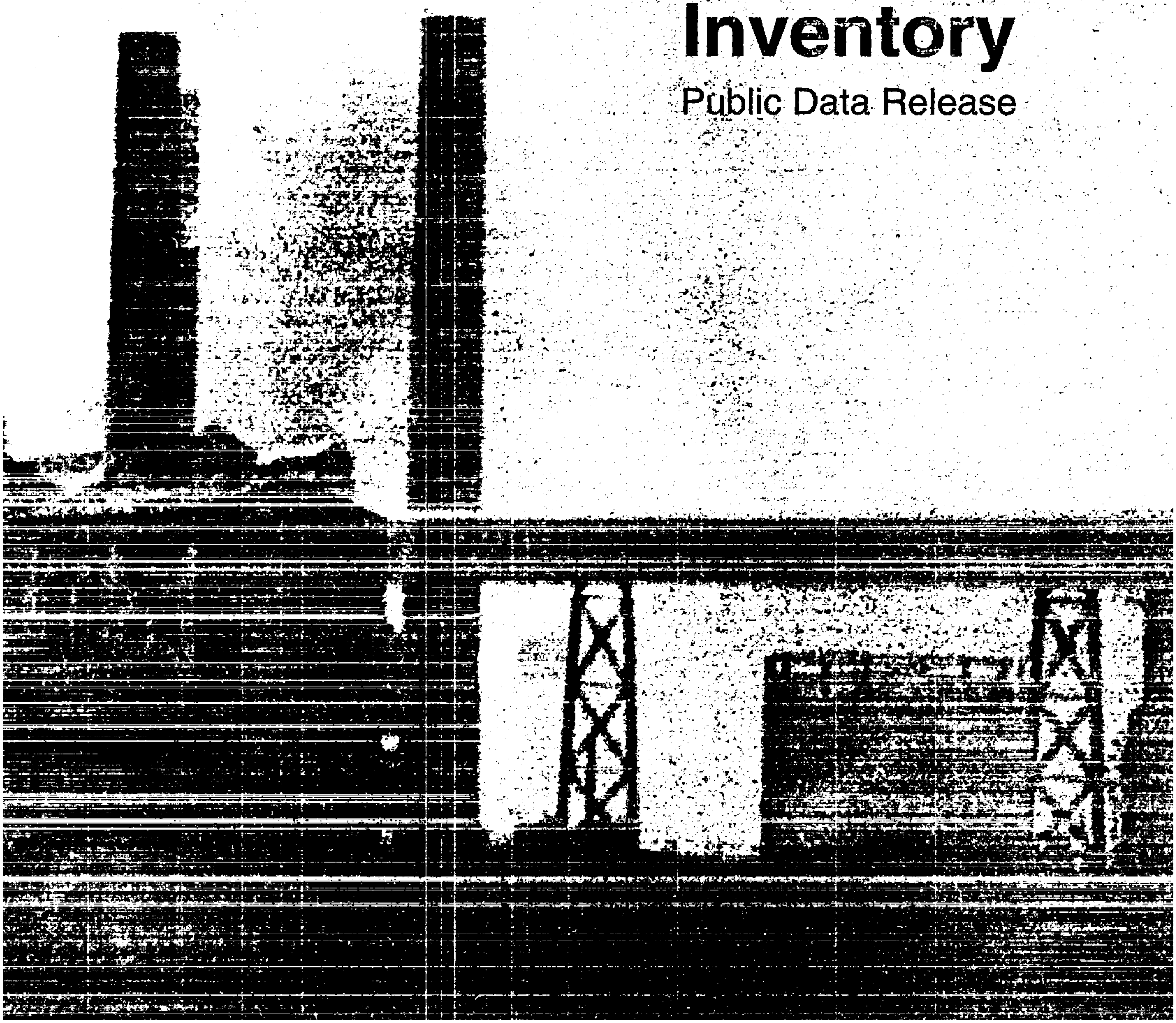
United States
Environmental Protection
Agency

Office of Pollution
Prevention and Toxics
(7408)

EPA 745-R-94-001
April 1994

1992 Toxics Release Inventory

Public Data Release



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Washington, DC 20460

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Photo: S. C. Delaney/U.S. EPA

Administrator Carol M. Browner signing proposed expansion of the TRI chemical reporting list, Jan. 6, 1994.

Message from the Administrator

This report presents the Toxics Release Inventory (TRI) data collected for 1992, the sixth year of this public right-to-know program. TRI gives the public direct access to information about environmental releases of toxic chemicals from industrial facilities in communities across the nation. TRI has become a powerful tool for preventing pollution and reducing risks from these chemicals.

The data in this document show that reported releases of listed toxic chemicals continue to decline. In all, reported releases have dropped about 35% since 1988. But the total amount of toxic chemical waste generated by industry is not declining. In fact industry reported producing more toxic waste in 1992 than in 1991, and similar increases are projected for 1993 and 1994. So while industry may be improving its management of toxic chemical waste, clearly there are still many opportunities for preventing pollution by reducing the use of toxic chemicals.

This year, we made substantial progress in expanding TRI so that it will work even more effectively as a tool for pollution prevention.

- EPA added 34 toxic chemicals and chemical categories to the TRI list and proposed to add 313 more. This proposed addition will nearly double the number of listed chemicals.
- In August of 1993, President Clinton signed an Executive Order requiring federal facilities—not just private industry—to report on their toxic releases. Beginning with the 1994 reporting year, federal facilities that meet TRI reporting thresholds will be required to report to the public on their toxic releases.
- EPA is now undertaking to add non-manufacturing industries to the list of facilities required to report their toxic releases. Many such industries release or transfer significant amounts of toxic chemicals.

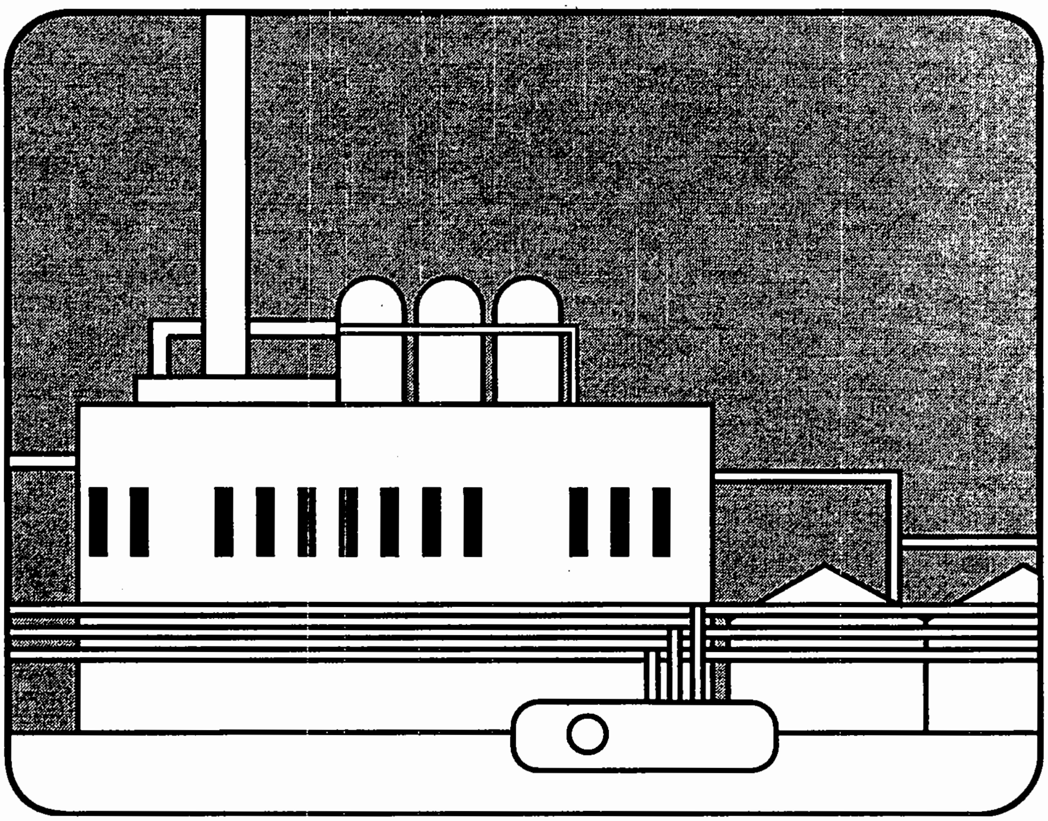
The expansion of TRI will give the public more complete information about potential risks from toxic chemicals in their communities.

I urge individuals and representatives of communities, government, public interest groups, and business to use this information. Contact the resources listed in this report for more information. Access the computer database for specific information about the facilities that concern you. Above all, I urge you to act on what you learn. Let's put this information to work for a cleaner and safer environment.

Carol M. Browner

1992 Toxics Release Inventory
Public Data Release

Executive Summary



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1992 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE

EXECUTIVE SUMMARY

MAJOR FINDINGS

Reported industrial releases of toxic chemicals into the nation's environment in 1992 totalled 3.182 billion pounds, a decline of 6.6% since 1991 and 35% since 1988.

The total quantity of toxic chemicals in waste generated by industry in 1992 has increased slightly since 1991, to about 37.3 billion pounds.

Transfers of toxic chemicals to off-site locations for treatment, disposal, and other waste management in 1992 totalled 4.368 billion pounds, an increase of nearly 17% since 1991. Most of this increase was due to increased transfers for recycling.

About 36% of all facilities reporting to TRI reported implementing source reduction activities to reduce the quantity of toxic chemicals generated in waste.

Releases and transfers of the 17 chemicals targeted through EPA's 33/50 Program of voluntary reductions have declined more than 40% since 1988, exceeding by more than 100 million pounds the program's 1992 interim reduction goal of 33%.

CHAPTER 1: 1992 TRI RELEASES AND TRANSFERS

A total of 23,630 facilities submitted 81,016 individual chemical reports to TRI in 1992.

Reported industrial releases of toxic chemicals into the nation's environment totalled 3.182 billion pounds in 1992. More than half of this amount, about 58%, was released to the nation's air. Figure E-1 presents 1992 TRI releases by environmental media.

Reported transfers of chemicals off-site for treatment, disposal, and other waste management totalled 4.368 billion pounds in 1992. Nearly two-thirds of this amount consisted of transfers off-site for recycling. Transfers to off-site locations for disposal constituted less than 6% of all off-site transfers. Figure E-2 presents off-site transfers by transfer type.

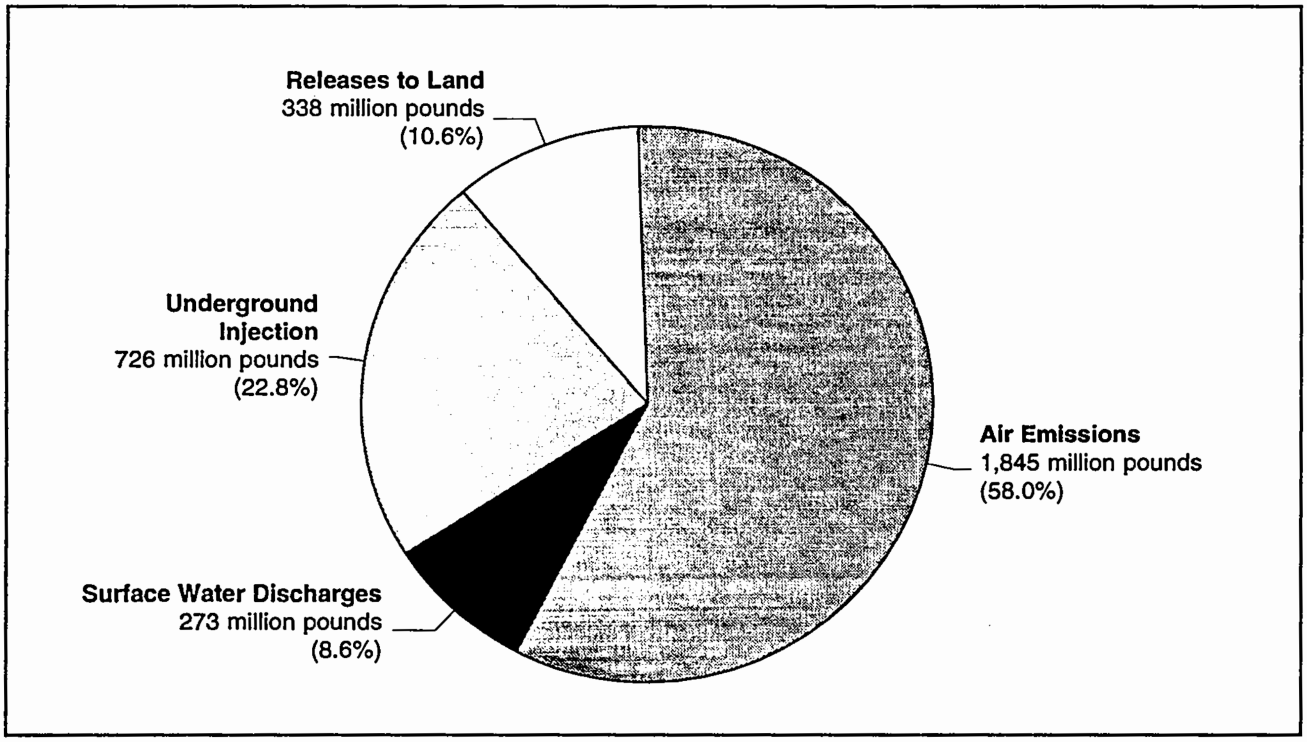


Figure E-1. TRI Releases, 1992.

