	1,769,735	1,631,045
108-88-3	Toluene	15,572,603	16,503,972	17,645,405	17,691,209	17,477,897
71-55-6	1,1,1-Trichloroethane	5,427,953	2,766,119	2,420,884	1,815,808	1,155,197
79-01-6	Trichloroethylene	2,602,508	3,034,056	2,798,413	2,210,721	1,962,179
	Xylenes	11,900,818	8,007,062	9,541,783	8,998,333	8,373,670
	Cadmium and cadmium compounds	337,522	199,349	228,228	169,015	135,576
	Chromium and chromium compounds	5,047,723	5,974,885	5,156,876	3,917,803	3,792,765
	Cyanide compounds	485,275	397,495	538,971	421,764	385,744
	Lead and lead compounds	5,434,843	2,960,761	5,747,663	5,645,551	5,296,782
	Mercury and mercury compounds	65,832	526	2,475	2,547	2,552
	Nickel and nickel compounds	2,455,527	2,472,629	2,661,748	2,269,086	2,209,487
	Subtotal for 33/50 Chemicals	80,039,838	68,747,056	75,306,149	67,438,090	63,983,159
	Subtotal for All Other TRI Chemicals	421,053,343	365,871,929	372,677,666	379,046,717	353,450,678
	Subtotal for All TRI Chemicals	501,093,181	434,618,985	447,983,815	446,484,807	417,433,837
	Total for 33/50 Chemicals	555,419,767	664,479,525	644,350,518	605,044,604	620,323,974
	Total for All Other TRI Chemicals	6,034,295,369	6,227,550,794	6,293,180,875	6,647,091,008	6,621,999,818
	Total for All TRI Chemicals	6,589,715,136	6,892,030,319	6,937,531,393	7,252,135,612	7,242,323,792

⑲ Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 4-7. Quantity of 33/50 Program Chemicals Released/Disposed of, by Chemical, 1991, 1993-1996.[20]

CAS Number	Chemical	1991 Quantity Released/ Disposed of Pounds	1993 Quantity Released/ Disposed of Pounds	1994 Quantity Released/ Disposed of Pounds	Projected Data 1995 Quantity Released/ Disposed of Pounds	Projected Data 1996 Quantity Released/ Disposed of Pounds
71-43-2	Benzene	18,897,429	11,540,804	9,966,186	9,512,073	9,178,926
56-23-5	Carbon tetrachloride	1,650,166	1,168,152	847,419	563,029	498,542
67-66-3	Chloroform	19,939,888	13,436,746	11,466,125	10,605,487	10,383,493
75-09-2	Dichloromethane	79,828,895	65,082,386	69,053,033	57,080,360	52,457,403
78-93-3	Methyl ethyl ketone	106,412,846	83,721,857	80,107,774	71,814,786	67,636,617
108-10-1	Methyl isobutyl ketone	28,841,695	24,449,586	25,615,023	23,514,536	21,854,867
127-18-4	Tetrachloroethylene	16,735,732	10,900,830	10,785,921	8,778,725	7,718,748
108-88-3	Toluene	206,808,830	168,664,091	164,627,303	150,258,538	144,523,787
71-55-6	1,1,1-Trichloroethane	138,803,672	46,025,083	37,826,474	22,225,516	7,985,960
79-01-6	Trichloroethylene	35,034,674	30,264,373	29,980,770	24,006,845	19,376,046
	Xylenes	129,177,777	115,115,205	115,426,930	106,383,399	102,400,877
	Cadmium and cadmium compounds	1,234,575	3,360,643	2,047,197	2,073,501	2,036,794
	Chromium and chromium compounds	41,203,321	38,636,846	37,719,855	40,552,181	40,491,316
	Cyanide compounds	7,146,331	6,427,622	7,579,180	7,365,366	7,137,485
	Lead and lead compounds	36,367,408	34,377,029	33,542,596	30,907,872	31,715,081
	Mercury and mercury compounds	103,043	51,820	53,258	49,455	49,255
	Nickel and nickel compounds	11,436,647	10,493,637	9,378,476	11,167,123	12,567,257
	Total for 33/50 Chemicals	879,622,929	663,716,710	646,023,520	576,858,792	538,012,454
	Total for All Other TRI Chemicals	1,929,925,291	1,686,448,821	1,577,500,191	1,526,187,244	1,702,849,724
	Total for All TRI Chemicals	2,809,548,220	2,350,165,531	2,223,523,711	2,103,046,036	2,240,862,178

Table 4-8. Quantity of 33/50 Program Chemicals in Production-related Waste, by Chemical, 1991, 1993-1996.[20]

CAS Number	Chemical	1991 Total Production-related Waste Pounds	1993 Total Production-related Waste Pounds	1994 Total Production-related Waste Pounds	Projected Data 1995 Total Production-related Waste Pounds	Projected Data 1996 Total Production-related Waste Pounds
71-43-2	Benzene	133,309,424	123,034,043	117,294,905	113,837,246	115,335,072
56-23-5	Carbon tetrachloride	34,518,506	24,787,401	26,798,411	25,774,634	25,511,227
67-66-3	Chloroform	60,867,293	50,432,928	50,414,310	49,457,276	48,812,676
75-09-2	Dichloromethane	251,714,819	192,591,248	197,359,730	188,282,788	183,439,867
78-93-3	Methyl ethyl ketone	492,158,863	386,532,536	378,095,187	379,719,273	385,080,766
108-10-1	Methyl isobutyl ketone	234,901,439	160,912,908	170,376,889	171,232,564	177,480,304
127-18-4	Tetrachloroethylene	171,123,047	117,693,726	110,609,497	101,107,844	98,868,590
108-88-3	Toluene	1,300,576,659	1,693,002,418	1,704,578,282	1,700,656,492	1,661,627,137
71-55-6	1,1,1-Trichloroethane	323,511,294	129,080,636	125,050,852	93,827,808	57,177,730
79-01-6	Trichloroethylene	312,285,542	314,498,150	298,909,937	196,702,678	169,714,761
	Xylenes	693,652,353	709,214,608	655,989,274	655,978,094	659,561,835
	Cadmium and cadmium compounds	8,210,520	10,311,151	10,299,924	9,850,747	10,046,389
	Chromium and chromium compounds	249,980,001	342,600,004	347,761,163	365,421,794	374,092,501
	Cyanide compounds	50,580,114	50,122,261	84,675,328	79,734,699	78,078,614
	Lead and lead compounds	1,106,511,944	971,741,704	1,058,150,168	942,522,306	868,947,789
	Mercury and mercury compounds	1,983,111	1,221,196	1,020,477	1,082,292	1,140,189
	Nickel and nickel compounds	147,925,528	162,509,339	187,740,010	203,689,524	217,587,301
	Total for 33/50 Chemicals	5,573,810,457	5,440,286,257	5,525,124,344	5,278,878,059	5,132,502,748
	Total for All Other TRI Chemicals	15,219,391,575	15,706,293,557	16,624,256,302	17,333,515,380	17,617,205,331
	Total for All TRI Chemicals	20,793,202,032	21,146,579,814	22,149,380,646	22,612,393,439	22,749,708,079

[20] Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

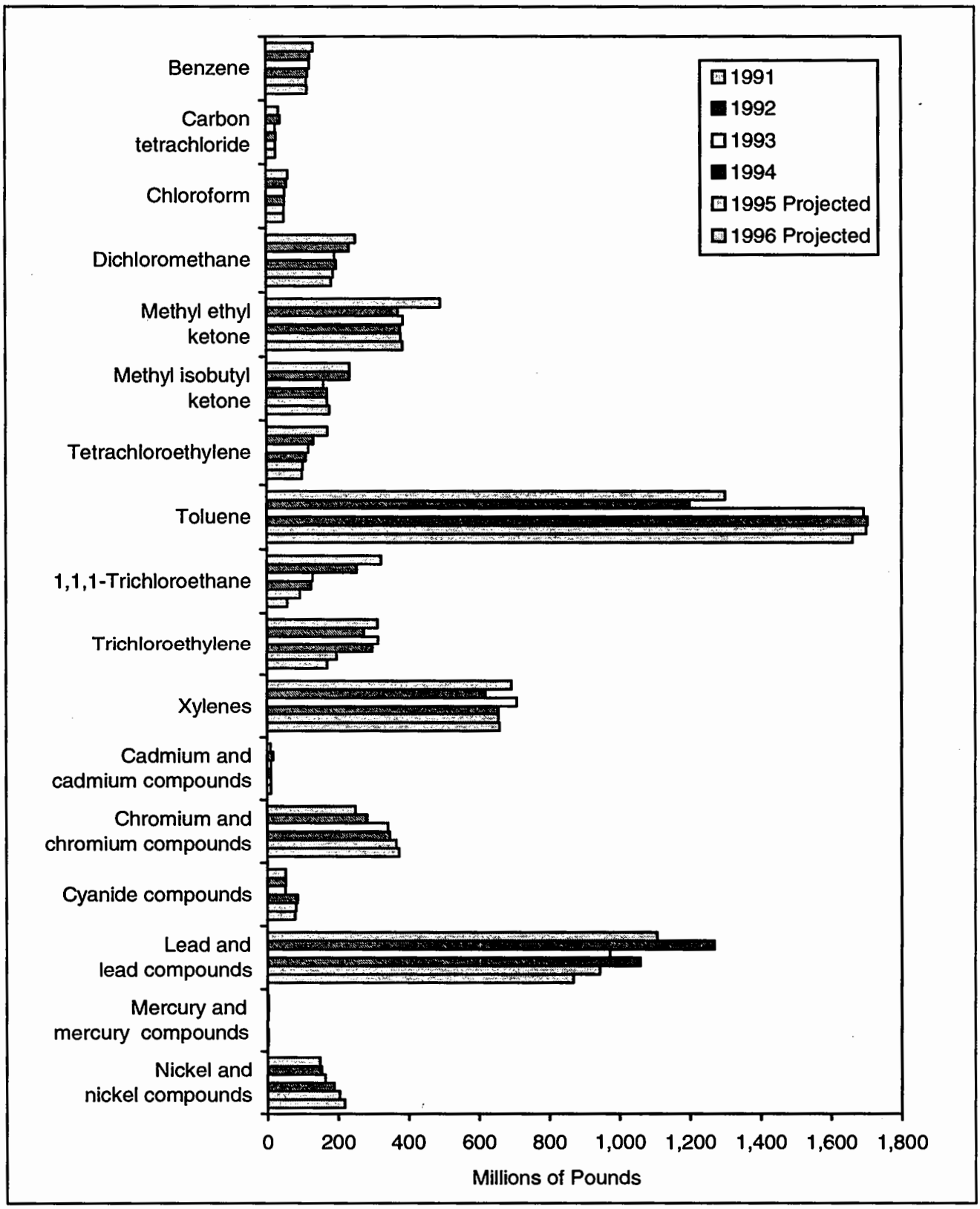


Figure 4-12. Total Production-related Waste, 33/50 Program Chemicals, Actual and Projected, 1991-1996.[21]

[21] Data for 1991 as reported on 1991 forms; data for 1992 as reported on 1992 forms; all other years from 1994 forms.

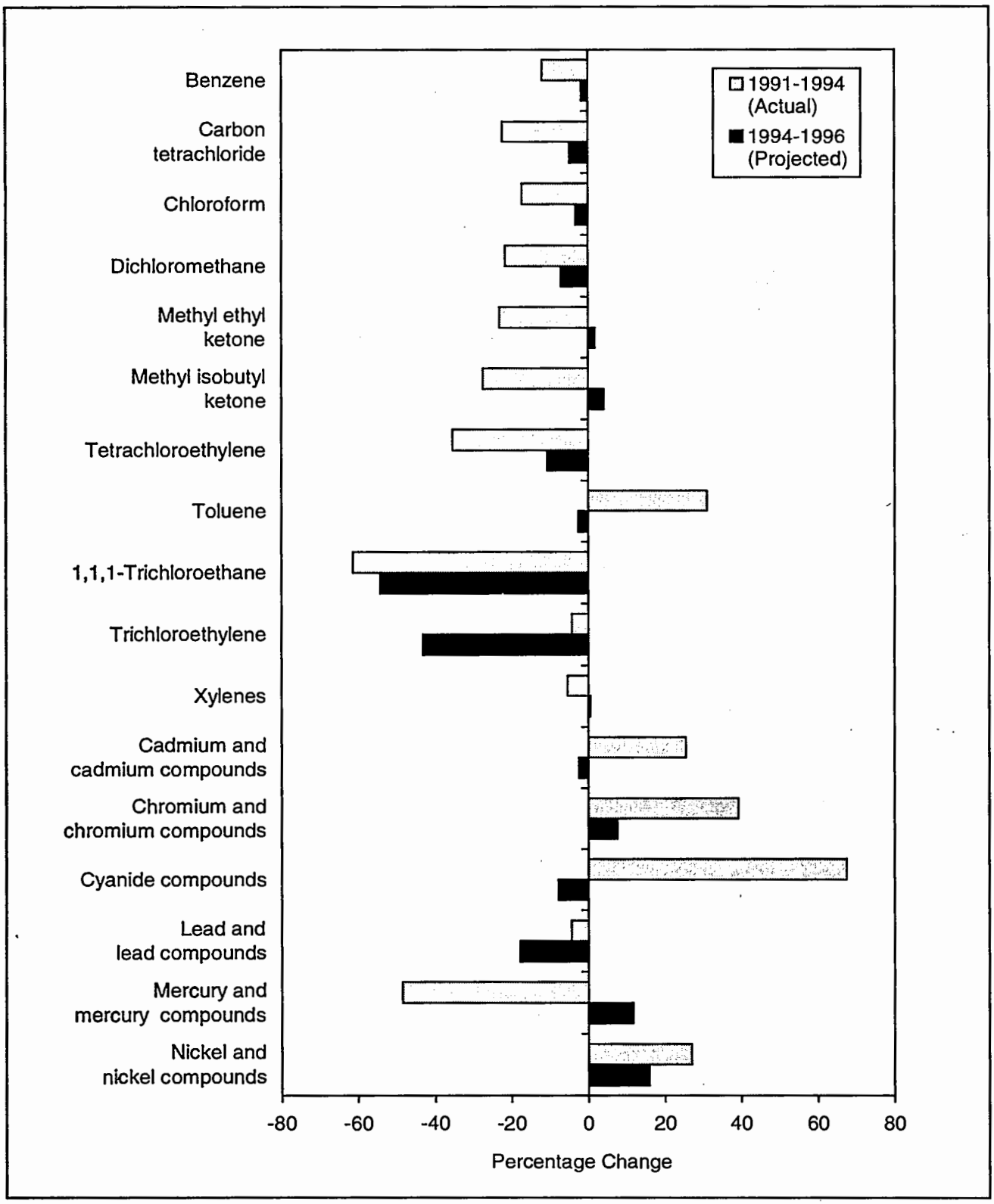


Figure 4-13. Percentage Change in Total Production-related Waste, 33/50 Program Chemicals, Actual and Projected, 1991-1996.[22]

[22] Data for 1991 as reported on 1991 forms; data for 1994 and 1996 from 1994 forms.

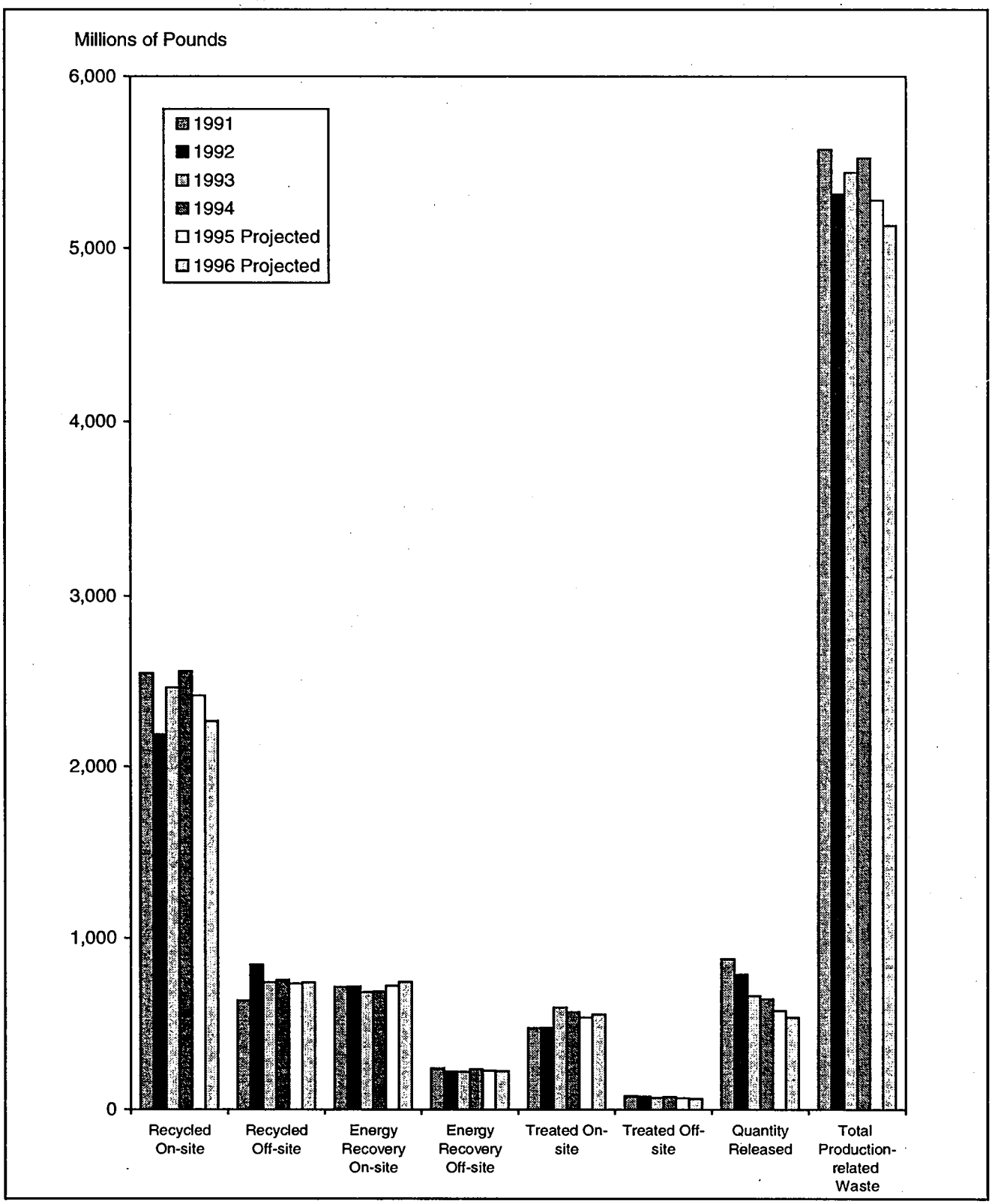


Figure 4-14. Quantities of 33/50 Program Chemicals Managed in Waste, by Management Type, Actual and Projected, 1991-1996.㉓

㉓ Data for 1991 as reported on 1991 forms; data for 1992 as reported on 1992 forms; all other years from 1994 forms.

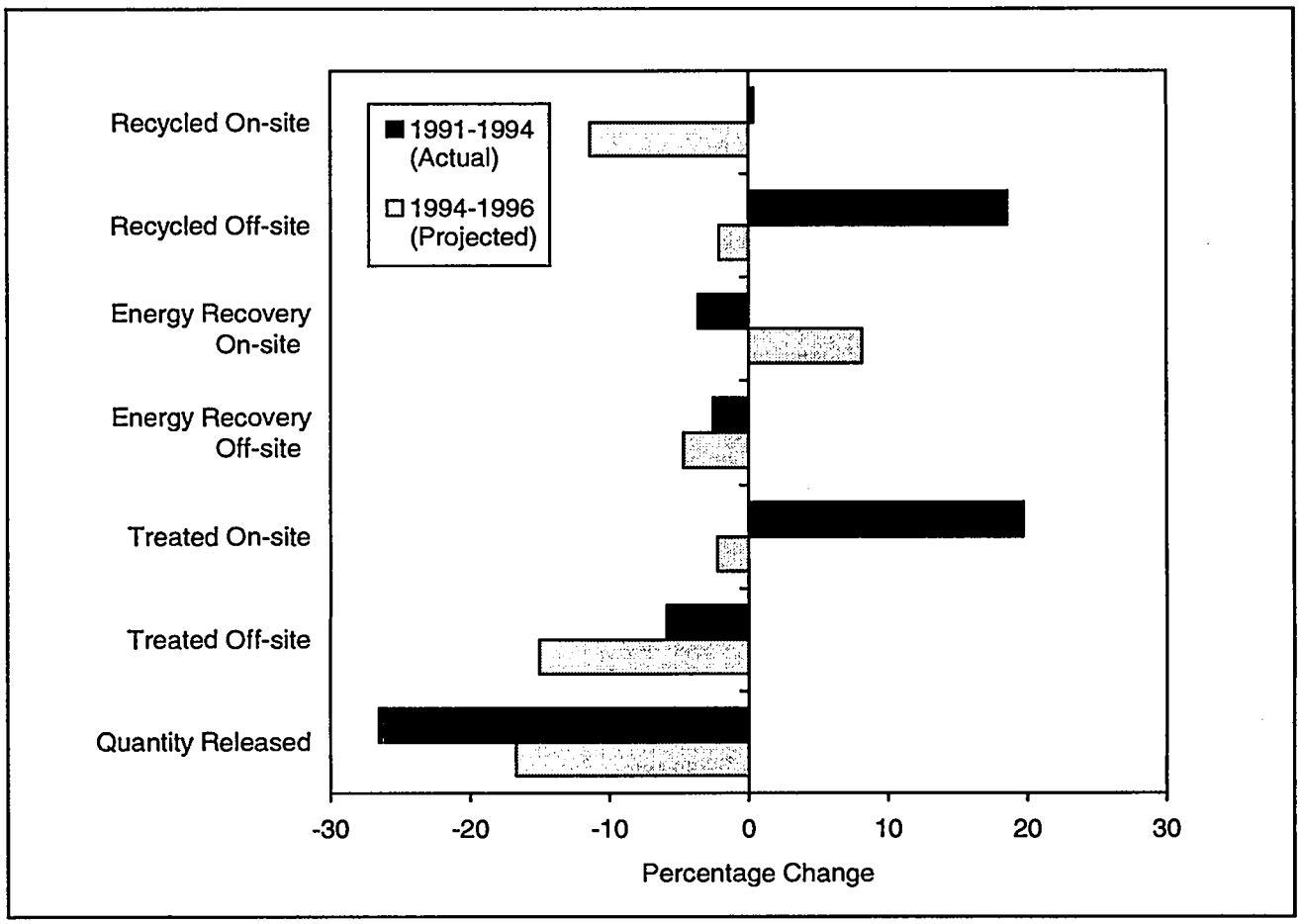


Figure 4-15. Percentage Change in Waste Management Practices, 33/50 Program Chemicals, 1991-1996.[24]

SOURCE REDUCTION REPORTING FOR 33/50 PROGRAM CHEMICALS

Facilities are also required to report in Section 8 of Form R any source reduction efforts that were directed toward TRI chemicals during the reporting year and the methods they employed in identifying source reduction opportunities.

Source Reduction Activities

Table 4-9 summarizes facilities' reporting of source reduction activities for each of the seventeen 33/50 Program chemicals for 1991-1994. As a group and individually, 33/50 Program chemicals in 1994 again evidenced higher rates and levels of source reduction activity reporting than that reported for other TRI chemicals. Of the more than 16,000 Form Rs reporting implementation of a source reduction activity during 1994, 42.9% (6,947) were for the seventeen 33/50 Program chemicals. The 33/50 chemicals accounted for only 34% of total TRI Form Rs, but 43% of the source reduction reports. Thirty percent of 33/50 chemical Form Rs reported the occurrence of source reduction, compared to 20% of the forms submitted for other TRI chemicals.

[24] Data for 1991 as reported on 1991 forms; data for 1994 and 1996 from 1994 forms.

Individual 33/50 Program chemicals had some of the highest levels of reporting on source reduction. Three of the five TRI chemicals with the greatest number of Form Rs reporting source reduction activities in 1994 are 33/50 chemicals [toluene, xylene (mixed isomers), and methyl ethyl ketone]. The high ranking for 33/50 Program chemicals is partly due to the fact that they rank among the highest TRI chemicals in total number of Form Rs submitted. But chemicals targeted for reduction under the 33/50 Program also evidenced some of the highest percentages of Form R submissions indicating source reduction. Among 33/50 Program chemicals, the highest was 1,1,1-trichloroethane, with 49% of its TRI forms indicating source reduction activity. The high degree of attention to applying source reduction techniques to this chemical reflects concerns over the 1996 ban on its production.

Thirteen 33/50 Program chemicals are among the top 50 TRI chemicals for numbers of forms reporting source reduction in 1994. Of these, organic chemicals generally evidenced higher percentages of Form Rs reporting source reduction than did the inorganics. Only one of the 11 organics fell below the 30% rate (carbon tetrachloride). None of the inorganics exceeded the 30% source reduction activity rate, with chromium and nickel (and their compounds) falling below the 20% mark (17% and 15% respectively).

For the period 1991-1994, source reduction activity reporting has declined both in absolute terms, due mostly to reductions in total Form Rs submitted to TRI, and in percentage terms, though only marginally (2.4% for 1991-1994). Similar patterns are observed for both 33/50 and non-33/50 Program chemicals. Facilities are only supposed to report an activity the first year they implement it, which may contribute to the decline in reporting.

Facilities described the type of source reduction activity that they implemented for each chemical (see Table 4-10). The 33/50 Program chemicals as a group did not differ significantly from other TRI chemicals in the types of activities employed. Improvement in facility operating practices is the most common approach, followed by process modifications.

Methods Used to Identify Source Reduction Opportunities

Table 4-11 summarizes facilities' reporting of source reduction activity identification methods for each of the seventeen 33/50 Program chemicals in 1994. Here again, facilities did not seem to treat Program chemicals differently than other TRI chemicals in their search for source reduction opportunities, although the data do show a somewhat greater reliance on assistance from state programs.

LOOKING TO THE FUTURE: WRAPPING UP 33/50 AND LOOKING TO A NEXT GENERATION

1995 has come and gone and even though 1995 TRI data won't be available for another year, the 33/50 Program's ultimate 50% pollution reduction goal has been achieved—a year ahead of schedule. So what's left to be done in wrapping up the 33/50 Program, and what's in store for the future?

Industries' efforts to meet 33/50's challenges have concluded in many cases, though many companies set environmental goals that extend years into the future and others are drawing on momentum established through their Program participation to continue their voluntary reduction efforts on their own. At EPA, the 33/50

Table 4-9. Number of Forms Reporting Source Reduction Activity, by 33/50 Program Chemical, 1991-1994.[25]

CAS Number	Chemical	Number of TRI Forms				Forms Reporting Source Reduction Activities: Number				Forms Reporting Source Reduction Activities: Percent of All Forms			
		1991	1992	1993	1994	1991	1992	1993	1994	1991	1992	1993	1994
71-43-2	Benzene	486	476	474	491	155	154	143	139	31.9	32.4	30.2	28.3
56-23-5	Carbon tetrachloride	102	90	75	69	29	27	18	14	28.4	30.0	24.0	20.3
67-66-3	Chloroform	185	181	175	167	68	62	54	42	36.8	34.3	30.9	25.1
75-09-2	Dichloromethane	1,300	1,140	1,081	1,030	525	421	382	344	40.4	36.9	35.3	33.4
78-93-3	Methyl ethyl ketone	2,594	2,512	2,473	2,389	974	918	921	911	37.5	36.5	37.2	38.1
108-10-1	Methyl isobutyl ketone	1,047	1,038	1,021	1,031	387	361	341	358	37.0	34.8	33.4	34.7
127-18-4	Tetrachloroethylene	578	519	490	459	216	193	178	169	37.4	37.2	36.3	36.8
108-88-3	Toluene	3,968	3,822	3,643	3,566	1,504	1,453	1,387	1,343	37.9	38.0	38.1	37.7
71-55-6	1,1,1-Trichloroethane	3,734	3,210	2,111	1,207	1,620	1,504	1,172	592	43.4	46.9	55.5	49.0
79-01-6	Trichloroethylene	725	681	790	783	291	248	288	273	40.1	36.4	36.5	34.9
	Xylenes	3,832	3,698	3,611	3,517	1,372	1,325	1,291	1,257	35.8	35.8	35.8	35.7
	Cadmium and cadmium compounds	217	187	178	158	61	64	64	60	28.1	34.2	36.0	38.0
	Chromium and chromium compounds	3,115	3,134	3,206	3,182	604	570	574	547	19.4	18.2	17.9	17.2
	Cyanide compounds	318	297	297	292	94	85	80	75	29.6	28.6	26.9	25.7
	Lead and lead compounds	1,819	1,712	1,687	1,662	488	444	431	419	26.8	25.9	25.5	25.2
	Mercury and mercury compounds	56	39	35	30	12	8	10	8	21.4	20.5	28.6	26.7
	Nickel and nickel compounds	2,418	2,448	2,537	2,573	381	356	392	396	15.8	14.5	15.5	15.4
Total for 33/50 Chemicals		26,494	25,184	23,884	22,606	8,781	8,193	7,726	6,947	33.1	32.5	32.3	30.7
Total for All Other TRI Chemicals		46,761	46,105	45,601	44,823	10,336	9,959	9,698	9,237	22.1	21.6	21.3	20.6
Total for All TRI Chemicals		73,255	71,289	69,485	67,429	19,117	18,152	17,424	16,184	26.1	25.5	25.1	24.0

Program staff are putting the finishing touches on the Agency's flagship partnership experiment. Major activities include:

National Conference

The 33/50 Program is co-sponsoring a National Conference, in conjunction with the Hampshire Research Institute, entitled "Putting Pollution Prevention into Action." This conference will be held in September 1996 in Washington, DC. The purpose of this gathering is twofold: 1) provide insight into current pollution prevention activities and challenges for developing new initiatives and partnerships for the future and 2) celebrate the successful partnership of the 33/50 Program.

The conference will follow three tracks that will cover:

- Partnerships and Initiatives for Pollution Prevention—pushing forward with P2;
- Integrating Pollution Prevention into the Mainstream—the challenges for P2 in global environmental concerns and business; and,
- Initiatives for the 21st Century—ideas for advancing environmental management and building a sustainable world.

In conjunction with this conference, the 33/50 Program will be thanking all 1,300 participants for their contributions to the early achievements of reduction goals.

[25] Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 4-10. Number of TRI Forms Reporting Source Reduction Activity, by Category, by 33/50 Program Chemical, 1994.[26]

CAS Number	Chemical	Category of Source Reduction Activity							
		Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
71-43-2	Benzene	49	10	103	8	73	3	3	1
56-23-5	Carbon tetrachloride	6	0	3	1	10	0	0	0
67-66-3	Chloroform	15	0	7	15	23	0	0	1
75-09-2	Dichloromethane	159	34	82	95	110	89	19	36
78-93-3	Methyl ethyl ketone	459	175	159	233	235	107	287	98
108-10-1	Methyl isobutyl ketone	204	69	71	69	124	29	116	47
127-18-4	Tetrachloroethylene	95	14	37	13	40	72	4	9
108-88-3	Toluene	636	204	295	342	387	112	404	162
71-55-6	1,1,1-Trichloroethane	212	49	77	171	94	272	49	71
79-01-6	Trichloroethylene	136	13	35	20	54	152	8	17
	Xylenes	586	174	256	280	378	88	440	137
	Cadmium and cadmium compounds	24	8	14	19	20	4	1	15
	Chromium and chromium compounds	311	75	130	107	227	31	21	57
	Cyanide compounds	33	8	18	10	43	13	1	1
	Lead and lead compounds	238	60	85	137	159	7	9	66
	Mercury and mercury compounds	2	0	0	2	5	0	0	1
	Nickel and nickel compounds	240	62	89	48	155	39	12	38
	Total for 33/50 Chemicals	3,405	955	1,461	1,570	2,137	1,018	1,374	757
	Total for All Other TRI Chemicals	5,695	1,377	3,460	1,603	4,030	658	761	786
	Total for All TRI Chemicals	9,100	2,332	4,921	3,173	6,167	1,676	2,135	1,543

33/50 Program Company Profiles

Over the past two years, the 33/50 Program has released 23 Company Profiles detailing the specific projects companies have undertaken to reduce their emissions of the 17 target chemicals. Nine new studies incorporating 1994 TRI data will be released this summer. The release of each new group of Profiles is accompanied by a new volume of a Reduction Highlights summary report, which contains short extracts of the new studies and a table listing all studies completed at that time.

33/50 Program Success Stories

At the recommendation of an outside 33/50 Program advisory group, EPA issued invitations to all 1,300 33/50 participating parent companies to "Tell the World" about their 33/50 pollution reduction activities by submitting their own Success Stories. A sample story was modelled on one of EPA's more recent Company Profiles. More than 200 companies expressed interest in writing these case studies, which will be shorter than the Profiles since they will feature only one reduction project per story.

A compendium of Success Stories will be released initially at the September conference. Success Stories will be distributed in hard copy and electronic format via the Internet as an entire compendium and in custom groups based on readers' interests in chemicals, processes, sectors, and pollution reduction techniques.

[26] Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 4-11. Methods Used to Identify Source Reduction Activity, by 33/50 Program Chemical, 1994.[27]

CAS Number	Chemical	Number of Forms Reporting Source Reduction Activities	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
			Internal	External			Informal	Formal Program
71-43-2	Benzene	139	77	4	12	45	19	14
56-23-5	Carbon tetrachloride	14	5	0	2	5	2	2
67-66-3	Chloroform	42	17	4	4	22	5	4
75-09-2	Dichloromethane	344	132	10	42	156	67	30
78-93-3	Methyl ethyl ketone	911	360	52	162	451	164	96
108-10-1	Methyl isobutyl ketone	358	150	20	55	188	65	41
127-18-4	Tetrachloroethylene	169	83	6	23	80	27	12
108-88-3	Toluene	1,343	520	68	171	620	222	137
71-55-6	1,1,1-Trichloroethane	592	230	27	80	263	72	59
79-01-6	Trichloroethylene	273	117	11	27	129	43	23
	Xylenes	1,257	492	56	161	570	230	120
	Cadmium and cadmium compounds	60	28	1	10	30	9	11
	Chromium and chromium compounds	547	211	27	85	278	104	57
	Cyanide compounds	75	33	4	7	33	14	5
	Lead and lead compounds	419	165	27	67	214	76	49
	Mercury and mercury compounds	8	4	1	0	5	2	3
	Nickel and nickel compounds	396	136	22	75	228	87	43
Total for 33/50 Chemicals		6,947	2,760	340	983	3,317	1,208	706
Total for All Other TRI Chemicals		10,610	4,198	433	1,408	5,099	2,048	1,160
Total for All TRI Chemicals		17,557	6,958	773	2,391	8,416	3,256	1,866

Table 4-11.

Chemical	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other
Benzene	1	3	9	11	57
Carbon tetrachloride	0	0	0	0	5
Chloroform	0	0	3	1	15
Dichloromethane	3	1	24	81	76
Methyl ethyl ketone	9	3	56	281	174
Methyl isobutyl ketone	8	2	26	109	60
Tetrachloroethylene	6	0	7	35	21
Toluene	28	8	89	437	281
1,1,1-Trichloroethane	13	10	41	195	118
Trichloroethylene	10	1	19	70	48
Xylenes	21	8	90	430	254
Cadmium and cadmium compounds	0	1	3	14	15
Chromium and chromium compounds	2	1	35	144	95
Cyanide compounds	1	0	6	19	13
Lead and lead compounds	3	5	25	93	92
Mercury and mercury compounds	0	0	0	0	0
Nickel and nickel compounds	1	0	20	79	60
Total for 33/50 Chemicals	106	43	453	1,999	1,384
Total for All Other TRI Chemicals	103	51	602	2,113	2,134
Total for All TRI Chemicals	209	94	1,055	4,112	3,518

(27) Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

FOR MORE INFORMATION . . . .

Companies' written communications with the 33/50 Program are available to the public along with a variety of Program information materials, including computer-generated lists of participating companies. Anyone interested in obtaining additional information about the 33/50 Program can do so by calling EPA's TSCA Assistance Hotline at (202) 554-1404 Monday through Friday between 8:30 a.m. and 5:00 p.m. EST.