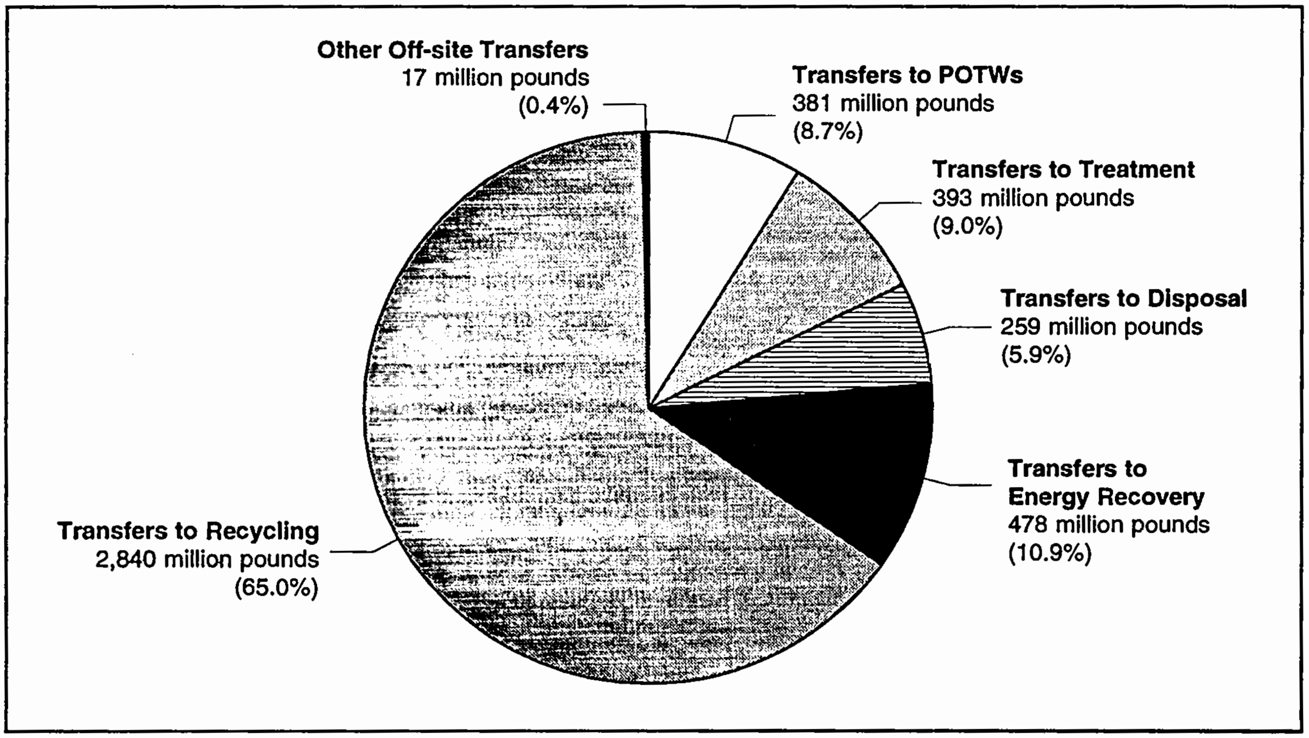


Figure E-2. TRI Transfers for Waste Management, 1992.

The five states with the largest quantities of total TRI releases (including underground injection of waste) are Louisiana (465 million pounds), Texas (420 million pounds), Tennessee (194 million pounds), Ohio (144 million pounds), and Indiana (124 million pounds). These same five states have the greatest quantities of TRI chemicals released to air, water and land (excluding underground injection), although Ohio drops to fifth place.

The top five industries for total TRI releases (including underground injection) are chemical manufacturing (1.536 billion pounds), primary metals (345 million pounds), paper manufacturing (233 million pounds), plastics (138 million pounds), and transportation equipment (137 million pounds). Figure E-3 illustrates the top 10 industries for total TRI releases in 1992.

The top 10 parent companies controlled slightly more than 1% of all facilities reporting to TRI, but accounted for 31% of total TRI releases (including underground injection) and 24% of TRI releases to air, water and land. The top 50 facilities reporting to TRI accounted for 42% of total TRI releases (including underground injection) and 31% of TRI releases to air, water and land.

The top five chemicals for total TRI releases were ammonia, hydrochloric acid, methanol, phosphoric acid, and toluene. The top five chemicals for releases to air, water and land were methanol, ammonia, phosphoric acid, toluene, and acetone.

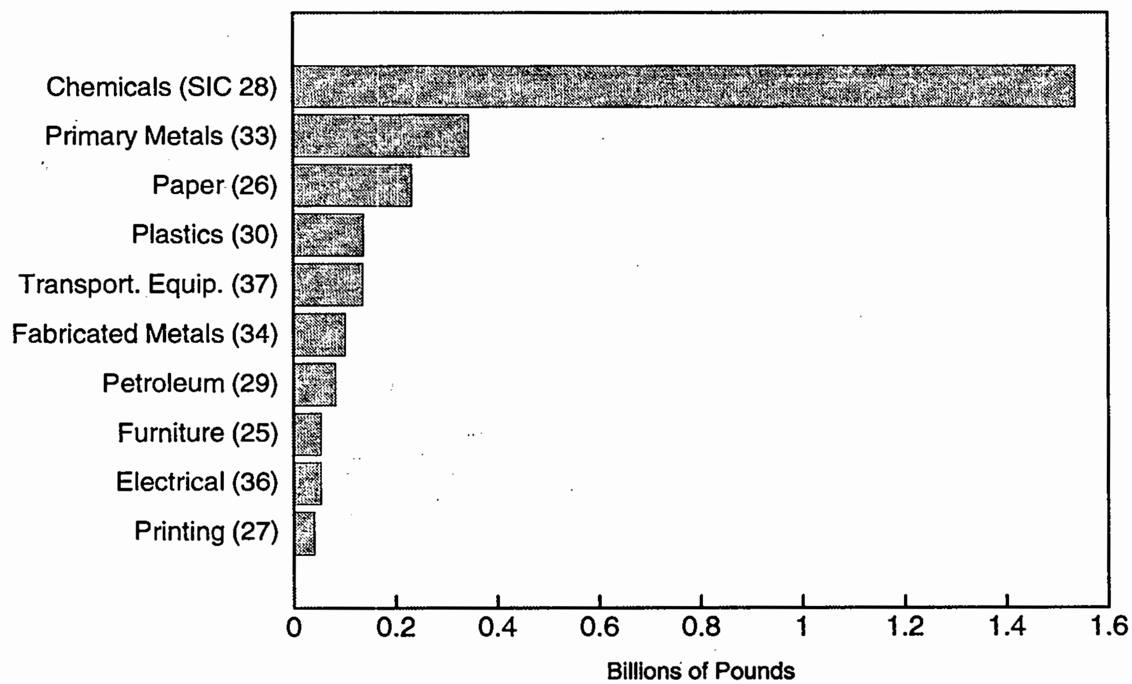


Figure E-3. Top 10 Industries for Total TRI Releases, 1992.

A total of 197 million pounds of known or suspected carcinogens were released by facilities. Facilities also reported releasing 166 million pounds of ozone-depleting chemicals, 283 million pounds of metals and metal compounds, and 3 million pounds of bioaccumulators.

CHAPTER 2: PREVENTION AND MANAGEMENT OF TRI CHEMICALS IN WASTE

Facilities reported generating 37.334 billion pounds of TRI chemicals in waste in 1992. This quantity includes amounts recycled, burned for energy recovery, treated, and released or disposed, both on-site and off-site. It includes only production-related quantities, not amounts generated as a result of non-routine incidents, such as accidents and remedial activities. An additional 34 million pounds of non-production related wastes were reported by facilities in 1992.

More than 50% of the toxic chemicals generated in waste was recycled by facilities, either on-site or off-site. Only about 9% was released on-site or disposed off-site. Figure E-4 presents 1992 quantities of toxic chemicals in waste, by waste management technique.

The top five industries for total quantities of TRI chemicals in waste were chemical manufacturing (19.897 billion pounds), primary metals (4.044 billion pounds), petroleum (2.945 billion pounds), paper (2.538 billion pounds), and electrical equipment (.964 billion pounds).

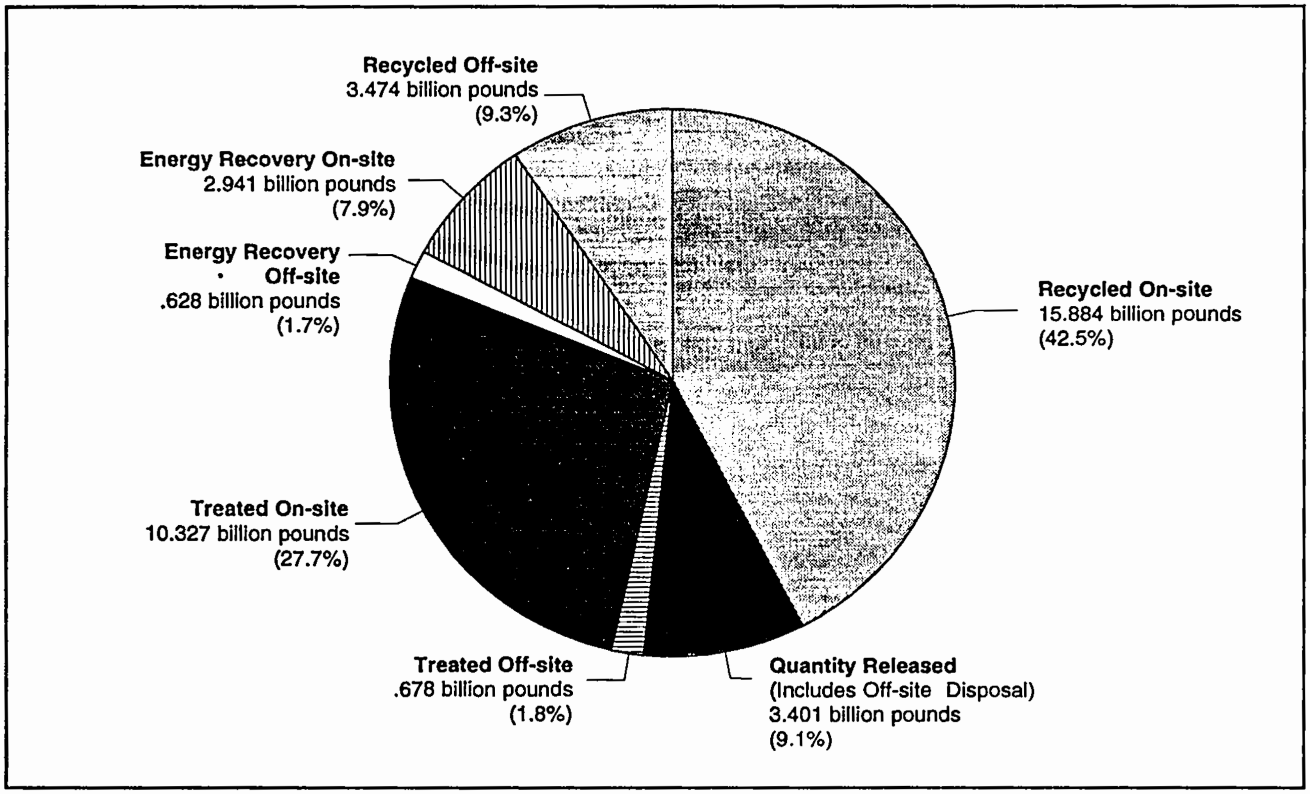


Figure E-4. Management of TRI Chemicals in Waste, by Activity, 1992.

The total reported quantity of toxic chemicals in waste increased slightly since 1991, from 37.162 billion pounds to 37.334 billion pounds. Although small in percentage terms (0.5%), the increase

Projected data (Table E-2) indicate that the total quantity of waste generated by facilities may rise slightly in 1993 and 1994. Percentages of waste undergoing recycling and energy recovery are projected to increase slightly, while percentages treated and released or disposed are projected to decrease slightly.

Thirty-six percent of all facilities reported undertaking at least one source reduction activity to reduce the quantity of TRI chemicals in waste. Twenty-five percent of all reporting forms received reported source reduction. The most frequently reported source reduction activities were good operating practices, process modifications, and spill and leak prevention activities.

CHAPTER 3: YEAR-TO-YEAR COMPARISON OF TRI DATA

In order to control for changes in the chemical list over time, all year-to-year comparisons are based on a consistent list of only those chemicals that were reportable for all years being compared. The 1991-1992 comparisons include some chemicals that were added to the TRI list after 1988; the 1988-1992 comparisons do not. Therefore, totals for 1991 and 1992 in the 1991-1992 comparison do not match totals for 1991 and 1992 presented in the 1988-1992 comparison. Although TRI data were collected for 1987, 1988 has been selected as the baseline year for the program because of concerns about the data quality of industry's first-year submissions.

Reported industrial releases of toxic chemicals dropped 6.6% since 1991, a decrease of 224 million pounds. In all, reported releases have dropped 35% since 1988.

Table E-3 presents release and transfer data for 1991 and 1992, including percent changes for each release and transfer type. Figure E-5 illustrates environmental releases by release type for each year 1988-1992.

Table E-3. Comparison of TRI Releases and Transfers, 1991-1992.

	1991 Pounds	**1992** Pounds	**Change in Amount** Pounds	**Percent Change** Percent
Air emissions	2,036,678,204	1,844,958,336	-191,719,868	-9.4
Surface water discharges	243,351,148	272,932,953	29,581,805	12.2
Underground injection	710,366,770	725,946,415	15,579,645	2.2
Releases to land	414,844,420	337,809,053	-77,035,367	-18.6
Total Releases	3,405,240,542	3,181,646,757	-223,593,785	-6.6
Transfers to recycling	2,266,829,164	2,839,825,919	572,996,755	25.3
Transfers to energy recovery	443,311,526	477,639,264	34,327,738	7.7
Transfers to treatment	353,150,798	393,466,540	40,315,742	11.4
Transfers to POTWs	395,560,966	381,096,823	-14,464,143	-3.7
Transfers to disposal	267,586,409	258,642,577	-8,943,832	-3.3
Other off-site transfers❸	10,316,150	16,933,490	6,617,340	64.1
Total Transfers	3,736,755,013	4,367,604,613	630,849,600	16.9
Total Releases and Transfers	7,141,995,555	7,549,251,370	407,255,815	5.7

❸ Transfers reported with no waste management codes or invalid codes.

Air emissions have declined 9.4% since 1991, from 2.037 billion pounds to 1.845 billion pounds. Much of this decrease was attributable to decreased releases of a variety of solvents, ammonia, and chlorine. Air emissions have decreased 32% since 1988.

Surface water discharges increased 12.2%, from 243 million pounds in 1991 to 273 million pounds in 1992. This increase was due to increased run-off releases of phosphoric acid from four fertilizer manufacturing facilities in Louisiana and Texas. Excluding these releases from the national totals, other water releases actually decreased by 11.5% since 1991. Overall, water releases have declined 12% since 1988.

Releases to land decreased 18.6% since 1991, from 415 million pounds in 1991 to about 338 million pounds in 1992. Land releases have declined 34% since 1988.

Underground injection of waste increased 2.2%, from 710 million pounds in 1991 to 726 million pounds in 1992. Underground injection of waste has dropped 46% since 1988.

Reported transfers of toxic chemicals to off-site locations for treatment, disposal, and other waste management increased 17% since 1991. This increase of 631 million pounds was primarily due to transfers for recycling, which increased 25% since 1991. Transfers for energy recovery and for

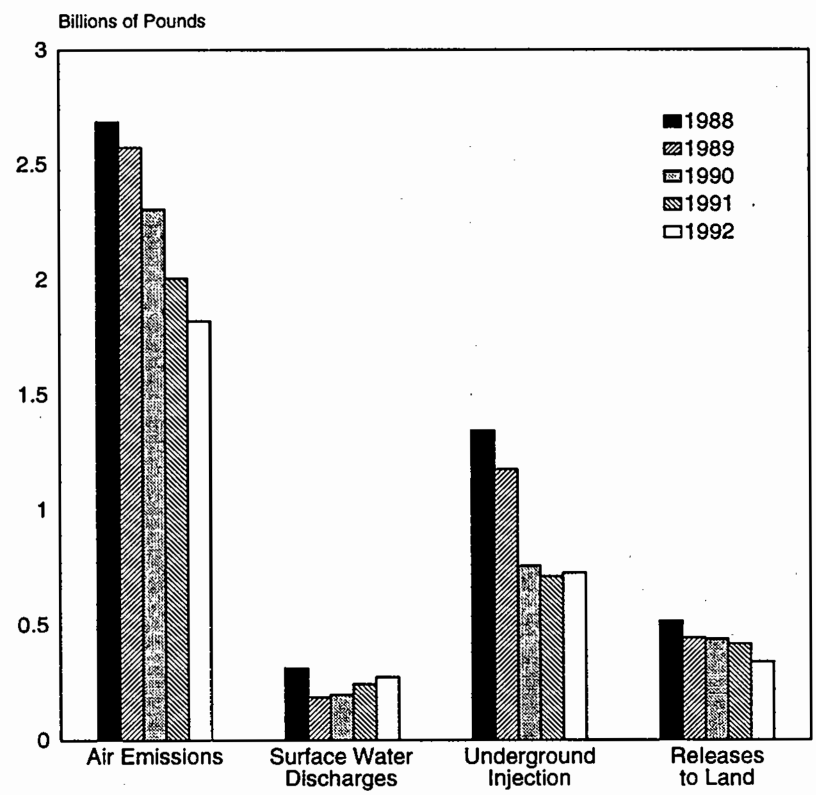


Figure E-5. TRI Releases, 1988-1992.❹

❹ Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

treatment also increased. See Table E-3 for 1991 and 1992 transfer data by transfer type, including percent changes. 1992 transfers cannot be directly compared to 1988 transfers because of a change in reporting requirements that took effect in 1991.

CHAPTER 4: TRI REPORTING PROFILES FOR 33/50 PROGRAM CHEMICALS

The 33/50 Program is a voluntary pollution prevention initiative that targets 17 TRI chemicals for reductions in releases and transfers. Goals for the 33/50 Program are a 33% reduction by the 1992 reporting year, and a 50% reduction by the 1995 reporting year, measured against 1988 TRI data. 33/50 Program goals include all releases, as well as transfers to off-site locations for treatment and disposal. Transfers for recycling and energy recovery are not included because they were not reportable in 1988.

Releases and transfers of these 17 targeted chemicals have declined more than 40% since 1988, exceeding by more than 100 million pounds the program's interim reduction goal of 33%. Figure E-6 presents the combined releases and transfers of these 17 chemicals for each year 1988 to 1992, as well as the reduction goals for the 33/50 Program. Because the 33/50 Program was not initiated until 1991, reductions achieved between 1988 and 1990 contribute to the national reduction goals but should not be viewed as resulting from the 33/50 Program.

Releases and transfers of these 17 chemicals declined by about 10.4% between 1991 and 1992. This rate of decrease was four times the rate for all other TRI chemicals between 1991 and 1992.

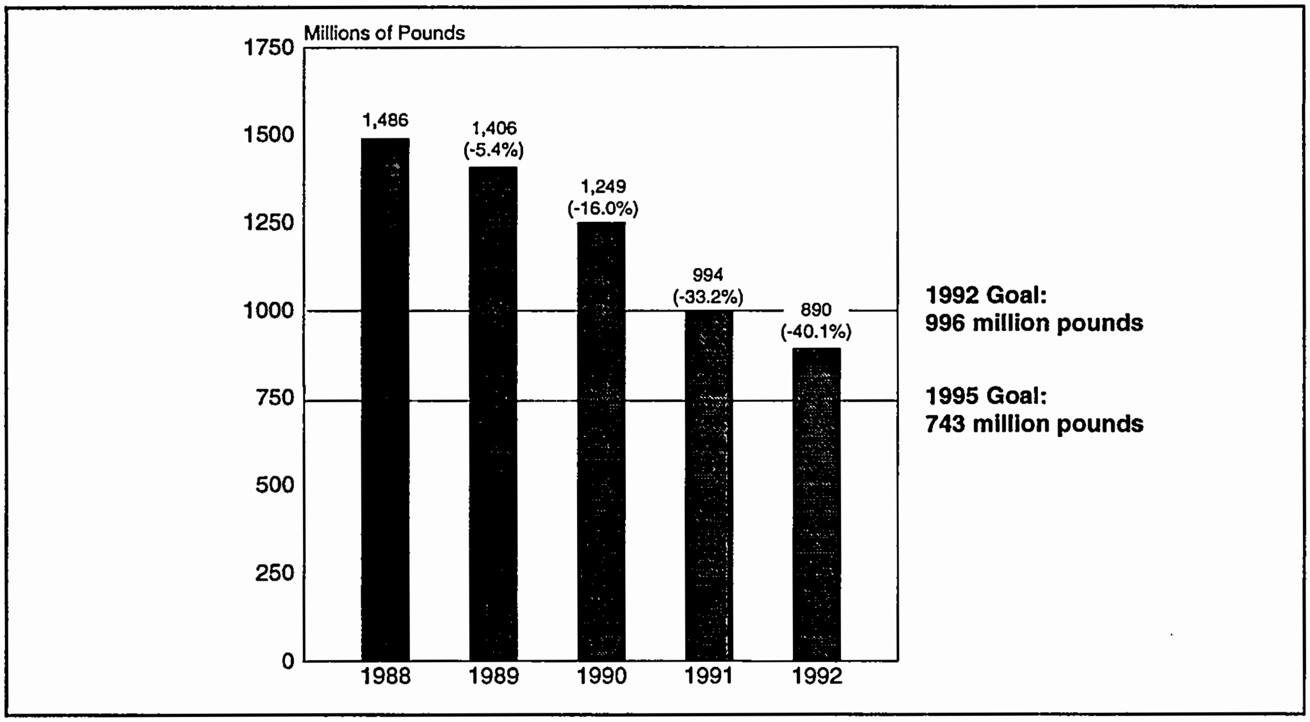
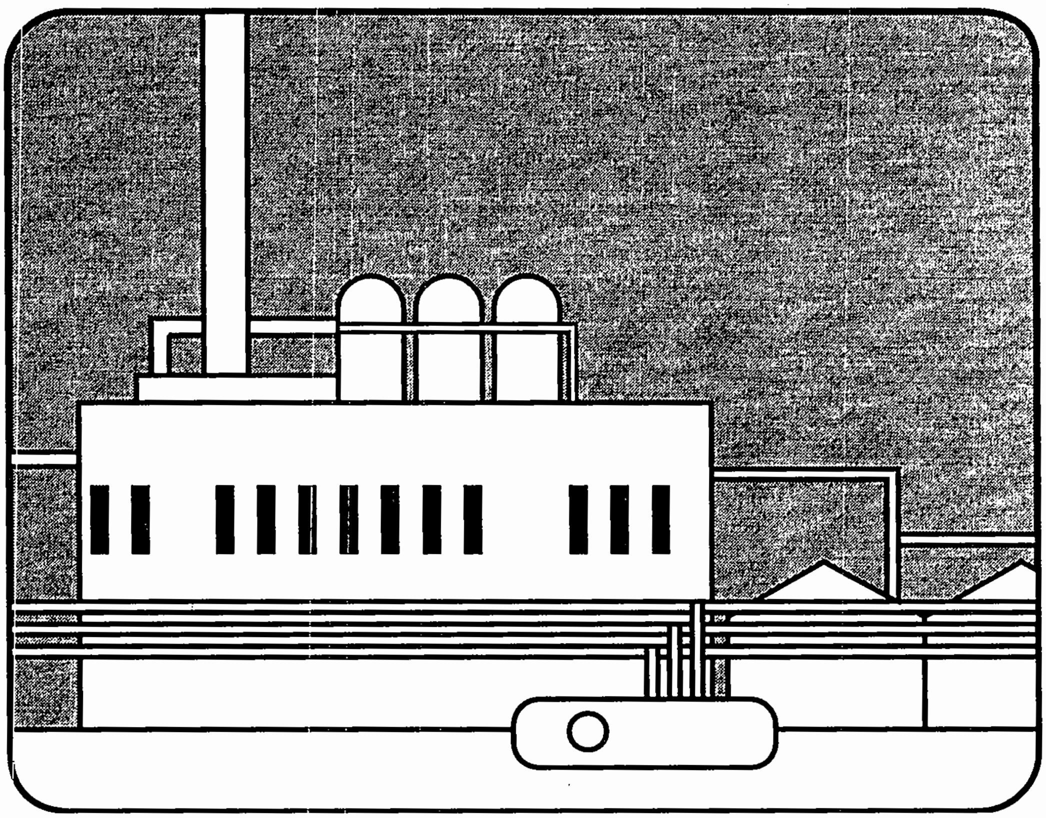


Figure E-6. TRI Releases and Transfers of 33/50 Program Chemicals, 1988-1992.[5]

[5] The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.