Or contact the 33/50 Program staff directly at EPA headquarters at (202) 260-6907 or by directing letters to Mail Code 7408, Office of Pollution Prevention and Toxics, U.S. EPA, 401 M Street, SW., Washington, DC 20460. Program staff can also be reached via fax at (202) 401-8142, or via the Internet at BURNS.MIKE@EPAMAIL.EPA.GOV. Information about the 33/50 Program can also be obtained from 33/50 Program Coordinators in EPA's 10 Regional Offices:

US EPA - Region I
(MS: ATR)
1 Congress Street
Boston, MA 02203
PH#: (617) 565-3240
FAX: (617) 565-1141

US EPA - Region II
(MS: 105)
2890 Woodbridge Ave, Bldg. 10
Edison, NJ 08837
PH#: (908) 906-6815
FAX: (908) 321-6788

US EPA - Region III
(MS: 3AT01)
841 Chestnut Bldg
Philadelphia, PA 19107
PH#: (215) 566-9302
FAX: (215) 566-3156

US EPA - Region IV
345 Courtland Street, NE
Atlanta, GA 30365
PH#: (404) 347-3555 x 6977
FAX: (404) 347-1681

US EPA - Region V
(MS: SP-14J)
77 W. Jackson Blvd.
Chicago, IL 60604
PH#: (312) 886-6219
FAX: (312) 353-4342

US EPA - Region VI
(MS: 6T-PT)
1445 Ross Avenue
Dallas, TX 75202
PH#: (214) 665-7582
FAX: (214) 665-2164

US EPA - Region VII
(MS: ARTX)
726 Minnesota Avenue
Kansas City, KS 66101
PH#: (913) 551-7315
FAX: (913) 551-7065

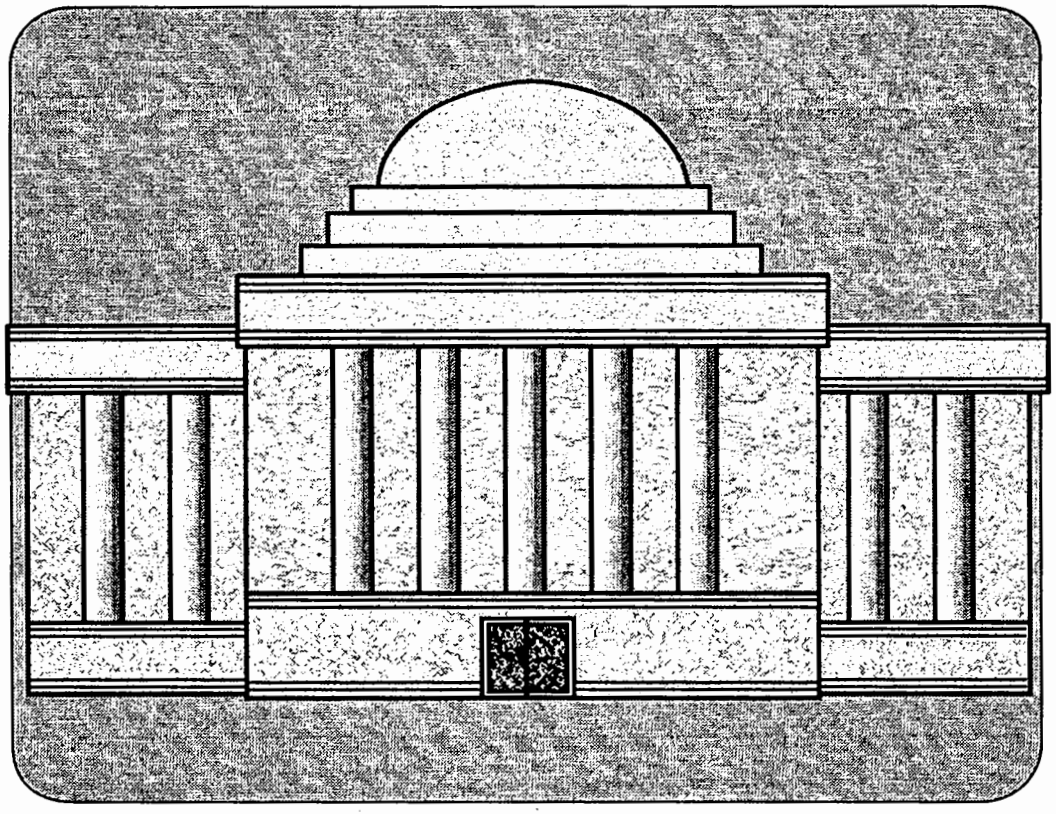
US EPA - Region VIII
(MS: 8ART-AP)
999 - 18th St., Suite 600
Denver, CO 80202-2405
PH#: (303) 312-6515
FAX: (303) 312-6044

US EPA - Region IX
(MS: A-4-3)
75 Hawthorne Street
San Francisco, CA 94105
PH#: (415) 744-1121
FAX: (415) 744-1073

US EPA - Region X
(MS: HW-107)
1200 - 6th Avenue
Seattle, WA 98101
PH#: (206) 553-4762
FAX: (206) 553-8338

Chapter 5

TRI Reporting by Federal Facilities



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TRI REPORTING BY FEDERAL FACILITIES

INTRODUCTION

On August 3, 1993, President Clinton signed Executive Order 12856 which required facilities owned and operated by Federal agencies to report to TRI, starting with the 1994 reporting year. Federal facilities, like other industrial facilities, contribute to the presence of toxic materials in our environment and in the communities where they operate. The President's Executive Order was intended to ensure that the public has access to the most comprehensive information possible on releases and transfers of toxic chemicals, to strengthen the Federal government's commitment to full accountability, and to assure that Federal facilities are good neighbors in the communities where they operate. The goal also is to realize the same successes achieved at private facilities, including reductions in the releases and transfers of toxic chemicals and the implementation of pollution prevention activities.

The Executive Order extends all the provisions of EPCRA to Federal facilities. Federal facilities must file TRI reports with EPA and the states (EPCRA section 313) and must submit reports on hazardous chemicals to local authorities (EPCRA sections 311-312). E.O. 12856 extends the reporting requirements of EPCRA 313 to all Federal facilities, regardless of SIC Code. The E.O. also directs each Federal agency to "establish a voluntary goal to reduce total releases and off-site transfers of toxic chemicals or toxic pollutants by 50%" using 1994 TRI data as a baseline. Federal agencies are called upon to be environmental leaders. Whether by promoting pollution prevention or by placing greater priority on environmental issues, Federal facilities should be proactive on reducing the releases and transfers of chemicals of concern, using prevention approaches wherever practicable.

Various agencies have risen to the challenge, and gone beyond the basic requirements of this E.O. For example, the Department of Energy (DOE), the Federal agency with the second largest number of TRI reporting facilities, reported for both 1993 and 1994. The public now has the opportunity to compare the 1994 releases and transfers of toxic chemicals from DOE facilities to the 1993 quantities. The Postal Service has created positions in its regional offices for environmental managers and has conducted studies to determine how best to promote pollution prevention at the Postal Service facilities. The Department of Defense (DOD) has directed that all of its facilities prepare pollution prevention plans. Within DOD, the Air Force has set specific goals for eliminating or reducing the use of ozone depleting chemicals, pesticides, and the seventeen 33/50 Program chemicals.

Interpretation of the reporting requirements for Federal facilities was made by an Inter-Agency Task Force composed of all the Federal agencies subject to E.O. 12856. EPA, in coordination with this Task Force, developed a guidance document delineating these responsibilities. Several issues, however, remained unresolved at the time of publication of this document, including the interpretation of some of the reporting

exemptions. EPA and the other Federal agencies are continuing to work together to clarify issues related to the reporting requirements for Federal facilities.

EPA and the other Federal agencies also are cooperating to ensure that those Federal facilities which meet the EPCRA 313 reporting criteria are complying with the Executive Order. EPA's Federal Facility Enforcement Office (FFEO), part of EPA's Office of Enforcement and Compliance Assurance (OECA), is working with the Federal agencies and with EPA's regional offices to identify any reporting deficiencies. As most facilities which are subject to TRI are expected to have submitted forms, the thrust of the review is to determine the accuracy of reporting. EPA will work closely with all facilities to assure full compliance with the letter and spirit of the law.

While 1994 is the first year of reporting by the Federal government, EPA has received data from some Federally owned sites since 1987. These reports were submitted by contractors working for the Federal government at the Federal facilities. These types of Federal facilities are known as Government Owned Contractor Operated (GOCO) facilities. Being operated by private businesses, GOCOs always have been subject to reporting under EPCRA section 313, provided the reporting criteria for that statute were met.

E.O. 12856 requires Federal agencies to file TRI reports for activities at GOCO sites which they control. As E.O. 12856 did not exempt contractors at GOCOs from reporting to TRI, EPA receives TRI reports covering the same activities from both the private and Federal entities at the GOCOs. To prevent a duplication of information, only the data from the Federal entity is entered into the TRI database; the GOCO data is not. Interested users can access the GOCO data, as well as the Federal facility data, on a diskette available from the Government Printing Office (GPO).

1994 NATIONAL OVERVIEW

While some Federal facilities have reported voluntarily in previous years, as a result of E.O. 12856, 191 Federal facilities became subject to TRI reporting for the first time in 1994. These facilities were owned and operated by 12 Federal agencies, with DOD leading the way with 127 reporting facilities. The 1994 data for Federal facilities showed total releases of 9.8 million pounds. Off-site transfers totalled 10.4 million pounds. These facilities were dispersed across the country, with 43 states having at least one Federal facility that reported to TRI. The types of chemical releases, the ratio of releases and transfers, plus other characteristics offer an opportunity to compare the data from Federal facilities, not only with other Federal facilities, but also with the private sector.

A point to consider when reviewing the Federal facility data, however, is that with 191 facilities and 686 submissions, a few facilities can have a strong impact on the reporting patterns for the government as a whole. A single Federal facility reporting high releases of a particular chemical can skew data analyses in several ways. The state in which that facility is located, for instance, could become one of the states with the highest release values. The Federal agency of which the facility is a part could change from ranking low in terms of releases and transfers to ranking high.

In terms of releases and transfers, the government reporting pattern provides a noticeable divergence from the statistics for the private

1994 Releases	Pounds
Total Releases	9,827,896
Fugitive Air	4,081,765
Point Source Air	4,148,737
Surface Water	243,722
Underground Injection	445,537
On-site Land Releases	908,135

Table 5-1. TRI Releases from Federal Facilities, 1994.

1994 Transfers	Pounds
Total Transfers	10,442,903
Transfers to Recycling	5,233,203
Transfers to Energy Recovery	595,382
Transfers to Treatment	1,637,738
Transfers to POTWs	313,453
Transfers to Disposal	2,661,427
Other Off-site Transfers❶	1,700

Table 5-2. TRI Transfers from Federal Facilities, 1994.

sector. As can be seen in Tables 5-1 and 5-2, total releases and total transfers for Federal facilities are similar, at approximately 10 million pounds each. For the private sector, however, transfers are almost twice the amount of releases. One factor contributing to this difference may be that many of the chemicals that private industry sends off-site—metals—are not reported to the same degree by Federal facilities.

The manner in which the reported chemicals are discharged provides another anomaly between Federal facilities and the private sector (see Figures 5-1 and 5-2). Air releases from Federal facilities equal about 83.7% of the total releases. For industry, however, only 68.8% of the total releases are to air. This difference can be traced, at least in part, to the higher rate of reporting for chemicals typically used as solvents and cleaners by Federal facilities. Federal facilities in general are not primary manufacturers or processors of chemicals, but rather users of them.

Table 5-3 compares releases and transfers from Federal facilities to releases and transfers from non-Federal facilities.

REPORTING BY AGENCIES AND FACILITIES

Tables 5-4 and 5-5 show the releases and transfers from each Federal agency reporting to TRI.

The top three agencies, in terms of the number of facilities reporting, are DOD, DOE, and the Department of Agriculture (USDA). With 161 of the 191 facilities, these three agencies represent 84.3% of the total. By itself, DOD comprises 66.5% of the reporting facilities. As for the number of forms submitted, the top three agencies are DOD, DOE, and the National Aeronautics and Space Administration (NASA). Of the 686 TRI forms from Federal facilities, 621, or 90.5%, come from these three agencies. The 520 submissions from DOD equal 75.8% of the total from all Federal facilities.

On average, Federal facilities submitted 3.6 forms per facility. DOD facilities averaged 4.1 forms per facility; DOE facilities averaged 3.7. With the exception of the U.S. Enrichment Corporation (USEC), which had 10 submissions from two reporting facilities, the remaining agencies averaged 1.8 forms per facility. To put

❶ Transfers reported without valid waste management codes.

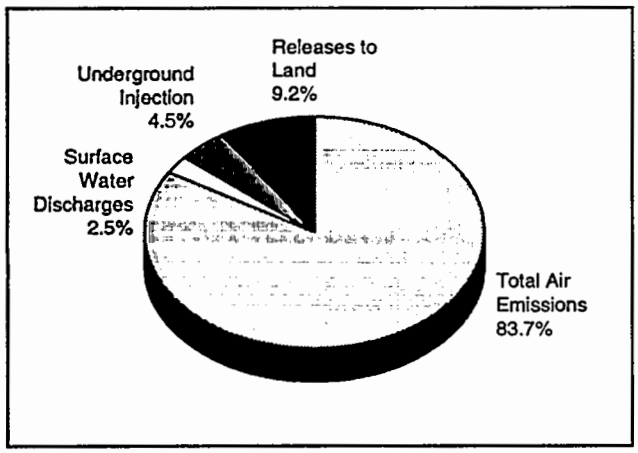

Figure 5-1. Distribution of TRI Releases from Federal Facilities, 1994.

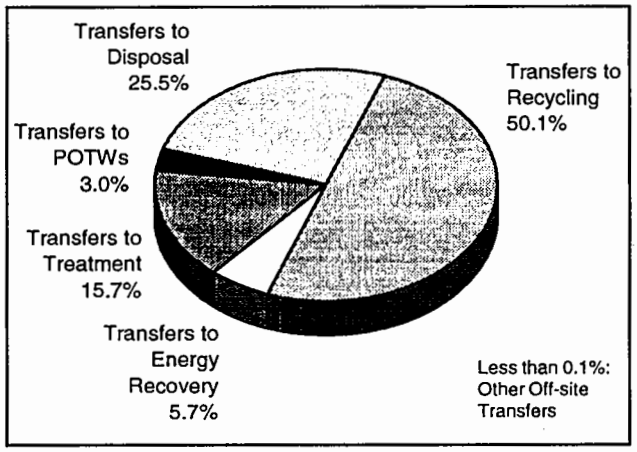

Figure 5-2. Distribution of TRI Transfers from Federal Facilities, 1994.

these numbers into perspective, the average number of forms filed by private industry facilities is 3.3 forms.

Comparing the release information between Federal agencies reveals interesting data. The 7.1 million pounds reported by DOD, for instance, is more than double the total releases reported by the other 11 agencies (see Figure 5-3). Looking at the releases per submission, however, presents a different picture. DOD's average releases per form equal 13,741 pounds. The average for all other Federal agencies is 16,161 pounds per form.

Table 5-3. TRI Releases and Transfers from Federal Facilities Compared to All Other TRI Facilities, 1994.

Category	Federal Facilities		All Other TRI Facilities		All TRI Facilities	
	Number		Number		Number	
Facilities	191		22,553		22,744	
Forms	686		74,646		75,332	
	Pounds	Percent	Pounds	Percent	Pounds	Percent
Total Air Emissions	8,230,502	40.6	1,547,777,583	25.6	1,556,008,085	25.7
Fugitive Air	4,081,765	20.1	403,433,539	6.7	407,515,304	6.7
Point Source Air	4,148,737	20.5	1,144,344,044	19.0	1,148,492,781	19.0
Surface Water	243,722	1.2	65,839,566	1.1	66,083,288	1.1
Underground Injection	445,537	2.2	348,522,689	5.8	348,968,226	5.8
On-site Land Releases	908,135	4.5	288,242,991	4.8	289,151,126	4.8
Total Releases	9,827,896	48.5	2,250,382,829	37.3	2,260,210,725	37.3
Transfers to Recycling	5,233,203	25.8	2,450,887,745	40.6	2,456,120,948	40.6
Transfers to Energy Recovery	595,382	2.9	463,611,101	7.7	464,206,483	7.7
Transfers to Treatment	1,637,738	8.1	317,172,595	5.3	318,810,333	5.3
Transfers to POTWs	313,453	1.5	254,375,383	4.2	254,688,836	4.2
Transfers to Disposal	2,661,427	13.1	294,939,035	4.9	297,600,462	4.9
Other Off-site Transfers❷	1,700	0.0	3,600,726	0.1	3,602,426	0.1
Total Transfers	10,442,903	51.5	3,784,586,585	62.7	3,795,029,488	62.7
Total Releases and Transfers	20,270,799	100.0	6,034,969,414	100.0	6,055,240,213	100.0

❷ Transfers reported without valid waste management codes.

The USEC is the agency at the other end of the scale, with 75,070 pounds per submission. The 10 reports from the two USEC reporting facilities totaled 750,706 pounds. The primary function of this agency, created by Congress in 1993, is to enrich uranium. Congress carved the USEC out of DOE, as part of a general effort to privatize various Federal operations. The USEC is still in transition to privatization and therefore reports to TRI as part of the Federal government. When the privatization is complete, the USEC will cease being a Federal entity and no longer will be subject to E.O. 12856. By reporting under SIC Code 28, as in the 1994 reporting year, the two USEC facilities will remain subject to reporting under EPCRA 313.

Transfer data for the government is skewed more than the release data (see Figure 5-4). DOD reports 94.5% of the transfers from Federal facilities. With such high reporting, the expectation might be that the average transfers per submission for the government essentially would match the DOD average. In fact, the Federal government average of 15,223 pounds is significantly less than the DOD average of 18,974 pounds. Removing DOD from the

Table 5-4. TRI Releases from Federal Facilities, by Federal Agency, 1994.

Federal Agency	Facilities Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Dept. of Defense	127	520	6,848,022	189,902	6	107,267	7,145,197
Dept. of Energy	23	85	292,223	3,766	445,531	232,273	973,793
U.S. Enrichment Corporation	2	10	749,862	783	0	61	750,706
Dept. of Agriculture	11	11	0	0	0	567,993	567,993
National Aeronautics and Space Admin.	6	16	221,427	2,236	0	0	223,663
Dept. of Justice	3	7	79,360	23,331	0	0	102,691
Tennessee Valley Authority	6	12	12,100	23,704	0	21	35,825
Dept. of Transportation	2	3	23,566	0	0	250	23,816
Dept. of Treasury	6	11	2,261	0	0	20	2,281
Dept. of Interior	2	3	1,161	0	0	250	1,411
Dept. of Health and Human Services	2	6	500	0	0	0	500
Environmental Protection Agency	1	2	20	0	0	0	20
Total	191	686	8,230,502	243,722	445,537	908,135	9,827,896

Table 5-5. TRI Transfers from Federal Facilities, by Federal Agency, 1994.

Federal Agency	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers❸ Pounds	Total Transfers Pounds
Dept. of Defense	4,918,572	590,070	1,544,904	263,182	2,548,318	1,450	9,866,496
Dept. of Energy	67,592	1,508	44,785	260	11,853	0	125,998
U.S. Enrichment Corporation	0	0	0	0	0	0	0
Dept. of Agriculture	0	0	0	0	0	0	0
National Aeronautics and Space Admin.	14,362	250	525	250	9,081	0	24,468
Dept. of Justice	0	0	0	10,331	0	0	10,331
Tennessee Valley Authority	0	0	27,066	0	0	0	27,066
Dept. of Transportation	0	3,554	998	0	1,541	250	6,343
Dept. of Treasury	207,276	0	0	515	30,012	0	237,803
Dept. of Interior	0	0	0	4,500	0	0	4,500
Dept. of Health and Human Services	25,401	0	19,460	34,415	60,622	0	139,898
Environmental Protection Agency	0	0	0	0	0	0	0
Total	5,233,203	595,382	1,637,738	313,453	2,661,427	1,700	10,442,903

❸ Transfers reported without valid waste management codes.

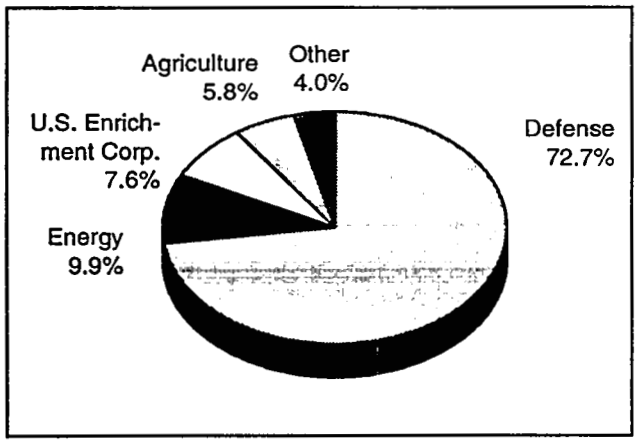

Figure 5-3. Top Four Federal Agencies for TRI Releases, 1994.

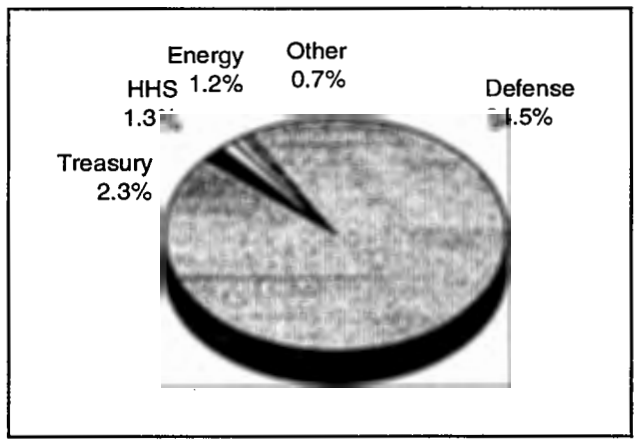

Figure 5-4. Top Four Federal Agencies for TRI Transfers, 1994.

calculations reveals average transfers per submission of 3,472 pounds for the other 11 agencies. Representing only 5% of the total transfers for the government, the transfers per submission from these 11 agencies thus are sufficiently different from DOD, creating a larger than expected impact on the average for the government as a whole.

Reporting by Department of Defense Facilities

The fact that DOD plays such a principal role in the TRI data, and that it is possible to break down this data by the different commands, invites more in-depth analyses (see Tables 5-6 and 5-7). Most of the facilities reporting at DOD are from the Army, Air Force, and the Navy. The other DOD commands contribute to a lesser degree. When looking at the number of submissions, however, this pattern shifts slightly. The Army and Air Force remain the top commands with 169 and 141 submissions, respectively, while the Navy and the Defense Logistics Agency form a second tier with 83 and 86 forms.

A review of the DOD's release data shows the relative contributions of each command (see Figure 5-5). The Air Force reported 67.1% of the DOD releases, constituting nearly half (48.8%) of the total releases from the Federal government. The vast majority of these releases are air emissions, largely from air craft maintenance, including corrosion control, structural maintenance, and the cleaning and repairing of equipment. The result is that releases per submission from the Air Force average 34,012 pounds, more than double the government average of 14,326 pounds per submission. The average releases per submission for the other DOD commands falls well below the government average, at 6,199 pounds.

For transfer data, the Army is the dominant department, with 71.2% of the total transfers for DOD (see Figure 5-6). The Air Force, although second, is far behind with 14.7% of the total. The Army's position largely stems from one location, the Lake City Army facility in Independence, MO. Over one-third of the DOD transfer data, and nearly one-third of the transfer data for the Federal government, are reported by this facility for two chemicals, copper and zinc compounds. These chemicals are components of the material used for small-caliber ammunition.

Table 5-6. TRI Releases from Department of Defense Facilities, 1994.

Command	Facilities Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Air Force	34	141	4,590,422	139,618	5	65,677	4,795,722
Army	41	169	893,672	27,352	1	18,610	939,635
Navy	25	83	760,796	19,813	0	1,800	782,409
Marines	8	36	550,530	1,519	0	3,880	555,929
Defense Logistics Agency	16	86	48,512	0	0	0	48,512
Army Corps of Engineers	2	3	3,410	1,600	0	17,300	22,310
National Security Agency	1	2	680	0	0	0	680
Total	127	520	6,848,022	189,902	6	107,267	7,145,197

Table 5-7. TRI Transfers from Department of Defense Facilities, 1994.

Command	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[4] Pounds	Total Transfers Pounds
Air Force	287,720	225,789	266,702	178,371	488,857	1,450	1,448,889
Army	4,310,985	185,098	1,003,701	2,128	1,521,145	0	7,023,057
Navy	293,462	72,833	180,067	21,144	75,222	0	642,728
Marines	26,405	98,500	83,380	61,539	463,094	0	732,918
Defense Logistics Agency	0	7,850	10,415	0	0	0	18,265
Army Corps of Engineers	0	0	0	0	0	0	0
National Security Agency	0	0	639	0	0	0	639
Total	4,918,572	590,070	1,544,904	263,182	2,548,318	1,450	9,866,496

Reporting by Department of Energy Facilities

While 1994 was the first year that Federal facilities were required to file under TRI, year-to-year comparisons are possible for some Federal facilities. The Secretary of DOE, under a 1992 directive, ordered DOE facilities to report to TRI. As a result, EPA received 1993 TRI reports from 22 DOE facilities. With the submission of 1994 data, DOE provided the first opportunity to track TRI data over time at a Federal agency.

As the data in Table 5-8 show, there was a significant drop in the total releases at DOE. Almost the entire change occurred at two DOE facilities. One of the facilities, the DOE Naval Petroleum facility in Tupman, CA, reported 3.6 million pounds of releases of methanol in 1993. In 1994, however, this facility reported just over 300,000 pounds for this chemical, a drop of 3.3 million pounds. The reduction results from the facility determining that the 3.3 million pounds actually was a component of the petroleum sold by the facility, while only 300,000 pounds was part of the waste stream. The methanol in the waste stream, therefore, was the only portion reportable under TRI.

The second DOE site reporting significant reductions in releases was the U.S. DOE Portsmouth Gaseous Diffusion Plant in Piketon, OH. In 1993, this facility reported close to 169,000 pounds of releases, while in 1994, the releases fell below 2,000 pounds. The reason for this reduction can be traced to the creation of the USEC in 1993. One of the USEC facilities is located at the Piketon site. The 1993 TRI data from the DOE facility included 167,000 pounds

[4] Transfers reported without valid waste management codes.

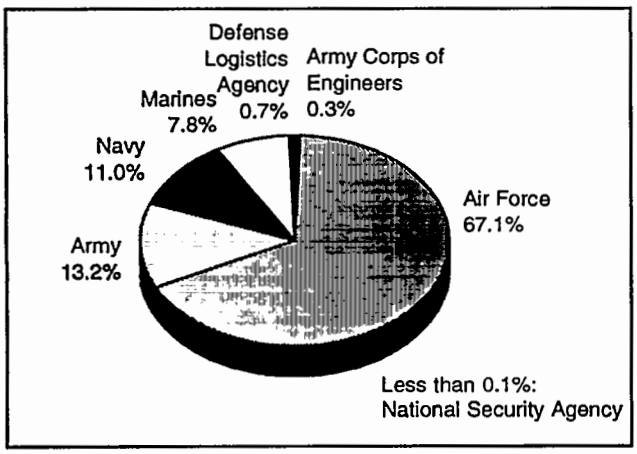

Figure 5-5. Distribution of TRI Releases from Department of Defense Commands, 1994.

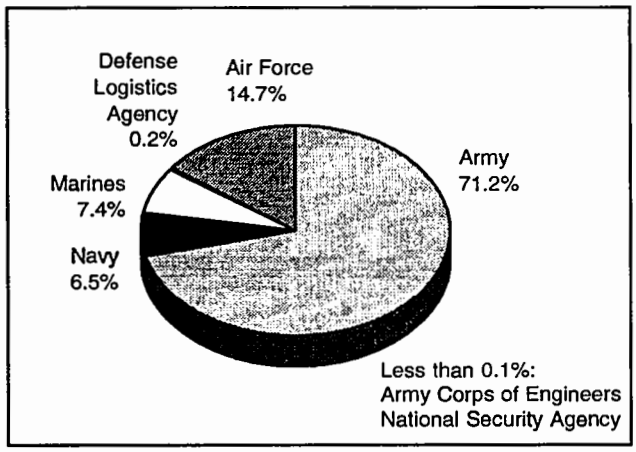

Figure 5-6. Distribution of TRI Transfers from Department of Defense Commands, 1994.

Table 5-8. Total Releases for U.S. Department of Energy Facilities Reporting to TRI, 1993 and 1994.❺

Facility Name	City	State	1993 Forms Number	1993 Total Releases Pounds	1994 Forms Number	1994 Total Releases Pounds
U.S. DOE Argonne Natl. Lab	Argonne	IL	6	1,500	6	529
U.S. DOE Brookhaven Natl. Lab	Upton	NY	3	2,905	2	1,405
U.S. DOE EG&G Mound Plant	Miamisburg	OH	1	250	0	0
U.S. DOE Fermilab	Batavia	IL	5	1,800	5	250
U.S. DOE Fernald Envt'l. Mgmt. Project	Fernald	OH	1	1,910	1	1,710
U.S. DOE Hanford Site	Richland	WA	1	14	0	0
U.S. DOE Idaho National Eng. Lab	Scoville	ID	2	68,310	6	15,089
U.S. DOE Kansas City Plant	Kansas City	MO	1	1,270	0	0
U.S. DOE Lawrence Livermore Natl. Labs	Livermore	CA	0	0	1	2,700
U.S. DOE Los Alamos Natl. Lab	Los Alamos	NM	2	4,865	1	1,920
U.S. DOE Naval Petroleum Reserve No. 3	Casper	WY	2	327	3	24,398
U.S. DOE Naval Petrol. Reserves of Calif.	Tupman	CA	10	3,782,920	11	461,093
U.S. DOE Nevada Test Site	Mercury	NV	1	0	0	0
U.S. DOE Oak Ridge K-25 Site	Oak Ridge	TN	4	5,303	4	88
U.S. DOE Oak Ridge National Lab	Oak Ridge	TN	4	7,358	4	612
U.S. DOE Oak Ridge Y-12 Plant	Oak Ridge	TN	4	73,750	4	72,350
U.S. DOE Pinellas Plant	Largo	FL	4	22,750	3	6,850
U.S. DOE Portsmouth Gaseous Diff. Plant	Piketon	OH	5	168,914	3	1,841
U.S. DOE Rocky Flats Env. Tech. Site	Golden	CO	3	4,122	3	2,431
U.S. DOE Sandia Natl. Lab	Albuquerque	NM	1	250	3	1,250
U.S. DOE Savannah River Site	Aiken	SC	8	67,096	6	55,569
U.S. DOE Stanford Linear Accelerator Ctr.	Menlo Park	CA	1	8,300	1	13,300
U.S. DOE Weldon Spring Site	St. Charles	MO	1	255	2	11
Total			70	4,224,169	69	663,396

❺ Does not include delisted chemicals, chemicals added in 1994, ammonia, ammonium sulfate (solution), or sulfuric acid.

of release and transfer data from the USEC operations. In 1994, however, the DOE facility reported only for the DOE operations, with USEC reporting independently.

Top Facilities

Table 5-9 shows the top 50 Federal facilities based on total TRI releases, with Figure 5-7 showing the locations of the top 25. DOD facilities number 36 of these 50. Of the 14 facilities not belonging to DOD, DOE owns six, with the other eight split among NASA, USDA, the Department of Justice (DOJ), and the USEC.

Table 5-10 shows the top 50 facilities based on total transfers reported to TRI. These top 50 facilities accounted for 96.8% of the total transfers reported by Federal facilities. The largest reporter is the U.S. Army Lake City Army Ammunition Plant, with 31.6% of the total transfers reported by Federal facilities. As seen in Table 5-10, most of the transfers reported by this facility were sent off-site for recycling. Six of the top seven Federal facilities reporting transfer data were Army facilities.

REPORTING BY STATE

Tables 5-11 and 5-12 provide state by state breakdowns of facilities, releases and transfers. Figures 5-8 and 5-9 show releases by state, and transfers by state. As with the private sector, the states with the most releases and transfers are not necessarily the states with the greatest number of facilities. Oklahoma, which has the largest releases, has only five reporting facilities. Missouri has transfer totals which are triple the totals of the next state, but with only four facilities. California, which is the state with the largest number of facilities, is third for releases and second for transfers.

REPORTING BY INDUSTRIAL ACTIVITY

With Federal facilities filing, TRI now collects data from facilities that are outside the manufacturing two-digit SIC code range 20-39. Box 5-1 provides a description of each of the SIC Codes reported by Federal facilities. The 28 SIC codes reported by the Federal government span from 02 to 99 (see Table 5-13). Some of the Federal facilities identified themselves using only one of the SIC codes, while others reported a combination of SIC codes. SIC code 97 (national security and international affairs) is the most commonly reported classification. This SIC code was reported on 299 Federal facility submissions (43.6%), accounting for 56.5% of all releases from Federal facilities. The next most common SIC codes for Federal facilities were SIC code 37 (transportation equipment), reported on 100 submissions; SIC code 51 (wholesale trade-nondurable goods), reported on 85 submissions; and SIC code 34 (fabricated metals), reported on 71 submissions.

REPORTING BY CHEMICAL

The chemical forms submitted by Federal facilities reflect a reporting pattern that is different from the private sector. Only 16 of the top 25 chemicals for total releases from Federal facilities (see Table 5-14) are also in the top 25 for total releases from all facilities. Most of these 16 chemicals, which typically are used as solvents and for cleaning equipment, are released primarily to air. Even hydrochloric acid, which industry primarily injects underground, is released mostly to the air by Federal facilities. The major exceptions are sulfuric acid, which is released mainly to water and land; ammonia and ammonium nitrate (solution), largely released to land and via underground injection by two USDA facilities; and methanol, much of which one DOE facility disposed of through underground injection.

Table 5-9. Top 50 Federal Facilities with the Largest Total TRI Releases, 1994.