1992 Toxics Release Inventory Public Data Release

Introduction



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1992 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 chemical-specific and facility-specific information collected under these laws can be used by the public to identify facilities and 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 activity 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 1992 included more than 300 chemicals and 20 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 a printed report, 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 1992. Industry reporting forms for 1992 were due to EPA and the states by July 1, 1993. This document also provides basic data for the two preceding years (1990 and 1991) 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. Data collected for 1989 can be obtained from the on-line computer database.

WHO MUST REPORT?

Manufacturing facilities that have 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. Thresholds for manufacturing and processing are currently 25,000 pounds for each listed chemical, while the threshold for otherwise use is 10,000 pounds per chemical. 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.

WHAT MUST BE REPORTED?

TRI contains a great deal of information in addition to release and transfer estimates. Facilities must provide identifying information, such as name, location, type of business, contact names, name of parent company, and environmental permit numbers; information about the manufacture, process, and use of the listed chemical and the maximum amount on-site during the year; release and transfer estimates for each environmental medium and type of transfer; locations of off-site transfers; and waste treatment methods and efficiencies.

Beginning with the 1991 reports, facilities were required to provide additional information about waste management and source reduction activities. These additional data elements include quantities of the listed chemical recycled, combusted for energy recovery, and treated on-site, quantities transferred off-site for recycling and energy recovery, source reduction activities implemented, and methods used to identify those activities. 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 work with the original data to complete the understanding of chemical release, transfer, and treatment [illegible]

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 over 80,000 reports from approximately 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. EPA is developing a proposed rule that would add additional industries to the TRI. For this effort, EPA is looking at an array of non-manufacturing industries that release and/or transfer significant amounts of TRI chemicals. Many toxic chemicals, including some chemicals regulated under other environmental statutes, currently are not listed under EPCRA section 313. EPA recently finalized the addition of more than thirty chemicals and proposed the addition of more than 300 chemicals to the TRI list.

TRI requires the reporting of estimated data and does not mandate that facilities monitor their releases. Various estimation techniques are used where monitoring data is not available, and EPA has published estimation guidance for the regulated community. Variances between facilities can result from the use of different estimation methodologies. While EPA has an active and aggressive enforcement component, there is not one hundred percent compliance with the reporting requirements. This 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 1992 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 1992. Each year, EPA has been able to reduce the amount of time required to process and make available the forms received. Particularly as more facilities switch from paper to magnetic media submissions, the amount of time required for data processing and quality assurance will continue to decrease, allowing EPA to make the TRI data available more quickly following the submission deadline.

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

On August 3, 1993, President Clinton signed a new Executive Order pledging the Federal government to protect the environment by preventing pollution at the source. This executive order applies Federal Right-to-Know laws, including TRI reporting requirements, to all Federal facilities beginning in 1994. Federal facilities meeting the TRI chemical thresholds will have to file TRI reports, regardless of whether or not they are engaged in manufacturing. The first reports under this executive order will be due to EPA by July 1, 1995.

On November 30, 1993, EPA finalized the addition of more than thirty chemicals to the TRI list. EPA added 11 hydrochlorofluorocarbons (HCFCs) because of their potential to damage the earth's protective ozone layer, leading to adverse human health and environmental effects. EPA also added 21 chemicals and 2 chemical categories that were listed under the Resource Conservation and Recovery Act. These chemicals will be reportable beginning with calendar year 1994, with the first reports due by July 1, 1995.

On January 12, 1994, EPA proposed the addition of 313 toxic chemicals to the TRI list, including hazardous air pollutants, carcinogens, ozone depleters, and pesticide active ingredients. This addition would nearly double the number of chemicals reportable to TRI. EPA intends to finalize these additions by November 30, 1994, in order to make these chemicals reportable for the 1995 calendar year.

As discussed above, EPA is currently developing a proposed rule that would add additional industries to TRI. Announcement of a partial list of candidate industry sectors that will form the basis of the proposal is expected to coincide with this release of the 1992 TRI data. Following this announcement, EPA will continue refining its analysis, will conduct general public meetings to discuss the analysis, and will begin a dialogue process with industries under consideration for addition.

With the expansion of chemicals and industries subject to TRI reporting, EPA is considering crafting a threshold modification to eliminate chemical reports with low volume releases and transfers. This is partially in response to receipt of a petition submitted by the Small Business Administration to exempt low level releases, and may provide a means of eliminating reports that contain data of marginal utility, while preserving maximum information utility and availability, particularly at the local level.

EPA initiated a public dialog process in early 1993 to address issues associated with reporting the new data required by the Pollution Prevention Act. In this process, representatives of environmental groups, industry, states, and academia were convened to discuss issues and provide EPA with advice and recommendations for resolving them. EPA anticipates promulgation of final guidance for reporting the Pollution Prevention Act data by 1995.

HOW CAN I OBTAIN ADDITIONAL TRI INFORMATION?

This report contains 1992 TRI data and limited comparison data for 1988, 1990 and 1991. The TRI database is accessible to the public via on-line telecommunications through the National Library of Medicine's TOXNET system. Information about accessing the TRI database through TOXNET is provided in Appendix B. Other potential sources of TRI information include the state EPCRA section 313 contact, the EPA Regional Office, the State Emergency Response Commission, the Local Emergency Planning Committee, or the facility itself. Information about EPA Regional and state EPCRA section 313 contacts is found in Appendix G.

EPA has prepared a number of documents to assist citizens, the news media, local and state governmental officials and others in using the TRI and other EPCRA data. These materials describe where the information can be obtained, its strengths and limitations, and how the data can be used in programs to protect public health and enhance environmental quality. To request copies of TRI and EPCRA documents or to obtain further information about the program, citizens should call their state Section 313 contact or the toll-free Emergency Planning and Community Right-to-Know Information Hotline at 1-800-535-0202.

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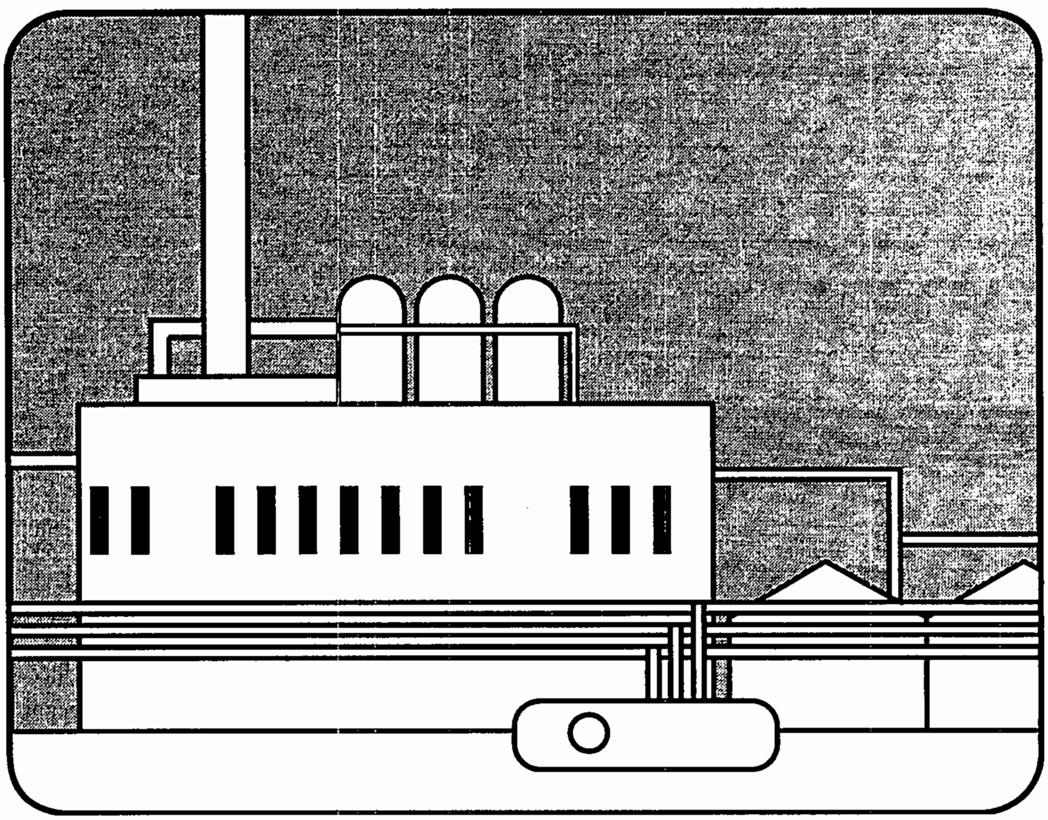
Chapter 1

1992 TRI Releases and Transfers



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1992 TRI RELEASES AND TRANSFERS

INTRODUCTION

This chapter provides information reported by facilities for calendar year 1992 on releases of toxic chemicals at the facility and transfers of chemicals off-site by the facility for the purposes of treatment, disposal, energy recovery, and recycling. Figure 1-1 illustrates the media to which on-site releases can occur and the off-site transfers for waste management that are reported. These data are presented in three ways: by state, by industry and by chemical. The chemical section provides data on chemicals that may be of special interest to the public, as well as a complete listing of releases and transfers of all chemicals.

In 1992, there were 3.182 billion pounds of toxic chemicals released into the environment. Direct releases included 1.845 billion pounds released to air, 273 million pounds released to surface water, and 338 million pounds released to land. An additional 726 million pounds were injected underground. (See Table 1-1, Figure 1-2).

Facilities also sent a total of 4.368 billion pounds of toxic chemicals to off-site locations for treatment, disposal, energy recovery, and recycling. The bulk of these off-site transfers, 2.84 billion pounds, were sent off-site to be recycled. In addition, 478 million pounds of toxic chemicals were sent off-site for energy recovery, 393 million pounds were transferred off-site for treatment, 259 million pounds of toxic chemicals were transferred off-site for disposal, and 381 million pounds were sent to Publicly Owned Treatment Works (POTWs). An additional 17 million pounds of toxic chemicals were reported with no waste management codes or invalid codes and are listed as "Other Off-site Transfers." (See Table 1-2, Figure 1-3).

AN EXPLANATION OF RELEASES AND TRANSFERS

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. The left side of Figure 1-1 illustrates these release types.

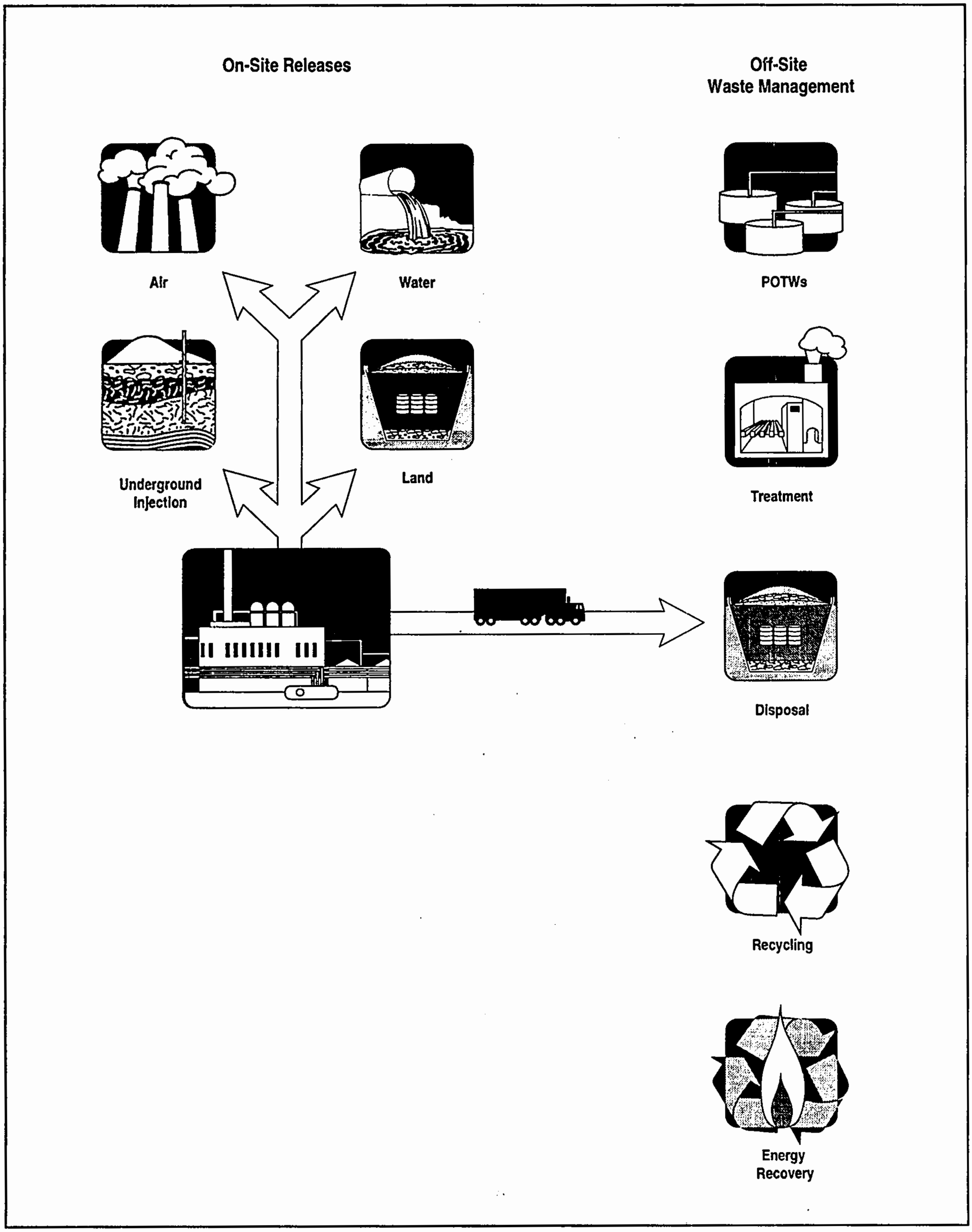


Figure 1-1. On-site Releases and Off-site Transfers Reported to TRI.

Releases to Air

Releases to air are reported either as fugitive or stack 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 reported 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 forms 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 wastes to a landfill (in which waste is buried), to land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), and to a surface impoundment (which is an uncovered holding area used to volatilize and/or settle waste materials), and to other land disposal (such as spills, leaks, or waste piles).

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 under TRI as transferred off-site are sent to off-site facilities for the purposes of either 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.

Transfers to Publicly Owned Treatment Works (POTWs)

A POTW is a wastewater treatment facility that is owned by a state or local municipality. Wastewaters from facilities reporting under TRI are transferred through pipes or sewers to the POTW. Treatment or removal of a chemical from the wastewater depends upon the nature of the

Table 1-1. TRI Releases, 1992.

1992 Releases	Pounds
Total Releases	3,181,646,757
Air Emissions	1,844,958,336
Surface Water Discharges	272,932,953
Underground Injection	725,946,415
Releases to Land	337,809,053

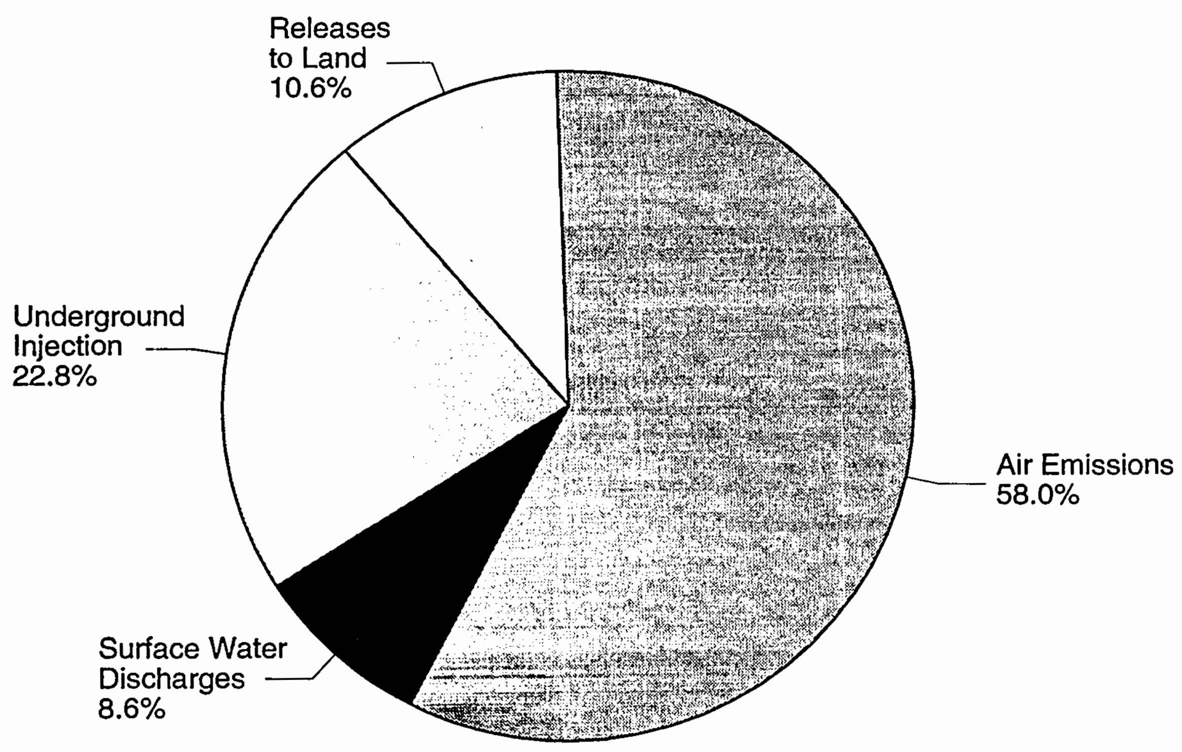


Figure 1-2. TRI Releases, 1992.

Table 1-2. TRI Transfers, 1992.

1992 Transfers	Pounds
Total Transfers	4,367,604,613
Transfers to Recycling	2,839,825,919
Transfers to Energy Recovery	477,639,264
Transfers to Treatment	393,466,540
Transfers to POTWs	381,096,823
Transfers to Disposal	258,642,577
Other Off-site Transfers	16,933,490

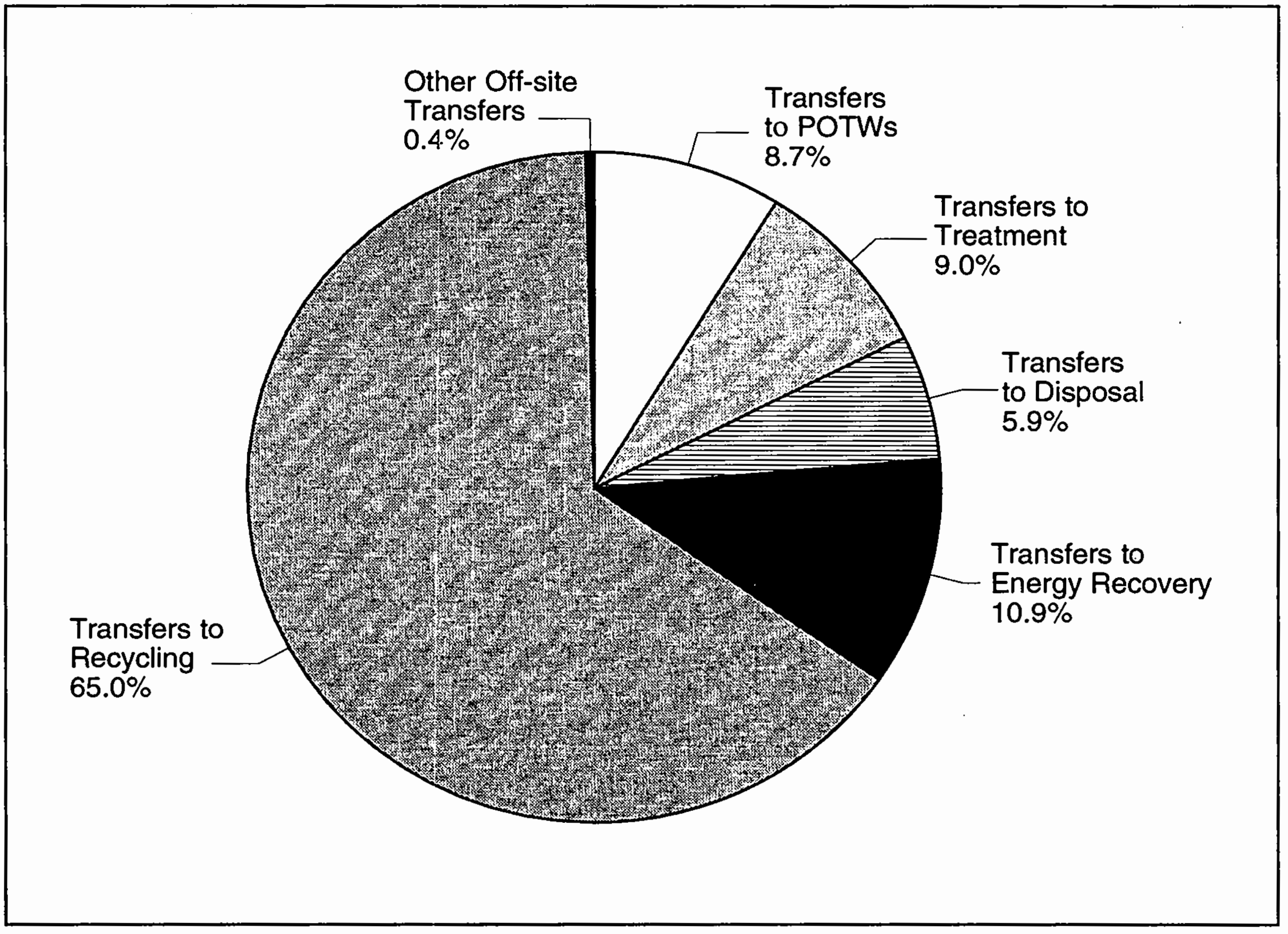


Figure 1-3. TRI Transfers, 1992.

chemical, as well as the treatment methods present at the POTW. In general, chemicals that are easily utilized as nutrients by microorganisms, are volatile, or have a low solubility in water are likely to be removed to some extent. Chemicals that are volatile will evaporate into the atmosphere. Some chemicals, such as metals, may be removed, but are not destroyed and are disposed of in landfills. Not all TRI chemicals can be treated or removed by a POTW. Those that are not removed or destroyed by treatment are released by the POTW to surface 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 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 above) at the 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 have been classified as "other off-site transfers."

WHAT TO CONSIDER WHEN USING TRI DATA

Users of the 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 to evaluate the 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. The following are some of these factors:

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.

Exposure Considerations

♦ **Potential degradation or persistence of the chemical in the environment.**

Exposure to a chemical is dependent upon how long 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 smog; metals are persistent and will not be degraded upon release to the environment.

- As a result, small releases of a persistent highly toxic chemical may create a more serious problem than large releases of a chemical that is rapidly transformed in the environment.

♦ **Bioconcentration of the chemical in the food chain.**

The chemical may concentrate or may disperse as it moves up the food chain.

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

- 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 will depend on the environmental medium to which a chemical is released. The medium also affects the type of exposure (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.

- Exposure that results from releases to water bodies (streams, lakes, etc.) depends on the downstream uses of the water, including drinking, cooking, and bathing.

- Releases to POTWs may result in exposure if chemicals are not removed through treatment processes and are passed through the POTW to water bodies used by downstream communities.

- Toxic chemicals released to land may be transported to other environmental media as a result of run-off or migration of the chemical through the soil into underlying water sources.

- Specially designed facilities such as Class I underground wells in which toxic chemicals in wastes are injected into rock below underground sources of drinking water reduce the potential exposure from land disposal. These wells are designed to entomb liquid wastes for at least 10,000 years.

- Chemicals may enter the food chain through the presence of the toxic chemical in soil or water.

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

The amount of the chemical that ultimately enters the environment depends upon how the toxic chemical was handled during disposal, treatment, energy recovery, or recycling, as is illustrated in the following examples.

- 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 is either released to the air or is disposed of in ash to land.

- The efficiency of the treatment of toxic chemicals in wastes 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 type of treatment method and the nature of the chemical.

- Toxic chemicals in wastes 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.

1992 TRI DATA BY STATE

The following figures and tables present the 1992 release and transfer data by state.

The maps in Figures 1-4 and 1-5 illustrate which states have the highest volumes of TRI releases and transfers.

Table 1-3 presents TRI releases, by media, by state. Table 1-4 presents TRI transfers, by transfer type, by state. Both tables are ordered alphabetically. No reports were received in 1992 for the District of Columbia, Guam, or the Northern Mariana Islands.