Facility Name	City	State	SIC Codes	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Under-ground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
U.S. Air Force	Tinker AFB	OK	97	22	1,614,702	417	0	0	1,615,119
U.S. Air Force	Robins AFB	GA	97	6	696,172	145	0	0	696,317
USDA Agricultural Research Svc.	Clay Center	NE	91 02	1	0	0	0	486,120	486,120
U.S. DOE Naval Petroleum Reserves	Tupman	CA	13	13	18,241	0	445,007	0	463,248
U.S. Enrichment Corp.	Piketon	OH	28	7	385,102	783	0	61	385,946
U.S. Enrichment Corp.	Paducah	KY	28	3	364,760	0	0	0	364,760
U.S. Marine Corps Cherry Pt. Air Sta.	Cherry Point	NC	97	14	313,105	1,500	0	5	314,610
U.S. Air Force Plant 06 GA	Marietta	GA	37	10	304,647	250	0	0	304,897
U.S. Navy Naval Air Station	Jacksonville	FL	97	8	291,130	253	0	0	291,383
U.S. Air Force McClellan AFB	Sacramento	CA	37	9	282,720	0	0	0	282,720
U.S. Army Anniston Army Depot	Anniston	AL	97	13	278,301	2,634	0	0	280,935
U.S. Air Force	Kelly AFB	TX	97	9	278,459	85	0	0	278,544
U.S. Air Force Ogden Air Logistics	Hill AFB	UT	97 45 34	16	272,210	750	0	4,700	277,660
U.S. DOE Idaho National Engr. Lab.	Scoville	ID	87 28 37	7	15,991	0	0	220,600	236,591
U.S. Air Force 138th Fighter Group	Tulsa	OK	37	1	236,550	0	0	0	236,550
U.S. Marine Corps Logistics Base	Albany	GA	97	8	215,400	0	0	0	215,400
U.S. Air Force Flight Test Center	Edwards AFB	CA	97	6	158,400	0	0	12,430	170,830
U.S. Air Force Engr. Devel. Center	Arnold AFB	TN	97	4	154,096	326	0	0	154,422
U.S. Air Force	Wright-Patterson AFB	OH	97	2	148,000	0	0	0	148,000
NASA Marshall Space Flight Center	Huntsville	AL	37	5	129,629	2,236	0	0	131,865
U.S. Air Force Davis-Monthan AFB	Tucson	AZ	37	7	120,628	0	0	0	120,628
U.S. Air Force Clear Air Station	Clear	AK	97	1	0	120,000	5	0	120,005
U.S. Army Red River Army Depot	Texarkana	TX	37	15	106,411	4,173	0	32	110,616
U.S. Navy Norfolk Naval Base	Norfolk	VA	97	7	91,105	16,000	0	0	107,105
U.S. Army Holston Ammo. Plant	Kingsport	TN	28	7	98,737	4,229	0	0	102,966
U.S. Navy Norfolk Naval Shipyard	Portsmouth	VA	37	9	98,505	765	0	750	100,020
U.S. Bureau of Prisons	Florence	CO	92 25	5	79,360	10,331	0	0	89,691
U.S. Air Force Newark AFB	Heath	OH	97	1	80,528	5	0	0	80,533
USDA Beltsville Agri. Research Ctr.	Beltsville	MD	87	1	0	0	0	79,820	79,820
U.S. DOE Savannah River Site	Aiken	SC	28	8	63,197	225	0	11,652	75,074
U.S. DOE Oak Ridge Y-12 Plant	Oak Ridge	TN	34 28 33	4	72,350	0	0	0	72,350
U.S. Army Letterkenny Army Depot	Chambersburg	PA	97	9	65,061	46	0	0	65,107
U.S. DOE Energy Tech. Engr. Ctr.	Simi Hills	CA	87	2	64,720	0	0	0	64,720
U.S. Air Force	Elmendorf AFB	AK	09	4	11,501	0	0	45,000	56,501
U.S. Army Fort Hood	Fort Hood	TX	97	3	56,315	0	0	0	56,315
U.S. Navy Puget Sound Naval Ship.	Bremerton	WA	97	5	50,935	2,460	0	0	53,395
U.S. Air Force Plant 03 OK	Tulsa	OK	37	5	47,528	0	0	0	47,528
U.S. Navy Naval Air Station	Pensacola	FL	97	4	44,100	0	0	0	44,100
U.S. Navy Naval Surf. Warfare Ctr.	Louisville	KY	97	1	39,503	0	0	0	39,503
U.S. Army Lake City Ammo. Plant	Independence	MO	34	13	37,808	196	0	1,288	39,292
U.S. Air Force Plant 04 TX	Fort Worth	TX	37	10	37,550	0	0	0	37,550
U.S. Navy Long Beach Naval Ship.	Long Beach	CA	97	3	32,600	250	0	0	32,850
NASA Lewis Research Center	Cleveland	OH	96	3	32,682	0	0	0	32,682
NASA Langley Research Center	Hampton	VA	96	1	32,000	0	0	0	32,000
U.S. Army Pine Bluff Arsenal	Pine Bluff	AR	28	5	29,179	760	0	0	29,939
U.S. Navy Pearl Harbor Naval Ship.	Pearl Harbor	HI	97	2	26,750	0	0	0	26,750
U.S. Air Force	Cannon AFB	NM	97	2	26,627	0	0	0	26,627
U.S. Navy Mayport Naval Station	Mayport	FL	97	3	25,380	0	0	0	25,380
U.S. Marine Corps Logistics Base	Barstow	CA	97	7	20,995	0	0	3,575	24,570
U.S. DOE Naval Petroleum Reserve	Casper	WY	13	3	23,124	750	524	0	24,398
Subtotal				314	7,672,794	169,569	445,536	866,033	9,153,932
Total for All Federal Facilities				686	8,230,502	243,722	445,537	908,135	9,827,896

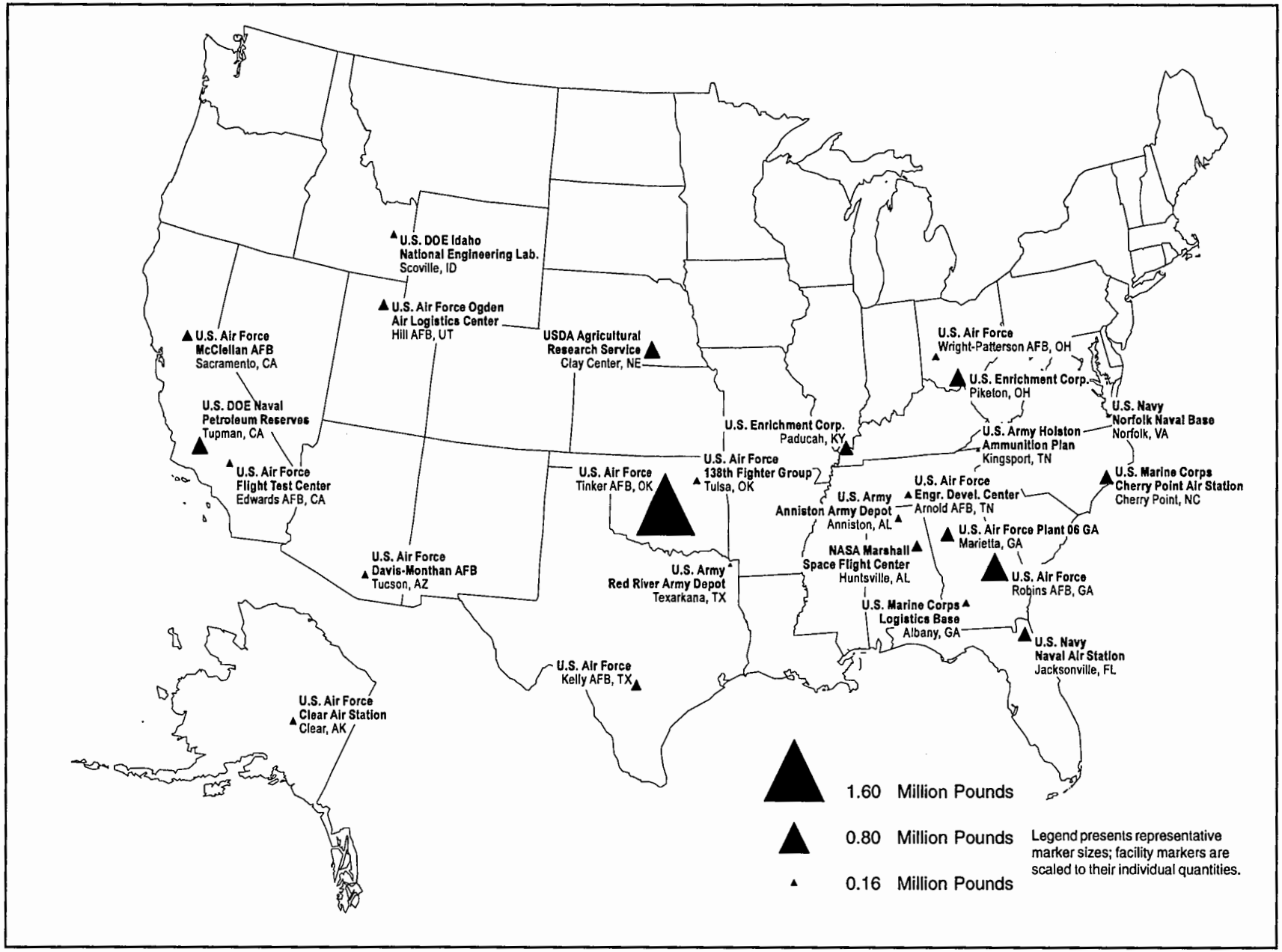

Figure 5-7. Top 25 Federal Facilities for Total TRI Releases, 1994.

Table 5-10. Top 50 Federal Facilities with the Largest Total TRI Transfers, 1994.

Facility Name	City	State	SIC Codes	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[6] Pounds	Total Transfers Pounds
U.S. Army Lake City Army Ammo. Plant	Independence	MO	34	3,241,986	10,620	7,077	1,738	35,804	0	3,297,225
U.S. Army Pine Bluff Arsenal	Pine Bluff	AR	28	0	0	0	0	696,000	0	696,000
U.S. Army Fort McCoy	Camp McCoy	WI	97	15,229	0	588,573	0	0	0	603,802
U.S. Army Anniston Depot Center	Anniston	AL	97	302,032	20,456	183,799	0	60,374	0	566,661
U.S. Army Field Artillery Center	Fort Sill	OK	99	0	0	1,100	0	561,100	0	562,200
U.S. Air Force	Marietta	GA	37	17,000	103,540	0	0	270,816	0	391,356
U.S. Army Fort Carson	Fort Carson	CO		371,588	0	0	0	0	0	371,588
U.S. Marine Corps Logistics Base	Barstow	CA	97	0	0	0	60,754	174,617	0	235,371
U.S. Navy Naval Surface Warfare Center	Indian Head	MD	97	225,710	0	0	0	0	0	225,710
U.S. Air Force Ogden Air Logistics Center	Hill AFB	UT	97 45 34 37	71,000	43,200	100,980	1,040	8,130	0	224,350
U.S. Army Scranton Army Ammo. Plant	Scranton	PA	97 34	208,672	7,895	514	130	1,190	0	218,401
U.S. Marine Corps MCB Camp Pendleton	Oceanside	CA	97 20 36 37	0	0	0	0	216,157	0	216,157
U.S. Marine Corps Logistics Base	Albany	GA	97	9,300	98,500	63,450	530	4,850	0	176,630
U.S. Army Letterkenny Army Depot	Chambersburg	PA	97	83,565	0	0	0	79,958	0	163,523
U.S. Army Red River Army Depot	Texarkana	TX	97 37	7,881	118,967	32,818	0	115	0	159,781
U.S. Air Force McClellan AFB	Sacramento	CA	97 37 38	88,550	0	45,900	150	11,700	0	146,300
U.S. Army Watervliet Arsenal	Watervliet	NY	97	10,000	0	103,600	0	30,800	0	144,400
U.S. Public Health Service	Bethesda	MD	99	25,401	0	12,460	33,660	60,622	0	132,143
U.S. Mint	San Francisco	CA	34	123,896	0	0	260	0	0	124,156
U.S. Air Force Bolling AFB	Washington	DC	97	0	0	0	113,577	0	0	113,577
U.S. Air Force	Tulsa	OK	37	1,102	26,920	75,885	0	0	0	103,907
U.S. Air Force	Kelly AFB	TX	97	21,675	5,685	275	0	67,286	0	94,921
U.S. Navy Norfolk Naval Shipyard	Portsmouth	VA	37	0	0	85,975	750	0	0	86,725
U.S. Bureau of Engraving	Washington	DC	27 28 34	54,111	0	0	255	30,012	0	84,378
U.S. Marine Corps Cherry Pt. Air Station	Cherry Point	NC	97	15,305	0	0	0	67,470	0	82,775
U.S. Air Force	Robins AFB	GA	97	0	0	0	0	80,299	0	80,299
U.S. Air Force	Fort Worth	TX	37	14,100	32,700	7,755	250	25,400	0	80,205
U.S. Air Force	Tinker AFB	OK	97	41,967	0	4,357	0	10,746	0	57,070
U.S. Navy North Island Naval Air Station	San Diego	CA	97	16,000	32,750	2,880	10	10	0	51,650
U.S. Army Headquarters XVIII Airborne	Fort Bragg	NC	97	49,260	0	0	0	0	0	49,260
U.S. Air Force Plant 44 AZ	Tucson	AZ	37	27,683	8,364	9,074	0	1,396	0	46,517
U.S. DOE Energy Technology Engr. Center	Simi Hills	CA	87	41,892	0	5	0	0	0	41,897
U.S. Navy Norfolk Naval Base	Norfolk	VA	97	0	11,760	29,663	0	112	0	41,535
U.S. Air Force	Elmendorf AFB	AK	97	0	0	250	37,850	0	0	38,100
U.S. Navy Puget Sound Naval Shipyard	Bremerton	WA	97	5	0	37,955	10	0	0	37,970
U.S. Army Longhorn Ammunition Plant	Karnack	TX	97 34 28	0	0	36,545	0	569	0	37,114
U.S. Navy Naval Air Warfare Center	Patuxent River	MD	97	13,265	0	5,280	525	17,845	0	36,915
U.S. Army Rock Island Arsenal	Rock Island	IL	34	0	0	0	5	36,500	0	36,505
U.S. Navy Naval Air Station	Jacksonville	FL	97	0	0	0	0	34,265	0	34,265
U.S. Army Tooele Depot	Tooele	UT	39	0	0	24,700	0	4,036	0	28,736
U.S. Marine Corps Blount Island Command	Jacksonville	FL	97	1,800	0	19,930	0	0	0	21,730
U.S. DOE Lawrence Livermore Labs	Livermore	CA	87 96 97	21,000	0	530	0	5	0	21,535
U.S. Navy Corpus Christi Naval Air Station	Corpus Christi	TX	97	887	0	345	0	18,865	0	20,097
NASA	Huntsville	AL	37	9,962	0	10	0	9,081	0	19,053
U.S. TVA Shawnee Fossil Plant	West Paducah	KY	49	0	0	19,000	0	0	0	19,000
U.S. Air Force	Wright-Patterson AFB	OH	97	0	0	770	18,079	0	0	18,849
U.S. Navy Amphibious Base	San Diego	CA	97	18,250	0	0	0	0	0	18,250
U.S. DOE Stanford Linear Accelerator Ctr.	Menlo Park	CA	82	4,100	0	12,600	0	0	0	16,700
U.S. Navy Bangor Naval Submarine Base	Silverdale	WA	97	0	15,976	0	0	0	0	15,976
U.S. Army Garrison	Fort Huachuca	AZ	91	11,259	0	0	0	4,337	0	15,596
Subtotal				5,165,433	537,333	1,514,055	269,573	2,620,467	0	10,106,861
Total for All Federal Facilities				5,233,203	595,382	1,637,738	313,453	2,661,427	1,700	10,442,903

[6] Transfers reported without valid waste management codes.

The top two chemicals reported by the government are dichloromethane and methyl ethyl ketone. Together these two chemicals composed nearly one-third of the total releases reported by the government. Both of these chemicals were reported almost exclusively by DOD, as shown in Table 5-15. DOD also reported the vast majority of releases of 1,1,1-trichloroethane, the chemical with the fourth-largest total releases. These three chemicals comprised 51.9% of the releases reported by DOD. Common uses for these three chemicals are as solvents and paint strippers.

The chemical with the third largest releases was dichlorotetrafluoroethane, or CFC-114, a chemical for which only 18 industrial facilities and three Federal facilities filed forms in 1994. Of the three Federal facilities, the two USEC facilities reported the vast majority of this chemical, used as a coolant during the processing of uranium. The releases of CFC-114, primarily to air, put both USEC facilities in the top six for Federal facilities, made SIC code 28 the third largest classification, and constituted more than half of the government releases in Ohio and most of the government releases in Kentucky. The third Federal site which reported for this chemical is a NASA facility.

Missing from the top 25 chemicals for the government, in terms of releases, are any metals. Looking at Table 5-16, however, shows that seven of the top 25 chemicals in terms of transfers are metals. With 95% of the total transfers, DOD reports the majority for 24 of these top 25 chemicals (see Table 5-17). The one exception is nickel, for which the Treasury Department reported the majority. Treasury, the agency with the second highest amount of reported transfers, reported for four chemicals in the top 25, of which three are metals.

RELEASE AND TRANSFER DATA FROM CONTRACTOR-OPERATED FACILITIES

As stated in the introduction of this chapter, some Federal facilities, while owned by the government, are operated by contractors. With E.O. 12856, both the contractor and the Federal entity at these GOCO sites are required to submit TRI reports. The question then arises whether, for each of these facilities, the reports from the government entity match the reports from the contractor. One reason for a deviation in the reporting data could be that the government and contractor both submitted reports for the same chemical, but there was a difference in the release and transfer data between the two reports. Another discrepancy could occur when reports are filed for different chemicals. For instance, the contractor might file a single report for nickel, while the government entity might submit reports only for xylene and dichloromethane. A third possibility is that a contractor operates a sub-unit within a Federal facility. The contractor would file TRI reports for that sub-unit only, while the government entity would be required to report for the entire facility, including the contractor activities.

Table 5-18 provides a comparison of the data. The column on the left shows the data from all government facilities. The next two columns provide data only for the GOCO facilities. The column on the right provides the data from the government entity. The middle column gives data from the same facilities, but as reported by the contractor.

Comparing the TRI data reported by the contractors vs. the government at these GOCO sites showed greater discrepancies for the releases than for the transfers. The total releases reported by the contractors was more than 780,000 pounds greater than the total reported

Table 5-11. TRI Releases from Federal Facilities, by State, 1994.

State	Facilities Number	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
Alabama	8	35	448,777	7,824	0	500	457,101
Alaska	5	24	15,511	120,000	5	45,000	180,516
American Samoa	0	0	0	0	0	0	0
Arizona	5	12	137,774	0	0	50	137,824
Arkansas	2	6	51,770	760	0	0	52,530
California	25	74	627,714	10,465	445,007	19,760	1,102,946
Colorado	6	24	93,501	10,791	0	250	104,542
Connecticut	0	0	0	0	0	0	0
Delaware	0	0	0	0	0	0	0
District of Columbia	5	8	4,891	1,600	0	17,300	23,791
Florida	7	30	369,835	253	0	0	370,088
Georgia	5	27	1,216,219	405	0	250	1,216,874
Hawaii	2	4	26,760	250	0	250	27,260
Idaho	3	9	15,991	0	0	221,100	237,091
Illinois	3	16	11,529	0	0	0	11,529
Indiana	2	5	1,824	0	0	0	1,824
Iowa	1	4	16,448	0	0	0	16,448
Kansas	2	5	25,373	281	0	4,217	29,871
Kentucky	7	13	409,268	34,000	0	2,380	445,648
Louisiana	1	1	0	0	0	0	0
Maine	3	13	7,105	0	0	510	7,615
Maryland	9	26	55,467	85	0	80,360	135,912
Massachusetts	0	0	0	0	0	0	0
Michigan	2	9	4,820	0	0	0	4,820
Minnesota	0	0	0	0	0	0	0
Mississippi	1	2	3,042	0	0	0	3,042
Missouri	4	18	39,818	13,457	0	1,538	54,813
Montana	1	1	0	0	0	250	250
Nebraska	1	1	0	0	0	486,120	486,120
Nevada	2	2	10,559	0	0	0	10,559
New Hampshire	0	0	0	0	0	0	0
New Jersey	2	2	16,276	0	0	0	16,276
New Mexico	5	12	36,153	1,910	0	250	38,313
New York	5	19	3,234	4,341	0	0	7,575
North Carolina	2	15	313,110	1,750	0	255	315,115
North Dakota	1	8	18,850	0	0	0	18,850
Ohio	8	26	660,645	1,658	0	82	662,385
Oklahoma	5	37	1,926,301	417	0	3,330	1,930,048
Oregon	2	2	0	0	0	500	500
Pennsylvania	5	19	94,075	243	0	0	94,318
Puerto Rico	1	1	0	0	0	0	0
Rhode Island	1	7	2,005	0	0	0	2,005
South Carolina	4	19	81,599	225	0	12,267	94,091
South Dakota	1	1	11,000	3,200	0	0	14,200
Tennessee	7	26	325,883	4,555	0	21	330,459
Texas	12	50	527,817	4,258	0	32	532,107
Utah	4	27	285,423	750	0	4,838	291,011
Vermont	0	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0	0
Virginia	7	25	226,300	17,034	0	755	244,089
Washington	4	9	69,199	2,460	0	0	71,659
West Virginia	0	0	0	0	0	0	0
Wisconsin	1	7	14,351	0	1	5,970	20,322
Wyoming	2	5	24,285	750	524	0	25,559
Total	191	686	8,230,502	243,722	445,537	908,135	9,827,896

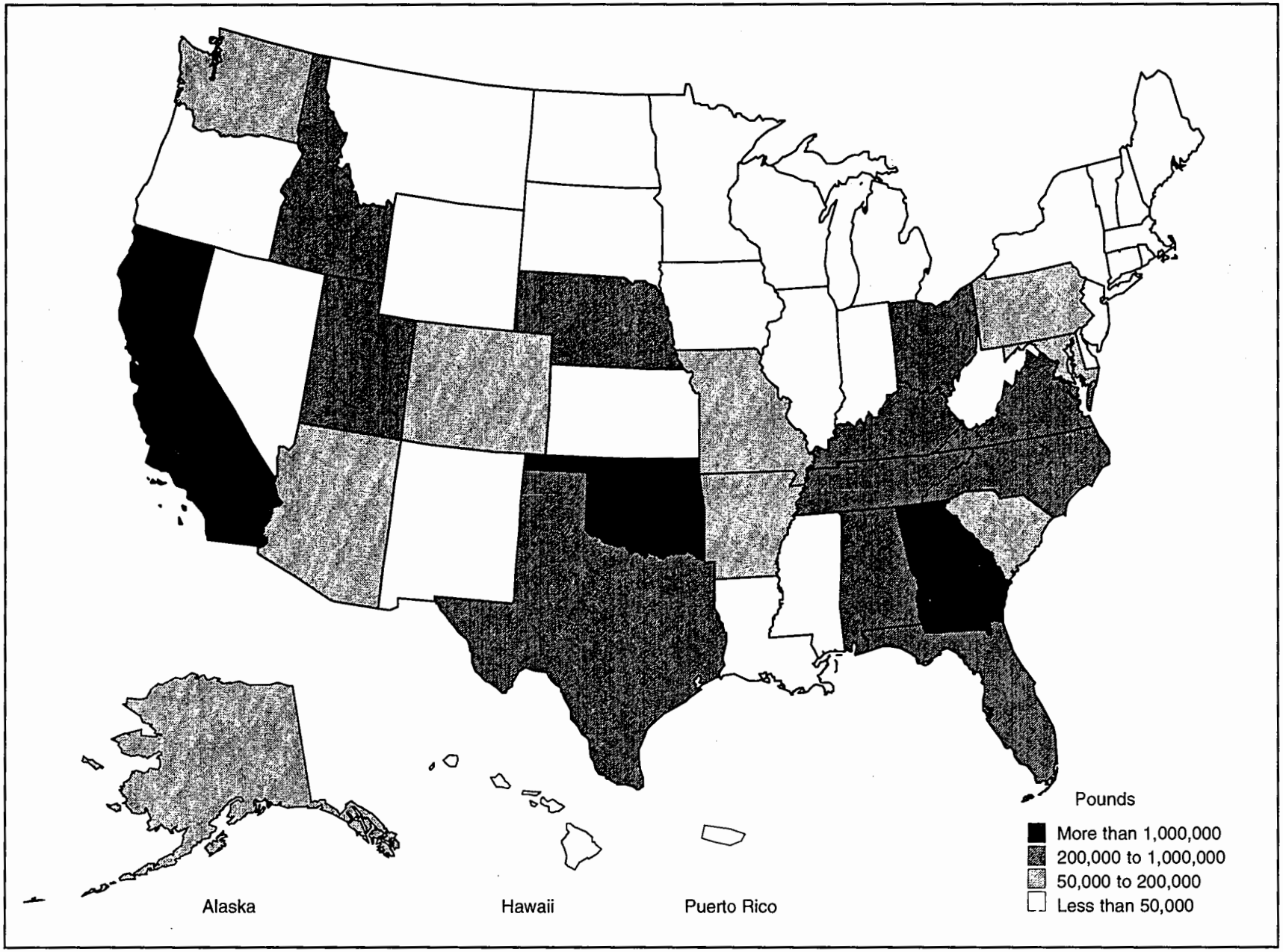

Figure 5-8. TRI Releases from Federal Facilities, 1994.

Table 5-12. TRI Transfers from Federal Facilities, by State, 1994.

State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[7] Pounds	Total Transfers Pounds
Alabama	311,994	20,456	192,375	0	70,205	250	595,280
Alaska	0	0	2,280	39,100	0	1,450	42,830
American Samoa	0	0	0	0	0	0	0
Arizona	38,942	8,364	9,074	0	8,833	0	65,213
Arkansas	0	0	0	0	696,000	0	696,000
California	331,986	33,750	63,150	65,924	409,794	0	904,604
Colorado	371,593	0	5,850	10,331	3	0	387,777
Connecticut	0	0	0	0	0	0	0
Delaware	0	0	0	0	0	0	0
District of Columbia	66,611	0	0	113,832	30,012	0	210,455
Florida	2,640	770	35,765	10	37,855	0	77,040
Georgia	30,569	214,925	63,450	535	356,324	0	665,803
Hawaii	6,600	0	260	0	2,600	0	9,460
Idaho	0	0	1,435	0	8,255	0	9,690
Illinois	0	1,508	12,528	5	36,500	0	50,541
Indiana	0	0	489	0	0	0	489
Iowa	0	9,316	0	0	0	0	9,316
Kansas	270	17	0	0	0	0	287
Kentucky	0	0	33,160	0	0	0	33,160
Louisiana	0	0	0	0	0	0	0
Maine	0	10,507	2,030	0	0	0	12,537
Maryland	276,876	3,559	27,127	34,940	80,008	0	422,510
Massachusetts	0	0	0	0	0	0	0
Michigan	0	4,350	0	0	0	0	4,350
Minnesota	0	0	0	0	0	0	0
Mississippi	0	5,380	1,605	0	0	0	6,985
Missouri	3,241,986	10,620	7,077	1,738	35,804	0	3,297,225
Montana	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0
New Jersey	0	0	0	15,302	0	0	15,302
New Mexico	0	250	263	250	0	0	763
New York	10,000	0	109,706	6,175	30,800	0	156,681
North Carolina	64,565	0	0	0	67,470	0	132,035
North Dakota	0	0	0	0	0	0	0
Ohio	6,344	3,500	15,511	18,079	0	0	43,434
Oklahoma	43,319	26,920	84,672	0	571,846	0	726,757
Oregon	0	0	0	0	0	0	0
Pennsylvania	294,881	7,895	2,599	427	81,148	0	386,950
Puerto Rico	0	0	0	0	0	0	0
Rhode Island	0	0	280	0	0	0	280
South Carolina	0	0	12,086	255	3	0	12,344
South Dakota	0	0	0	0	0	0	0
Tennessee	0	0	0	0	1,634	0	1,634
Texas	47,793	162,289	83,370	250	112,235	0	405,937
Utah	71,000	43,200	125,680	1,040	12,166	0	253,086
Vermont	0	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0	0
Virginia	0	11,830	118,638	750	9,112	0	140,330
Washington	5	15,976	38,705	10	2,820	0	57,516
West Virginia	0	0	0	0	0	0	0
Wisconsin	15,229	0	588,573	0	0	0	603,802
Wyoming	0	0	0	4,500	0	0	4,500
Total	5,233,203	595,382	1,637,738	313,453	2,661,427	1,700	10,442,903

[7] Transfers reported without valid waste management codes.

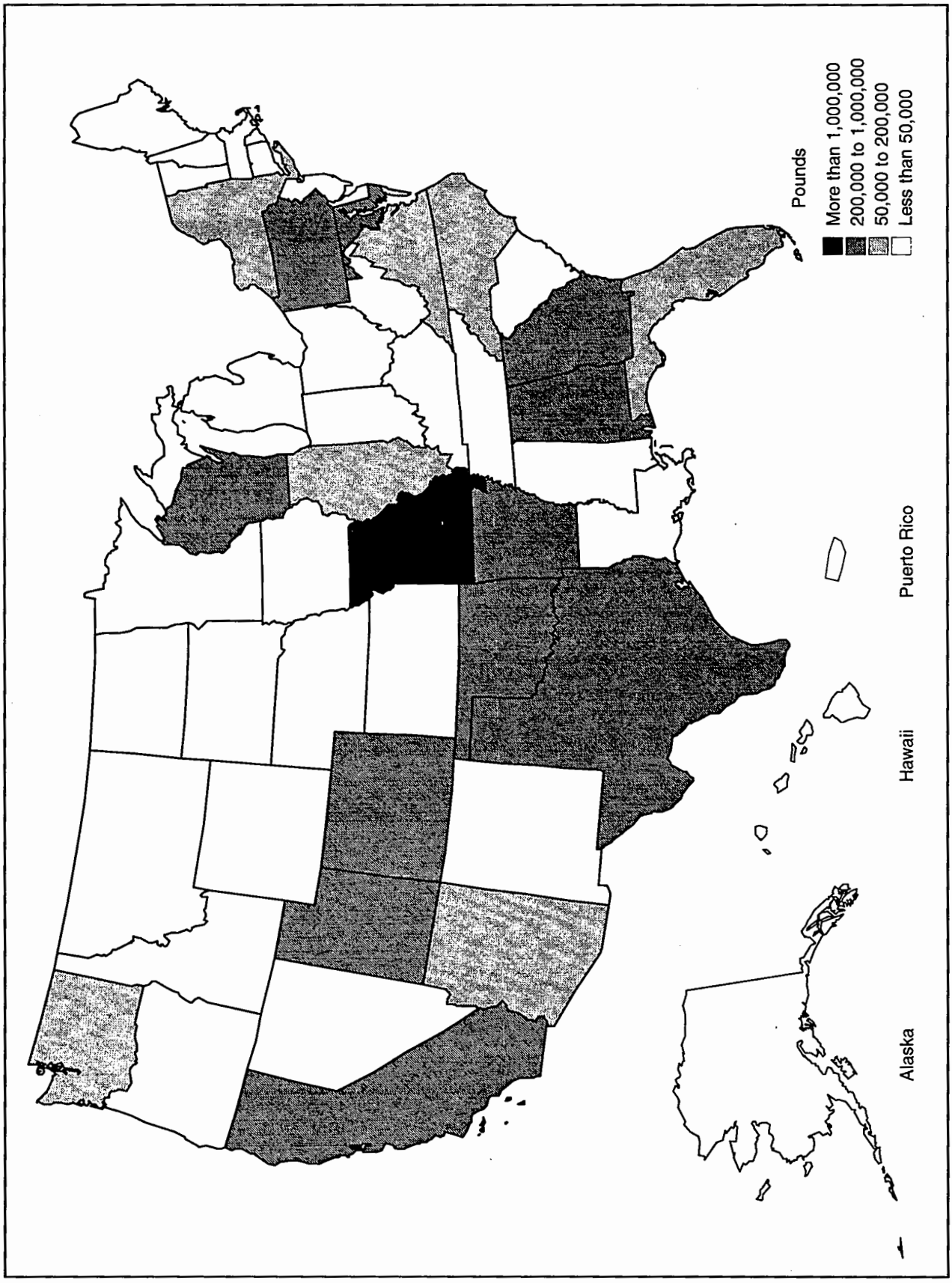

Figure 5-9. TRI Transfers from Federal Facilities, 1994.

Table 5-13. TRI Releases from Federal Facilities, by Two-Digit SIC Code, 1994 (Ordered by Total Release).

SIC Codes	Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
97	268	4,958,434	171,007	6	79,479	5,208,926
37	64	1,102,371	10,624	0	782	1,113,777
28	46	942,876	6,217	0	11,734	960,827
13	16	41,365	750	445,531	0	487,646
91 02	1	0	0	0	486,120	486,120
37 38	9	282,720	0	0	0	282,720
97 45 34 37	16	272,210	750	0	4,700	277,660
87 28 37	7	15,991	0	0	220,600	236,591
87	31	80,636	0	0	79,820	160,456
96	11	91,798	0	0	0	91,798
92 25	5	79,360	10,331	0	0	89,691
34	30	79,804	196	0	4,638	84,638
34 28 33	4	72,350	0	0	0	72,350
49	10	4,470	25,954	0	17,321	47,745
51	81	46,080	0	0	0	46,080
97 34 37	1	26,203	0	0	0	26,203
97 37	2	23,311	0	0	0	23,311
34 36	2	17,929	0	0	0	17,929
82	2	13,300	0	0	0	13,300
99	11	13,263	0	0	0	13,263
39	2	13,000	0	0	138	13,138
92	2	0	13,000	0	0	13,000
34 28	5	12,686	0	0	0	12,686
97 34	6	11,085	197	0	0	11,282
36	5	6,855	4,225	0	0	11,080
97 34 28	1	6,800	0	0	0	6,800
91	11	6,205	460	0	0	6,665
87 96 97	2	2,700	0	0	0	2,700
91 51	4	2,432	0	0	0	2,432
45 08	9	0	0	0	2,053	2,053
27 28 34	3	1,481	0	0	0	1,481
99 49 75	2	1,161	0	0	0	1,161
45	1	255	0	0	250	505
87 15	2	500	0	0	0	500
87 36	2	500	0	0	0	500
27	1	250	0	0	0	250
95 08	1	0	0	0	250	250
97 20 36 37	1	0	0	0	250	250
97 28 34	2	121	0	0	0	121
49 16 17	2	0	11	0	0	11
28 34	1	0	0	0	0	0
No SIC code reported	4	0	0	0	0	0
Total	686	8,230,502	243,722	445,537	908,135	9,827,896

by the government entities. Total transfers, on the other hand, were almost equal, with the government reporting slightly more than the contractors. The differences occurred at eight facilities and involved 17 TRI reports.

Many of the discrepancies were minor. For six chemicals, however, the data submitted by a contractor exceeded government values by at least 10,000 pounds and in two cases the government values exceeded contractor values by at least 10,000 pounds. The greatest dissimilarity occurred at an Air Force facility where the contractor submitted 15 TRI reports, but the government entity only reported for 10 chemicals. The contractor submitted five reports more than the government, including one report for cyclohexane in which the releases equaled 674,177 pounds. EPA plans to review any discrepancies to determine their cause.

WASTE MANAGEMENT AND POLLUTION PREVENTION DATA

Federal facilities, like the private sector, must comply with the Pollution Prevention Act of 1990. As a result, Federal facilities must provide information on the management of waste, both on-site and off-site. The Federal facilities also must identify what actions were taken to reduce or eliminate the use of the reported chemicals. EPA's goal is to encourage source reduction, which is the prevention of the generation of waste. When it is not feasible to implement source reduction, the PPA established as a national policy a hierarchy of waste management. Under this hierarchy, recycling is the most preferable method of managing waste, followed by treatment, and releases (including disposal). This last method should be considered a last resort. Although the PPA does not specifically address combustion for energy recovery, EPA has recognized that this form of waste management shares characteristics of both recycling and treatment. EPA, therefore, has placed energy recovery between recycling and treatment on the waste management hierarchy.

Two-Digit Standard Industrial Classification (SIC) Codes Reported by Federal Facilities, 1994

- 02 Agriculture production livestock and animal specialties
- 08 Forestry
- 13 Oil and gas extraction
- 15 Building construction—general contractors and operative builders
- 16 Heavy construction other than building construction—contractors
- 17 Construction—special trade contractors
- 20 Food and kindred products
- 25 Furniture and fixtures
- 27 Printing, publishing, and allied industries
- 28 Chemicals and allied products
- 33 Primary metal industries
- 34 Fabricated metal products, except machinery and transportation equipment
- 36 Electronic and other electrical equipment and components
- 37 Transportation equipment
- 38 Measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks
- 39 Miscellaneous manufacturing industries
- 45 Transportation by air
- 49 Electric, gas, and sanitary services
- 51 Wholesale trade—nondurable goods
- 75 Automotive repair, services, and parking
- 82 Educational services
- 87 Engineering, accounting, research, management, and related services
- 91 Executive, legislative, and general government, except finance
- 92 Justice, public order, and safety
- 95 Administration of environmental quality and housing programs
- 96 Administration of economic programs
- 97 National security and international affairs
- 99 Nonclassifiable establishments

Box 5-1. Two-Digit Standard Industrial Classification (SIC) Codes Reported by Federal Facilities, 1994

As shown in Table 5-19, Federal facilities reported nearly 30.0 million pounds of chemicals managed in production-related waste for 1994. Federal facilities released or disposed of 38.5% of their toxic chemicals in waste. Federal facilities managed 21.0% of their toxic chemicals in waste using on-site treatment practices. Off-site and on-site recycling accounted for the management of 16.0% and 13.7%, respectively,

Table 5-14. Top 25 TRI Chemicals with Largest Total Releases from Federal Facilities, 1994.