Table 1-5 ranks states by TRI releases to air, water, and land only (excluding underground injection of waste). The top five states for total air/water/land releases are Louisiana, Texas, Tennessee, Indiana, and Ohio. Table 1-6 ranks states by total TRI releases, including underground injection of waste. In this ranking, the same five states make up the top five, but Indiana drops to fifth place behind Ohio.

EPA has offered these alternative ways to provide state rankings because substantial questions have been raised about whether Class I injection wells are properly viewed as a direct environmental discharge. Properly designed and constructed Class I injection wells have substantially lower exposure potential than direct forms of release. Therefore, EPA believes it is appropriate to provide rankings with and without underground injection to enable the public to focus on areas of greater concern.

Although the top five states on Tables 1-5 and 1-6 are nearly identical, rankings for some other states change dramatically, depending on whether the ranking includes underground injection. For example, Kansas is ranked 27th for air/water/land releases (Table 1-5), but 10th for total releases (including underground injection) (Table 1-6). Mississippi is ranked 16th for air/water/land releases, but sixth for total releases.

Tables 1-7 through 1-12 illustrate the movement of off-site transfers of waste within and between states. Table 1-7 presents transfers from one location to another within the same state. Table 1-8 presents transfers received at locations in the state from TRI facilities 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 transfers from facilities in a state to locations outside that state (exports of waste from that state to other states).

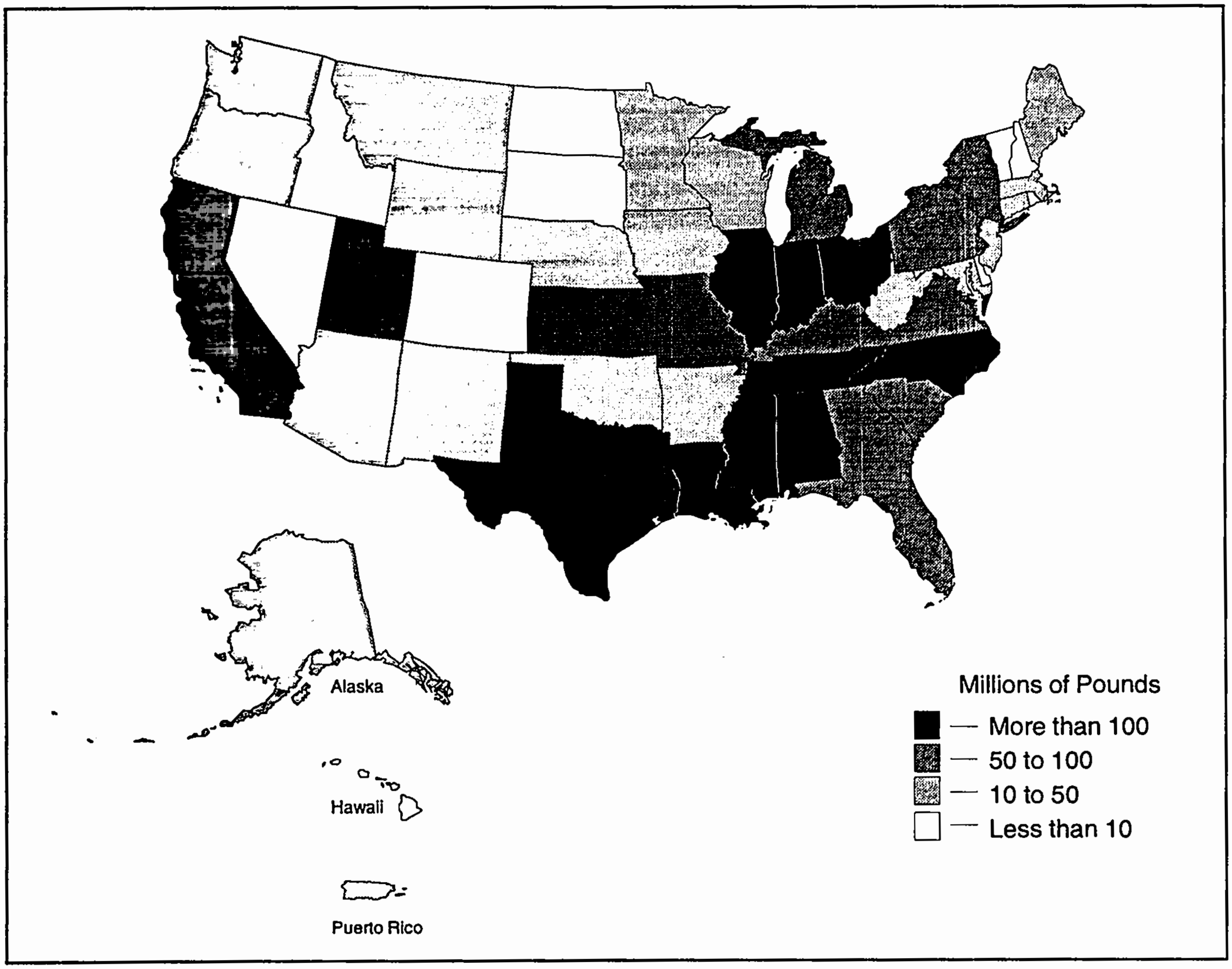


Figure 1-4. TRI Releases by State, 1992.

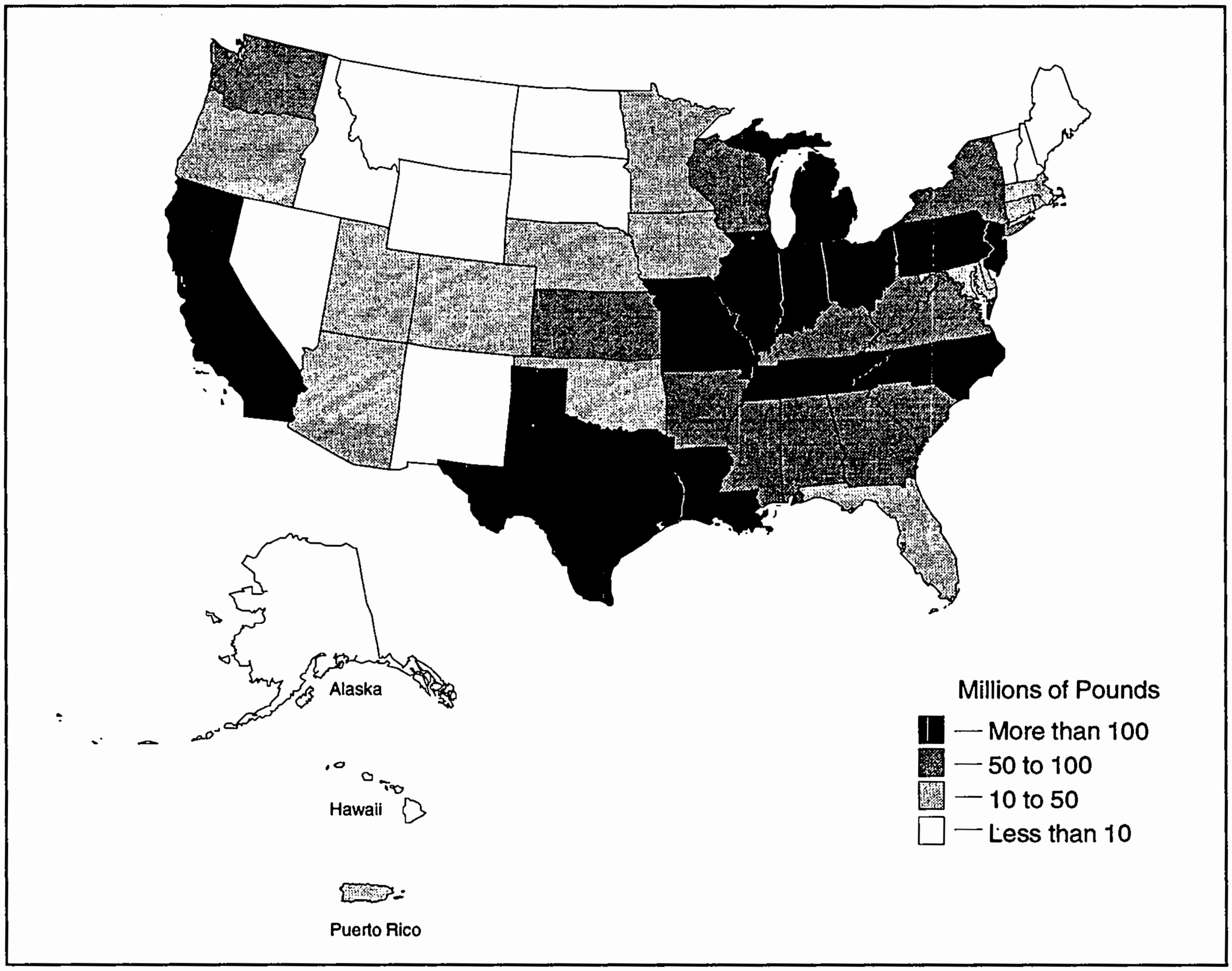


Figure 1-5. TRI Transfers by State, 1992.

Table 1-3. TRI Releases by State, 1992 (Alphabetically Ordered).

State	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
Alabama	14,766,447	80,155,915	5,078,042	6,269,431	6,144,897	112,414,732
Alaska	946,556	9,999,390	3,907,576	192	457	14,854,171
American Samoa	11,240	0	0	0	0	11,240
Arizona	3,990,312	4,402,548	5	0	37,721,228	46,114,093
Arkansas	8,533,559	19,557,542	1,434,309	11,995,448	2,247,087	43,767,945
California	25,704,187	30,160,539	10,212,654	884,806	3,589,861	70,552,047
Colorado	2,234,375	2,856,197	139,955	500	277,861	5,508,888
Connecticut	5,939,914	7,569,385	3,067,723	0	3,902	16,580,924
Delaware	1,270,271	3,738,222	236,887	0	138,518	5,383,898
Florida	11,825,436	21,707,703	3,283,487	11,772,909	33,863,305	82,452,840
Georgia	12,320,452	38,149,707	3,679,910	15	1,265,341	55,415,425
Hawaii	449,878	146,108	7,210	269,261	1,510	873,967
Idaho	587,695	4,620,389	160,405	0	2,875,528	8,244,017
Illinois	23,293,102	49,905,112	5,744,242	20,942,184	18,293,118	118,177,758
Indiana	28,060,916	57,870,503	1,057,170	3,777,831	33,534,069	124,300,489
Iowa	5,800,992	26,812,863	1,276,714	0	1,528,882	35,419,451
Kansas	9,810,879	15,723,162	733,170	59,642,195	1,300,740	87,210,146
Kentucky	11,666,067	26,852,533	576,039	29,040,503	1,593,133	69,728,275
Louisiana	21,540,139	67,511,483	186,329,129	186,673,578	2,497,703	464,552,032
Maine	2,200,855	11,017,818	591,203	405	1,461,538	15,271,819
Maryland	3,813,351	6,758,618	838,672	0	1,592,309	13,002,950
Massachusetts	5,078,578	9,274,729	74,809	0	102,601	14,530,717
Michigan	16,745,464	49,633,661	750,074	6,083,782	10,313,476	83,526,457
Minnesota	5,729,081	23,881,866	502,921	0	1,505,226	31,619,094
Mississippi	13,160,820	41,190,276	1,545,410	57,994,938	5,803,832	119,695,276
Missouri	11,366,604	25,014,770	1,119,222	250	14,896,038	52,396,884
Montana	1,104,641	1,683,973	139,875	0	40,959,484	43,887,973
Nebraska	3,359,723	9,220,859	444,578	0	105,502	13,130,662
Nevada	366,694	510,501	370	0	2,768,641	3,646,206
New Hampshire	1,666,080	4,305,279	74,669	0	7,859	6,053,887
New Jersey	7,939,632	12,466,348	415,684	750	619,823	21,442,237
New Mexico	478,650	1,495,040	6	0	18,395,674	20,369,370
New York	16,323,183	38,965,922	1,779,412	0	1,575,410	58,643,927
North Carolina	17,818,822	64,264,845	750,668	0	20,749,490	103,583,825
North Dakota	492,407	1,262,958	118,022	0	30,759	1,904,146
Ohio	28,189,163	62,512,460	4,774,674	25,090,607	23,243,306	143,810,210
Oklahoma	7,901,256	16,301,942	1,075,537	2,029,508	864,194	28,172,437
Oregon	4,374,968	12,011,100	507,540	0	2,759,377	19,652,985
Pennsylvania	25,625,394	35,859,024	1,351,030	250	4,795,555	67,631,253
Puerto Rico	7,084,573	7,257,922	45,961	250	14,296	14,403,002
Rhode Island	2,024,624	1,294,828	115,849	0	16,830	3,452,131
South Carolina	16,899,203	45,038,227	1,053,027	0	4,934,161	67,924,618
South Dakota	491,448	2,418,172	57,005	0	5	2,966,630
Tennessee	35,842,871	91,531,459	2,625,582	63,508,375	678,950	194,187,237
Texas	76,125,814	81,325,796	16,754,975	227,453,795	17,901,649	419,562,029
Utah	3,723,298	65,291,333	103,845	0	10,087,907	79,206,383
Vermont	343,399	486,575	32,363	0	7,753	870,090
Virgin Islands	1,192,682	362,207	111,274	0	614	1,666,777
Virginia	19,147,340	44,879,730	1,896,631	1	2,442,147	68,365,849
Washington	7,115,719	14,892,830	4,037,428	0	476,174	26,522,151
West Virginia	8,406,928	14,614,371	1,523,102	0	261,463	24,805,864
Wisconsin	7,612,029	29,402,986	676,379	300	1,523,745	39,215,439
Wyoming	854,018	1,438,881	120,529	12,514,351	36,125	14,963,904
Total	549,351,729	1,295,606,607	272,932,953	725,946,415	337,809,053	3,181,646,757