CAS Number[8]	Chemical	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Under-ground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
75-09-2	Dichloromethane	22	824,942	1,194,949	285	0	0	2,020,176
78-93-3	Methyl ethyl ketone	35	275,909	818,818	2,711	0	620	1,098,058
76-14-2	Dichlorotetrafluoroethane (CFC-114)	3	696,960	49,000	0	0	0	745,960
71-55-6	1,1,1-Trichloroethane	26	320,775	329,894	109	0	382	651,160
7664-41-7	Ammonia	20	95,694	10,751	1,198	0	533,423	641,066
7647-01-0	Hydrochloric acid	20	1,223	295,323	0	127,214	0	423,760
127-18-4	Tetrachloroethylene	5	266,593	146,158	2,237	0	0	414,988
67-56-1	Methanol	12	69,776	19,485	1,020	307,916	0	398,197
7664-93-9	Sulfuric acid (acid aerosols)	40	2,669	37,487	134,887	5	220,000	395,048
108-95-2	Phenol	6	119,997	251,182	132	0	0	371,311
108-88-3	Toluene	47	158,199	203,549	15	1	470	362,234
76-13-1	Freon 113	13	186,439	95,938	5	0	0	282,382
91-20-3	Naphthalene	21	251,300	4,572	10	0	260	256,142
1330-20-7	Xylene (mixed isomers)	38	105,233	74,725	10	6,525	6,014	192,507
—	Glycol ethers	18	122,732	36,203	17,000	0	12,730	188,665
79-01-6	Trichloroethylene	5	14,400	169,559	0	0	0	183,959
107-21-1	Ethylene glycol	34	147,475	683	4,739	1,181	14,552	168,630
71-36-3	n-Butyl alcohol	10	138,095	26,842	310	0	0	165,247
108-10-1	Methyl isobutyl ketone	11	37,432	91,432	0	0	180	129,044
7782-50-5	Chlorine	42	20,823	21,380	68,827	0	3,182	114,212
75-71-8	Dichlorodifluoromethane (CFC-12)	7	95,143	0	0	0	0	95,143
7697-37-2	Nitric acid	23	3,316	76,980	0	0	540	80,836
6484-52-2	Ammonium nitrate (solution)	2	270	0	21	0	79,820	80,111
75-45-6	Chlorodifluoromethane (HCFC-22)	7	44,254	22,251	0	0	5	66,510
50-00-0	Formaldehyde	1	250	51,200	0	0	0	51,450
	Subtotal	468	3,999,899	4,028,361	233,516	442,842	872,178	9,576,796
	Total for All Chemicals	686	4,081,765	4,148,737	243,722	445,537	908,135	9,827,896

Table 5-15. Top 25 TRI Chemicals with Largest Total Releases from Federal Facilities, by Agency, 1994.

CAS Number[8]	Chemical	Defense Pounds	Energy Pounds	Enrichment Corporation Pounds	Agriculture Pounds	All Others Pounds	Total Releases Pounds
75-09-2	Dichloromethane	2,005,618	3,100	0	0	11,458	2,020,176
78-93-3	Methyl ethyl ketone	1,098,058	0	0	0	0	1,098,058
76-14-2	Dichlorotetrafluoroethane (CFC-114)	0	0	730,000	0	15,960	745,960
71-55-6	1,1,1-Trichloroethane	605,123	13,300	0	0	32,737	651,160
7664-41-7	Ammonia	73,697	66,846	0	488,173	12,350	641,066
7647-01-0	Hydrochloric acid	294,008	129,252	0	0	500	423,760
127-18-4	Tetrachloroethylene	330,126	0	0	0	84,862	414,988
67-56-1	Methanol	41,050	355,577	1,570	0	0	398,197
7664-93-9	Sulfuric acid (acid aerosols)	162,311	222,046	110	0	10,581	395,048
108-95-2	Phenol	371,311	0	0	0	0	371,311
108-88-3	Toluene	327,888	8,509	0	0	25,837	362,234
76-13-1	Freon 113	217,551	2,700	0	0	62,131	282,382
91-20-3	Naphthalene	256,142	0	0	0	0	256,142
1330-20-7	Xylene (mixed isomers)	152,659	13,621	0	0	26,227	192,507
—	Glycol ethers	187,184	0	0	0	1,481	188,665
79-01-6	Trichloroethylene	180,459	3,500	0	0	0	183,959
107-21-1	Ethylene glycol	164,555	1,371	0	0	2,704	168,630
71-36-3	n-Butyl alcohol	149,990	0	0	0	15,257	165,247
108-10-1	Methyl isobutyl ketone	118,064	10,980	0	0	0	129,044
7782-50-5	Chlorine	74,320	2,170	3,722	0	34,000	114,212
75-71-8	Dichlorodifluoromethane (CFC-12)	49,721	0	0	0	45,422	95,143
7697-37-2	Nitric acid	10,697	69,559	580	0	0	80,836
6484-52-2	Ammonium nitrate (solution)	291	0	0	79,820	0	80,111
75-45-6	Chlorodifluoromethane (HCFC-22)	39,305	21,505	0	0	5,700	66,510
50-00-0	Formaldehyde	51,450	0	0	0	0	51,450
	Subtotal	6,961,578	924,036	735,982	567,993	387,207	9,576,796
	Total for All Chemicals	7,145,197	973,793	750,706	567,993	390,207	9,827,896

[8] Compound categories do not have CAS numbers (—).

Table 5-16. Top 25 TRI Chemicals with Largest Total Transfers from Federal Facilities, 1994.

CAS Number❾	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers Pounds	Total Transfers Pounds
7440-50-8	Copper	2,401,046	0	255	5,370	14,251	0	2,420,922
—	Zinc compounds	971,481	0	17,134	764	385,199	0	1,374,578
107-21-1	Ethylene glycol	128,103	53,245	177,895	54,232	318,662	0	732,137
7439-92-1	Lead	696,259	0	502	5	26,941	0	723,707
25321-14-6	Dinitrotoluene (mixed isomers)	0	0	0	0	561,100	0	561,100
1634-04-4	Methyl tert-butyl ether	10	820	526,520	0	10	0	527,360
78-93-3	Methyl ethyl ketone	56,581	250,576	65,918	2,828	121,307	0	497,210
67-72-1	Hexachloroethane	0	0	0	0	348,000	0	348,000
7697-37-2	Nitric acid	225,020	0	66,904	0	23,101	0	315,025
71-55-6	1,1,1-Trichloroethane	68,192	46,701	86,720	40	50,425	0	252,078
—	Chromium compounds	24,801	5,850	19,120	750	191,049	0	241,570
7664-93-9	Sulfuric acid (acid aerosols)	103,031	0	22,875	87,913	11,680	0	225,499
75-09-2	Dichloromethane	2,355	41,005	145,987	270	15,717	0	205,334
—	Manganese compounds	55,819	0	1,220	6	136,516	0	193,561
108-88-3	Toluene	14,732	67,173	50,569	2,198	57,199	0	191,871
7664-38-2	Phosphoric acid	0	0	111,019	34,410	28,000	0	173,429
—	Copper compounds	125,503	5,200	14,124	766	368	0	145,961
1330-20-7	Xylene (mixed isomers)	8,085	64,559	39,134	15	27,817	0	139,610
123-31-9	Hydroquinone	0	0	0	113,577	0	0	113,577
76-13-1	Freon 113	43,071	250	30,249	0	33,900	0	107,470
79-01-6	Trichloroethylene	31,100	7,895	48,164	5	190	0	87,354
127-18-4	Tetrachloroethylene	41,084	345	5,612	20	37,531	0	84,592
7440-02-0	Nickel	73,074	0	15	15	762	0	73,866
—	Glycol ethers	8,167	4,000	5,033	255	50,429	0	67,884
100-41-4	Ethylbenzene	5,500	2,255	56,229	5	755	0	64,744
	Subtotal	5,083,014	549,874	1,491,198	303,444	2,440,909	0	9,868,439
	Total for All Chemicals	5,233,203	595,382	1,637,738	313,453	2,661,427	1,700	10,442,903

Table 5-17. Top 25 TRI Chemicals with Largest Total Transfers from Federal Facilities, by Agency, 1994.

CAS Number❾	Chemical	Defense Pounds	Treasury Pounds	Health and Human Services Pounds	Energy Pounds	All Others Pounds	Total Transfers Pounds
7440-50-8	Copper	2,353,006	67,916	0	0	0	2,420,922
—	Zinc compounds	1,374,328	0	0	250	0	1,374,578
107-21-1	Ethylene glycol	723,001	0	0	1,070	8,066	732,137
7439-92-1	Lead	669,035	29,269	25,401	2	0	723,707
25321-14-6	Dinitrotoluene (mixed isomers)	561,100	0	0	0	0	561,100
1634-04-4	Methyl tert-butyl ether	527,360	0	0	0	0	527,360
78-93-3	Methyl ethyl ketone	497,210	0	0	0	0	497,210
67-72-1	Hexachloroethane	348,000	0	0	0	0	348,000
7697-37-2	Nitric acid	312,402	0	0	2,623	0	315,025
71-55-6	1,1,1-Trichloroethane	241,059	0	0	4,100	6,919	252,078
—	Chromium compounds	241,570	0	0	0	0	241,570
7664-93-9	Sulfuric acid (acid aerosols)	190,486	0	0	24,682	10,331	225,499
75-09-2	Dichloromethane	194,324	0	7,005	4,005	0	205,334
—	Manganese compounds	193,538	0	0	23	0	193,561
108-88-3	Toluene	185,883	0	0	765	5,223	191,871
7664-38-2	Phosphoric acid	135,919	0	34,410	3,100	0	173,429
—	Copper compounds	145,961	0	0	0	0	145,961
1330-20-7	Xylene (mixed isomers)	138,700	0	0	910	0	139,610
123-31-9	Hydroquinone	113,577	0	0	0	0	113,577
76-13-1	Freon 113	80,135	0	0	21,030	6,305	107,470
79-01-6	Trichloroethylene	87,159	0	0	195	0	87,354
127-18-4	Tetrachloroethylene	84,094	0	0	0	498	84,592
7440-02-0	Nickel	6,347	67,519	0	0	0	73,866
—	Glycol ethers	37,622	30,262	0	0	0	67,884
100-41-4	Ethylbenzene	64,744	0	0	0	0	64,744
	Subtotal	9,506,560	194,966	66,816	62,755	37,342	9,868,439
	Total for All Chemicals	9,866,496	237,803	139,898	125,998	72,708	10,442,903

❾ Compound categories do not have CAS numbers (—).

Table 5-18. TRI Releases and Transfers from Federal Facilities, Contractor Reports Compared to Government Reports, 1994.

	All Government Reports Number	All Contractor Reports Number	Government Reports from Facilities with Contractor Reports Number
Facilities	191	23	23
Forms	686	122	112
	Pounds	Pounds	Pounds
Fugitive Air	4,081,765	588,566	332,556
Point Source Air	4,148,737	1,516,156	609,378
Surface Water	243,722	7,309	7,227
Underground Injection	445,537	0	0
On-site Land Releases	908,135	223,711	233,561
Total Releases	9,827,896	2,335,742	1,182,722 ⑩
Transfers to Recycling	5,233,203	3,551,880	3,559,379
Transfers to Energy Recovery	595,382	204,983	199,355
Transfers to Treatment	1,637,738	155,085	154,971
Transfers to POTWs	313,453	2,129	2,128
Transfers to Disposal	2,661,427	347,350	347,023
Other Off-site Transfers ⑪	1,700	0	0
Total Transfers	10,442,903	4,261,427	4,262,856

management of 16.0% and 13.7%, respectively, of toxic chemicals in waste. Approximately 7% of waste managed by Federal facilities was treated off-site, while only 3.9% of waste was combusted for energy recovery on- or off-site.

These statistics reveal a reliance on the methods at the bottom of the waste management hierarchy. Releases (including disposal) are the least preferable means of managing waste but represent the practice used to manage 38.5% of all toxic chemicals in waste generated at Federal facilities. On-site and off-site treatment accounted for 27.9% of the toxic chemicals managed by Federal facilities.

Federal and non-Federal facilities differ in the extent to which they employ the various waste management methods. Non-Federal TRI facilities released 9.4% of their total production-related waste, compared to the 38.5% for Federal facilities (see Table 5-20). Non-Federal TRI facilities managed 55.8% of their production-related waste through recycling or energy recovery practices, with 44.2% released or treated on-site or off-site. For Federal facilities, these statistics are reversed, with 66.4% of waste treated or released and 33.6% managed through recycling or energy recovery.

Projected Quantities of TRI Chemicals in Waste

While the 1994 data indicate the need for more efficient management of chemicals in waste, data for 1993 and projections for 1995 and 1996

⑩ Total releases should be greater by 370,642 pounds. Contractor reports in this amount were submitted, but the linked government entity was not correctly identified until after data for this report were prepared.

⑪ Transfers reported without valid waste management codes.

Table 5-19. Actual and Projected Quantities of TRI Chemicals in Waste, from Federal Facilities, 1993-1996.[12]

Management Activity	1993		1994		Projected 1995		Projected 1996	
	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent
Recycled On-site	3,806,188	15.6	4,101,633	13.7	4,413,063	17.7	4,551,769	18.7
Recycled Off-site	984,053	4.0	4,802,036	16.0	4,511,566	18.1	4,615,987	18.9
Energy Recovery On-site	601,222	2.5	616,190	2.1	169,330	0.7	158,770	0.7
Energy Recovery Off-site	359,690	1.5	548,127	1.8	435,567	1.7	413,541	1.7
Treated On-site	5,239,824	21.4	6,292,593	21.0	5,877,663	23.6	5,863,912	24.0
Treated Off-site	561,445	2.3	2,072,436	6.9	926,263	3.7	824,847	3.4
Quantity Released/Disposed of	12,898,842	52.8	11,544,939	38.5	8,590,913	34.5	7,956,278	32.6
Total Production-related Waste	24,451,264	100.0	29,977,954	100.0	24,924,365	100.0	24,385,104	100.0

Table 5-20. Quantities of TRI Chemicals in Waste from Federal Facilities Compared to All TRI Facilities, 1994.

Management Activity	Federal Facilities		All Other TRI Facilities		All TRI Facilities	
	Pounds	Percent	Pounds	Percent	Pounds	Percent
Recycled On-site	4,101,633	13.7	8,402,728,070	31.7	8,406,829,703	31.7
Recycled Off-site	4,802,036	16.0	2,512,191,338	9.5	2,516,993,374	9.5
Energy Recovery On-site	616,190	2.1	3,421,939,978	12.9	3,422,556,168	12.9
Energy Recovery Off-site	548,127	1.8	468,659,486	1.8	469,207,613	1.8
Treated On-site	6,292,593	21.0	8,652,764,728	32.6	8,659,057,321	32.6
Treated Off-site	2,072,436	6.9	555,254,744	2.1	557,327,180	2.1
Quantity Released/Disposed of	11,544,939	38.5	2,503,037,617	9.4	2,514,582,556	9.5
Total Production-related Waste	29,977,954	100.0	26,516,575,961	100.0	26,546,553,915	100.0
Non-Production-related Waste	150,892		78,551,435		78,702,327	

waste management hierarchy. As Table 5-19 shows, releases (including disposal) accounted for 52.8% of toxic chemicals managed in waste in 1993, but this is projected to fall to 32.6% in 1996. On-site treatment, which was 21.4% of waste management in 1993, is expected to climb slightly, to 24.0% in 1996. On-site and off-site recycling, however, are both projected to account for 19% of the toxic chemicals managed in waste in 1996, up from 15.6% and 4.0% respectively in 1993. Combining the data for 1996 projections of on-site and off-site recycling shows that Federal facilities plan to rely on recycling (37.6%) more than any other means of managing chemicals in waste, a significant change from 1993 data.

Projections for 1995 and 1996 show some convergence for Federal facility data with all other TRI reporters. While projections for all other TRI reporters remain fairly consistent from 1994 to 1996, with only slight changes in the percentages of waste recycled, treated, or released (see Table 2-3), Federal facilities' projections show a shift from release and disposal to recycling. Total recycling at Federal facilities in 1996, at 37.6%, is expected to be about the same as all other TRI reporting facilities, at 41.4%.

Comparisons Among Federal Agencies for Chemicals in Waste

Table 5-21 provides chemicals-in-waste management data for each of the 12 Federal

[12] Data for all years taken from 1994 Form R.

Table 5-21. Actual and Projected Quantities of TRI Chemicals in Waste, by Federal Agency, 1993-1996.

Federal Agency	Year[13]	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
Dept. of Agriculture	93	0	0	0	0
	94	0	0	0	0
	95	0	0	0	0
	96	0	0	0	0
Dept. of Defense	93	859,499	861,313	601,222	357,120
	94	1,223,213	4,545,737	616,190	543,206
	95	1,427,735	4,215,988	169,330	429,837
	96	1,372,118	4,363,928	158,770	408,421
Dept. of Energy	93	2,891,609	104,011	0	2,570
	94	2,521,712	67,692	0	1,279
	95	2,647,528	85,200	0	1,130
	96	2,905,651	84,100	0	980
Dept. of Health and Human Services	93	0	0	0	0
	94	0	25,401	0	0
	95	0	25,000	0	0
	96	0	12,000	0	0
Dept. of Interior	93	0	0	0	0
	94	0	0	0	0
	95	0	0	0	0
	96	0	0	0	0
Dept. of Justice	93	0	0	0	0
	94	0	0	0	0
	95	0	0	0	0
	96	0	0	0	0
Dept. of Transportation	93	0	0	0	0
	94	0	0	0	3,554
	95	0	0	0	4,600
	96	0	0	0	4,140
Dept. of Treasury	93	0	1,729	0	0
	94	0	148,906	0	0
	95	0	173,978	0	0
	96	0	142,659	0	0
Environmental Protection Agency	93	0	0	0	0
	94	0	0	0	0
	95	0	0	0	0
	96	0	0	0	0
National Aeronautics and Space Administration	93	55,080	17,000	0	0
	94	356,708	14,300	0	88
	95	337,800	11,400	0	0
	96	274,000	13,300	0	0
Tennessee Valley Authority	93	0	0	0	0
	94	0	0	0	0
	95	0	0	0	0
	96	0	0	0	0
U.S. Enrichment Corporation	93	0	0	0	0
	94	0	0	0	0
	95	0	0	0	0
	96	0	0	0	0
Total	93	3,806,188	984,053	601,222	359,690
	94	4,101,633	4,802,036	616,190	548,127
	95	4,413,063	4,511,566	169,330	435,567
	96	4,551,769	4,615,987	158,770	413,541

Table 5-20.

Federal Agency	Year[11]	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed of Pounds	Total Production-related Waste Pounds	Non-Production related Waste Pounds
Dept. of Agriculture	93	0	0	80,500	80,500	
	94	0	0	566,329	566,329	84
	95	0	0	474,758	474,758	
	96	0	0	464,654	464,654	
Dept. of Defense	93	1,571,314	485,604	7,542,561	12,278,633	
	94	2,680,680	1,891,352	8,823,831	20,324,209	70,894
	95	2,386,464	791,229	6,121,919	15,542,502	
	96	2,346,579	704,582	5,580,157	14,934,555	
Dept. of Energy	93	2,048,356	39,145	4,485,900	9,571,591	
	94	1,175,492	57,141	991,359	4,814,675	19,265
	95	1,106,455	27,386	1,009,346	4,877,045	
	96	1,110,455	26,849	995,197	5,123,232	
Dept. of Health and Human Services	93	13,000	3,650	150	16,800	
	94	11,000	53,320	150	89,871	60,422
	95	100	46,220	140	71,460	
	96	10	34,520	130	46,660	
Dept. of Interior	93	0	0	0	0	
	94	4,430	70	1,191	5,691	0
	95	4,500	100	0	4,600	
	96	4,500	100	0	4,600	
Dept. of Justice	93	0	0	13,000	13,000	
	94	0	10,331	102,691	113,022	0
	95	0	10,000	23,000	33,000	
	96	0	10,000	16,500	26,500	
Dept. of Transportation	93	0	0	0	0	
	94	0	2,539	23,568	29,661	220
	95	0	3,400	25,000	33,000	
	96	0	3,060	22,500	29,700	
Dept. of Treasury	93	1,560,060	32,745	1,737	1,596,271	
	94	2,298,347	30,096	8,440	2,485,789	0
	95	2,239,294	28,606	8,333	2,450,211	
	96	2,191,668	26,415	8,195	2,368,937	
Environmental Protection Agency	93	0	0	0	0	
	94	0	0	20	20	0
	95	0	0	18	18	
	96	0	0	16	16	
National Aeronautics and Space Admin.	93	394	301	228,836	301,611	
	94	636	521	232,687	604,940	5
	95	850	321	182,705	533,076	
	96	1,500	321	153,265	442,386	
Tennessee Valley Authority	93	0	0	4,000	4,000	
	94	59,208	27,066	43,891	130,165	0
	95	65,000	19,001	35,704	119,705	
	96	135,000	19,000	26,704	180,704	
U.S. Enrichment Corporation	93	46,700	0	542,158	588,858	
	94	62,800	0	750,782	813,582	2
	95	75,000	0	709,990	784,990	
	96	74,200	0	688,960	763,160	
Total	93	5,239,824	561,445	12,898,842	24,451,264	
	94	6,292,593	2,072,436	11,544,939	29,977,954	150,892
	95	5,877,663	926,263	8,590,913	24,924,365	
	96	5,863,912	824,847	7,956,278	24,385,104	

[13] Data for all years taken from the 1994 Form R.

agencies that had one or more facilities reporting to TRI in 1994. The table shows DOD and DOE, followed by Treasury, reporting the greatest amounts of chemicals in waste. Most agencies reported more production-related waste in 1994 than in 1993 or than the projections for 1995 and 1996.

Only seven agencies reported non-production related waste for 1994. Two agencies, DOD and HHS, together accounted for 87% of the non-production related waste for the Federal government.

Looking at the projections for individual agencies, NASA, on a percentage basis, is anticipating the greatest changes in the management of chemicals. For 1993 data, NASA reports that 23.9% of waste was recycled (on-site or off-site) versus 75.9% released. NASA projections for 1996 indicate a reversal, with 64.9% recycled (on-site or off-site) and 34.6% released. DOD and DOE also expect shifts from release and disposal to recycling, although not as dramatic as NASA.

Source Reduction at Federal Agencies

Tables 5-22 and 5-23 provide information on source reduction activities at the Federal agencies and their facilities, as reported on the 1994 TRI forms. On a percentage basis, the Department of Transportation presents the best record, with source reduction activities reported by 100% of facilities and on 100% of the TRI reports. DOD, with 56 facilities reporting source reduction on 212 forms, dominates the Federal facility picture based on the number of facilities and forms. DOE is second, with 14 facilities reporting source reduction on 17 forms.

The most frequently reported source reduction activity was good operating practices (89 times), followed by inventory control (68) and spill and leak prevention (57). These activities, while effectively reducing the use of the toxic chemicals, essentially improve efficiency through better handling of toxic chemicals. These activities, therefore, may not be as far-reaching as other categories of source reduction, like process modification or raw material modification.

If Federal facilities are to move up the pollution prevention hierarchy, there will have to be a greater reliance on source reduction activities. Federal facilities will find, as many private industry facilities discovered, that source reduction not only minimizes the risk to human health and the environment, but also can reduce cost and improve efficiency.

FUTURE EFFORTS

Much of the discussion in this chapter has focused on the levels of reported releases and transfers from Federal facilities. The private sector reported similarly high levels in the first years of TRI reporting. The private sector subsequently has achieved significant reductions in the reported releases and transfers. EPA fully expects to witness steady reductions by the Federal facilities in the next several years. Several of the Federal agencies already are taking aggressive action to reduce releases and transfers of toxic chemicals. These and other actions are being driven, not only by E.O. 12856, but by the recognition at Federal agencies and facilities that the Federal sector must be a leader and that environmental protection must be advanced by the Federal community.

Table 5-22. Number of Federal Facilities and Forms Reporting Source Reduction, by Federal Agency, 1994.

Federal Agency	TRI Facilities Number	Facilities Reporting Source Reduction Activities: Number	Facilities Reporting Source Reduction Activities: Percent of All Facilities in the Agency Percent	TRI Forms Number	Forms Reporting Source Reduction Activities: Number	Forms Reporting Source Reduction Activities: Percent of All Forms from the Agency Percent
Dept. of Defense	127	56	44.1	520	212	40.8
Dept. of Energy	23	14	60.9	85	17	20.0
Dept. of Agriculture	11	9	81.8	11	9	81.8
Tennessee Valley Authority	6	2	33.3	12	2	16.7
National Aeronautics and Space Admin.	6	4	66.7	16	10	62.5
Dept. of Treasury	6	1	16.7	11	1	9.1
Dept. of Justice	3	0	0.0	7	0	0.0
Dept. of Health and Human Services	2	1	50.0	6	1	16.7
Dept. of Transportation	2	2	100.0	3	3	100.0
Dept. of Interior	2	2	100.0	3	2	66.7
U.S. Enrichment Corporation	2	1	50.0	10	2	20.0
Environmental Protection Agency	1	0	0.0	2	0	0.0
Total	191	92	48.2	686	259	37.8

Table 5-23. Number of Times Source Reduction Activity Reported, by Category, by Federal Agency, 1994.

Federal Agency	Source Reduction Activity Category: Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
Dept. of Defense	77	59	40	44	24	45	44	16
Dept. of Energy	5	4	5	5	7	4	0	0
Dept. of Agriculture	0	0	9	0	0	0	0	0
Tennessee Valley Authority	1	0	0	0	1	0	0	0
National Aeronautics and Space Admin.	5	1	1	2	3	1	0	0
Dept. of Treasury	0	0	0	1	0	0	0	0
Dept. of Justice	0	0	0	0	0	0	0	0
Dept. of Health and Human Services	1	0	0	0	0	0	0	0
Dept. of Transportation	0	3	0	0	0	0	0	0
Dept. of Interior	0	0	1	0	1	0	0	0
U.S. Enrichment Corporation	0	1	1	0	2	0	0	0
Environmental Protection Agency	0	0	0	0	0	0	0	0
Total	89	68	57	52	38	50	44	16

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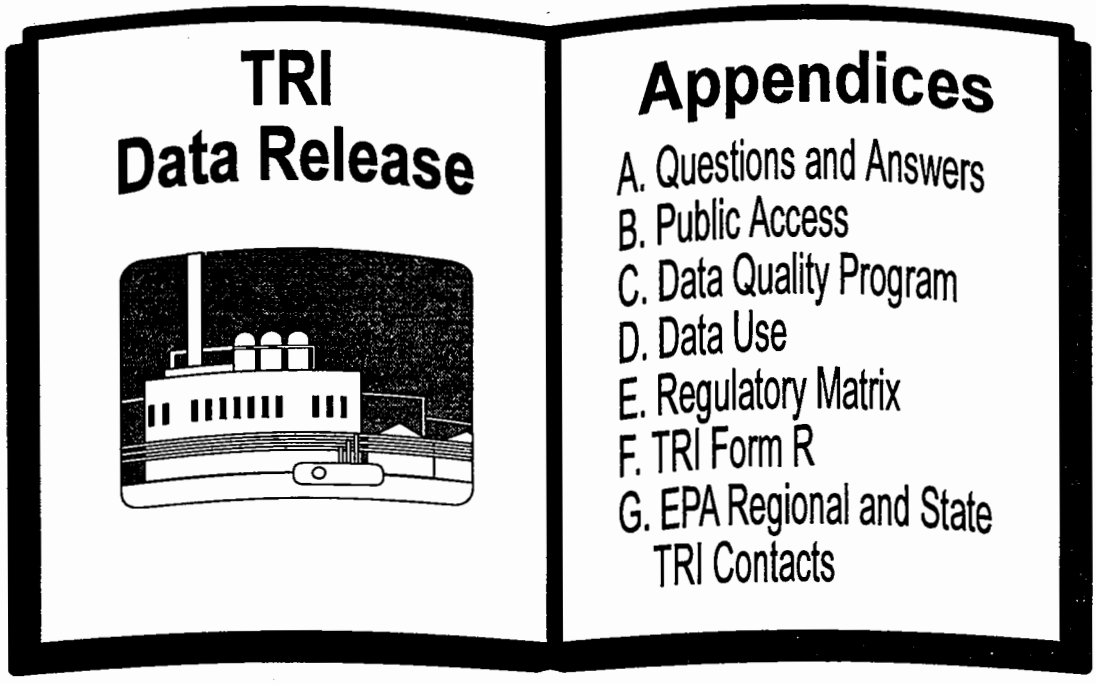
Appendices


TRI
Data Release
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A. Questions and Answers
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APPENDIX A

QUESTIONS AND ANSWERS

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For further information about any of these topics, contact the EPCRA Hotline at 1-800-535-0202.

I. INDUSTRY EXPANSION

Q1 Do all industrial facilities in the U.S. that meet reporting thresholds have to report to TRI?

A No. From 1987 to 1994, only manufacturing facilities classified in SIC codes 20–39 were required to report. Federal facilities were also required to report beginning with the 1994 reporting year. Many other industrial facilities that may be significant sources of toxic chemical releases do not have to report. The Office of Technology Assessment estimated that manufacturing accounts for only 5% of releases.

Q2 Does EPA plan to expand the reporting requirements to cover industries that are not currently required to report?

A Yes. EPA has the statutory authority to require additional facilities to report under EPCRA section 313 and is in the process of determining which industries are most appropriate for addition to TRI.

Q3 How is EPA identifying and selecting industries for possible addition to TRI?

A EPA is making its determination based upon such factors as indication of the management of TRI chemicals and the relationship between manufacturing activities and other facilities engaged in activities which support the manufacturing process. EPA is also considering such factors as whether the facilities conduct activities compatible with TRI reporting requirements and the burden imposed through these requirements. EPA has focused on those industries where reportable releases of TRI chemicals occur and which support manufacturing activities in some direct way.

Q4 What industries have been identified?

A EPA has examined a large number of industries that are part of sectors previously identified. The broad sectors identified as being closely related to manufacturing are energy production, materials extraction, materials distribution, and waste management. Several industries were identified within these sectors—electric utilities, mining, oil and gas exploration and production, commercial waste treatment, POTWs and landfills, materials recycling and recovery, airports, and some transportation and warehousing operations.

Q5 What has EPA done in this effort during the past year?

A As part of this examination, EPA has continued to refine its analysis regarding the management of toxic chemicals at facilities within the industries under consideration. EPA also held two major public meetings and heard the diverse viewpoints on the expansion issues from a wide range of stakeholders. EPA continues to solicit extensive public input. Once final determinations are made regarding the contents of the proposal and it is published in the *Federal Register*, a period of public comment will ensure extensive public input prior to any revisions.

Q6 What are the issues that will determine how TRI industry expansion is conducted?

A EPA must consider the costs to industry of complying with the regulatory burden associated with TRI reporting. Concern over "unfunded mandates" at the state and local level and small business impacts mean that EPA must take into account the burden that other levels of government as well as the regulated community will bear. Also, the current reporting structure of TRI, with its reporting definitions, thresholds, and exemptions, may inhibit valuable reporting from some facilities under consideration. EPA must take this structure into account as it considers the quality and quantity of reporting possible from the industries under consideration.

Q7 When does EPA expect to apply the reporting requirements to additional industries?

A EPA anticipates proposing new sectors for inclusion in TRI during 1996.

Q8 What impact does the Presidential Directive from August 8, 1995, have on this effort?

A This directive was issued in conjunction with Executive Order 12969. It instructs EPA to move forward with industry expansion and the consideration of incorporating materials accounting data into TRI. For industry expansion, this directive provides firm backing from the Administration for EPA's efforts on this issue, and calls on the Agency to expedite the proposed rulemaking.

II. THE FEDERAL FACILITIES EXECUTIVE ORDER

Q9 Are Federal facilities required to report under section 313 of EPCRA?

A On August 3, 1993, the President signed Executive Order 12856, "Federal Facility Compliance with Right-to-Know and Pollution Prevention Laws," requiring *government-owned and government-operated* Federal facilities (GOGOs) to comply with EPCRA. Therefore, as of reporting year 1994, all Federal facilities must file TRI reports under EPCRA section 313. Executive Order 12856 also commits all Federal agencies to reduce by 50% their toxic chemical releases and transfers for treatment and disposal by 1999. A Federal agency may go beyond the TRI list of toxic chemicals and set a voluntary reduction goal for other chemicals that are used at its facilities.

Prior to the 1994 reporting year GOGOs were not required to report by law, but some reported voluntarily. The Department of Energy voluntarily submitted reports for the 1993 reporting year to EPA and the states for 23 facilities. *Government-owned and contractor-operated* facilities (GOCOs), however, were already covered and reported under EPCRA section 313 prior to E.O. 12856.

Q10 Are all Federal agencies required to develop a pollution prevention strategy and pollution prevention plans?

A Each Federal agency that has one or more facilities meeting any of the EPCRA reporting requirements is responsible for the development of a written pollution prevention strategy. The strategies are available from the EPA Pollution Prevention Information Clearinghouse (PPIC) at (202) 260-1023 and from each individual agency. EPA has published "Meeting the Challenge: A Summary of Federal Agency Pollution Prevention Strategies" (EPA 300-R-95-014). This document is also available from the PPIC. Covered Federal facilities were also required to prepare pollution prevention plans by December 31, 1995. For a copy of a facility's plan, interested persons can contact the individual facility.

Q11 Which agencies have submitted pollution prevention strategies under Executive Order 12856?

A The following 16 Federal entities submitted pollution prevention strategies:

- Central Intelligence Agency
- Department of Agriculture
- Department of Defense
- Department of Energy
- Department of Health and Human Services
- Department of Interior
- Department of Justice
- Department of Transportation
- Department of the Treasury
- Department of Veterans Affairs
- Environmental Protection Agency
- General Services Administration
- National Aeronautics and Space Administration
- Smithsonian Institution
- Tennessee Valley Authority
- U.S. Enrichment Corporation
- U.S. Postal Service

The Department of Veterans Affairs, which does not currently have facilities covered under the Executive Order, has chosen to prepare a pollution prevention strategy. The U.S. Postal Service and the Smithsonian Institution, which are not legally covered under the Executive Order, have also submitted strategies.

Q12 Will EPA report to the public on the Federal agencies' progress toward meeting their voluntary 50% reduction goals?

A EPA must report annually to the President on the Federal agencies' progress toward reducing their releases and transfers of toxic chemicals. This information will be made available to the public in an annual progress report which can be obtained from the Pollution Prevention Information Clearinghouse at (202) 260-1023.

Q13 How many facilities are covered under this Executive Order? How many facilities were expected to report to TRI?

A The Executive Order directed each agency to identify which of their facilities might be covered by EPCRA. Covered facilities are defined in the Executive Order to include any Federal facility which meets one or more of the threshold requirements for reporting set forth in sections 302, 303, 304, 311, 312, and 313 of EPCRA. The agencies identified approximately 1,900 facilities that may be covered under EPCRA. A list of these facilities is available from the PPIC.

Out of the estimated 1,900 covered facilities, EPA estimated that around 400 Federal facilities would submit TRI reports. TRI is only one component of EPCRA, and therefore only one component of the Executive Order. The remaining Federal facilities were thought to meet other provisions of the directive, for example EPCRA's section 304, which deals with accidental releases of toxic chemicals and sections 311-312, which relates to emergency planning.

Q14 How many Federal facilities reported under EPCRA section 313 for reporting year 1994? What is the total number of chemical reports submitted to TRI from these facilities?

A For reporting year 1994, 191 Federal facilities submitted 686 chemical reports. The number of reporting facilities is approximately half the number which EPA originally expected. The difference is the result of several factors. A number of the Federal facilities did not meet the reporting thresholds. Other facilities took advantage of reporting exemptions, such as the motor vehicle maintenance exemption and the personal use exemption.

Q15 Are Federal facilities located in foreign countries required to comply with this Executive Order?

A This Executive Order does not apply to Federal facilities outside the customs territory of the United States, such as U.S. diplomatic and consular missions abroad.

III. FEDERAL ACQUISITION AND COMMUNITY RIGHT-TO-KNOW EXECUTIVE ORDER

Q16 What is Executive Order 12969 and how does it affect Federal contractors?

A On August 8, 1995, the President signed Executive Order 12969, "Federal Acquisition and Community Right-To-Know" (60 FR 40989; August 10, 1995), mandating that, to the extent practicable, each Federal agency shall contract only with those companies that have committed to continue reporting their releases of toxic chemicals under EPCRA section 313 and PPA section 6607. To achieve this goal, E.O. 12969 requires prospective contractors to include in their bids a certification that, if

awarded the contract, they will continue to report as required under EPCRA section 313, unless an exemption provided by the Executive Order applies. The E.O. applies to all competitive contracts expected to exceed $100,000. This certification requirement also is required of first-tier subcontractors.

Q17 Does this mean that Federal contractors currently not required to report under section 313 of EPCRA must now report if they want to be awarded a government contract?

A No. E.O. 12969 does not extend the EPCRA section 313 reporting requirements to facilities which are not currently subject to them. E.O. 12969 only mandates that contractors already required to report under section 313 of EPCRA certify that they will continue to do so for the life of the contract, or face termination of their government contracts. Federal contractors not required to report may simply indicate in their proposals that they are not subject to the EPCRA section 313 reporting requirements.

Q18 Where can I get more information about the provisions of E.O. 12969?

A On September 29, 1995, EPA published guidance for implementing E.O. 12969 in the *Federal Register* (60 FR 50738). This guidance provides a section-by-section analysis of the Executive Order. Also, on October 30, 1995 an interim final rule amending the Federal Acquisition Regulations (FAR) was published (60 FR 55306). This interim final rule, which took effect immediately, provided detailed instructions for contracting officers to comply with E.O. 12969. The FAR Council currently is working to promulgate a final rule. For additional information, you can call the EPCRA Hotline at (800) 535-0202.

IV. POLLUTION PREVENTION

Q19 November 1992 is the expiration date listed on Form R. Is the Form R valid for reporting year 1995?

A The Form R was revised in May 1992 to include the Pollution Prevention Act requirements. November 1992 was the expiration date given by the Office of Management and Budget (OMB) when it approved the Form on May 19, 1992. However, the Pollution Prevention Act Implementation Provisions of the 1993 Appropriations Act allows the Agency to continue to use this Form R until regulations are promulgated. Therefore, this Form R is still valid and should be used for all submissions until changes are made to the form.

Q20 Why don't the totals reported for "Source Reduction and Recycling Activities" in Section 8 of the Form R equal the quantities reported for "Transfers of the Toxic Chemical in Wastes to Off-Site Locations" in Section 6 of Form R? Do these represent different quantities? Why are the data reported in two places on the Form R?

A The quantities reported in Sections 6 and 8 may be different if the facility has reported accidental or one-time releases not related to production. Quantities reported in Section 8.1 through 8.7 do not include such quantities, while quantities reported in Section 6 do. If the facility has not reported any non-production related releases, the quantities reported in Section 8 and Section 6 should be the same.

Differences in the data are also due to different interpretations made by reporting facilities when completing Sections 6 and 8. EPA is building on the experience gained from the 1991 through 1994 reports to develop final guidance for reporting facilities.

Q21 How does the quantity released, reported in Section 8 of the Form R, Source Reduction and Recycling Activities, differ from the quantities reported in the Section 5, Releases of the Toxic Chemical to the Environment On-Site?

A The quantity reported as released in Section 8.1 can differ from the total of the releases reported in Section 5 in two basic ways. First, the quantity reported in Section 8 *includes* quantities sent off-site for disposal. This quantity *is not* reported in Section 5 but *is* reported in Section 6. Second, the quantity reported in Sections 8.1–8.7 *should not* include any quantities released to the environment because of catastrophic, remedial, or one-time events that are non-routine (not associated with production operations). Such quantities *would* be included as part of the total releases reported in Section 5 and Section 8.8.

Q22 Why are the off-site energy recovery, recycling, and treatment data characterized differently from these same activities on-site?

A The difference in how the data are characterized is based on the level of knowledge the facility has. For example, a facility is able to estimate the amount of the toxic chemical recovered by on-site recycling processes because this activity is under its control. The facility is not likely to know the amount recovered through a similar activity occurring off-site because it is not under its control. What the facility should know, however, is the quantity of the chemical sent off-site for the purpose of recycling. This same difference in knowledge applies to on-site and off-site energy recovery and treatment. The facility can estimate amounts combusted for energy and destroyed through their treatment processes, but they may only know the amounts sent off-site for the purpose of energy recovery and treatment.

Q23 Why are the individual quantities reported in Section 8, Source Reduction and Recycling Activities, mutually exclusive?

A These quantities are designed to add up to the total amount of the TRI chemical in waste streams (exclusive of catastrophic, remedial, or one-time non-production related releases). To accomplish this, the individual quantities undergoing each type of waste management activity must be mutually exclusive because any double or multiple counting of an amount of the reported TRI chemical in waste streams will inflate the actual total. By avoiding multiple counting, a more accurate picture of how the toxic chemical in waste streams is managed within the waste management hierarchy can be obtained.

Q24 Why are catastrophic releases reported separately?

A The catastrophic releases are reported separately because they cannot be predicted and generally are not amenable to source reduction efforts.

Q25 Why are the recycling numbers so large?

A The recycling numbers are very large in comparison with the amounts reported as being released to the environment because the nature of recycling is to recover the chemical for further use. Unlike the quantities released, which leave the process, the amounts recycled return to the process again and again.

Q26 How will EPA and others use the "future years" reported estimates? What if actual estimates differ from the projected estimates?

A EPA will use the future estimates data as indicators of possible future trends in waste management. The future year estimates are projections and do not represent a commitment or a quantity that the facility must meet under penalty of enforcement. In addition, this data is useful to city planners in identifying future pollution loads and opportunities for new businesses.

Q27 What is the production index?

A The production index is a ratio of production during the reporting year and production during the prior year. It is intended to allow data users to assess the impact of business changes on changes in total waste generated.

Q28 How is a chemical that is treated on-site and then disposed of reported in Section 8 of the Form R?

A The amount of a chemical destroyed in on-site treatment is the quantity reported as treated on-site. Any amount not destroyed (the balance) is reported as the quantity "released" (including transferred off-site for disposal).

Q29 Does EPA plan to review the quality of the data reported in Section 8 of the Form R?

A EPA has instituted a computerized review of the data, primarily to check potential data discrepancies between Section 8 and Sections 5 and 6 of the form.

Q30 What is the difference between energy recovery and incineration?

A Both incineration and energy recovery involve combustion of a toxic chemical in a waste. However, they have different purposes. Energy recovery is combustion of toxic waste occurring in a boiler, kiln, or industrial furnace in which the heat from the combustion is used to generate steam or to heat other materials in a manufacturing process. Incineration is the combustion of toxic waste in order to destroy the toxic chemical by converting it into one or more other chemicals.

Q31 Over 1 million pounds of various metals and metal compounds have been reported as transferred to energy recovery. Can metal compounds be used for energy recovery?

A No. These reports were made in error. They may represent metal compounds in waste solvents that were sent to an energy recovery unit. EPA's instructions cite metals as an example of the type of chemicals that should not be reported as undergoing energy recovery because they do not contribute to the heating value of the waste stream.

Q32 A large quantity of toluene was reported as burned off-site for energy recovery in 1994. Does any of the toluene get released to the environment as a result of this?

A Energy recovery processes are not 100% efficient. Therefore, some small amount of the toluene is likely to be released, either as uncombusted material or as fugitive releases from the handling of the toluene-containing material prior to combustion.

Q33 How are the data elements in Section 8 of Form R different from those stated in the Pollution Prevention Act?

A Facilities do not report the "quantity entering any waste stream prior to recycling, treatment, or disposal" as stated in the PPA. This number is derived by EPA by adding up the individual quantities that were reported as released, used for energy recovery, treated, and

recycled. This total number is available in the public database for each chemical reported by a facility. Energy recovery, which is not discussed in the PPA, has aspects of both recycling and waste treatment and is reported separately from the quantities reported as treated or recycled. Instead of reporting the percent changes of quantities reported in Sections 8.1–8.7 from the prior year and for the next two years, the Form R collects the actual prior year quantity and the estimated two future years' quantities in pounds per year. Quantities treated, recycled, or undergoing energy recovery are reported separately by whether they occur on-site or off-site.

Q34 What is the Office of Pollution Prevention and Toxics (OPPT) doing to reduce environmental releases reportable under EPCRA section 313?

A OPPT is using TRI data to help target activities, chemicals, facilities, and industry categories that are of high concern. The Pollution Prevention Policy Council's initiative, "Source Reduction Review Project," is one example where the TRI data were used as a screening tool to identify a group of industrial categories as long-term targets of opportunity. As a part of this project, OPPT is working with other program offices to incorporate prevention into their programs through regulation, where feasible, and through guidance and voluntary efforts. OPPT is also working with industry (usually through trade associations) to raise awareness of the benefits of pollution prevention. OPPT also conducts training programs that help orient government and industry toward pollution prevention and to incorporate prevention into their regular activities. A state grants program is available to help states develop pollution prevention programs. OPPT and the Office of Research and Development have developed a clearinghouse, the Pollution Prevention Information Clearinghouse (PPIC), that provides information on pollution prevention for industry, government, and public interest groups to use in encouraging and implementing prevention.

Q35 The quantity of certain chemicals released (at a particular facility or nationwide) is decreasing. What does this mean?

A Currently, Form R does not allow for facility- and-chemical specific quantification of source reduction. Also, the TRI database does not include specific explanations of the reasons for changes in quantities reported by facilities. The new TRI data required under the PPA can give some indication of whether changes are due to shifting of chemicals off-site for energy recovery, treatment, or recycling; decrease in economic activity or production levels; or source reduction. Many other factors, however, may also cause changes in reported release quantities, for example, substitution of one chemical for another, changes in accounting or estimation techniques, changes in the design of a product, or regulatory requirements. A study completed by OPPT examined how some of the above factors contributed to changes in releases and transfers between 1989 and 1990. The study found that although source reduction was a significant factor in explaining some of the changes, fluctuations in production were more frequently cited for individual facilities' increases and decreases. This is an important consideration because measuring progress in source reduction must also take into account production changes.

Source reduction is too complex to be captured by only one measure. These data collected on Form R will help EPA better evaluate release trends and will also be critical in developing a comprehensive understanding of the effects of pollution prevention activities. The data provide EPA with a more comprehensive view of waste management practices. They shift the focus from releases to movement up the waste management hierarchy.

V. MATERIALS ACCOUNTING

Q36 What is materials accounting?

A Materials accounting is a tool that tracks the use and flow of chemicals through manufacturing processes. Data elements that may be considered part of a materials accounting program could include: quantity of chemical brought on-site, quantity of chemical produced on-site, quantity of chemical consumed in the manufacturing process, quantity of chemical contained in product, quantity of chemical contained in waste.

Q37 Why is EPA interested in expanding TRI to collect materials accounting information under EPCRA?

A Communities and public interest groups have indicated to EPA that there are gaps in existing Right-to-Know information and that materials accounting information would be useful, not only to them, but to the government and industry itself. These groups believe that materials accounting data, in the hands of the public, would provide information that would aid in studies on a variety of issues including, but not limited to, trend information on chemical use patterns, the quantity of toxics in products, worker health and safety issues, and promoting and tracking pollution prevention activities.

Q38 What are the concerns voiced about the collection of materials accounting information under EPCRA?

A The most common concerns about the collection of materials accounting information voiced to EPA include the potential loss of confidential business information to competitors, whether EPA has the legislative authority to collect this type of information, and the public's ability to interpret and use this type of information. The basic need for the collection and public dissemination of chemical use information has been questioned by some stakeholders. Some people believe that the collection of materials accounting data would cause duplicative reporting because some industrial facilities may already be required to report this or similar information under other environmental statutes. Industry spokespersons are also concerned that a materials accounting program would impose an excessive reporting burden to industry.

Q39 Does EPA plan to expand the reporting requirements to include the collection of materials accounting information? Does EPA expect to come out with a proposed rule for the implementation of a materials accounting program?

A EPA is committed to strengthening the public's Right-to-Know. EPA is presently examining the issues related to the collection and dissemination of materials accounting information to determine if there are data gaps

that could be filled by expansion of TRI. Two public meetings have been held on this topic, in September 1994 and in October 1995. After reviewing the comments from these meetings, EPA has developed steps for further analyses. For example, EPA will evaluate the two state programs (New Jersey and Massachusetts) that already collect materials accounting information; existing, internal EPA databases for overlap of relevant materials accounting information; the potential to collect occupational health and safety information; and concerns about potential loss of confidential business information as a result of reporting.

EPA is still examining the issues surrounding a materials accounting program. As the benefits and concerns are studied and assessed, EPA will report back to the public with its plans on this issue.

VI. ALTERNATE THRESHOLD RULE

Q40 What is the Alternate Threshold Rule?

A EPA finalized a reporting modification that was effective January 1, 1995. In the final rule, 59 FR 61488, entitled "TRI Alternate Threshold for Facilities with Low Annual Reportable Amounts," EPA established a reporting option for facilities that meet TRI reporting thresholds for a listed chemical, but whose total annual reportable amount (defined below) does not exceed 500 pounds for that chemical.

For facilities that do not exceed the 500-pound criterion for a listed chemical, this reporting modification provides the option of applying an "alternate manufacture, process or otherwise use threshold" of 1 million pounds to the chemical. If a facility does not exceed the 1 million pound (alternate) threshold, then that facility is eligible to submit a "certification statement" in place of a full Form R.

A facility that fits within the category description, and manufactures, processes, or otherwise uses no more than 1 million pounds of a listed toxic chemical annually, and whose owner/operator elects to take advantage of the alternate threshold is not considered a TRI covered facility for that chemical for the purpose of submitting a Form R. This determination may provide further regulatory relief from other Federal or state regulations that apply to facilities on the basis of their TRI reporting status. A facility will need to refer to other applicable regulations in order to determine if other requirements are affected by this reporting modification.

Q41 What is included in the total annual reportable amount?

A For the purpose of this reporting modification, the annual reportable amount is equal to the combined total quantities managed on a per-chemical basis, which are disposed of within the facility, treated at the facility (as represented by amounts destroyed or converted by waste treatment processes), recovered at the facility as a result of recycling operations, combusted for the purpose of energy recovery at the facility, and amounts transferred from the facility to off-site locations for the purpose of recycling, energy recovery, treatment, and/or disposal. These volumes correspond to the sum of amounts reportable for data elements on EPA Form R (EPA Form 9350-1; Rev. 12/4/93) as Part II column B of Section 8, data elements

8.1. Quantity Released; 8.2. Quantity Used for Energy Recovery On-site; 8.3. Quantity Used for Energy Recovery Off-site; 8.4. Quantity Recycled On-site; 8.5. Quantity Recycled Off-site; 8.6. Quantity Treated On-site; and 8.7. Quantity Treated Off-site.

Q42 Why did EPA establish the Alternate Threshold reporting option?

A This rulemaking was undertaken in response to two petitions that requested EPA to provide some regulatory relief for a subset of facilities covered under EPCRA section 313. The certification statement provided by this rulemaking creates a simplified form of reporting which is intended to reduce the compliance burden associated with EPCRA section 313 reporting without significantly reducing the amount of release data available to the public. EPA estimates approximately 20,100 Form Rs can be replaced by certification statements based on 1992 reporting trends.

Q43 How much money is this expected to save?

A EPA estimates that this modification will save industry and EPA an annual total of $17.3 million and $700,000, respectively.

Q44 What information will be collected on the certification statement and how will that information be made available to the public?

A The certification statement must be submitted on an annual basis for each eligible chemical. The information submitted on the certification statement includes facility identification information and the chemical or chemical category identity. The information submitted on the certification statement will appear in the TRI database in the same manner that information submitted on Form R appears, excluding the release, transfer, and other waste management quantities. An approved certification statement, including a magnetic media version, was made available in the 1995 TRI Form R and Instructions package.

Q45 Aren't there some chemicals for which 500 pounds of releases could be a potentially serious environmental or health problem? Why is the 500-pound cut-off the same for all chemicals, regardless of their toxicity?

A When EPA began evaluating approaches to a reporting modification that would provide regulatory burden reduction, it considered making a distinction among the listed chemicals. EPA recognizes that there are differences in toxicities among the chemicals listed under EPCRA section 313. However, EPA determined that in order to effectively accomplish burden reduction, it was also necessary that the mechanism which provides the burden reduction not be unduly complicated. Therefore, in order to ensure that reporting modifications not jeopardize the public's Right-to-Know, a quantity for the "annual reportable amount" was selected that would be acceptable for application to the complete list of chemicals.

EPA believes the level of 500 pounds selected for this reporting modification, coupled with the information collected by the certification statement, will not appreciably lessen the value of currently collected information. EPA is planning a future modification of current thresholds to more fully capture information on chemicals that persist in the environment and bioaccumulate.

Q46 What kind of recordkeeping is required of facilities that submit certification statements?

A Owners and operators who determine that they are eligible and wish to apply the alternate threshold to a particular chemical must retain records substantiating this determination for a period of three years from the date of the submission of the certification statement. These records must include the calculations made by the facility that confirm its eligibility for each chemical for which the alternate threshold was applied as well as sufficient documentation to support these calculations.

VII. TRI LIST OF CHEMICALS

Q47 How was the list of chemicals subject to TRI reporting created?

A A list of chemicals subject to TRI reporting was given to EPA by Congress in EPCRA. The statutory list was derived from separate lists from the states of New Jersey and Maryland. The criteria for chemicals on the Maryland and New Jersey lists differ from the criteria established under EPCRA section 313. For instance, the Maryland list is a survey list and consists of chemicals that are noted for toxicity and/or high-volume activities in that state. As a result of these differences in listing criteria, a number of chemicals have been added to the TRI list that were not on the original state lists. Also, a number of chemicals have been deleted from the original TRI list of toxic chemicals because EPA determined that they did not meet any of the criteria for listing.

Under EPCRA section 313, anyone can petition EPA to add a chemical(s) to, or delete a chemical(s) from, the list of chemicals.

EPA has developed criteria and is currently refining the process for reviewing the TRI list of chemicals. The result of this exercise will allow EPA to more effectively add chemicals to and delete chemicals from the list. This will result in reporting on chemicals that meet the intent of section 313.

Q48 What are the criteria for listing a chemical under section 313 of EPCRA?

A For a chemical or chemical category to remain on or be added to the TRI list, it must be known to cause or reasonably be anticipated to cause one of the following:

- Significant adverse acute health effects at concentration levels that are reasonably likely to exist beyond facility boundaries as a result of continuous, or frequently recurring, releases;
- In humans—cancer; teratogenic effects; or serious or irreversible reproductive dysfunction, neurological disorders, heritable genetic mutations, or other chronic health effects;
- A significant adverse effect on the environment because of its toxicity, its toxicity and persistence in the environment, or its toxicity and tendency to bioaccumulate in the environment of sufficient seriousness to warrant reporting under EPCRA section 313.

Q49 What chemicals have been added to the TRI list?

A EPA added to the list nine chemicals that were subject to reporting for the 1990 reporting year. These chemicals were added to the list for

cancer or other chronic toxicity concerns. These chemicals are:

Allyl alcohol
Creosote
2,3-Dichloropropene
m-Dinitrobenzene
o-Dinitrobenzene
p-Dinitrobenzene
Dinitrotoluene (mixed isomers)
Isosafrole
Toluene diisocyanate (mixed isomers)

As a result of a petition submitted by three governors and the Natural Resources Defense Council, EPA also added to the list seven chlorofluorocarbons (CFCs) and halons that were subject to reporting beginning with the 1991 reporting year. These chemicals were added because they are stratospheric ozone depleters. Depletion of stratospheric ozone can lead to adverse human health and environmental effects. These chemicals are:

Bromochlorodifluoromethane (Halon 1211)
Bromotrifluoromethane (Halon 1301)
Dibromotetrafluoroethane (Halon 2402)
Dichlorodifluoromethane (CFC-12)
Dichlorotetrafluoroethane (CFC-114)
Monochloropentafluoroethane (CFC-115)
Trichlorofluoromethane (CFC-11)

In response to another petition, 11 hydrochlorofluorocarbons (HCFCs) were also added, subject to reporting beginning with the 1994 reporting year (reports due by July 1, 1995). These chemicals were added because they are listed as Class II ozone-depleting substances in section 602(b) of the Clean Air Act. These chemicals are:

Chlorodifluoromethane (HCFC-22)
Dichlorotrifluoroethane (HCFC-123) and isomers
Chlorotetrafluoroethane (HCFC-124) and isomers
1,1-Dichloro-1-fluoroethane (HCFC-141b) and isomers
1-Chloro-1,1-difluoroethane (HCFC-142b)

An additional 21 chemicals and two chemical categories that appear on the Resource Conservation and Recovery Act (RCRA) list of hazardous wastes were added to the TRI list. Reporting for these chemicals was required beginning with the 1994 reporting year (reports due by July 1, 1995). These chemicals are:

Acetophenone
Amitrole
Bis(2-chloroethoxy)methane
1,4-Dichloro-2-butene
Dihydrosafrole
Ethylene bisdithiocarbamic acid, salts and esters
Ethylidene dichloride
Formic acid
Hexachlorophene
Hydrogen sulfide*
Malononitrile
Methacrylonitrile
Methyl chlorocarbonate
Methyl mercaptan*
2-Methylpyridine
5-Nitro-o-toluidine
Paraldehyde
Pentachloroethane
Pronamide
1,1,1,2-Tetrachloroethane
Thiram
Trypan blue
Warfarin and salts

On November 30, 1994, EPA issued a final rule adding 286 chemicals to the TRI list, including about 160 pesticides. Many of these chemicals have been identified as of concern under sections 112(b) and 602(b) of the Clean Air Act, section 307(a) of the Clean Water Act, section 1412 of the Safe Drinking Water Act, and under

* Reporting for these chemicals has been suspended.

the Federal Insecticide, Fungicide, and Rodenticide Act.

Q50 How were the chemicals added in November 1994 selected?

A EPA began with a pool of 1,031 chemicals regulated or identified as of concern under various environmental statutes. In addition, EPA considered chemicals designated as possible, probable, or known carcinogens in the Monographs of the International Agency for Research on Cancer (IARC) and the 6th annual Report on Carcinogens of the National Toxicology Program (NTP), U.S. Department of Health and Human Services.

This list was narrowed by excluding those chemicals already on TRI or proposed for addition in response to a petition. The remaining chemicals underwent a toxicity screen using numerical criteria guidelines and a production volume screen. This narrowed the list of candidates to approximately 400 chemicals.

The remaining candidates underwent a rigorous hazard assessment, including a detailed review of the toxicity of each to determine whether the chemical meets the statutory criteria for listing.

Q51 How many of the chemicals proposed to be added by EPA were not added because they did not meet the criteria for listing?

A EPA determined that three of the proposed chemicals did not meet the statutory criteria for listing and so they were not added. These three chemicals are:

Clomazone
5-Chloro-2-(2,4-dichlorophenoxy)phenol
Tetrasodium ethylenediaminetetraacetate

Q52 Why did EPA defer the addition of 40 chemicals and one chemical category?

A EPA decided to defer action on 40 chemicals and one chemical category because more time was needed to address technical and policy issues that were raised about these chemicals. EPA did not wish to delay action on the addition of 286 chemicals that met the listing criteria, so the public comments on the deferred chemicals will be addressed in a future rulemaking.

Q53 If EPA proposed 313 chemicals and deferred or dropped 44, how is it that 286 chemicals were finalized?

A The discrepancy arises from the addition of the diisocyanates category. The 313 chemicals in the proposed rule included three individual diisocyanates. As an alternative, EPA proposed adding the three diisocyanates and 17 other diisocyanates as a delimited category, but the additional 17 diisocyanates were not counted in the 313 proposed chemicals. EPA finalized the alternative proposal, and the 17 additional diisocyanates were counted among the 286 chemicals finalized.

Q54 I understand that EPA's November 30, 1994, rulemaking that added 286 chemicals and chemical categories to the TRI chemical list was challenged in court. Who challenged the rule, and has the case been settled?

A Four organizations (Chemical Manufacturers Association, National Oilseed Processors Association, Troy Corporation, and NMP Producers Group) challenged several aspects of the November 30, 1994, rulemaking. Combined, these suits challenged the listing of the following chemicals and chemical categories: hexane; 3-iodo-2-propynyl butyl carbamate; 2,6-dimethylphenol; bronopol; polychlorinated alkanes; methyltrichlorosilane; dimethyldichlorosilane; trimethylchlorosilane;

isophorone diisocyanate; 2,2,4-trimethylhexamethylene diisocyanate; 2,4,4-trimethylhexamethylene diisocyanate; and *N*-methyl-2-pyrrolidone. CMA's suit also challenged EPA's decision to not consider exposure for the 152 moderately high to highly toxic chemicals that were added in this rulemaking based on sufficient evidence of adverse chronic health effects.

On April 30, 1996, Judge Gladys Kessler of the United States District Court for the District of Columbia ruled in EPA's favor with respect to all claims. Therefore, all of the challenged chemicals are reportable beginning with the 1995 reporting year, except for the three chlorosilanes (methyltrichlorosilane, dimethyldichlorosilane, trimethylchlorosilane). EPA voluntarily remanded these chlorosilanes; therefore, they are not reportable for the 1995 reporting year.

Q55 Where can lists of the added and deferred chemicals be obtained?

A The lists are in the final rule which was published in the *Federal Register* on November 30, 1994 (59 FR 61432). Copies may be obtained by contacting the EPCRA Hotline (1-800-535-0202).

Q56 How many additional reports will be submitted due to the addition of 286 chemicals?

A The first reports for these chemicals will be required for reporting year 1995 and will be submitted by August 1, 1996. EPA estimates that about 10,500 additional reports and 3,500 certification statements will be submitted, assuming facilities use the alternate threshold reporting option, which is also effective for the 1995 reporting year and beyond. The alternate threshold reporting option is further discussed in Section VI of this Appendix.

Q57 What chemicals have been deleted from the TRI list or had their listings modified?

A The following individually listed chemicals have been deleted from the TRI list:

- Acetone
- Ammonium sulfate (solution)*
- Butyl benzyl phthalate
- Color Index (C.I.) Acid Blue 9 diammonium salt
- C.I. Acid Blue 9 disodium salt
- Di-n-octyl phthalate (n-dioctyl phthalate)
- Melamine
- Sodium hydroxide (solution)
- Sodium sulfate (solution)
- Terephthalic acid
- Titanium dioxide

The following chemicals have been deleted from the categories indicated:

- Barium sulfate (barium compounds category)
- Copper phthalocyanine compounds substituted with only bromine, chlorine, and/or hydrogen (copper compounds category)
- High molecular weight glycol ethers were deleted from the glycol ethers category by redefining the category to exclude such chemicals.

The following chemicals have had their listings modified; they now include the modifier shown in parenthesis:

- Aluminum oxide (fibrous forms)
- Ammonia (includes anhydrous ammonia and aqueous ammonia from water, dissociable ammonium salts, and other sources; 10% of total aqueous ammonia is reportable under this listing)
- Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

*The aqueous ammonia from ammonium sulfate solutions is still reportable under the ammonia listing.

Q58 Has EPA taken any other actions on listed chemicals?

A On August 22, 1994, EPA issued an administrative stay for hydrogen sulfide and methyl mercaptan and on October 27, 1995, EPA issued an administrative stay for 2,2-dibromo-3-nitrilopropionamide (DBNPA). Until these stays are lifted, hydrogen sulfide, methyl mercaptan, and DBNPA are not reportable under EPCRA section 313.

Q59 What is the status of EPCRA section 313 petitions to date?

A EPA has responded to and is currently working on many petitions to modify the EPCRA section 313 list of toxic chemicals. The following is a summary of section 313 petition activity to date.

EPCRA Section 313 Petitions

Chemical	Action Requested	Status
Acetone	Delist	Granted
Aluminum oxide (non-fibrous)	Delist	Granted
Alloys	Delist	Denied (1)
Ammonium sulfate (solution) (2)	Delist	Partially Granted
Antimony tris(iso-octyl-mercaptoacetate)	Delist	Denied
Barium sulfate	Delist	Granted
Butyl benzyl phthalate	Delist	Granted
Cadmium selenide	Delist	Denied
Cadmium sulfide	Delist	Denied
CFC-11 (3)	List	Granted
CFC-114	List	Granted
CFC-115	List	Granted
CFC-12	List	Granted
Chromium (III) compounds	Delist	Denied
C.I. Acid Blue 9 disodium and diammonium salts (4)	Delist	Granted
C.I. Pigment Blue 15	Delist	Granted
C.I. Pigment Green 36	Delist	Granted
C.I. Pigment Green 7	Delist	Granted
Cobalt and compounds	Delist	Denied
Copper metal	Modify	Pending
Copper mono-chlorophthalocyanine (5)	Delist	Granted
Cyclohexane	Delist	Denied
Chromium antimony titanium buff rutile	Delist	Denied
Decabromodiphenyl ether	Delist	Denied
2,2-Dibromo-3-nitrilopropionamide	Delist	Comment Requested
Di-n-Octyl phthalate	Delist	Granted
Di(2-ethylhexyl)adipate	Delist	Proposed
Di(2-ethylhexyl)phthalate	Delist	Pending
Diethyl phthalate	Delist	Proposed
Disodium and monosodium methane arsenate	Delist	Denied
Ethylene	Delist	Denied
Ethylene glycol	Delist	Pending
Glycol ethers	Modify	Granted
Halon 1211	List	Granted
Halon 1301	List	Granted
Halon 2402	List	Granted
Hydrochlorofluorocarbons (6)	List	Partially Granted

Hydrochloric acid	Modify	Proposed
Inorganic fluorides	List	Denied
Iron chromite	Delist	Withdrawn
Manganese and compounds	Delist	Denied
Manganese and compounds in slags	Delist	Denied
Melamine	Delist	Granted
Methyl ethyl ketone	Delist	Withdrawn
Methyl isobutyl ketone	Delist	Withdrawn
Molybdenum trioxide	Delist	Withdrawn
Nickel and compounds	Delist	Denied
ortho-Phenylphenol	Delist	Denied
Phosphoric acid	Delist	Withdrawn
Phosphoric acid	Delist	Pending
Phthalic anhydride	Delist	Withdrawn
Polymeric diphenylmethane diisocyanate	Delist	Pending
Propylene	Delist	Denied
Sodium hydroxide (solution)	Delist	Granted
Sodium sulfate (solution)	Delist	Granted
Sulfuric acid	Delist	Denied
Sulfuric acid	Modify	Granted
Terephthalic acid	Delist	Granted
Titanium dioxide	Delist	Granted
Trifluralin	Delist	Withdrawn
Zinc borate hydrate	Delist	Denied
Zinc sulfide	Delist	Denied
82 RCRA Chemicals (6)	List	Partially Granted

(1) EPA is reviewing whether certain constituent metals of alloys should be reportable.
(2) The ammonium sulfate (solution) deletion will not result in a loss of reporting, but rather in more focused reporting since the aqueous ammonia from ammonium sulfate solutions is still reportable under the modified ammonia listing.
(3) CFC = Chlorofluorocarbon
(4) C.I. = Color Index
(5) Finalized as copper phthalocyanine compounds substituted only with bromine, chlorine, and/or hydrogen.
(6) Refer to Question 59 for a complete list of the HCFCs and RCRA chemicals that were added to the list.

VIII. AIR EMISSIONS

Q60 What are the air quality impacts and toxicity concerns for the TRI chemicals with the largest air releases?

A The 15 chemicals with the largest releases to the air account for 79% of all air releases.

A number of TRI chemicals (e.g. methanol, toluene, xylenes, styrene) are volatile organic compounds (VOCs) that participate in atmospheric photochemical reactions that contribute to the secondary formation of tropospheric (ground-level) ozone, commonly referred to as smog. Ground-level ozone is a respiratory tract irritant that reacts rapidly with the tissues and fluids lining the airways of the lungs. Ozone is known to exacerbate pre-existing respiratory conditions such as asthma.

Additionally, a number of the chemicals reported to TRI that pose direct health effects are regulated under the Clean Air Act Amendments as Hazardous Air Pollutants (HAPs). The

possible health effects are classified into several categories:

Carcinogenic: Chemicals that have a probability of resulting in cancer.

Reproductive: Chemicals that have a probability of causing adverse effects on the reproductive system.

Developmental: Chemicals that have a probability of causing detrimental effects during the embryonic stages of development.

Neurotoxicity: Chemicals that have a probability of causing adverse effects on the nervous system.

Q61 What regulatory authority does the Agency have to reduce toxic air emissions?

A Title I of the Clean Air Act Amendments (CAAA) covers emission reduction for volatile organic compounds (VOCs) to meet ambient air quality standards for ozone. These programs are controlled to some extent by state and/or local governments. A number of TRI chemicals are regulated under Title I as VOCs that participate in atmospheric photochemical reactions to produce ozone, a regulated ambient air pollutant.

Title III of the CAAA is the primary regulatory tool by which EPA controls emissions of air toxics. Title III (specifically section 112) lists 189 Hazardous Air Pollutants (HAPs), almost all of which are part of the TRI list. Twelve of the top 15 TRI chemicals with the largest air emissions are also HAPs.

Title III, section 112(b) of the CAAA, lists hazardous air pollutants (HAPs) that EPA is required to regulate by categories of HAPs sources. In accordance with section 112, EPA published the final list of categories of sources to be regulated on July 16, 1992 (57 F.R. 31576). Under section 112(d), EPA must issue regulations requiring listed categories of sources emitting HAPs to utilize control technologies to reduce their air emissions, for example, the maximum achievable control technology (MACT). After the application of the maximum achievable control technology (MACT) standards, section 112(f) states that EPA may issue additional standards, if necessary, within eight years to further protect the public.

One of the first standards to be promulgated under Title III was the Hazardous Organic National Emissions Standards for Hazardous Air Pollutants, or the HON Rule, October 1992. The HON Rule had far-reaching effects because it required reductions of 110 of the 189 hazardous air pollutants. The HON/MACT standard affected many sources of toxic emissions, such as process vents, equipment leaks, and storage tanks at chemical manufacturing plants. The requirement resulted in substantial reductions in emissions from the affected facilities.

Title III, Section 112(r) of the CAAA, requires EPA to develop risk management planning (RMP) regulations to help prevent accidental releases of at least 100 substances. In January 1994, EPA promulgated a final list consisting of 140 toxic and flammable substances, as well as Division 1.1 explosives, which will be subject to the requirements in the RMP rulemaking. Facilities producing, handling, or storing threshold quantities of listed substances, including chlorine and ammonia, will be required to undertake a risk management program and develop risk management plans available to the public. The program must include a hazard assessment, prevention program, and emergency response program.

In addition to the other air pollutant regulations, section 604 of Title VI mandates restrictions of ozone-depleting chemicals. On December 10, 1993, EPA published a final rule (58 FR 65018) that phases out the production of ozone-depleting chemicals, including Freon 113, dichlorodifluoromethane (CFC-12), and 1,1,1-trichloroethane (methyl chloroform), by

January 1, 1996, due to their ozone-depleting potential. The effective date of this rule was January 1, 1994. (See question 49 for the ozone-depleting chemicals added to TRI.)

The EPA's Technology Transfer Network Bulletin Board System (TTN BBS) is an excellent resource for information regarding proposed and promulgated rules pursuant to the 1990 CAAA. The modem number is (919) 541-5742, and it operates at 8,N,1 (8 databits, No parity, 1 stopbit). For more information regarding the TTN BBS, including Internet access, contact the help desk at (919) 541-5384.

Q62 How are the TRI chemicals with large quantities of air emissions regulated?

A Listed below are the 10 chemicals with the greatest total reported air emissions in TRI for 1994, and the authority by which they will be regulated under the Clean Air Act Amendments.

Chemical	Regulated Provision under Clean Air Act Amendment
Methanol	Title I and Title III Section 112(b)
Toluene	Title I and Title III Section 112(b)
Ammonia	Title III Section 112(r)
Xylene	Title I and Title III Section 112(b)
Carbon disulfide	Title I and Title III Section 112(b)
Methyl ethyl ketone	Title I and Title III Section 112(b)
Hydrochloric acid	Title III Section 112(b)
Dichloromethane	Title III Section 112(b)
Chlorine	Title III Section 112(b) and 112(r)
Glycol ethers	Title III Section 112(b)
Styrene	Title III Section 112(b)
1,1,1-Trichloroethane	Title I, Title III Section 112(b), and Title VI
Ethylene	Title I
Trichloroethylene	Title III Section 112(b)
n-Butyl alcohol	Title I

Q63 Why are some of the CAAA's 189 hazardous air pollutants (HAPS) not included in the TRI list of chemicals?