Table 1-4. TRI Transfers by State, 1992 (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 Transfers❶ Pounds	Total Transfers Pounds
Alabama	37,395,734	11,317,763	10,002,833	1,097,314	6,269,626	3,523,948	69,607,218
Alaska	242,373	0	3,088	20	40	0	245,521
American Samoa	0	0	0	0	0	0	0
Arizona	25,568,056	958,400	2,217,865	488,744	132,571	14,362	29,379,998
Arkansas	52,662,167	5,068,940	1,403,473	507,607	5,172,469	57,677	64,872,333
California	123,936,368	12,450,501	6,854,269	21,250,793	5,848,678	114,136	170,454,745
Colorado	9,183,768	2,012,002	3,074,583	513,901	172,496	250	14,957,000
Connecticut	21,284,285	4,485,697	6,007,190	1,830,985	953,588	237,527	34,799,272
Delaware	7,768,213	1,388,720	767,827	2,461,868	42,934	0	12,429,562
Florida	20,008,993	4,939,383	5,962,703	12,513,210	1,990,984	1,500	45,416,773
Georgia	54,805,619	6,731,845	3,028,572	4,887,889	7,857,111	18,334	77,329,370
Hawaii	26,749	0	15	30,000	163,500	0	220,264
Idaho	346,467	302,663	70,395	2,063,990	35,465	0	2,818,980
Illinois	161,297,773	32,605,832	18,100,845	72,221,011	12,955,462	777,646	297,958,569
Indiana	341,282,661	18,015,870	41,190,745	4,402,399	14,430,737	820,996	420,143,408
Iowa	16,871,054	3,640,877	2,275,573	8,722,686	1,852,550	46,050	33,408,790
Kansas	44,222,880	2,316,495	4,021,017	3,608,102	9,162,353	104,452	63,435,299
Kentucky	62,743,147	11,127,746	9,551,771	2,414,318	3,243,462	676,902	89,757,346
Louisiana	231,989,078	6,882,645	5,135,902	65,044	3,834,727	250	247,907,646
Maine	2,539,404	430,462	262,611	662,867	902,685	4,320	4,802,349
Maryland	24,123,689	1,139,762	1,766,794	4,603,586	419,248	1,830	32,054,909
Massachusetts	19,512,246	8,908,572	5,583,501	5,086,842	1,699,677	246,583	41,037,421
Michigan	122,096,833	73,946,823	21,542,900	14,603,830	19,999,289	596,888	252,786,563
Minnesota	18,426,894	4,952,100	2,883,377	5,077,928	635,538	23,295	31,999,132
Mississippi	62,900,235	3,304,435	631,323	834,427	1,158,442	16,035	68,844,897
Missouri	183,300,509	11,583,162	74,159,677	22,893,750	2,849,323	83,784	294,870,205
Montana	2,481,824	117,064	10,142	27,798	154,333	0	2,791,161
Nebraska	14,210,583	1,133,219	1,909,910	1,458,203	3,918,367	1,264,675	23,894,957
Nevada	419,922	12,816	25,647	9,832	104,198	0	572,415
New Hampshire	6,993,658	428,063	580,617	500,121	348,950	1,000	8,852,409
New Jersey	103,116,529	28,817,117	18,778,453	37,871,671	2,602,616	262,619	191,449,005
New Mexico	313,771	227,060	75,712	213,548	23,729	350	854,170
New York	54,187,040	10,281,862	8,704,889	9,168,633	5,486,109	256,771	88,085,304
North Carolina	109,655,255	10,527,347	6,195,335	4,237,959	4,630,110	778,514	136,024,520
North Dakota	114,470	60,934	83,096	191,497	40,768	0	490,765
Ohio	187,635,645	37,352,001	31,058,073	20,745,800	28,139,365	1,690,674	306,621,558
Oklahoma	13,546,881	1,241,820	1,404,342	183,932	7,162,410	6,825	23,546,210
Oregon	12,604,632	589,211	764,380	4,275,478	3,118,674	4,800	21,357,175
Pennsylvania	119,900,060	18,172,115	29,273,713	13,205,484	23,937,935	3,164,684	207,653,991
Puerto Rico	11,836,770	9,262,409	4,178,882	4,744,380	425,286	45,188	30,492,915
Rhode Island	10,687,202	424,267	614,488	446,844	1,972,923	11,628	14,157,352
South Carolina	73,904,607	8,477,487	6,291,077	4,376,717	5,500,977	422,353	98,973,218
South Dakota	232,301	277,083	76,739	146,802	49,626	25,344	807,895
Tennessee	51,788,406	11,918,428	2,969,850	21,157,009	16,704,049	45,619	104,583,361
Texas	210,676,070	82,367,924	36,734,826	32,343,665	31,562,033	1,036,725	394,721,243
Utah	32,283,024	329,018	397,556	613,392	4,247,283	0	37,870,273
Vermont	4,317,515	531,800	155,838	69,162	37,273	0	5,111,588
Virgin Islands	703	0	176	0	57,180	0	58,059
Virginia	24,383,922	8,142,682	2,664,560	18,950,994	1,605,751	16,074	55,763,983
Washington	73,415,105	874,582	987,801	479,968	1,150,347	16,173	76,923,976
West Virginia	36,690,521	9,950,309	2,676,802	1,912,254	2,591,662	21,812	53,843,360
Wisconsin	39,886,693	7,611,813	10,349,625	10,894,409	11,220,687	494,897	80,458,124
Wyoming	7,615	138	5,162	28,160	66,981	0	108,056
Total	2,839,825,919	477,639,264	393,466,540	381,096,823	258,642,577	16,933,490	4,367,604,613

❶ Transfers reported without valid waste management codes.

Table 1-5. TRI Releases to Air, Water, and Land by State, 1992 (Ordered by Total Air/Water/Land Release).

State	Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/Water/Land Releases Pounds
Louisiana	89,051,622	186,329,129	2,497,703	277,878,454
Texas	157,451,610	16,754,975	17,901,649	192,108,234
Tennessee	127,374,330	2,625,582	678,950	130,678,862
Indiana	85,931,419	1,057,170	33,534,069	120,522,658
Ohio	90,701,623	4,774,674	23,243,306	118,719,603
Alabama	94,922,362	5,078,042	6,144,897	106,145,301
North Carolina	82,083,667	750,668	20,749,490	103,583,825
Illinois	73,198,214	5,744,242	18,293,118	97,235,574
Utah	69,014,631	103,845	10,087,907	79,206,383
Michigan	66,379,125	750,074	10,313,476	77,442,675
Florida	33,533,139	3,283,487	33,863,305	70,679,931
California	55,864,726	10,212,654	3,589,861	69,667,241
Virginia	64,027,070	1,896,631	2,442,147	68,365,848
South Carolina	61,937,430	1,053,027	4,934,161	67,924,618
Pennsylvania	61,484,418	1,351,030	4,795,555	67,631,003
Mississippi	54,351,096	1,545,410	5,803,832	61,700,338
New York	55,289,105	1,779,412	1,575,410	58,643,927
Georgia	50,470,159	3,679,910	1,265,341	55,415,410
Missouri	36,381,374	1,119,222	14,896,038	52,396,634
Arizona	8,392,860	5	37,721,228	46,114,093
Montana	2,788,614	139,875	40,959,484	43,887,973
Kentucky	38,518,600	576,039	1,593,133	40,687,772
Wisconsin	37,015,015	676,379	1,523,745	39,215,139
Iowa	32,613,855	1,276,714	1,528,882	35,419,451
Arkansas	28,091,101	1,434,309	2,247,087	31,772,497
Minnesota	29,610,947	502,921	1,505,226	31,619,094
Kansas	25,534,041	733,170	1,300,740	27,567,951
Washington	22,008,549	4,037,428	476,174	26,522,151
Oklahoma	24,203,198	1,075,537	864,194	26,142,929
West Virginia	23,021,299	1,523,102	261,463	24,805,864
New Jersey	20,405,980	415,684	619,823	21,441,487
New Mexico	1,973,690	6	18,395,674	20,369,370
Oregon	16,386,068	507,540	2,759,377	19,652,985
Connecticut	13,509,299	3,067,723	3,902	16,580,924
Maine	13,218,673	591,203	1,461,538	15,271,414
Alaska	10,945,946	3,907,576	457	14,853,979
Massachusetts	14,353,307	74,809	102,601	14,530,717
Puerto Rico	14,342,495	45,961	14,296	14,402,752
Nebraska	12,580,582	444,578	105,502	13,130,662
Maryland	10,571,969	838,672	1,592,309	13,002,950
Idaho	5,208,084	160,405	2,875,528	8,244,017
New Hampshire	5,971,359	74,669	7,859	6,053,887
Colorado	5,090,572	139,955	277,861	5,508,388
Delaware	5,008,493	236,887	138,518	5,383,898
Nevada	877,195	370	2,768,641	3,646,206
Rhode Island	3,319,452	115,849	16,830	3,452,131
South Dakota	2,909,620	57,005	5	2,966,630
Wyoming	2,292,899	120,529	36,125	2,449,553
North Dakota	1,755,365	118,022	30,759	1,904,146
Virgin Islands	1,554,889	111,274	614	1,666,777
Vermont	829,974	32,363	7,753	870,090
Hawaii	595,986	7,210	1,510	604,706
American Samoa	11,240	0	0	11,240
Total	1,844,958,336	272,932,953	337,809,053	2,455,700,342

Table 1-6. TRI Releases by State, 1992 (Ordered by Total Release).