A Nine chemicals listed as HAPs in the CAAA that were not listed on EPCRA section 313 were proposed for addition as part of the Agency's expansion of the TRI chemical list. On November 22, 1994, EPA issued a final rule that added six of those nine chemicals to the TRI list. Facilities regulated under EPCRA section 313 were required to report on the following HAPs for the first time in reporting year 1995:

- Dimethyl formamide
- Hexamethylene-1,6-diisocyanate
- Hexane
- Phosphine
- Polycyclic Organic Matter (polycyclic aromatic compounds)
- Triethylamine

The following three HAPs were proposed for listing but deferred and as such are still not listed on EPCRA section 313:

- Caprolactam
- Isophorone
- Mineral fibers

The following six HAPs have not been proposed for addition to the TRI chemical list:

- Coke Oven Emissions
- p,p'-Dichlorodiphenyldichloroethylene (DDE)
- Radionuclides (including radon)
- 2,3,7,8-Tetrachlorodibenzo-p-dioxin
- 2,2,4-Trimethylpentane

There are various reasons why the remaining hazardous air pollutants have not been proposed for addition to EPCRA section 313. Two examples follow: 1) Coke oven emissions is a process category. It consists of a mixture of various chemicals that are individually listed on EPCRA section 313 or are being proposed for addition to EPCRA section 313, i.e., polycyclic

aromatic compounds. EPA believes that, for the purposes of the Toxics Release Inventory, coke oven emissions are more appropriately covered by listing the constituents rather than the process category. 2) Other chemicals such as 2,3,7,8-tetrachlorodibenzo-p-dioxin are not produced in quantities that will meet or exceed the EPCRA section 313 reporting thresholds. Listing this type of chemical would not result in the submission of TRI reports.

IX. WATER DISCHARGES

Q64 What are the water quality impacts and toxicity concerns for the TRI chemicals with the largest surface water releases?

A The six chemicals with the largest releases to surface waters account for 89.5% of all the discharges to surface waters reported to the TRI for 1994. The top six chemicals are:

phosphoric acid
ammonia
methanol
ammonium nitrate (solution)
ammonium sulfate (solution)
zinc compounds

Phosphoric acid affects water quality primarily by introducing phosphates into the water body. Phosphates may cause algae blooms which result in deoxygenation of water and other effects which may lead ultimately to fish kills. Ammonia, ammonium sulfate, and ammonium nitrate primarily affect water quality by introducing ammonia into the water body. EPA has issued water quality criteria for ammonia. EPA also regulates the oxygen demand from ammonia and the nutrient impact of all three ammonia chemicals. Methanol is a semi-volatile chemical that biodegrades readily and is toxic only at moderately high levels. Zinc compounds are toxic to fish and other aquatic life.

EPA continues to examine all chemicals discharged to surface waters to see if their toxicity or the characteristics of the receiving waters require short-term or long-term attention. The environmental impact of these discharges is much more dependent on the toxicity of the chemicals and on the physical, chemical, and biological characteristics of the receiving waters than simply on the weight of these chemicals.

Q65 The discharge of phosphoric acid to surface waters decreased by over 150 million pounds between 1993 and 1994, almost six times more than any other chemical discharged to water. What accounts for this large decrease in the discharge of phosphoric acid to surface water?

A Previous TRI reports indicated that two IMC-Agrico facilities in Louisiana reported discharges of very large quantities of phosphoric acid (110.7 million pounds in 1988). In December of 1991, the company set a voluntary goal of reducing its discharges by 75% (from 1988 levels) by 1994. The 1994 levels were reported at 13.5 million pounds, a reduction of 88%. A large portion of the decrease in phosphoric acid discharges for 1994 is a result of implementation of the pollution prevention initiative at IMC-Agrico's Uncle Sam and Faustina Plants. These reductions were achieved by preventing rainwater from falling on gypsum stacks (a byproduct of fertilizer production). The stacks were covered with an impervious clay layer and piping was installed to convey any rainwater runoff to the company's water treatment plant. This best management practice

prevented large quantities of contaminated stormwater from being generated and released to surface waters.

Q66 How does EPA (or the states) regulate EPCRA section 313 chemicals discharged to water?

A Under section 301 of the Clean Water Act (CWA), the discharge of any pollutant by any person is unlawful unless it is in compliance with the provisions of the Act. The provisions are implemented by EPA and the states through the development of effluent guidelines, the adoption of water quality standards, and the issuance of a National Pollutant Discharge Elimination System (NPDES) permit. Pursuant to Congressional directive, these programs have focused on 126 toxic pollutants of greatest concern, known as "priority pollutants." However, regulatory authorities also rely heavily on measurements of whole effluent toxicity as an aggregate measure of toxicity and an indication of the presence of toxic compounds other than the priority pollutants. The list of priority pollutants includes 80 of the TRI chemicals.

States are in the process of adopting water quality standards for those priority pollutants that could reasonably be expected to interfere with water quality. The states and EPA then use standards, together with best available treatment technology guidelines, to set enforceable permit limits on the amounts of these and other toxic pollutants that local governments and industries are allowed to discharge to waters of the United States.

While many of the TRI chemicals with the largest surface water discharges are controlled, a number of the small-volume chemicals with high toxicity levels are not fully regulated. EPA will continue to work with the states to ensure that all appropriate standards and permits are adopted. EPA is also preparing to issue Federal water quality standards if states do not adopt standards as Congress has directed. In addition, states and EPA regulate the overall toxicity of effluents with permit limits that rely upon biological toxicity tests. These limits serve, in part, to control the discharge of those TRI chemicals for which there are no state water quality standards.

Q67 What are EPA's plans to develop water quality criteria for chemicals that are on the EPCRA section 313 list that do not yet have them?

A EPA has published aquatic life and/or human health protective ambient water quality criteria for 134 of the TRI chemicals. There is a current capability to develop four to six aquatic life protective water quality criteria a year. Obviously, at this level of effort, it would take many years to complete criteria for all of the chemicals on the TRI list.

Because criteria and advisory development is a multi-year process, EPA is careful to set priorities before beginning work. First, EPA collects a variety of toxicology and exposure information on chemicals we are considering for criteria or advisories. Then, EPA ranks the pollutants. Finally, the Office of Water meets with other affected offices within EPA to obtain their views before making a final selection of chemicals for criteria and advisory development. TRI data will play a major role in setting these priorities.

Once EPA issues a criteria document for a chemical, the next step is for states to adopt them as water quality standards under state law. Those standards are then used to derive enforceable NPDES permit limits for specific direct discharging facilities.

Q68 What is the process for deciding whether to revise effluent guidelines or to develop new effluent guidelines to reflect the TRI information?

A EPA is required to publish a biennial effluent guidelines plan under section 304(m) of the CWA. The purpose of the plan is to identify those industrial categories for which effluent limitations and standards should be developed or revised. Plans were published in 1990, 1992, and 1994. The 1994 plan did not select any new industries for development because work still continued on industries selected in the 1992 plan. The choice of industries to be regulated is based on a number of factors, including TRI data. The Office of Prevention, Pesticides and Toxic Substances has prepared information on the industrial categories that are responsible for the majority of the discharges of the TRI chemicals. A Task Force is currently advising EPA on how to improve the process for selection of additional industries, and this may lead to a greater reliance on TRI data.

Q69 How will EPA use TRI to implement the Public Water Supply Supervision Program of the Safe Drinking Water Act?

A The Office of Ground Water and Drinking Water will use the TRI data in a variety of ways to identify potential contaminants in specific geographic areas.

In particular, these data could be source data for vulnerability assessments to determine frequency of monitoring by public water systems.

The Office of Ground Water and Drinking Water could review chemicals reported in the TRI database to identify candidates for future maximum contaminant level developments.

The Office of Ground Water and Drinking Water compares hazardous waste injection data with TRI data to identify and match those contaminants released.

Q70 How will EPA use the TRI data to improve the management of the permit program?

A EPA will investigate the feasibility of EPA Headquarters and Regions and the states using TRI data to determine whether permits issued to some or all of these facilities control the release of contaminants listed in TRI reports.

The Office of Wastewater Management (OWM) has used TRI data to begin to identify new undetected significant industrial users discharging to POTWs and to identify illegal unpermitted discharges. The Office of Enforcement and Compliance (OEC) has used data to identify discharges by industrial users to POTWs to determine whether additional NPDES permit limits are needed. OEC, EPA Regional offices, and states will continue to use the data for geographic and national planning, and targeting of activities to high priority areas (i.e., near coastal areas, wetlands) and to target inspections to suspected violators that could lead to permit modification, new or revised limits when the permit is reissued, or an enforcement action.

X. UNDERGROUND INJECTION

Q71 What is an underground injection of toxic chemicals?

A Underground injection is the release of toxic chemicals below the surface of the earth. Such releases may be directed to different types of wells. Class I wells are technologically sophisticated wells that inject hazardous and non-hazardous waste into deep subsurface, isolated rock formations that are separated from the lower most underground sources of drinking water by layers of impermeable clay and rock. Generally, the largest number of facilities that practice underground injection inject waste into Class I wells. When constructed and operated in compliance with program requirements, these wells are expressly designed to prevent the movement of disposed and leachate fluids into protected aquifers. Other facilities may be injecting waste into Class V wells, which may be of concern because they may be directly discharging into aquifers protected by the Underground Injection Control program and are a high priority for inspection and enforcement follow-up. EPA bans injection of hazardous waste into or above aquifers used as sources of drinking water.

Q72 How are the TRI data used by the Safe Drinking Water Act's Underground Injection Control (UIC) Program?

A EPA and the implementing states verify the accuracy of TRI-reported underground injection operations to determine if these operations are properly authorized and in compliance with the program's requirements.

Q73 Why is there such disparity from state to state in the underground injection data reported to TRI?

A Underground injection is a practice that varies widely across geographical areas of the United States. Underground injection control reporting to TRI will range from little or no data to showing millions of pounds injected annually. This is due to several factors: (1) whether a particular area's geology and hydrology is suitable for injection; (2) industry disposal, injection, and reporting practices; and (3) state laws and regulations governing underground injection control practices.

Where an area is geologically suitable for injection, there is usually a high degree of subsurface disposal activity and generally a high degree of reporting for that area. Conversely, in areas not geologically suitable for injection, there is little subsurface disposal activity and, therefore, there will be little or no reporting for that area. Industrial complexes engaged in subsurface disposal are generally located in geographically suitable locations such as the Gulf Coast, Midwest Region, Midcontinent Region, etc. The states in these geographic regions are where one may expect to find the highest TRI reporting levels. Some states have either banned underground injection or have never implemented an underground injection control program. These states will have little to no TRI reporting for underground injection.

Q74 How could a release of a toxic chemical into an underground injection well affect an area's groundwater resources?

A Underground injection of toxic chemicals may, depending on the type of well and well management practices, pose a threat of contami-

nation to underground sources of drinking water. For this reason, each facility in the TRI database that reports a discharge to an underground injection well is checked to verify that it is permitted for such discharges. If it is not properly authorized, the facility would then be subject to state or EPA enforcement action. If the facility is properly permitted, the operation would be subject to a compliance review on a prescribed schedule.

Q75 Does EPA have any estimation of what percentage of the TRI releases to underground injection wells are going to Class I wells (deep underground injection of industrial or municipal wastes)?

A The current TRI Form R does not differentiate the underground injection releases by well type. Other UIC volume data reported by the states and the Regions indicate that the majority of TRI releases are to Class I industrial (non-hazardous) and Class I hazardous injection wells.

Q76 How are Class I injection wells monitored to ensure against any toxic releases to the environment?

A All permitted Class I wells are rigorously monitored to prevent any loss of fluids injected in the receiving geologic formations. Class I wells must be properly sited and adequately cased and cemented to protect underground sources of drinking water and isolate the injection zone; the well casing, tubing, and annular seal must be tested for mechanical integrity; a test for any fluid movement along the borehole must be run at least every five years; and the operator must identify all wells within a specified distance from the injection well bore to assure that all abandoned wells are properly plugged so that there is no potential for fluid movement by these paths.

Q77 What is the difference between a hazardous and nonhazardous Class I Injection well permit?

A All Class I Injection wells, hazardous and nonhazardous, must have an approved UIC permit to operate in the U.S. The basic difference between the two well permits is the physical, chemical, and biological makeup of the waste to be injected. Both well permits establish the necessary criteria and standards for the safe operation of these wells, in addition to protecting underground sources of drinking water from contamination. Hazardous and nonhazardous Class I injection well permits similarly address siting, construction, operation, reporting, testing, and monitoring requirements. However, the hazardous UIC well permit addresses these requirements more stringently because of the hazardous nature of corrosive and toxic wastes. There is more frequent well testing and monitoring. Additionally, since a 1988 UIC rulemaking, all Class I hazardous waste injection wells disposing a RCRA-banned hazardous waste must either complement the well permit with a rigorous technical demonstration referred to as a "No-migration Demonstration" or treat the waste to Agency-approved safe levels before disposal.

It should be noted that some state UIC programs (Primacy) require the same stringent requirements for the granting of nonhazardous UIC well permits as for hazardous well permits.

Q78 Have any Class I wells released fluids to underground sources of drinking water (USDWs), and, if so, were these wells adequately repaired?

A Instances of contamination of underground sources of drinking water by Class I wells have been rare. EPA and the states have identified only two cases where hazardous injected waste contaminated underground sources of drinking water (USDWs) and one case where a Class I

well was suspected of causing contamination. All three cases occurred prior to the implementation of a state or Federal UIC program. EPA also identified eight cases where leakage from Class I hazardous wells entered non-USDW formations. These leaks were minor in nature and immediately adjacent to the well bore. All of these cases were addressed by either repairing the wells or properly plugging and abandoning operations.

Q79 What happens to abandoned operations?

A Prior to abandoning a Class I, II, or III well, the well owner or operator is required to plug the well with cement to prevent the movement of fluids either into or between underground sources of drinking water. The regulations concerning the plugging and abandoning of Class I-III wells can be found at 40 CFR 146.10.

In addition, the owner or operator of a Class I hazardous well must comply with much more stringent closure plan requirements. These owners or operators must submit a detailed closure plan as part of their permit applications and demonstrate financial responsibility (i.e., that they will be able to pay all costs associated with the closing of the well). The regulations concerning the closing of a Class I hazardous well can be found at 40 CFR 146.71.

XI. SOLID AND HAZARDOUS WASTE

Q80 What role do TRI data play in chemical accident prevention?

A TRI data are used to support two activities related to chemical accident prevention:

TRI data are used to identify chemical handling facilities that could benefit from information on chemical process safety for preventing accidental chemical releases.

TRI data are used as one source of background material in learning more about facility activities. For example, these data can assist a team in preparing for a chemical safety audit at a particular chemical-handling facility.

Q81 How can a Local Emergency Planning Committee (LEPC) use the TRI data?

A LEPCs can use the TRI data for emergency planning for response to chemical accidents. The LEPCs receive notifications of accidental releases under EPCRA section 304. They can compare the data received under section 304 to the TRI data to help screen the risks posed by manufacturing facilities in their community. They also can review TRI information along with chemical inventory information submitted by facilities under sections 311 and 312 of EPCRA to obtain a "chemical profile" of their community for use in planning for response to chemical accidents.

Q82 Are the TRI chemicals regulated under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)?

A Of the 343 individually listed TRI chemicals reportable for 1994, 322 are also CERCLA hazardous substances. TRI chemicals that are also CERCLA hazardous substances are subject to all of the requirements of CERCLA, as amended by SARA, such as reporting, liability, and penalties.

Q83 How do the EPCRA section 313 reporting requirements compare to CERCLA reporting requirements?

A There are few similarities between the reporting requirements of EPCRA section 313 and those of CERCLA section 103. Section 313 requires the owner or operator of a facility where a toxic chemical is manufactured, processed, or otherwise used to submit a toxic chemical release form to EPA when the quantity of the toxic chemical exceeds the threshold quantity established by section 313(f) of EPCRA.

The reporting requirements of section 103 of CERCLA require any person in charge of a vessel or facility to report the release of a hazardous substance into the environment, in a quantity equal to or greater than its "reportable quantity," to the National Response Center. The purpose of reporting under CERCLA section 103 is to allow the Federal government to assess each reported release to determine if a response action is warranted.

Q84 How many TRI chemicals are regulated under the Resource Conservation and Recovery Act (RCRA)?

A Approximately two-thirds of the 343 individually listed TRI chemicals reportable for 1994 are regulated under RCRA. Forty of the individually listed TRI chemicals are currently used to identify a waste as a characteristic hazardous waste under RCRA. When such chemicals are found in the waste above specified levels, the waste is subject to RCRA regulation. In addition, 153 of the individually listed TRI chemicals are also listed as hazardous wastes when they are unused or discarded in commercial chemical products under RCRA.

Q85 How many facilities are regulated by the RCRA program and what is the overlap with facilities that report for TRI?

A Under Subtitle C, RCRA regulates about 5,000 Treatment, Storage, and Disposal facilities (TSDs). RCRA also regulates more than 200,000 large- and small- quantity generators (LQGs and SQGs) and about 18,000 transporters.

Of the generators that are regulated under Subtitle C of RCRA, approximately 17,000 LQGs report RCRA waste generation and management activities biennially via the National Hazardous Waste Report (biennial report). Approximately 7,000 of the LQGs report to the TRI. These sites and facilities are listed in the Resource Conservation and Recovery Information System (RCRIS) and may be cross-checked with TRI facilities by EPA ID number.

Q86 How are TRI releases of hazardous wastes regulated under RCRA?

A Hazardous wastes must be stored, treated, or disposed of in hazardous waste management units regulated under the RCRA or under authorized state laws. Hazardous waste land disposal units, including landfills, land treatment, surface impoundments, and waste piles, must meet applicable design and operating controls, such as liners and leak detection systems and groundwater monitoring systems to detect releases out of the unit. All facilities that store, treat, or dispose of hazardous wastes are subject to corrective action requirements to clean up hazardous wastes or hazardous constituents that migrate from any waste management unit at the facility.

Q87 Are all land releases reported under TRI regulated under RCRA?

A Some land releases may be accidental releases of chemicals in wastes that are not regulated by RCRA. Most of the land releases reported to TRI fall under one of the following categories: on-site disposal of hazardous wastes which are regulated under RCRA or authorized state hazardous waste programs; and industrial solid waste or waste from mining and mineral processing activities that would be regulated under state solid waste management programs insofar as they do exist. Some mineral processing wastes are regulated as hazardous wastes.

Under EPCRA section 313, facilities that manufactured or processed 25,000 pounds or used 10,000 pounds of a listed chemical must report. Under RCRA, those facilities that generate more than 100 kilograms (220 pounds) of hazardous waste per month must report.

Q88 Can direct comparisons be made between TRI data and RCRA data for amounts of toxic waste generated, waste minimization, etc.?

A It is difficult to make comparisons for several reasons:

TRI reports individual chemical constituent data; RCRA requires reporting on a total waste stream that represents a substantially larger volume than any single chemical contained in the waste stream. A RCRA hazardous waste stream may or may not contain TRI chemicals.

RCRA distinguishes between regulated and exempt wastes. A particular TRI chemical may occur in a waste that is exempt and need not be reported under RCRA. For example, certain wastewater treatment activities are exempt from RCRA, as are the activities of small-quantity generators who generate less than 100 kg/month of hazardous waste.

Currently, only facilities in SIC codes 20–39 are required to report to TRI; RCRA reporting is not limited by SIC code.

Under RCRA, hazardous waste generators are required to report on existing or planned waste minimization activities at facilities on a biennial basis. The current reporting forms request information on reduction of the volume of waste generated. These data differ from TRI data in that they represent specific RCRA waste streams rather than individual chemical constituents. EPA's Office of Solid Waste is exploring approaches to refine the utility of the waste minimization data collected through the biennial reporting system and to coordinate the results with TRI data.

XII. EXPOSURE AND HEALTH EFFECTS

Q89 What amount of toxic chemicals am I exposed to?

A Estimating exposure based on release quantities requires an analysis of chemical- and site-specific characteristics. There is no simple conversion of release quantity to concentration in the environment or dose received by individuals.

Natural environmental processes can transform the chemical (e.g., sunlight decomposes some chemicals); transfer it from one medium to another (e.g., evaporation may transfer some chemicals from water to air); or concentrate it

(e.g., bioaccumulation of the chemical in fish). Concentration in the environment can depend on many factors such as the volume of water in the receiving stream into which the chemical is released, dispersion of air releases as a function of local meteorological conditions, the height from which an air release occurs, integrity of landfill liners or other containment of disposed materials, and many other factors. Finally, your exposure to the chemicals will depend on factors such as distance from the release, and the source and treatment of your drinking water supply, etc.

Q90 What are my chances of getting sick when I have been exposed to chemicals?

A The likelihood of becoming sick from chemicals is determined by the length of time you are exposed, the amount of chemical to which you are exposed and as well as the "inherent" toxicity of the chemical. The risk increases as the amount of exposure increases.

Q91 When are higher exposures more likely?

A Accidents can expose the facility's workers and surrounding community to higher concentrations of the chemicals. Other conditions that increase risk of exposure include dust-releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.). During process start-up and shutdown operations, there also is a greater likelihood of exposure. The closer one is to a release, the greater the potential for exposure.

Q92 Is the risk of getting sick higher for workers in the facilities than for community residents?

A Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water and chemicals in the air over long periods. Because of this, and because of exposure of sensitive populations, such as children or people who are already ill, community exposures may cause health problems.

Q93 If I have acute (short-term) health effects, will these actually develop into chronic effects?

A Not always. Most chronic (long-term) effects result from repeated exposures to a chemical. Although many acute effects are reversible, some exposures may also cause chronic health effects.

Q94 Can I get long-term effects without ever having short-term effects?

A Yes, because long-term effects can occur from repeated or continuous exposures to a chemical at levels not high enough to make you immediately sick.

Q95 Do all chemicals cause cancer?

A No. Most chemicals tested by scientists do not cause cancer.

Q96 Should I be concerned if a chemical causes cancer in animals?

A Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.

Q97 Should I be concerned if a chemical is a teratogen (a substance which causes fetal malformations) in animals?

A Yes. Although some chemicals may affect humans differently than they affect animals, damage to animals suggests that same damage can occur in humans.

Q98 But don't they test animals using much higher levels of a chemical than people usually are exposed to?

A Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless the chemical is a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses, especially over long periods of time.

Q99 Can men as well as women be affected by chemicals that cause reproductive system damage?

A Yes. Some chemicals reduce potency or fertility in either men or women. Some damage sperm and eggs, possibly leading to birth defects.

Q100 Aren't pregnant women at the greatest risk from reproductive hazards?

A Not necessarily. Pregnant women are at greatest risk from chemicals which harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of child-bearing age are at higher risk.

Q101 What is the risk to public health resulting from toxic emissions to the air?

A While the TRI data represent a useful means of identifying potential sources of toxic chemicals in the air, these data are not sufficient to accurately determine the magnitude of the public health risk posed by the emissions from a given facility. For example, TRI provides no information concerning the potential exposure to these emissions. These data are most useful to point out the direction for further analyses of public health risk. In addition to identifying new regulatory projects, the data can be used to make priority decisions for the air toxics regulatory agenda.

Q102 Is there any difference between fugitive and stack air emissions when it comes to my health?

A Dispersion of the chemical and its concentration at various distances from the point of release are affected by whether, for example, the chemical is emitted from a tall stack at high temperatures or a pipe fitting near the ground at ambient temperature. Thus, your exposure could vary depending on the manner in which the release occurs. In general, a ground or near-ground release, such as through fugitive emissions, will more likely result in a higher exposure and, therefore, a greater possible health hazard for nearby residents than emissions from tall stacks.

Q103 Can my drinking water be contaminated by these toxic chemicals?

A Again, this depends on the amount and concentration released, among other things. Characteristics at the site—including the relationship of the release to the water supply; geology and hydrology of the soil, both at the surface and below ground; and the distance to where the drinking water intake/well is located—will be determinants of drinking water contamination. Treatment, if any, that the water receives before it is piped to your house will also affect the quality of the water you drink.

Q104 Are the facilities with the largest toxic chemical releases always the most important in terms of public health?

A No. It is not possible to determine risks to public health strictly from knowing the amount of a chemical which is released by a facility over a year. A release total is an important first step in identifying a facility that may pose a public health hazard. Other factors that are necessary to the risk assessment process include specific information on: the environmental medium of the release, chemical toxicity and potency, local meteorological and topographical characteristics, where people live and work (potential population exposure), and when and how releases occur. Because some chemicals are more toxic than others, knowing only the quantity of chemicals released to the environment is not sufficient to determine its importance with respect to risk.

Q105 Is there a risk of getting sick when I have been exposed to a chemical that is released in small quantity?

A It depends upon the inherent ability of the chemical to cause an effect. Chemicals such as cyanide can make you sick even if you are exposed to a small quantity.

Q106 Why should I be concerned about getting ill when I am exposed to pharmaceuticals and pesticides which have been tested for safety?

A Uncontrolled use of such chemicals may pose the likelihood of an individual becoming sick depending upon how long that person is exposed and the amount of exposure. It will also depend upon the inherent toxicity of the chemical.

Q107 How does EPA determine the health and environmental effects of chemicals?

A EPA has developed guidelines to assess these effects. The available information on each chemical is evaluated using these guidelines and a determination is made on a case-by-case-basis. EPA is currently in the process of revising these guidelines. For further information call the EPCRA Hotline, (800) 535-0202.

Q108 Why should I be concerned about chemicals that accumulate at extremely low levels?

A These chemicals are persistent and accumulate in soil, plants, and organisms and, therefore, pose the chance of causing an adverse impact on human health and the environment even when released at low levels. Over a number of years such chemicals can accumulate into larger and larger quantities.

XIII. 33/50 PROGRAM

Q109 What is the 33/50 Program?

A The 33/50 Program is an EPA voluntary pollution prevention initiative begun in 1991. It derives its name from its overall goals—an interim goal of a 33% reduction in 1992 and an ultimate goal of a 50% reduction in 1995 in releases and transfers of 17 high-priority toxic chemicals, using 1988 TRI reporting as a baseline. The 33/50 Program emphasized simplicity and flexibility, allowing companies to set their own reduction goals and to achieve them in ways they felt made the most sense for their specific manufacturing operations. The Program represents an innovative experiment aimed at demonstrating whether voluntary programs can

augment the Agency's traditional command-and-control approach by achieving targeted reductions more quickly than would regulations alone. The 33/50 Program is part of a broad group of EPA activities designed to encourage pollution prevention as the best means of achieving reductions in toxic chemical releases and transfers.

Q110 How is the 33/50 Program related to the TRI program?

A The 33/50 Program relies on the TRI as its primary tool in measuring progress toward achieving the Program's national goals and in monitoring the progress of individual company participants and their facilities in meeting their own pollution reduction targets. The 33/50 Program compliments the TRI program: while TRI asks industry to monitor and publicly report on the pollution resulting from its manufacturing operations, the 33/50 Program takes the next step by asking—though not requiring—industry to do something about these environmental releases and off-site transfers. EPA has observed that the public accountability fostered by TRI and the Pollution Prevention Act play a vital role in persuading companies to take voluntary actions to prevent pollution. Nonetheless, establishment of the 33/50 Program appears to have accelerated the reduction rate for emissions of the 17 target chemicals.

Q111 What chemicals are included in the 33/50 Program?

A The 17 chemicals and chemical categories targeted for reductions are all listed TRI chemicals: benzene, cadmium and compounds, carbon tetrachloride, chloroform, chromium and compounds, cyanide and compounds, dichloromethane, lead and compounds, mercury and compounds, methyl ethyl ketone, methyl isobutyl ketone, nickel and compounds, tetrachloroethylene, toluene, 1,1,1-trichloroethane, trichloroethylene, and xylenes.

Q112 Has the 33/50 Program met its goals?

A Industry exceeded the 33/50 Program's national interim 33% reduction goal by more than 100 million pounds in 1992. National emissions of Program chemicals were reduced by an additional 94 million pounds in 1993 and 62 million pounds in 1994, bringing total reductions since 1988 to more than 756 million pounds (51%), exceeding the Program's ultimate 50% reduction goal a full year ahead of schedule.

Q113 How have companies reduced their emissions of the 33/50 Program's 17 chemicals?

A EPA encouraged 33/50 Program participants to employ source reduction as the method of first choice in reducing their releases and off-site transfers of Program chemicals. Companies could also undertake recycling, energy recovery, and treatment projects to achieve their 33/50 Program reduction goals. EPA has published twenty-three 33/50 Program Company Profiles that document some of the specific techniques employed by large and small companies alike to reduce their toxics emissions. Another 10 profiles are in development. EPA has also invited all participants to submit their own success stories, to be published and distributed by EPA in the Fall of 1996, highlighting their experiences and the significant environmental accomplishments they achieved voluntarily as members of the 33/50 Program.

Q114 Did the 33/50 Program end at the end of 1995?

A While the 33/50 Program's ultimate 50% reduction goal was targeted for 1995, EPA encouraged companies to set their own reduction goals and not to be constrained by the Program's national time frames. Some 33/50 Program companies have set pollution reduction goals that extend well past 1995. Furthermore,

while many company reduction projects may be completed by the end of 1995, EPA must wait for 1995 TRI data to be reported and assembled in 1997 to analyze and report on the full extent of 33/50 Program achievements. Accordingly, EPA's administration of the 33/50 Program did not terminate at the close of the 1995 calendar year.

Q115 What is EPA planning to do as a follow-up to the 33/50 Program?

A EPA solicited input from interested parties throughout 1995 to help determine whether there should be a next generation of the 33/50 Program and, if so, how a next generation voluntary toxics reduction initiative should be designed and administered. Approximately two-thirds of the written comments received favored continuing the 33/50 Program in one form or another.

EPA and its state, industrial, and environmental partners are continuing to deliberate over what kind of program would serve best as a follow-up to the 33/50 Program's successes. EPA will announce plans for a next generation of the 33/50 Program once this open decision-making process has been completed.

Q116 What company recognition activities is EPA planning for 33/50 Program participants throughout the remaining life of the Program?

A All companies that enrolled in the 33/50 Program received Certificates of Appreciation signed by the Administrator, and their names have been listed by EPA in periodic 33/50 Program Progress Reports, at Program conferences and events, and in various EPA communications and other environmental publications. EPA provided special recognition for approximately 300 participants, when the Program exceeded its 1992 national interim goal, for particularly rapid reductions in their releases and transfers of our target chemicals. In its November issue of Chemical Engineering magazine, the McGraw-Hill Corporation saluted eighteen 33/50 Program participants as Environmental Champions for their voluntary efforts to reduce their toxics emissions. The publication included letters of congratulation from both Vice President Al Gore and EPA Administrator Carol Browner.

To celebrate this year's early achievement of the Program's 50% goal, EPA is planning a major national conference to be held in Washington, DC, in September 1996. The conference will bring together decision-makers from industry, government, academia, and public interest groups in a thought provoking, analytical, and action-oriented arena to advance the role of voluntarism and partnership in pursuing the principles of environmental protection and pollution prevention. Companies that have been featured in 33/50 Program Company Profiles and that submit their own "Success Stories" will be invited to publicize their pollution reduction activities throughout the conference.

XIV. COMPLIANCE AND ENFORCEMENT

Q117 How many inspections have EPA's Regional offices conducted in support of the Office of Compliance (OC) EPCRA section 313 program?

A Since October 1988, EPA field offices have conducted 5,058 inspections of facilities subject to EPCRA section 313 reporting requirements.

FY 1988 – 153	FY 1992 – 774
FY 1989 – 768	FY 1993 – 839
FY 1990 – 701	FY 1994 – 548
FY 1991 – 666	FY 1995 – 612

Q118 How many civil complaints have been issued under section 313?

A EPA has issued 1,179 civil complaints (almost all of which were against non-reporters) since October 1988.

FY 1989 – 124	FY 1993 – 219
FY 1990 – 206	FY 1994 – 178
FY 1991 – 179	FY 1995 – 139
FY 1992 – 134	

Q119 What is the total amount of proposed penalties levied against EPCRA section 313 violators?

A EPA's Office of Compliance has levied proposed penalties in excess of $70,694,411 in the EPCRA section 313 program from October 1988 to September 1995. In fiscal year 1995 EPA proposed $8,159,791 in civil administrative penalties.

Q120 How many EPCRA section 313 enforcement cases have been settled? What is the total of final administrative penalties assessed?

A FY 1989 – 121 ($2,450,561)
FY 1990 – 193 ($4,186,428)
FY 1991 – 160 ($3,038,135)
FY 1992 – 129 ($2,608,651)
FY 1993 – 118 ($2,852,935
FY 1994 – 121 ($3,017,279)
FY 1995 – 69 ($1,032,304)

Q121 What are Supplemental Environmental Projects (SEPs)? How are they beneficial for environmental enforcement cases?

A A Supplemental Environmental Project is an environmentally beneficial project which a defendant voluntarily agrees to undertake as part of the settlement of an environmental enforcement action. The defendant, however, is not otherwise legally required to perform the project. SEPs go beyond compliance and that which is required by law (Federal, state, or local). These projects are aimed at reducing risk to human health and enhancing the condition of the environment.

By considering some percentage of the cost of a SEP as a factor in calculating a penalty, EPA encourages defendants to conduct such beneficial projects which would otherwise not be included as part of the assessed penalty. Further, the percentage of the mitigation is directly linked to the environmental benefits of the Project, which encourages defendants to conduct more environmentally comprehensive projects. Since fiscal year 1991 (when EPA

began tracking SEPs), EPA has settled 185 EPCRA section 313 cases containing one or more SEPs.

Q122 What is the EPCRA section 313 compliance and enforcement program doing about data quality?

A Data quality has emerged as a second important focus for the EPCRA section 313 compliance and enforcement programs, both at Headquarters and in the Regions. Now that the section 313 non-reporters compliance and enforcement program has matured, EPA is beginning to concentrate more on the quality of the TRI data submitted to EPA and the states. EPA and its Regions are using a variety of tools, from compliance assistance to issuing cases, in order to ensure compliance with the regulations.

Q123 Without a final regulation in place, how is EPA enforcing the Pollution Prevention Act reporting requirements?

A Submission to EPA and the state of certain source reduction, recycling, and other waste stream management information is required under the PPA. Because the requirement to submit these data is mandated by statute, owners and operators of regulated facilities must comply, regardless of the presence or absence of implementing regulations. However, because EPA has not promulgated definitions and guidance for complying with the PPA, its enforcement is focused on ensuring submission of these data, rather than on the methodology for calculating the data.

Q124 What is the Sector Notebook Project, and how does the project relate to TRI?

A In September 1995, the Office of Compliance published comprehensive profiles (Sector Notebooks) of 18 industrial sectors. The Project was designed to raise awareness of environmental regulations, pollution outputs, industrial processes, pollution prevention and compliance history associated with each profile sector. The reports enhance the ability of stakeholders to assess sector-wide issues on a multimedia basis. TRI data contained within the Sector Notebook provide a detailed breakdown of chemicals released and transferred by each industry and give a relative comparison of pollutant outputs across industrial categories. EPA plans to release several more Sector Notebooks at the end of 1996. Existing notebooks are available electronically on the Internet at the Enviro$ense World Wide Web site (http://es.inel.gov/) or via modem Directory 57 of the Enviro$ense bulletin board [modem number: (703) 908-2092]. Hard copies can be obtained from the Superintendent of Documents by calling (202) 512-2250. Information on the Sector Notebook Project can be obtained by calling (202) 564-2395.

APPENDIX B

PUBLIC ACCESS TO THE TOXICS RELEASE INVENTORY

According to many, the TRI program is one of the most effective environmental programs ever legislated by Congress and administered by EPA. Its success is due, in large part, to the right-to-know provisions contained in the legislation itself. By requiring that the resulting data be made publicly available "by electronic and other means," Congress ensured that citizens, the media, environmental advocates, researchers, the business community, and others could influence and evaluate industry's efforts to reduce toxics emissions.

Every year, EPA expands its outreach activities to include new potential users of the data. Through outreach activities, EPA identifies and engages the assistance of organizations to help promote TRI awareness, provide access, and increase data usage. Journalists, national public interest and environmental groups, and state governments continue to be key outreach participants. Libraries in communities all across the U.S., in particular, members of the Federal Depository Library Program, are committed to providing public access to TRI data in a variety of formats. Because the value of TRI increases as more people use it, EPA encourages these organizations to acquaint new users with TRI, help people who already know about TRI to better use and understand the data, and, whenever possible, provide feedback on how to improve TRI products and services.

Many options are available for accessing TRI. EPA offers the data in a variety of common computer and hard copy formats to ensure that everyone can easily use the information. TRI is available on diskette, CD-ROM, and computer bulletin boards. It is available on an on-line national computer database. More and more TRI information is being added to the Internet. TRI reports are available from state government offices as well as from EPA. For each reporting year, many states make their data available before EPA releases data from the national database. You can contact your state EPCRA Coordinator or you can call your EPA Regional TRI Coordinator for assistance. (See listing of Regional coordinators and state EPCRA contacts in Appendix G.) Many other avenues for accessing TRI are described in the following pages.

TRI has proven to be a rich source of data for a broad public audience. For instance, educators are using the data to conduct studies and courses on the environment; labor unions are using the TRI data to improve conditions for workers; and businesses are using the data in many ways — as a basis for reducing large stocks of toxic chemicals, to cut costs, to improve operations, to reduce the use of toxic chemicals, and for a variety of other reasons. Concerned citizens are a growing user group. These individuals, on

their own and through organized groups, are using TRI to raise and answer questions about chemical releases in their communities. States use the national data to compare releases within industries.

In the future, avenues of public access to TRI will continue to grow, and TRI will continue to be an important first step for discovering which chemicals are being manufactured, released, or transferred in communities across the country. The diversity of the groups across the country who use TRI will increase as will the varied uses of the data. TRI will increasingly become the data source used to positively influence the views of companies, legislators, and the public regarding the overall conditions of the nation's environment.

ACCESSING TOXICS RELEASE INVENTORY (TRI) PRODUCTS AND SERVICES

Accessing TRI data is easy. It is published in a wide variety of computer and hard copy formats to ensure that it is readily available. Through outreach activities, EPA identifies organizations in the toxics community to help promote awareness of TRI and use of its data products. TRI data is available on-line, for purchase from GPO or NTIS, or for use in Federal Depository Libraries across the U.S. In addition, state officials also receive TRI reports from facilities in their jurisdiction, and many states publish reports highlighting local trends. For more information about accessing TRI or obtaining TRI products, call or write: TRI User Support, U.S. EPA, 401 M St., SW. (MS-7407), Washington, DC 20460, (202) 260-1531. Or, visit us at our Web site, **http://www.epa.gov**.

Assistance Services

The **TRI User Support (TRI-US) Service** provides general information about the Toxics Release Inventory and support for access to any of the data formats. TRI specialists can help determine the data product best suited for the individual user's needs. The service provides comprehensive search assistance for the TRI on-line and CD-ROM applications. TRI-US provides both NLM/TOXNET and CD-ROM training through short sessions and workshops. Documentation for all TRI products is available from TRI-US. This support service provides referrals to EPA Regional and state TRI contacts and to the libraries where TRI is available. Referrals to TRI resources in other localities are also available.

- **TRI User Support Service (TRI-US)**
  U.S. EPA
  401 M St., SW. (MS-7407)
  Washington, DC 20460
  Call: (202) 260-1531
  Fax: (202) 401-2347
  Hours: 8:00 a.m. – 4:30 p.m.
  (Eastern Time)

The **Emergency Planning and Community Right-to-Know (EPCRA) Hotline** provides regulatory, policy, and technical assistance to Federal agencies, local and state governments, the public, the regulated community, and other interested parties in response to questions related to EPCRA. The Hotline provides

information on the availability of documents related to EPCRA and copies of selected EPCRA documents on a limited basis.

- **EPCRA Hotline**
  Call: (800) 535-0202 *(outside Washington Metropolitan area)*
  (703) 412-9810 *(in Washington Metropolitan area)*
  Fax: (703) 412-3333 *(to request documents only)*
  TDD: (800) 553-7672
  Hours: 8:30 a.m. – 7:30 p.m. (Eastern Time)

As a service to TRI data users, computer-generated facsimiles of TRI reporting forms will be provided upon request.

- **TRI Information Management Branch**
  Attn: Tonya Richardson
  Call: (202) 260-3757
  Fax: (202) 260-4655

Federal Depository Libraries

TRI products are distributed though the Federal Depository Library Program, a network of 1,400 public and academic libraries located in communities all across the U.S. While librarians in these organizations are not specialists in TRI information, they are often quite knowledgeable about obtaining and using information resources in general. Over 700 depository libraries receive the TRI on CD-ROM. Librarians in these institutions can assist you in searching the database and using other features of the discs, such as printing reports and downloading data from the CD-ROM. More and more depository libraries are allowing patrons to access the Internet using public workstations located in the library.

For more information or to identify the Federal Depository Library nearest you, contact your local library.

Electronic Media

CD-ROMs

This two-disc set contains the complete national TRI, starting with the first inventory in 1987. It also contains reference material on the health and environmental effects of the TRI chemicals. User-friendly software provides the capability to search data by facility, location, chemical, SIC, and many other access points. Other features allow flexibility in printing standard and custom reports, data downloading, and calculating releases for search sets (for example, to calculate average air releases for all pulp and paper manufacturers). Complete documentation, outlining the history of TRI, how it is used, and how to operate the software is included. Discs available from GPO and NTIS are the same, although prices may differ.

For more information, contact:

U.S. Government Printing Office (GPO)
Superintendent of Documents
P.O. Box 371954
Pittsburgh, PA 15250-7954
Call: (202) 512-1800
Fax: (202) 512-2250
Hours: 8:30 a.m. - 4:00 p.m. (Eastern Time)

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
Call: (703) 487-4650
Fax: (703) 321-8547
Hours: 8:30 a.m. – 5:00 p.m. (Eastern Time)

Diskettes

Selected TRI information is available on diskettes in dBASE (.dbf) or Lotus 1-2-3 (.wk1) format. For each state, one or more diskettes contain the most frequently used TRI data, such as the names, locations, and contacts for reporting facilities; chemical names and CAS numbers; aggregate releases in pounds of chemicals released to air, water, land, and underground injection wells; and total chemical transfers to off-site locations and Publicly Owned Treatment Works. Diskettes for 1991 and later years also contain selected pollution prevention data. A diskette containing Federal facilities nationwide is also available for reporting year 1994. Diskettes are accompanied by user instructions. The cost of diskettes for a single state ranges from $15–$17, depending on the number of disks in the set.

For more information, contact:

U.S. Government Printing Office (GPO)
Superintendent of Documents
P.O. Box 37082
Washington, DC 20013-7082
Call: (202) 512-1530
Fax: (202) 512-1262
Hours: 8:30 a.m. – 4:00 p.m.
(Eastern Time)

On-line Services

National Library of Medicine (NLM) TOXNET System

The **National Library of Medicine (NLM) TOXNET System** makes TRI accessible to concerned citizens and to businesses and organizations interested in environmental or public health issues. TOXNET offers state-of-the-art, user-friendly, on-line searching. The system features a variety of on-line user assistance features, a flexible command language, and "free text" search capability. Users can print specific portions of the records either on-line or off-line, and there are a wide variety of customized text options built into the system. Cross-file searching allows users to search multiple years of TRI data simultaneously. The menu-driven search package allows individuals with limited computer skills to use the TRI on-line database efficiently and effectively. Information about the health and environmental effects of TRI chemicals can also be accessed via the TOXNET system. On-line costs range from $18–$20 per hour. An NLM password is necessary to use the file. The system contains the complete national TRI data for all reporting years.

The TOXNET is also available on the Internet. The address for the file is toxnet.nlm.nih.gov. By December 1996, telecommunications access to TOXNET (except via Internet) will be limited to one toll-free telephone number (1-800-525-0216). Other value-added networks, such as Tymenet, Sprintnet, and CompuServe, will no longer provide access to TOXNET.

For more information, contact:

National Library of Medicine
Specialized Information Services
TRI Representative
8600 Rockville Pike
Bethesda, MD 20894
Call: (301) 496-6531
Hours: 7 days/week; 24 hours/day

Right-to-Know Computer Network (RTK NET)

The **Right-to-Know Computer Network (RTK NET)** offers free access to TRI data for 1987–1994, along with health facts for each TRI chemical, searchable through the World Wide Web, Telnet, and dial-up. RTK NET is an on-line telecommunications link to environmental and other databases. This service promotes pollution prevention by putting TRI data together with other related data to facilitate analyses for prevention strategies. It provides

communication among individuals concerned about toxics use reduction and seeks to increase use and analysis of TRI and related data. RTK NET links TRI with other environmental data, civil cases brought by the U.S. EPA, a portion of the 1990 Census data, and a mapping program called Landview.

The TRI data can be accessed through the World Wide Web (http://www.rtk.net), telnet (rtk.net), and by modem. [To access by modem, dial 202-234-8570, set computer parameters to 8, N, 1, and type "public" (no quotes) in lower case and register for a free account.] Participants can communicate with one another through computer-generated mail, in addition to exchanging and reviewing documents electronically.

In addition to the TRI data, the following databases on RTK NET may be of interest to TRI users:

- **ARIP** – EPA Accidental Release Information Program.
- **BRS** – EPA RCRA Biennial Reporting System.
- **NPRI** – Canada's TRI-like system, called the National Pollutant Release Inventory.
- **Census Data by Zip Code**, linking 1990 U.S. Summary with TRI, FINDS, and BRS.
- **CERCLIS** – CERCLA "Superfund" Information System.
- **CUS** – EPA chemical production database under TSCA.
- **DOCKET** – EPA civil litigation and administrative actions.
- **ERNS** – EPA Emergency Response Notification System.
- **FINDS** – Identifying information and location of all facilities regulated by EPA.
- **NPL** – EPA Superfund National Priorities List of Sites.
- **PCS** – EPA Water Permit Compliance System contains files on facilities, pipes, and pollutant limits.
- **ROADMAPS** – Regulatory levels and health effects of TRI chemicals.
- **RODs** – EPA Records of Decision.
- **SETS** – EPA Superfund Site Enforcement Tracking System.
- USGS Water Use Database.

Training is available from the computer service on using telecommunications, using RTK NET, and searching the database.

For more information, contact:
RTK NET
1742 Connecticut Avenue, N.W.
Washington, DC 20009-1171
Call: (202) 797-7200
Fax: (202) 234-8584

EPA Internet Public Server

For TRI, like many other EPA programs, the Internet is fast becoming one of the best resources for identifying information that is available to the public. EPA manages a full-service Internet site, offering access via the World Wide Web, FTP, and Gopher (see addresses given below). The information available through each of these servers is identical; the one that you use will depend upon your preferred method of access. Consult your system administrator for specific access procedures. There is no cost for accessing the EPA public servers or using any of the information that you find there.

The Gopher server is a menu-driven, user-friendly Internet utility that allows users to download information directly to their Internet accounts. The user starts at a main menu and follows a series of sub-menus to the desired item. The address for the EPA gopher server is **gopher://gopher.epa.gov**. To get to the TRI files from the main menu, make the following choices from the menus displayed on your screen: EPA Offices, Regions and Laboratories; Office of Prevention, Pesticides, and Toxic Substances; Office of Pollution Prevention and Toxics; and Toxics Release Inventory. Finally, choose the name of the file that you would like to download.

The FTP file server (**ftp://ftp.epa.gov**) allows the user to log directly onto EPA's servers by "anonymous login" and download files directly. Operation is slightly more complex than that of the gopher because users are required to know the specific path name and the names of the files they would like to download. (For example, tables from this report in Lotus spreadsheet format can be found in the directory \pub\gopher\TRI _Chem.) Because the number of files related to TRI are expected to grow, TRI User Support has begun maintaining a list of the files that are available on the EPA Gopher. For more information or a copy of this list, contact TRI User Support (202 260-1531).

The World Wide Web server (**http://www.epa.gov**) offers a graphical user interface allowing access not only to text but to images as well. Using a WWW program (or "browser," such as Netscape or Mosaic), users can access both the gopher and FTP servers in a user-friendly fashion. A text-based World Wide Web program called "Lynx" is available on some systems, which allows downloading capabilities without graphics.

For more information on the EPA's Internet servers, contact the Internet support group at the e-Mail address: internet_support@unixmail.rtpnc.epa.gov.

Integrated Risk Information System (IRIS)

The **Integrated Risk Information System (IRIS)** contains summaries of health risks and EPA regulatory information on over 500 specific chemicals. It is a key source for descriptive and quantitative information, such as oral reference dose and inhalation reference concentrations for chronic, noncarcinogenic health effects; oral slope factors and unit risk for chronic exposure to carcinogens; EPA drinking water health advisories; and summaries of EPA regulatory actions. The system is useful in the risk assessment process.

For on-line access, contact:

National Library of Medicine
Specialized Information Services
TRI Representative
8600 Rockville Pike
Bethesda, MD 20894
Call: (301) 496-6531
Hours: 7 days/week; 24 hours/day

For diskettes, contact:

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road.
Springfield, VA 22161
Call: (703) 487-4650
Fax: (703) 321-8547
Hours: 8:30 a.m. 5:00 p.m. (Eastern Time)

Printed Media

TRI Information Kit

The **TRI Information Kit** is designed to acquaint a broad and disparate audience with the TRI. The information kit is appropriate for those familiar or unfamiliar with TRI. It contains a brochure, bookmark, poster, and other explanatory materials. It is designed to answer the "who, what, when, why, where, and how" questions of TRI in clear, non-jargon language. The kit provides a broad explanation of TRI, as well as examples of how various groups have used TRI, where it can be accessed or obtained, and organizations that are sources for further information about TRI and the chemicals reported. Copies are free while supplies last. Request document number EPA-749-F-93-002.

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To request copies, contact:

National Center for Environmental Publications and Information (NCEPI)
26 West Martin Luther King Drive
Cincinnati, OH 45268
Call: (513) 489-8190
Fax: (513) 489-8695

Public Data Release Reports:

- **1994 Toxics Release Inventory: Public Data Release**
- **1994 Toxics Release Inventory: Public Data Release Executive Summary**
- **1994 Toxics Release Inventory: Public Data Release State Fact Sheets**

EPA assembles several detailed annual reports providing summaries, analyses, and comparison of TRI data by year. The reports summarize data on total releases and transfers of TRI chemicals; geographic distribution of TRI releases and transfers; industrial patterns of releases and transfers; the interstate and intrastate transport of waste; and other kinds of analyses. Copies are free while supplies last.

To request copies, contact:

EPCRA Hotline
Call: (800) 535-0202 *(outside Washington Metropolitan area)*
(703) 412-9810 *(in Washington Metropolitan area)*
Fax: (703) 412-3333 *(to request documents only)*
TDD: (800) 553-7672
Hours: 8:30 a.m. – 7:30 p.m. (Eastern Time)

TRI User Support Service (TRI-US)
U.S. EPA
401 M Street, SW. (MS-7407)
Washington, DC 20460
Call: (202) 260-1531
Fax: (202) 260-4659
Hours: 8:00 a.m. – 4:30 p.m. (Eastern Time)

Risk Screening Guide

"Toxic Chemical Release Inventory Risk Screening Guide"—Method for evaluating TRI data for environmental managers. Vols. 1 and 2, July 1989. EPA Document No.: 560/2-89-002.

To order, contact:

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
Call: (703) 487-4650
Fax: (703) 321-8547
Hours: 8:30 a.m. – 5:00 p.m. (Eastern Time)

Chemical Fact Sheets

In July 1994 OPPT initiated its Chemical Fact Sheets project, which provides brief (two-page) information summaries on chemicals of interest to the Office as part of its effort to provide the public with information on chemicals. The initial goal was to provide summaries that would supplement environmental release information for TRI chemicals.

During the information collection phase for the summaries, OPPT staff prepared Support Documents upon which to base the Fact Sheets. These Support Documents are more detailed reviews (10 or more pages long) of technical information from secondary sources.

While the level of detail varies, these documents provide information about the following for each chemical:

- its identity and properties,
- how it is used,
- how one might be exposed,
- what happens to it in the environment,
- how it affects human health and the environment.

A list of EPA offices and other groups to contact for more information is also included.

Fact Sheets are now available for 25 high-production volume TRI chemicals with another 15 to be released during the summer of 1996. Another 40 are in various stages of review. Among the chemicals for which Fact Sheets are available are methylene chloride (dichloromethane), toluene, acrylonitrile, and styrene.

The Fact Sheets, their accompanying Support Documents, and a list of the chemicals can be found on the Internet at: **http://www.epa.gov/chemfact**.

For more information contact:

TSCA Assistance Information Services Hotline
c/o: Garcia Consulting
401 M St., SW. (Mail Code: 7408)
Washington, DC 20460
Call: (202) 554-1404
TDD: (202) 554-0551
Fax: (202) 554-5603

Chemicals, the Press, and the Public

This guidebook describes the evolution of the "right-to-know" concept and then provides key provisions of the Emergency Planning and Community Right to Know Act of 1986. A staple of environmental journalism since it was published in 1989, this guidebook offers information on how to use the chemical and emergency planning and response data available under this law, and how to understand and interpret the information responsibly and effectively.

For more information, contact:

National Safety Council (NSC)
Environmental Health Center
1019 19th St., NW., Suite 401
Washington, DC 20036
Call: (202) 293-2270

APPENDIX C

TRI DATA QUALITY PROGRAM

The goals of EPA's data quality program for TRI are to: (1) identify and assist facilities that must report so that data submitted will be of the highest quality; (2) insure high quality data entry; (3) correct and normalize as much of the submitted data as possible in order to maximize the utility of the data; (4) accurately assess the relative validity of release estimates and other data, and (5) ensure completeness of the database with compliance and enforcement measures.

IDENTIFICATION AND ASSISTANCE TO FACILITIES

Through mass mailings to all facilities within the manufacturing sector of the economy, work with a wide variety of trade associations, local and national seminars, training courses, and enforcement activities, EPA has endeavored to locate all facilities required to report under section 313 of EPCRA and inform them of their obligations. In addition, EPA has prepared various materials to assist facilities in complying with EPCRA. These include detailed reporting instructions, a question-and-answer document, magnetic media reporting instructions, general technical guidance, and sixteen industry-specific guidance documents. In addition, EPA maintains a toll-free hotline to answer regulatory and technical questions to assist facilities.

DATA ENTRY QUALITY ACTIVITIES

EPA continues to place a high emphasis on data entry accuracy within the Toxics Release Inventory database. EPA's internal review of 3% of the records showed a data entry accuracy rate of over 99.9%. This is up from a 1987 reporting year rate of 97.5%. EPA continued the computerized edit checks at the point of data entry, including a high percent of verification and formalization of data reconciliation activities. EPA mailed copies of the release and transfer estimates to all reporting facilities to allow them to verify the entered data. EPA also received 62% of the 1994 submissions from facilities reporting on magnetic media, which ensures against EPA data entry errors. This compares to 53% magnetic media submissions for 1993. EPA is continuing to encourage the use of magnetic media by all submitters.

CORRECTION AND NORMALIZATION OF DATA

Because Congress has required that EPA make the TRI data available to the public through computer telecommunications, EPA has found it necessary to undertake a variety of activities to make the data more usable. This is due to the fact that computers only retrieve data in exactly the format requested (e.g., if asked for "Los Angeles," the computer will not identify

facilities listed under "LA"), and facilities report their data in a wide variety of ways. As a result, EPA has taken steps to use a consistent name for all counties, used a variety of nomenclature standards for names within the database, added latitude and longitude representing the center of the zip code area in which the facility is found, and has taken other steps to assist in the utilization of the data.

EPA generates a facility identification number at the time of data entry. Linkage between all years of reports has been made to the best of EPA's ability. This allows easy retrieval of cross-year data, even when a facility is sold or changes its name. The identification number has been sent to all facilities. Facilities are required to use this number on all future Form R reports submitted to the Agency. Use of this number facilitates data quality and cross-year analysis.

In 1995, EPA provided all states with a listing of facilities that reported for 1994 to verify that both the state and federal government received the same data. States that responded found cases where facilities had not reported to one or the other government. States provided copies of forms to the EPA where EPA had not received copies, and vice-versa. This activity has provided a critical step to assist EPA in coordinating the data collection with the states.

Every year EPA issues Notices of Noncompliance (NONs) to facilities who use invalid forms or provide incomplete forms, incomplete facility identification, or incorrect/ missing chemical identification. These facilities are also notified by telephone to make sure their follow-up revisions correct these errors. A facility that does not comply with a NON may be subject to civil penalties.

For reporting year 1994, EPA has again issued Notices of Technical Error (NOTEs) for missing required data or for incorrect information, such as facility identification numbers or invalid codes. The response rate to the NONs and NOTEs has been very good and has prevented errors from recurring in following years. To help facilities avoid these types of errors, a list of common errors was provided in the 1989 through 1994 reporting year instructions. Due to lack of a final regulation for the pollution prevention data elements and budget cuts for the TRI program, EPA did not issue NOTEs for the 1991 and 1992 reporting years.

ACCURACY EVALUATION

The accuracy of the release data can vary. Some releases can be estimated fairly easily, just by knowing how much of the chemical was used during the reporting year or by weighing drums of solid/liquid waste. Where monitoring of release streams or wastes has been done, release estimates may be within 20% of actual amount released, although infrequent, non-representative sampling may lead to much less accuracy. Estimates of fugitive air emissions and complex wastewaters for which monitoring data are not available may be off by one or even two orders of magnitude, particularly when the release is a small percentage of the amount of the chemical actually processed.

For the 1987 and 1988 reporting years, EPA conducted audits at facilities to determine how well facilities complied with the law and estimated release quantities. These audits did not "confirm" estimates through monitoring, but determined how well facilities used available data and estimation techniques to calculate releases.

Overall, based on the audit of 156 facilities, 1987 total annual releases appeared to have been underestimated by 2%, representing the net effect of overestimates and underestimates. For non-zero release estimates, more than three-

quarters were within a factor of two of EPA's best estimate. About 15% were in error by an order of magnitude or more.

The survey of the 1988 data focused on facilities in Standard Industrial Classification (SIC) codes 28 (chemical manufacturing), 29 (petroleum refining), and 34 (metal finishing and fabrication). Ninety facilities were visited. The aggregate 1988 release estimates in these industries were more accurate than their 1987 estimates, since their aggregate 1988 estimates were found to be approximately equal to the estimates calculated by the EPA contractor.

EPA is conducting another data quality survey of the 1994 data for SIC codes 28 (chemical manufacturing), SIC code 25 (furniture manufacturing), and SIC code 30 (Rubber and plastic products). This survey should be completed by the end of 1996 with results available by early 1997.

For the 1987 and 1988 reporting years, in a different type of survey, EPA also identified approximately 1,800 forms with suspect release data and telephoned facilities to discuss how to improve and correct their estimates. The information from this survey was also used to improve the reporting instructions and technical guidance.

COMPLIANCE ACTIVITIES

EPA has taken steps to make data quality a priority in its enforcement program. EPA conducted approximately 70 inspections during 1995 that focused on data quality in addition to non-reporting violations. EPA has developed a guidance manual for EPA Regional inspectors outlining what to look for when auditing an EPCRA reporting facility. The manual contains detailed guidance on how to determine if a facility has identified all reportable chemicals, made proper threshold determinations, and provided reasonable release estimates.

In fiscal year 1990, $1 million was awarded to 11 states to develop and implement TRI data quality assurance programs. These projects focused on one or more broad data quality assurance objectives: 1) verification of the accuracy of the estimates and other data submitted by the facilities; 2) identification of facilities that should have reported but did not; and 3) identification of discrepancies between TRI data reported to EPA and to the state. Quality assurance activities included facility site visits and telephone audits, cross-checking TRI data against other state data, such as permit data, using computer algorithms to identify suspect estimates, and comparing TRI data across reporting years.

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APPENDIX D

USES OF TRI DATA

INTRODUCTION

The TRI data were first released to the public in 1989. Since then, TRI data use has expanded rapidly, both in terms of the number of data users and the variety and complexity of their projects. This appendix summarizes the major categories of TRI data use and provides a few examples of representative uses in each category.

PUBLIC AWARENESS

Each year, the EPA develops this national summary report and a state fact sheet compendium to distribute to the public at the time the complete national TRI database is first released. These reports help raise public awareness of the TRI data and provide ready access to aggregate information that helps track progress in reducing emissions. Twenty-three states prepare similar summary reports for their TRI data.

Many public interest groups disseminate TRI data by analyzing and compiling it in summary reports. A bibliography prepared by the Working Group on Community Right-to-Know in summer 1994 lists well over 100 state and local reports and more than 30 national TRI reports compiled by public interest groups. These reports may focus attention on top dischargers, identify chemicals or geographic areas of concern, and highlight perceived needs for further action.

- "Manufacturing Pollution," a report produced by Citizen's Fund in August 1992, aggregated 1990 TRI data from different facilities by their parent company. The report summarized releases of all TRI chemicals, as well as subsets of chemicals that could cause cancer or birth defects.

- "Poisons in Our Neighborhoods," a report produced by Citizen's Fund in November 1993, summarized 1991 TRI data nationally and by state. The report attempted to measure the progress of manufacturers in preventing pollution and included report cards evaluating the pollution prevention efforts and performance of the top 50 waste-generating facilities in the chemical industry.

- "Troubled Waters: Major Sources of Toxic Water Pollution," a report released by the U.S. Public Interest Research Group in June 1993, examined TRI releases to surface waters and to publicly owned sewage treatment plants. Release of the report was timed to focus public attention on water and sewer discharges during Congressional attempts to revise the Clean Water Act. The report made

recommendations for amending the Act to provide the public more information about toxic releases to waterways and to strengthen enforcement.

- "Where the Wastes Are," a report released by OMB Watch and the Unison Institute in April 1994, examined facilities receiving the largest quantities of shipments of TRI chemicals in waste. The report identified the largest off-site recipients overall and in particular categories, such as incinerators and landfills. The report also profiled certain companies active in the operation of these toxic waste management facilities.

Because the public now has access to information about what potentially harmful substances are being released into their communities, they can use this information to begin to understand potential risks and to work with facilities to reduce those risks.

- After an analysis of 1987 TRI data revealed that an IBM plant in the "Silicon Valley" area discharged the largest quantities of ozone-depleting chlorofluorocarbons (CFCs) in California, a public interest group organized a campaign to reduce those emissions. Within months, senior management at IBM had pledged to completely eliminate the use of CFCs in their products and processes at the plant by 1993.

- Following the release of an environmental group's report identifying a local facility as the 45th-largest emitter of carcinogens to air in the nation, community activists in Northfield, MN, worked with the Amalgamated Clothing and Textile Workers Union to call for emissions reductions. Contract negotiations between the union and the facility resulted in an agreement for a 64% reduction in the use of toxic chemicals by 1992 and a 90% reduction in toxic emissions by 1993.

- In 1993, the Minnesota Citizens for a Better Environment released a report profiling the state's "top 40 toxic polluters" based on emissions of certain priority chemicals. The report was designed to provide enough information to support local efforts to negotiate with facilities for emissions reductions. Since publication, activists have worked with 18 of the 40 facilities identified in the report.

VOLUNTARY EMISSIONS REDUCTIONS

The public availability of the TRI data has led many corporations to commit publicly to voluntary emissions reductions. One well-known pledge was Monsanto's 1989 commitment to reduce its worldwide air emissions of toxic chemicals by 90% by 1992. In addition to providing the impetus for these reduction pledges, the TRI data also provide the public with the measurement tool needed to track companies' progress, as well as providing the companies a means of demonstrating their commitment and success.

A number of national, state, and local voluntary emissions reduction programs have sprung up since the beginning of TRI reporting. Many of these programs use TRI data to set toxic emissions reduction goals and to track progress in meeting those goals. Most of these programs provide positive recognition to companies or facilities that meet their reduction pledges.

- EPA's "33/50 Program" targeted 17 priority TRI chemicals for emissions reductions of 33% by 1992 and 50% by 1995, from 1988 levels. Chapter 4 of this report discusses the 33/50 program and its early achievement of the 50% reduction goal.

- Louisiana's Environmental Leadership Pollution Prevention Program is a statewide emissions prevention and reduction program that seeks a 45% reduction in toxic chemical emissions by 1997, using 1992 data as a baseline. The program sponsors the Governor Awards for Environmental Excellence to promote public recognition of industry achievements.

- The states of Kentucky, Ohio, and West Virginia have joined together in a "Tri-State Initiative" to identify, prevent, and remediate environmental threats in an area known for its industrial base and its susceptibility to air inversions. Program coordinators are using a risk assessment process to focus on sources of greatest concern. The program will use voluntary industry commitments and cooperative efforts between industry, the public, and government to achieve reductions in releases of TRI chemicals and criteria air pollutants.

POLLUTION PREVENTION TARGETING

Many government agencies are using TRI data to identify pollution prevention opportunities and better target their technical and financial assistance resources.

- The Pollution Prevention Program of the Colorado Department of Public Health and the Environment used TRI data, in combination with other air and water emissions data and hazardous waste data, to identify 10 industry sectors which are responsible for the largest quantities of hazardous waste generation or toxic emissions in the state. This study will serve as the basis for establishing priorities for pollution prevention activities and for distribution of technical assistance grants. The report will also be used to target large companies for participation in a Governor's Pollution Prevention Challenge Program to reduce toxic emissions and hazardous waste generation.

- The Pollution Prevention Division of the state of Georgia's Department of Natural Resources used TRI data in the process of identifying the technical assistance needs of manufacturing sectors that generate chemicals posing the greatest relative risk to public health and the environment. First, the Division prioritized chemicals based on toxicity and regulatory factors. The Division then examined manufacturing sectors releasing the highest-priority chemicals and identified particular subsectors for further assessment. The program is now conducting in-depth manufacturing sector assessments, including focus groups and site visits, to determine what processes produce the wastes, what multi-media waste problems exist, what pollution prevention activities are currently being undertaken, and what additional opportunities exist.

LEGISLATION AND REGULATION

The large quantities of toxic emissions reported under TRI have highlighted the need for changes in environmental regulations and legislation. Environmental groups have used TRI data to lobby for new or stronger national and state environmental protection laws or better enforcement of existing regulations. Government agencies have used TRI data to set priorities for regulatory development and implementation.

- TRI data provided the impetus for passage of pollution prevention laws in many states. Many of these laws require facility pollution

prevention planning; some laws charge facilities fees based on quantities of toxic chemical emissions or waste generated.

- The magnitude of largely unregulated air toxics releases revealed by the TRI data identified the need for additional air toxics legislation and helped create the political climate necessary to pass such laws. The release of the first national TRI data in 1989 helped lead to the passage of stringent air toxics requirements in the Clean Air Act Amendments of 1990. TRI data helped spur the Louisiana state legislature to require the state Department of Environmental Quality to issue regulations identifying 100 priority pollutants, setting emissions standards for those pollutants, and targeting a 50% emissions reduction from 1987 levels by 1994. A public interest group report on unregulated air toxics emissions in North Carolina led the state's Environmental Management Commission to set limits for 105 air pollutants.

- TRI data were used by some states in developing their lists of waters impaired by toxic pollutants under section 304(l) of the Clean Water Act. Public interest groups in 10 states used TRI data to petition EPA to add certain other bodies of water to these lists. For example, in North Carolina, the Clean Water Fund used TRI data and stream flow information to show that toxicity levels in 15 areas exceeded state and federal criteria for protecting human health and the environment.

EDUCATION

The TRI data are being used in many environmental education programs, particularly at the high school and university levels. Students learn about toxic chemical releases, the potential health and environmental effects of those releases, pollution prevention activities and opportunities, and the social and political aspects of environmental protection. Some organizations are also conducting educational outreach programs using TRI data.

- Students in the Environmental Studies Department at Dickinson College (Pennsylvania) use TRI data to conduct toxic waste audits on communities or facilities. Students identify epidemiological and environmental health effects, occupational exposure standards, and other relevant information. Students arrange plant tours which focus on toxic chemical use reduction and "good neighbor" agreements between facilities and communities. They also meet with local citizens, environmental organizations, labor unions and others.

- The John Snow Institute Center for Environmental Health Studies has developed a tutorial entitled "Environment and Health: How to Investigate Community Environmental Health Problems." This tutorial introduces the public to TRI and other resources which can be used to identify and address local pollution sources. Audiences include librarians, local officials, members of the media, environmental advocates, the general public, and students from high school to graduate level.

RISK SCREENING

TRI data are used extensively to identify and prioritize potential risks from toxic chemical releases. Risk screening processes using TRI data can help governments and others target facilities, industries, chemicals, or geographic areas for further investigation or follow-up

actions, including voluntary reduction efforts, technical assistance, incentives and disincentives, regulation development, or enforcement.

Simple risk screening techniques may sum TRI release data or release and transfer data by facility, geographic area, industry sector, or chemical. These approaches rely on certain assumptions, such as equal hazard potential from all chemicals and equal exposure potential for each environmental medium.

Other approaches weight the TRI data by the toxicity of the released chemical. Weights may be qualitative or quantitative toxicity rankings, or they may be based on toxicity values, such as a cancer potency or an acceptable dose level. More complex systems incorporate exposure evaluations, including information about chemical fate, environmental dispersion, and the size and characterization of receptors.

- New York State's Department of Health developed a risk screening protocol which uses TRI air release data to produce relative risk rankings for facilities and chemicals within the state. The procedure combines air emissions data and toxicity potency data to give a quantitative risk screening score for each facility. Three separate rankings were developed, based on carcinogenicity, non-cancer endpoints, and a combination of both factors. The results of these rankings suggested to the Department of Health that there is a need for more careful evaluation of potential health effects resulting from large releases of noncarcinogenic compounds such as respiratory irritants and small releases of very potent inorganic carcinogens.

- EPA's Office of Water used TRI data and other water emissions data in its National Sediment Contaminant Source Inventory, an evaluation of sources of sediment contamination in the U.S. This project identified point source pollutant discharges that may result in sediment contamination and analyzed these releases based on their potential sediment hazard. Chemical release amounts were weighted by the compound's relative toxicity to aquatic or human health, as well as relevant fate and transport factors. The study identified chemicals, geographic areas, and industrial categories of greatest concern for sediment contamination.

- Three EPA Regional offices are developing a screening process that will allow decision-makers to focus pollution prevention efforts, exposure and risk assessments, or epidemiological studies on areas of greatest concern. The first phase of the process produces a "Chronic Index," which ranks TRI releases in terms of their relative toxicity. The results of this Index are aggregated by facility, by chemical, and by geographic area using a grid system. The second phase of the process will produce a "Vulnerability Index," which describes the susceptibility of populations by scoring demographic attributes such as age, economic status, and minority status.

- EPA's Office of Pollution Prevention and Toxics is nearing completion of its TRI "Environmental Indicators Model," which provides year-to-year indicators of the potential impacts of TRI chemical releases on human health and the environment. The indicators consider TRI release and transfer volumes, chronic toxicity, exposure potential, and size of receptor populations. Both generic and site-specific exposure characteristics can be incorporated. The model will allow targeting and prioritization of chemicals, industries, and geographic areas.

ENVIRONMENTAL JUSTICE ANALYSIS

Public interest groups, academics, and government researchers are using TRI data to investigate environmental justice issues. TRI data can be used to help determine whether members of racial or ethnic minorities or people with lower-income levels may experience higher levels of exposure to or risk from toxic chemicals released by industrial facilities.

- Researchers from EPA's Office of Health Research recently published a study of national and regional differences in county-level TRI air emissions according to the ethnicity or race and household income of the populations. Using a measure known as a "Population Emissions Index," a population-weighted average emission for each county, the study found that all minority groups except Native Americans tend to live in counties where TRI air emissions levels are higher than in counties where whites live. However, the data also suggest that household incomes tend to be higher in counties with higher TRI air releases.

- Researchers at the University of California, Santa Barbara's Center for Geographic Information and Analysis used 1989 TRI data and 1990 U.S. Census data to examine and map significant relationships between the race and income of populations and their proximity to TRI sites in Los Angeles.

GEOGRAPHIC INFORMATION SYSTEMS

Many organizations are incorporating TRI data into computerized Geographic Information Systems (GIS) to analyze and display TRI data and to examine potential impacts in particular geographic areas. GIS is particularly useful for combining data from multiple sources, because it allows overlays of data for the same geographic areas for display and analysis. GIS can show locations of emissions sources (such as TRI sites) relative to receptors (such as residential populations or water sources), environmental characteristics surrounding the sites, and political boundaries. GIS users can perform calculations, such as determining the number of people within a certain distance of a facility, and can build sophisticated models to evaluate potential risks.

- The New Jersey Department of Environmental Protection and Energy used TRI data in a GIS to prioritize facilities and geographic areas for implementation of pollution prevention measures. A grid system of two-mile by two-mile cells was used for aggregation of air releases and land releases. Minor watersheds were used to aggregate and map water releases. In order to study the cumulative impact of many releases in the area, chemicals were grouped based on health and environmental effects.

- EPA's Office of Information Resources Management sponsored the development of a Population Estimation and Characterization Tool, which uses GIS technology and demographic data for risk-based and environmental justice applications. The tool allows users to estimate and characterize populations within a given radius of a single TRI facility or multiple facilities and to identify areas of multiple potential exposure.

ENFORCEMENT AND COMPLIANCE

Because the TRI data include detailed facility identification information, as well as releases to all media and transfers to off-site locations, TRI is particularly well-suited to multi-media enforcement and compliance planning, priority-

setting, and targeting. TRI data can be integrated with other release and waste generation data, monitoring data, and compliance history information to provide a more complete picture of facility or industry compliance with environmental regulations.

- EPA's Office of Research and Development and Office of Enforcement and Compliance Assurance are developing a "Multi-Media Ranking System" to prioritize sites for enforcement actions and to evaluate the effectiveness of environmental laws in reducing risks from sites. The system ranks sites based on their multi-media releases of pollutants, their potential risk to human health and the environment, and the history of legal violations by the facility. The system combines TRI data with data from EPA air and water databases. For each site, the system develops a Chemical Ranking Factor based on chemical toxicity and fate information, a Vulnerability Ranking Factor based on the climate, soil type, and other environmental properties surrounding the site, and a Population Ranking Factor based on the demographic characteristics surrounding the site.

EPA and many states are also using TRI data to attempt to identify violations of various environmental statutes, such as the Clean Air Act and the Clean Water Act.

- Twenty states use TRI data to target permit compliance inspections of facilities.

- EPA's Office of Air and Radiation has used the TRI data to aid in identifying potential or actual violations of the National Ambient Air Quality Standards for lead.

- EPA's Office of Solid Waste and Emergency Response has used TRI data as a means of establishing potential liability under the Comprehensive Environmental Response, Compensation and Liability Act and the Resource Conservation and Recovery Act.

"GREEN INDEXING"

Investment analysts, researchers and others are using TRI data, along with other environmental and social data, to rate companies' comparative environmental performance. Demand for environmental performance information by investors, insurance companies, and the public has led many companies to develop environmental annual reports similar to annual reports on financial performance traditionally prepared for investors.

- The Clean Yield Group, an investment portfolio management group, compares companies' TRI release data to their industry averages of pounds of toxic chemicals per dollar of sales. This serves as a rough yardstick to gauge how a company measures up against other companies in its industry and allows the investment firm to track how the company's release performance is improving from year to year.

- The Investor Responsibility Research Center, Inc., a not-for-profit research organization for institutional investors, uses TRI data in developing its *Corporate Environmental Profile Directory*. This directory presents quantitative, consistently derived data that allows investors to evaluate and compare corporate environmental performance. The corporate profiles include TRI release and transfer data, as well as an "Emissions Efficiency Index" which compares toxic chemical emissions to the company's domestic revenue.

- *Fortune* magazine used TRI data as a central element in compiling a "green index" of America's biggest manufacturers. The magazine examined companies' environmental records and developed a relative ranking system that assigned companies scores from zero to 10 in 20 performance categories, including the amount of toxic emissions per dollar value of sales and their percent reduction in toxic chemical emissions. The article included lists of 10 leading companies, 10 "laggard" companies, and 10 most improved companies.

The concept of "green indexing" can also be applied to industry sectors or to geographic areas. For example, TRI and other environmental data can be used to rank industries based on their comparative potential for environmental harm or to rank states based on indicators of their environmental quality.

- A researcher in Louisiana developed a method for normalizing the TRI data to allow comparisons among facilities, industries, and states to help evaluate the comparative effectiveness of pollution control strategies, policies, and programs. The method calculates an "emissions-to-jobs ratio," the number of pounds of emissions per job in a given industry and location. This ratio is then compared to a national or other average to determine relative performance. It can also be tracked over time to evaluate improvement.

- The Institute for Southern Studies, a public interest group, used TRI data in producing a report entitled "The 1991-1992 Green Index: A State-by-State Guide to the Nation's Environmental Health." This report ranked states according to numerous environmental criteria, including toxic chemical emissions.

TAXES AND FEES

A number of states base fees on the number of TRI reports filed or the quantity of TRI chemicals released and/or transferred from facilities. Some states use TRI data to tax facilities or to modify their taxes. Taxes and fees can serve as important incentives to prevent waste generation and pollution.

- The "environment-to-jobs" ratio calculated in Louisiana was included in an environmental scorecard that was developed and implemented to modify tax exemptions granted to facilities to encourage and reward job creation. If a facility's environmental score (including its "environment-to-jobs ratio") was low, the amount of the tax exemption could be decreased.

- The U.S. Internal Revenue Service used TRI data to identify companies releasing CFCs in order to enforce a tax imposed on releases of CFCs.

APPENDIX E

REGULATORY MATRIX: TRI CHEMICALS IN OTHER FEDERAL PROGRAMS

Many of the chemicals covered under TRI are also subject to other environmental laws. The following matrix indicates whether the currently listed TRI chemicals are subject to any of the following selected environmental laws:

1. EPCRA 302: EPCRA section 302 (codified at 40 CFR Part 355), facilities with listed extremely hazardous substances (EHSs) in quantities greater than their Threshold Planning Quantities (TPQs) must report to the State Emergency Response Commission. TPQs are based on a combination of acute toxicity and ability of the substance to become airborne. The list of EHSs and their TPQs can be found at 40 CFR Part 355 Appendix A. For more information, contact the EPCRA Information Hotline: 1-800-535-0202.

2. CAA 112: The Clean Air Act (CAA) section 112(b), National Emission Standards for Hazardous Air Pollutants (NESHAPS; codified at 40 CFR Part 61), lists the Hazardous Air Pollutants and includes emissions standards and monitoring requirements for plants with listed chemicals.

3. CERCLA: Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA; 42 USC 9601 et seq.), releases of listed substances at or above their Reportable Quantities (RQs) must be reported to the National Response Center. RQs are set on the basis of aquatic toxicity, acute mammalian toxicity, ignitability, reactivity, chronic toxicity, and carcinogenicity, with possible adjustment on the basis of biodegradation, hydrolysis, and photolysis. The list of CERCLA hazardous substances and their RQs can be found at 40 CFR 302.4. For more information, contact the RCRA/Superfund Hotline: 1-800-424-9346.

4. FIFRA: The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) creates a statutory framework under which EPA, through a registration process, regulates the development, sale, distribution, and use of pesticides.

5. NPDWR: The National Primary Drinking Water Regulations (NPDWR) under the Safe Drinking Water Act, Subparts B and G (codified at 40 CFR Part 141) list Maximum

Contaminant Levels (MCLs) for certain chemicals. The MCL is the maximum permissible level of a contaminant in public drinking water systems. MCLs are based on health factors, but are also required by law to reflect the technological and economic feasibility of removing the contaminant from the water supply. Further information is available from the Safe Drinking Water Hotline: 1-800-424-4791.

6. PPL: The Clean Water Act (CWA) regulates the discharge of pollutants into waterways by industrial sources, municipal sources, and other sources. These sources of water pollution are subject to effluent limitations based on guidelines and water quality standards. Approximately 125 pollutants make up a "Priority Pollutants List" (PPL). EPA has developed water quality criteria for all the priority pollutants.

7. RCRA (P/U): Under the Resource Conservation and Recovery Act (RCRA), hazardous waste is required to be managed "cradle to grave" (i.e., from the point of generation to the point of ultimate disposal). For a waste to be classified as hazardous, it can be an F, K, P, or U listed hazardous waste (40 CFR 261.30 - 261.33) or exhibit one of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. The chemicals on the P and U list are commercial chemical products, off-specification species, container residues, and spill residues. The chemicals on the P list have been identified as acute hazardous waste; those on the U list have been identified as toxic waste. For more information, contact the RCRA/Superfund Hotline: 1-800-424-9346.

CAS Number❶	Chemical	EPCRA 302	CAA 112(b)	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
75-07-0	Acetaldehyde		X	X					X
60-35-5	Acetamide		X	X					
75-05-8	Acetonitrile		X	X					X
53-96-3	2-Acetylaminofluorene		X	X					X
107-02-8	Acrolein	X	X	X	X		X	X	
79-06-1	Acrylamide	X	X	X		X			X
79-10-7	Acrylic acid		X	X					X
107-13-1	Acrylonitrile	X	X	X			X		X
309-00-2	Aldrin	X		X			X	X	
107-18-6	Allyl alcohol	X		X				X	
107-05-1	Allyl chloride		X	X					
7429-90-5	Aluminum (fume or dust)								
1344-28-1	Aluminum oxide (fibrous forms)								
117-79-3	2-Aminoanthraquinone								
60-09-3	4-Aminoazobenzene								
92-67-1	4-Aminobiphenyl		X	X					
82-28-0	1-Amino-2-methylanthraquinone								
61-82-5	Amitrole			X	X				X
7664-41-7	Ammonia	X		X					
6484-52-2	Ammonium nitrate (solution)								
7783-20-2	Ammonium sulfate (solution)								
62-53-3	Aniline	X	X	X					X
90-04-0	o-Anisidine		X	X					
104-94-9	p-Anisidine								
134-29-2	o-Anisidine hydrochloride								
120-12-7	Anthracene			X			X		
7440-36-0	Antimony		X	X		X	X		
—	Antimony compounds		X	X		X			
7440-38-2	Arsenic		X	X		X	X		
—	Arsenic compounds		X	X		X			
1332-21-4	Asbestos (friable)		X	X		X	X		
7440-39-3	Barium					X			
—	Barium compounds					X			
98-87-3	Benzal chloride	X		X					X
55-21-0	Benzamide								
71-43-2	Benzene		X	X		X	X		X
92-87-5	Benzidine		X	X			X		X
98-07-7	Benzoic trichloride	X	X	X					X
98-88-4	Benzoyl chloride			X					
94-36-0	Benzoyl peroxide								
100-44-7	Benzyl chloride	X	X	X				X	
7440-41-7	Beryllium		X	X		X	X		
—	Beryllium compounds		X	X		X			
92-52-4	Biphenyl		X	X	X				
111-91-1	Bis(2-chloroethoxy) methane			X				X	
111-44-4	Bis(2-chloroethyl) ether	X	X	X			X		X
542-88-1	Bis(chloromethyl) ether	X	X	X			X	X	
108-60-1	Bis(2-chloro-1-methylethyl) ether			X			X		X
103-23-1	Bis(2-ethylhexyl) adipate					X			
353-59-3	Bromochlorodifluoromethane (Halon 1211)			X					
75-25-2	Bromoform		X	X		X	X		X
74-83-9	Bromomethane	X	X	X	X		X		X

CAS Number❶	Chemical	EPCRA 302	CAA 112(b)	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
75-63-8	Bromotrifluoromethane (Halon 1301)			X					
106-99-0	1,3-Butadiene		X	X					
141-32-2	Butyl acrylate								
71-36-3	n-Butyl alcohol			X					X
78-92-2	sec-Butyl alcohol								
75-65-0	tert-Butyl alcohol								
106-88-7	1,2-Butylene oxide		X	X					
123-72-8	Butyraldehyde								
4680-78-8	C.I. Acid Green 3								
569-64-2	C.I. Basic Green 4								
989-38-8	C.I. Basic Red 1								
1937-37-7	C.I. Direct Black 38								
2602-46-2	C.I. Direct Blue 6								
16071-86-6	C.I. Direct Brown 95								
2832-40-8	C.I. Disperse Yellow 3								
3761-53-3	C.I. Food Red 5								
81-88-9	C.I. Food Red 15								
3118-97-6	C.I. Solvent Orange 7								
97-56-3	C.I. Solvent Yellow 3								
842-07-9	C.I. Solvent Yellow 14								
492-80-8	C.I. Solvent Yellow 34			X					X
128-66-5	C.I. Vat Yellow 4								
7440-43-9	Cadmium		X	X		X	X		
—	Cadmium compounds		X	X		X			
156-62-7	Calcium cyanamide		X	X					
133-06-2	Captan		X	X	X				
63-25-2	Carbaryl		X	X	X				
75-15-0	Carbon disulfide	X	X	X				X	
56-23-5	Carbon tetrachloride		X	X		X	X		X
463-58-1	Carbonyl sulfide		X	X					
120-80-9	Catechol		X	X					
133-90-4	Chloramben		X	X					
57-74-9	Chlordane	X	X	X	X	X	X		X
7782-50-5	Chlorine	X	X	X	X				
10049-04-4	Chlorine dioxide				X				
79-11-8	Chloroacetic acid	X	X	X					
532-27-4	2-Chloroacetophenone		X	X					
108-90-7	Chlorobenzene		X	X		X	X		X
510-15-6	Chlorobenzilate		X	X					X
75-68-3	1-Chloro-1,1-difluoroethane								
75-45-6	Chlorodifluoromethane								
75-00-3	Chloroethane		X	X			X		
67-66-3	Chloroform	X	X	X		X	X		X
74-87-3	Chloromethane		X	X			X		X
107-30-2	Chloromethyl methyl ether	X	X	X					X
—	Chlorophenols			X					
126-99-8	Chloroprene		X	X					
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane								
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane								
63938-10-3	Chlorotetrafluoroethane								
1897-45-6	Chlorothalonil				X				
7440-47-3	Chromium		X	X		X	X		
—	Chromium compounds		X	X		X			
7440-48-4	Cobalt		X						

CAS Number[1]	Chemical	EPCRA 302	CAA 112(b)	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
—	Cobalt compounds		X	X					
7440-50-8	Copper			X	X	X	X		
—	Copper compounds			X	X	X			
8001-58-9	Creosote			X	X				X
120-71-8	p-Cresidine								
1319-77-3	Cresol (mixed isomers)		X	X					X
108-39-4	m-Cresol		X	X	X				
95-48-7	o-Cresol	X	X	X					
106-44-5	p-Cresol		X	X					
98-82-8	Cumene		X	X					X
80-15-9	Cumene hydroperoxide			X					X
135-20-6	Cupferron								
—	Cyanide compounds	X	X	X		X			
110-82-7	Cyclohexane			X					X
94-75-7	2,4-D (acetic acid)		X	X	X	X			X
1163-19-5	Decabromodiphenyl oxide								
2303-16-4	Diallate			X					X
615-05-4	2,4-Diaminoanisole								
39156-41-7	2,4-Diaminoanisole sulfate								
101-80-4	4,4'-Diaminodiphenyl ether								
25376-45-8	Diaminotoluene (mixed isomers)			X					X
95-80-7	2,4-Diaminotoluene		X	X					X
334-88-3	Diazomethane		X	X					
132-64-9	Dibenzofuran		X	X					
96-12-8	1,2-Dibromo-3-chloropropane		X	X		X			X
106-93-4	1,2-Dibromoethane		X	X	X	X			X
124-73-2	Dibromotetrafluoroethane (Halon 2402)			X					
84-74-2	Dibutyl phthalate		X	X			X		X
25321-22-6	Dichlorobenzene (mixed isomers)			X			X		
95-50-1	1,2-Dichlorobenzene			X		X	X		X
541-73-1	1,3-Dichlorobenzene			X			X		X
106-46-7	1,4-Dichlorobenzene		X	X	X	X	X		X
91-94-1	3,3'-Dichlorobenzidine		X	X			X		X
75-27-4	Dichlorobromomethane			X		X	X		
764-41-0	4,4-Dichloro-2-butene			X					X
75-71-8	Dichlorodifluoromethane (CFC-12)			X					X
107-06-2	1,2-Dichloroethane		X	X	X	X	X		X
540-59-0	1,2-Dichloroethylene								
1717-00-6	1,1-Dichloro-1-fluoroethane								
75-09-2	Dichloromethane		X	X		X	X		X
120-83-2	2,4-Dichlorophenol			X			X		X
78-87-5	1,2-Dichloropropane		X	X		X	X		X
78-88-6	2,3-Dichloropropene			X					
542-75-6	1,3-Dichloropropylene		X	X	X		X		X
76-14-2	Dichlorotetrafluoroethane			X					
34077-87-7	Dichlorotrifluoroethane								
306-83-2	1,1-Dichloro-1,2,2-trifluoroethane								
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane								
90454-18-5	Dichloro-1,1,2-trifluoroethane								
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane								
62-73-7	Dichlorvos	X	X	X	X				
115-32-2	Dicofol			X	X				
1464-53-5	Diepoxybutane	X		X					X

CAS Number❶	Chemical	EPCRA 302	CAA 112(b)	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
111-42-2	Diethanolamine		X	X					
117-81-7	Di-(2-ethylhexyl) phthalate		X	X		X	X		X
84-66-2	Diethyl phthalate			X			X		X
64-67-5	Diethyl sulfate		X	X					
94-58-6	Dihydrosafrole			X					X
119-90-4	3,3'-Dimethoxybenzidine		X	X					X
60-11-7	4-Dimethylaminoazobenzene		X	X					X
119-93-7	3,3'-Dimethylbenzidine		X	X					X
79-44-7	Dimethylcarbamyl chloride		X	X					X
57-14-7	1,1-Dimethyl hydrazine	X	X	X					X
105-67-9	2,4-Dimethylphenol			X	X		X		X
131-11-3	Dimethyl phthalate		X	X			X		X
99-65-0	m-Dinitrobenzene			X					
528-29-0	o-Dinitrobenzene			X					
100-25-4	p-Dinitrobenzene			X					
534-52-1	4,6-Dinitro-o-cresol	X	X	X	X		X	X	
51-28-5	2,4-Dinitrophenol		X	X			X	X	
121-14-2	2,4-Dinitrotoluene		X	X			X		X
606-20-2	2,6-Dinitrotoluene			X			X		X
25321-14-6	Dinitrotoluene (mixed isomers)			X			X		
123-91-1	1,4-Dioxane		X	X					X
122-66-7	1,2-Diphenylhydrazine		X	X			X		X
106-89-8	Epichlorohydrin	X	X	X		X			X
110-80-5	2-Ethoxyethanol		X	X					X
140-88-5	Ethyl acrylate		X	X					X
100-41-4	Ethylbenzene		X	X		X	X		
541-41-3	Ethyl chloroformate								
74-85-1	Ethylene				X				
—	Ethylenebisdithiocarbamic acid, salts and esters			X					X
107-21-1	Ethylene glycol		X	X					
151-56-4	Ethyleneimine	X	X	X				X	
75-21-8	Ethylene oxide	X	X	X	X				X
96-45-7	Ethylene thiourea		X	X					X
75-34-3	Ethylidene dichloride			X					X
2164-17-2	Fluometuron				X				
50-00-0	Formaldehyde	X	X	X	X				X
64-18-6	Formic acid			X					X
76-13-1	Freon 113								
—	Glycol ethers		X	X					
76-44-8	Heptachlor		X	X	X	X	X	X	
118-74-1	Hexachlorobenzene		X	X		X	X		X
87-68-3	Hexachloro-1,3-butadiene		X	X			X		X
77-47-4	Hexachlorocyclopentadiene	X	X	X		X	X		X
67-72-1	Hexachloroethane		X	X			X		X
1335-87-1	Hexachloronaphthalene								
70-30-4	Hexachlorophene			X					X
680-31-9	Hexamethylphosphoramide		X	X					
302-01-2	Hydrazine	X	X	X					X
10034-93-2	Hydrazine sulfate								
7647-01-0	Hydrochloric acid	X	X	X	X				
74-90-8	Hydrogen cyanide	X		X		X		X	
7664-39-3	Hydrogen fluoride	X	X	X					X
123-31-9	Hydroquinone	X	X	X					
78-84-2	Isobutyraldehyde								

CAS Number[1]	Chemical	EPCRA 302	CAA 112(b)	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
67-63-0	Isopropyl alcohol (manufacturing)				X				
80-05-7	4,4'-Isopropylidenediphenol								
120-58-1	Isosafrole			X					X
7439-92-1	Lead		X	X		X	X		
—	Lead compounds		X	X		X			
58-89-9	Lindane	X	X	X	X	X	X		X
108-31-6	Maleic anhydride		X	X					X
109-77-3	Malononitrile			X					X
12427-38-2	Maneb				X				
7439-96-5	Manganese		X						
—	Manganese compounds		X	X					
7439-97-6	Mercury		X	X		X	X		
—	Mercury compounds		X	X		X			
126-98-7	Methacrylonitrile	X		X					X
67-56-1	Methanol		X	X	X				X
72-43-5	Methoxychlor		X	X	X	X			X
109-86-4	2-Methoxyethanol		X		X				
96-33-3	Methyl acrylate								
79-22-1	Methyl chlorocarbonate			X					X
109-06-8	2-Methylpyridine			X					X
1634-04-4	Methyl tert-butyl ether		X	X					
101-14-4	4,4'-Methylenebis (2-chloroaniline)		X	X					X
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine								
101-68-8	Methylenebis(phenylisocyanate)		X	X					
74-95-3	Methylene bromide			X					X
101-77-9	4,4'-Methylenedianiline		X	X					
78-93-3	Methyl ethyl ketone		X	X					X
60-34-4	Methyl hydrazine	X	X	X				X	
74-88-4	Methyl iodide		X	X					X
108-10-1	Methyl isobutyl ketone		X	X					X
624-83-9	Methyl isocyanate	X	X	X				X	
80-62-6	Methyl methacrylate		X	X					X
90-94-8	Michler's ketone								
1313-27-5	Molybdenum trioxide								
76-15-3	Monochloropentafluoroethane (CFC-115)			X					
505-60-2	Mustard gas	X							
91-20-3	Naphthalene		X	X	X		X		X
134-32-7	alpha-Naphthylamine			X					X
91-59-8	beta-Naphthylamine			X					X
7440-02-0	Nickel		X	X		X	X		
—	Nickel compounds		X	X					
7697-37-2	Nitric acid	X		X					
139-13-9	Nitrilotriacetic acid								
99-59-2	5-Nitro-o-anisidine								
99-55-8	5-Nitro-o-toluidine			X					X
98-95-3	Nitrobenzene	X	X	X			X		X
92-93-3	4-Nitrobiphenyl		X	X					
1836-75-5	Nitrofen								
51-75-2	Nitrogen mustard	X							
55-63-0	Nitroglycerin			X				X	
88-75-5	2-Nitrophenol			X			X		
100-02-7	4-Nitrophenol		X	X	X		X		X

CAS Number❶	Chemical	EPCRA 302	CAA 112(b)	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
79-46-9	2-Nitropropane		X	X					X
156-10-5	p-Nitrosodiphenylamine								
121-69-7	N,N-Dimethylaniline		X	X					
924-16-3	N-Nitrosodi-n-butylamine			X					X
55-18-5	N-Nitrosodiethylamine			X					X
62-75-9	N-Nitrosodimethylamine	X	X	X			X	X	
86-30-6	N-Nitrosodiphenylamine			X			X		
621-64-7	N-Nitrosodi-n-propylamine			X			X		X
4549-40-0	N-Nitrosomethylvinylamine			X				X	
59-89-2	N-Nitrosomorpholine		X	X					
759-73-9	N-Nitroso-N-ethylurea			X					X
684-93-5	N-Nitroso-N-methylurea		X	X					X
16543-55-8	N-Nitrosonornicotine								
100-75-4	N-Nitrosopiperidine			X					X
2234-13-1	Octochloronaphthalene								
20816-12-0	Osmium tetroxide			X				X	
123-63-7	Paraldehyde			X					X
56-38-2	Parathion	X	X	X	X			X	
76-01-7	Pentachloroethane			X					X
87-86-5	Pentachlorophenol		X	X	X	X	X		X
79-21-0	Peracetic acid	X			X				
108-95-2	Phenol	X	X	X	X		X		X
106-50-3	p-Phenylenediamine		X	X					
90-43-7	2-Phenylphenol				X				
75-44-5	Phosgene	X	X	X				X	
7664-38-2	Phosphoric acid			X	X				
7723-14-0	Phosphorus (yellow or white)	X	X	X	X				
85-44-9	Phthalic anhydride		X	X					X
88-89-1	Picric acid								
—	Polybrominated biphenyls								
1336-36-3	Polychlorinated biphenyls (PCBs)		X	X		X			
23950-58-5	Pronamide			X					X
1120-71-4	Propane sultone		X	X					X
57-57-8	beta-Propiolactone	X	X	X					
123-38-6	Propionaldehyde		X	X					
114-26-1	Propoxur		X	X	X				
115-07-1	Propylene								
75-55-8	Propyleneimine	X	X	X				X	
75-56-9	Propylene oxide	X	X	X	X				
110-86-1	Pyridine			X					X
91-22-5	Quinoline		X	X					
106-51-4	Quinone		X	X					X
82-68-8	Quintozene		X	X	X				X
81-07-2	Saccharin (manufacturing)			X					X
94-59-7	Safrole			X					X
7782-49-2	Selenium		X	X		X	X		
—	Selenium compounds		X	X		X			
7440-22-4	Silver			X	X		X		
—	Silver compounds			X	X				
100-42-5	Styrene		X	X		X			
96-09-3	Styrene oxide		X	X					
7664-93-9	Sulfuric acid (acid aerosols)	X		X	X				
630-20-6	1,1,1,2-Tetrachloroethane			X					X
79-34-5	1,1,2,2-Tetrachloroethane		X	X			X		X
127-18-4	Tetrachloroethylene		X	X		X	X		X

CAS Number[1]	Chemical	EPCRA 302	CAA 112(b)	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
961-11-5	Tetrachlorvinphos				X				
7440-28-0	Thallium			X		X	X		
62-55-5	Thioacetamide			X					X
139-65-1	4,4'-Thiodianiline								
62-56-6	Thiourea			X					X
137-26-8	Thiram			X	X				X
1314-20-1	Thorium dioxide								
7550-45-0	Titanium tetrachloride	X	X	X					
108-88-3	Toluene		X	X		X	X		X
584-84-9	Toluene-2,4-diisocyanate	X	X	X					X
91-08-7	Toluene-2,6-diisocyanate	X		X					X
26471-62-5	Toluenediisocyanate (mixed isomers)	X		X					X
95-53-4	o-Toluidine		X	X					X
636-21-5	o-Toluidine hydrochloride			X					X
8001-35-2	Toxaphene	X	X	X	X	X	X	X	
68-76-8	Triaziquone								
52-68-6	Trichlorfon			X	X				
120-82-1	1,2,4-Trichlorobenzene		X	X		X	X		
71-55-6	1,1,1-Trichloroethane		X	X	X	X	X		X
79-00-5	1,1,2-Trichloroethane		X	X		X	X		X
79-01-6	Trichloroethylene		X	X		X	X		X
75-69-4	Trichlorofluoromethane (CFC-11)			X					X
95-95-4	2,4,5-Trichlorophenol		X	X					X
88-06-2	2,4,6-Trichlorophenol		X	X			X		X
1582-09-8	Trifluralin		X	X	X				
95-63-6	1,2,4-Trimethylbenzene								
126-72-7	Tris(2,3-dibromopropyl) phosphate			X					X
72-57-1	Trypan blue			X					X
51-79-6	Urethane		X	X					X
7440-62-2	Vanadium (fume or dust)								
108-05-4	Vinyl acetate	X	X	X					
593-60-2	Vinyl bromide		X	X					
75-01-4	Vinyl chloride		X	X		X	X		X
75-35-4	Vinylidene chloride		X	X		X	X		X
—	Warfarin and salts			X				X	X
1330-20-7	Xylene (mixed isomers)		X	X	X	X			X
108-38-3	m-Xylene		X	X					X
95-47-6	o-Xylene		X	X					X
106-42-3	p-Xylene		X	X					X
87-62-7	2,6-Xylidine								
7440-66-6	Zinc (fume or dust)			X	X		X		
—	Zinc compounds			X	X				
12122-67-7	Zineb								

[1] Compound categories do not have CAS numbers (—).

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APPENDIX F

TRI FORM R FOR 1994

The 1994 Form R (a copy of which follows) is divided into two parts:

- **Part I (Facility Identification Information)** contains information on such matters as name, address, parent company information and contact names and phone numbers for the facility.
- **Part II (Chemical-Specific Information)** contains information such as chemical identity, facility activities and uses of the chemical, on-site release and transfer amounts, on-site waste treatment methods and efficiencies, and data on source reduction and recycling activities.

Readers who are interested in a more in-depth understanding of who is required to report to TRI and how to fill out the Form R, should refer to the EPCRA Information Hotline at 1-800-535-0202.

(IMPORTANT: Type or print; read instructions before completing form)

Form Approved OMB Number: 2070-0093
Approval Expires: 11/92

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FORM R TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

WHERE TO SEND COMPLETED FORMS:

1. EPCRA Reporting Center
   P.O. Box 3348
   Merrifield, VA 22116-3348
   ATTN: TOXIC CHEMICAL RELEASE INVENTORY
2. APPROPRIATE STATE OFFICE
   (See instructions in Appendix F)

Enter "X" here if this is a revision

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

For EPA use only

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR

19 ____

SECTION 2. TRADE SECRET INFORMATION

2.1	Are you claiming the toxic chemical identified on page 3 trade secret? ☐ Yes (Answer question 2.2; Attach substantiation forms) ☐ No (Do not answer 2.2; Go to Section 3)
2.2	If yes in 2.1, is this copy: ☐ Sanitized ☐ Unsanitized

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official

Signature

Date Signed

SECTION 4. FACILITY IDENTIFICATION

4.1

Facility or Establishment Name

TRI Facility ID Number

Street Address

City

County

State

Zip Code

Mailing Address (if different from street address)

City

State

Zip Code

PUT LABEL HERE

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EPA FORM R

PART I. FACILITY IDENTIFICATION INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
Toxic Chemical, Category, or Generic Name

SECTION 4. FACILITY IDENTIFICATION (Continued)

4.2	**This report contains information for:** (Important: check a or b; check c if applicable)	a. ☐ An entire facility	b. ☐ Part of a facility	c. ☐ A Federal facility			
4.3	**Technical Contact**	Name			Telephone Number (include area code)		
4.4	**Public Contact**	Name			Telephone Number (include area code)		
4.5	**SIC Code (4-digit)**	a.	b.	c.	d.	e.	f.
4.6	**Latitude and Longitude**	Latitude			Longitude		
		Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
4.7	**Dun & Bradstreet Number(s) (9 digits)**	a.					
		b.					
4.8	**EPA Identification Number(s) (RCRA I.D. No.) (12 characters)**	a.					
		b.					
4.9	**Facility NPDES Permit Number(s) (9 characters)**	a.					
		b.					
4.10	**Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)**	a.					
		b.					

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of Parent Company	
	☐ NA	
5.2	Parent Company's Dun & Bradstreet Number	
	☐ NA	(9 digits)

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United States Environmental Protection Agency

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 1. TOXIC CHEMICAL IDENTITY

(Important: DO NOT complete this section if you complete Section 2 below.)

1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete **only** if Part I, Section 2.1 is checked "yes." Generic Name must be structurally descriptive.)

SECTION 2. MIXTURE COMPONENT IDENTITY

(Important: DO NOT complete this section if you complete Section 1 above.)

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers,letters, spaces, and punctuation.)

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY

(Important: Check all that apply.)

3.1	**Manufacture the toxic chemical:**	a. ☐ Produce b. ☐ Import	If produce or import: c. ☐ For on-site use/processing d. ☐ For sale/distribution e. ☐ As a byproduct f. ☐ As an impurity
3.2	**Process the toxic chemical:**	a. ☐ As a reactant b. ☐ As a formulation component	c. ☐ As an article component d. ☐ Repackaging
3.3	**Otherwise use the toxic chemical:**	a. ☐ As a chemical processing aid b. ☐ As a manufacturing aid	c. ☐ Ancillary or other use

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1	☐ (Enter two-digit code from instruction package.)	

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PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
Toxic Chemical, Category, or Generic Name

SECTION 5. RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

			A. Total Release (pounds/ year) (enter range code from instructions or estimate)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	☐ NA			
5.2	Stack or point air emissions	☐ NA			
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
5.3.1	Stream or Water Body Name				
5.3.2	Stream or Water Body Name				
5.3.3	Stream or Water Body Name				
5.4	Underground injections on-site	☐ NA			
5.5	Releases to land on-site				
5.5.1	Landfill	☐ NA			
5.5.2	Land treatment/ application farming	☐ NA			
5.5.3	Surface impoundment	☐ NA			
5.5.4	Other disposal	☐ NA			

☐ **Check here only if additional Section 5.3 information is provided on page 5 of this form.**

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
Toxic Chemical, Category, or Generic Name

SECTION 5.3 ADDITIONAL INFORMATION ON RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

5.3	Discharges to receiving streams or water bodies (enter one name per box)	A. Total Release (pounds/year) (enter range code from instructions or estimate)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.3.__	Stream or Water Body Name			
5.3.__	Stream or Water Body Name			
5.3.__	Stream or Water Body Name			

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTW)

6.1.A Total Quantity Transferred to POTWs and Basis of Estimate

6.1.A.1 Total Transfers (pounds/year) (enter range code or estimate)	6.1.A.2 Basis of Estimate (enter code)

6.1.B POTW Name and Location Information

6.1.B.__ POTW Name		6.1.B.__ POTW Name	
Street Address		Street Address	
City	County	City	County
State	Zip Code	State	Zip Code

If additional pages of Part II, Sections 5.3 and/or 6.1 are attached, indicate the total number of pages in this box [ ] and indicate which Part II, Sections 5.3/6.1 page this is, here. [ ]
(example: 1, 2, 3, etc.)

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounc

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EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
Toxic Chemical, Category, or Generic Name

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2. ___ Off-site EPA Identification Number (RCRA ID No.)

Off-Site Location Name

Street Address

City | County

State | Zip Code | Is location under control of reporting facility or parent company? ☐ Yes ☐ No

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2. ___ Off-site EPA Identification Number (RCRA ID No.)

Off-Site Location Name

Street Address

City | County

State | Zip Code | Is location under control of reporting facility or parent company? ☐ Yes ☐ No

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

If additional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box ☐ and indicate which Part II, Section 6.2 page this is, here. ☐ (example: 1, 2, 3, etc.)

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
Toxic Chemical, Category, or Generic Name

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ **Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.**

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3-character code(s)]	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data?
7A.1a	7A.1b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐	7A.1c	7A.1d %	7A.1e Yes ☐ No ☐
7A.2a	7A.2b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐	7A.2c	7A.2d %	7A.2e Yes ☐ No ☐
7A.3a	7A.3b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐	7A.3c	7A.3d %	7A.3e Yes ☐ No ☐
7A.4a	7A.4b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐	7A.4c	7A.4d %	7A.4e Yes ☐ No ☐
7A.5a	7A.5b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐	7A.5c	7A.5d %	7A.5e Yes ☐ No ☐

If additional copies of page 7 are attached, indicate the total number of pages in this box ☐ and indicate which page 7 this is, here. ☐ (example: 1, 2, 3, etc.)

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PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
Toxic Chemical, Category, or Generic Name

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ **Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.**

Energy Recovery Methods [enter 3-character code(s)]

1 ☐ 2 ☐ 3 ☐ 4 ☐

SECTION 7C. ON-SITE RECYCLING PROCESSES

☐ **Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.**

Recycling Methods [enter 3-character code(s)]

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

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United States Environmental Protection Agency

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
Chemical, Category, or Generic Name

SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

All quantity estimates can be reported using up to two significant figures.		Column A Prior Year (pounds/year)	Column B Current Reporting Year (pounds/year)	Column C Following Year (pounds/year)	Column D Second Following Year (pounds/year)
8.1	Quantity released *				
8.2	Quantity used for energy recovery on-site				
8.3	Quantity used for energy recovery off-site				
8.4	Quantity recycled on-site				
8.5	Quantity recycled off-site				
8.6	Quantity treated on-site				
8.7	Quantity treated off-site				
8.8	Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year)				
8.9	Production ratio or activity index				

8.10	Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.			
	Source Reduction Activities [enter code(s)]	Methods to Identify Activity (enter codes)		
8.10.1		a.	b.	c.
8.10.2		a.	b.	c.
8.10.3		a.	b.	c.
8.10.4		a.	b.	c.

8.11	Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box)	YES ☐	NO ☐

* Report releases pursuant to EPCRA Section 329(8) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging injecting, escaping, leaching, dumping, or disposing into the environment." Do not include any quantity treated on-site or off-site.

APPENDIX G

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