State	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
Louisiana	21,540,139	67,511,483	186,329,129	186,673,578	2,497,703	464,552,032
Texas	76,125,814	81,325,796	16,754,975	227,453,795	17,901,649	419,562,029
Tennessee	35,842,871	91,531,459	2,625,582	63,508,375	678,950	194,187,237
Ohio	28,189,163	62,512,460	4,774,674	25,090,607	23,243,306	143,810,210
Indiana	28,060,916	57,870,503	1,057,170	3,777,831	33,534,069	124,300,489
Mississippi	13,160,820	41,190,276	1,545,410	57,994,938	5,803,832	119,695,276
Illinois	23,293,102	49,905,112	5,744,242	20,942,184	18,293,118	118,177,758
Alabama	14,766,447	80,155,915	5,078,042	6,269,431	6,144,897	112,414,732
North Carolina	17,818,822	64,264,845	750,668	0	20,749,490	103,583,825
Kansas	9,810,879	15,723,162	733,170	59,642,195	1,300,740	87,210,146
Michigan	16,745,464	49,633,661	750,074	6,083,782	10,313,476	83,526,457
Florida	11,825,436	21,707,703	3,283,487	11,772,909	33,863,305	82,452,840
Utah	3,723,298	65,291,333	103,845	0	10,087,907	79,206,383
California	25,704,187	30,160,539	10,212,654	884,806	3,589,861	70,552,047
Kentucky	11,666,067	26,852,533	576,039	29,040,503	1,593,133	69,728,275
Virginia	19,147,340	44,879,730	1,896,631	1	2,442,147	68,365,849
South Carolina	16,899,203	45,038,227	1,053,027	0	4,934,161	67,924,618
Pennsylvania	25,625,394	35,859,024	1,351,030	250	4,795,555	67,631,253
New York	16,323,183	38,965,922	1,779,412	0	1,575,410	58,643,927
Georgia	12,320,452	38,149,707	3,679,910	15	1,265,341	55,415,425
Missouri	11,366,604	25,014,770	1,119,222	250	14,896,038	52,396,884
Arizona	3,990,312	4,402,548	5	0	37,721,228	46,114,093
Montana	1,104,641	1,683,973	139,875	0	40,959,484	43,887,973
Arkansas	8,533,559	19,557,542	1,434,309	11,995,448	2,247,087	43,767,945
Wisconsin	7,612,029	29,402,986	676,379	300	1,523,745	39,215,439
Iowa	5,800,992	26,812,863	1,276,714	0	1,528,882	35,419,451
Minnesota	5,729,081	23,881,866	502,921	0	1,505,226	31,619,094
Oklahoma	7,901,256	16,301,942	1,075,537	2,029,508	864,194	28,172,437
Washington	7,115,719	14,892,830	4,037,428	0	476,174	26,522,151
West Virginia	8,406,928	14,614,371	1,523,102	0	261,463	24,805,864
New Jersey	7,939,632	12,466,348	415,684	750	619,823	21,442,237
New Mexico	478,650	1,495,040	6	0	18,395,674	20,369,370
Oregon	4,374,968	12,011,100	507,540	0	2,759,377	19,652,985
Connecticut	5,939,914	7,569,385	3,067,723	0	3,902	16,580,924
Maine	2,200,855	11,017,818	591,203	405	1,461,538	15,271,819
Wyoming	854,018	1,438,881	120,529	12,514,351	36,125	14,963,904
Alaska	946,556	9,999,390	3,907,576	192	457	14,854,171
Massachusetts	5,078,578	9,274,729	74,809	0	102,601	14,530,717
Puerto Rico	7,084,573	7,257,922	45,961	250	14,296	14,403,002
Nebraska	3,359,723	9,220,859	444,578	0	105,502	13,130,662
Maryland	3,813,351	6,758,618	838,672	0	1,592,309	13,002,950
Idaho	587,695	4,620,389	160,405	0	2,875,528	8,244,017
New Hampshire	1,666,080	4,305,279	74,669	0	7,859	6,053,887
Colorado	2,234,375	2,856,197	139,955	500	277,861	5,508,888
Delaware	1,270,271	3,738,222	236,887	0	138,518	5,383,898
Nevada	366,694	510,501	370	0	2,768,641	3,646,206
Rhode Island	2,024,624	1,294,828	115,849	0	16,830	3,452,131
South Dakota	491,448	2,418,172	57,005	0	5	2,966,630
North Dakota	492,407	1,262,958	118,022	0	30,759	1,904,146
Virgin Islands	1,192,682	362,207	111,274	0	614	1,666,777
Hawaii	449,878	146,108	7,210	269,261	1,510	873,967
Vermont	343,399	486,575	32,363	0	7,753	870,090
American Samoa	11,240	0	0	0	0	11,240
Total	549,351,729	1,295,606,607	272,932,953	725,946,415	337,809,053	3,181,646,757

Table 1-7. Transfers of TRI Chemicals in Wastes Within a State, 1992 (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 Transfers❷ Pounds	Total Transfers Within State Pounds
Indiana	289,022,055	9,867,879	38,703,136	11,686,493	784,789	350,064,352
Texas	110,106,890	73,878,264	32,015,095	28,408,201	1,030,645	245,439,095
Missouri	157,813,615	3,349,952	964,608	1,933,736	21,001	164,082,912
Michigan	78,860,007	37,821,035	12,926,009	14,996,807	573,383	145,177,241
Ohio	65,647,724	26,847,616	25,161,663	24,865,621	1,602,724	144,125,348
California	108,051,745	10,841,395	4,970,478	4,861,214	109,444	128,834,276
Pennsylvania	87,336,374	854,391	15,291,121	10,290,853	3,099,408	116,872,147
Louisiana	58,891,158	3,942,287	3,838,232	1,628,701	0	68,300,378
Washington	64,242,296	308,961	758,411	723,586	825	66,034,079
Illinois	27,945,419	9,095,907	12,553,594	9,982,100	629,351	60,206,371
New Jersey	17,876,276	20,449,063	7,962,341	1,562,118	238,719	48,088,517
South Carolina	35,166,511	3,560,114	3,407,545	4,794,795	379,762	47,308,727
Tennessee	29,275,390	2,506,628	1,075,530	8,486,833	42,257	41,386,638
Wisconsin	20,828,786	1,113,659	9,207,938	9,055,773	56,781	40,262,937
North Carolina	25,405,393	1,404,001	2,168,191	3,734,987	525,160	33,237,732
Kansas	14,729,375	731,290	2,278,301	8,888,948	900	26,628,814
West Virginia	24,146,566	17,940	72	1,693,905	0	25,858,483
New York	18,505,534	1,579,813	972,396	3,571,163	73,044	24,701,950
Alabama	8,015,289	8,082,674	1,320,398	5,948,626	2,415	23,369,402
Georgia	15,818,684	544,449	483,268	6,346,710	213	23,193,324
Puerto Rico	10,603,530	7,393,341	1,725,781	374,342	41,288	20,138,282
Kentucky	7,664,352	5,945,027	2,121,534	2,329,867	544,264	18,605,044
Massachusetts	7,794,734	3,506,834	1,963,166	1,056,006	120,101	14,440,841
Arkansas	8,382,312	787,288	328,527	3,763,858	250	13,262,235
Florida	8,737,140	711,098	1,969,219	877,128	0	12,294,585
Connecticut	9,944,820	96,211	1,057,026	566,094	0	11,664,151
Minnesota	8,163,758	1,068,328	1,709,476	234,521	824	11,176,907
Arizona	8,859,172	489,329	1,686,768	79,498	0	11,114,767
Oklahoma	6,549,774	214,891	44,566	1,307,593	250	8,117,074
Maryland	6,333,089	8,314	107,634	243,070	0	6,692,107
Utah	1,471,037	1,189	278,290	4,241,533	0	5,992,049
Virginia	2,568,875	1,848,277	220,812	1,341,369	2,020	5,981,353
Nebraska	1,303,862	12,255	1,690,713	1,445,144	1,025,885	5,477,859
Colorado	2,097,584	1,943,407	1,232,784	113,192	250	5,387,217
Iowa	1,936,509	59,702	1,249,069	1,440,858	750	4,686,888
Oregon	2,835,915	9,143	478,258	875,090	0	4,198,406
Mississippi	2,482,225	1,000	21,809	426,468	555	2,932,057
Rhode Island	651,413	486	75,049	1,611,621	0	2,338,569
Maine	1,255,322	250	7,550	791,643	0	2,054,765
Delaware	1,877,245	10	35,202	30,522	0	1,942,979
New Hampshire	1,089,036	0	48,565	76,240	0	1,213,841
North Dakota	93,600	750	49,000	449	0	143,799
Idaho	0	250	62,249	32,919	0	95,418
Nevada	0	47	2,522	73,269	0	75,838
Vermont	24,100	0	20,424	12,010	0	56,534
South Dakota	5	0	1,000	43,456	0	44,461
Wyoming	632	0	0	37,548	0	38,180
New Mexico	2,250	0	30,000	5,685	0	37,935
Montana	4,900	0	0	5,375	0	10,275
Hawaii	0	0	0	3,803	0	3,803
Virgin Islands	0	0	0	0	0	0
American Samoa	0	0	0	0	0	0
Alaska	0	0	0	0	0	0
Total	1,360,412,278	240,894,745	194,275,320	186,901,341	10,907,258	1,993,390,942

❷ Transfers reported without valid waste management codes.

Table 1-8. Receipt of TRI Chemicals in Wastes from Out of State, 1992 (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 Transfers❸ Pounds	Total Transfers Received Pounds
Pennsylvania	186,980,818	1,650,866	5,151,736	1,037,884	211,007	195,032,311
Indiana	138,225,045	29,475,675	9,143,466	8,994,139	194,141	186,032,466
Connecticut	182,833,083	60,921	692,422	387,056	23,730	183,997,212
Illinois	80,791,172	14,206,162	74,771,971	4,836,778	595,209	175,201,292
Ohio	83,352,328	39,479,666	21,365,088	18,689,570	70,267	162,956,919
Louisiana	94,749,913	8,069,040	16,342,274	3,031,305	10,338	122,202,870
Michigan	60,425,014	12,088,268	5,871,137	3,987,610	89,414	82,461,443
South Carolina	58,669,499	13,618,245	5,186,743	2,940,239	235,938	80,650,664
Alabama	39,175,801	26,990,047	3,432,132	2,403,102	62,652	72,063,734
Texas	43,296,026	2,526,966	6,592,824	8,603,387	35,875	61,055,078
Missouri	52,227,096	6,550,120	1,332,393	248,947	45,219	60,403,775
New Jersey	30,496,336	12,724,825	14,421,814	429,701	95,456	58,168,132
California	54,983,566	598,587	488,459	81,408	167,102	56,319,122
Tennessee	38,814,673	8,068,349	3,532,780	731,820	2,150	51,149,772
West Virginia	35,856,149	2,060	387,718	468,888	7,600	36,722,415
New York	30,933,247	1,341,796	2,439,258	1,010,346	55,123	35,779,770
Kentucky	8,397,195	18,944,435	4,005,796	455,042	15,014	31,817,482
Georgia	21,561,809	3,228,999	639,857	208,842	75,758	25,715,265
Delaware	23,922,011	14,719	27,903	1,559	0	23,966,192
Wyoming	23,101,551	0	0	0	0	23,101,551
Wisconsin	17,414,774	4,091,295	976,420	235,944	60,002	22,778,435
Florida	17,960,599	2,788,307	928,013	66,206	1,037	21,744,162
Virginia	7,102,325	7,023,682	1,664,550	1,814,881	39,783	17,645,221
Arkansas	2,730,673	7,302,257	6,579,502	437,033	16,951	17,066,416
North Carolina	13,691,051	1,630,004	431,761	436,125	39,744	16,228,685
Montana	13,644,344	0	0	2,097,000	0	15,741,344
Minnesota	8,299,813	3,460,317	1,839,507	5,574	4,581	13,609,792
Massachusetts	7,784,577	985,769	1,315,891	554,046	219,059	10,859,342
District of Columbia	9,444,201	0	750	245	0	9,445,196
Maryland	5,791,618	488,925	1,723,413	298,877	250	8,303,083
Kansas	142,652	4,730,651	569,533	105,429	3,698	5,551,963
Washington	2,061,228	333,770	319,216	2,196,473	0	4,910,687
Oklahoma	1,587,769	931,489	871,876	1,223,433	2,914	4,617,481
Arizona	3,849,053	10,679	188,388	14,575	1,822	4,064,517
Idaho	2,289,647	35	197,355	191,052	0	2,678,089
Iowa	2,199,763	22,343	10,864	71,092	0	2,304,062
Nevada	972,186	0	52,489	963,838	192	1,988,705
Rhode Island	1,730,224	37,558	201,943	6,541	4,700	1,980,966
Utah	214,800	220	579,109	774,870	0	1,568,999
Colorado	800,395	640,693	30,544	26,683	45,954	1,544,269
Oregon	612,197	29,428	49,041	350,182	0	1,040,848
Mississippi	331,115	48,163	1,270	205,969	57,427	643,944
Nebraska	90,194	88,947	2,760	33,024	0	214,925
New Hampshire	38,107	0	69	100,272	0	138,448
North Dakota	9,917	0	0	95,034	0	104,951
New Mexico	24,350	0	0	13,200	0	37,550
South Dakota	3,700	0	31,967	0	0	35,667
Alaska	0	0	30,462	407	0	30,869
Maine	23,205	45	0	299	0	23,549
Vermont	4,130	0	14,167	266	0	18,563
Virgin Islands	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0
American Samoa	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0
Other❹	69,772,702	2,460,196	4,754,589	875,043	3,536,125	81,398,655
Total	1,479,413,641	236,744,519	199,191,220	71,741,236	6,026,232	1,993,116,848

❸ Transfers reported without valid waste management codes.

❹ Includes wastes sent to other countries and to sites not identified by state.

Table 1-11. States with Net Imports of TRI Chemicals in Wastes (Transfers Received from Out of State Minus Transfers Sent Out of State), 1992 (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 Transfers❽ Pounds	Net Imports Pounds
Connecticut	171,493,618	-4,328,565	-4,257,742	-438	-213,797	162,693,076
Indiana	85,964,439	21,327,684	6,655,857	6,249,895	157,934	120,355,809
Pennsylvania	154,417,132	-15,666,858	-8,830,856	-12,609,198	145,731	117,455,951
California	39,098,943	-1,010,519	-1,395,332	-906,056	162,410	35,949,446
South Carolina	19,931,403	8,700,872	2,303,211	2,234,057	193,347	33,362,890
Alabama	9,795,356	23,754,958	-5,250,303	2,082,102	-3,458,881	26,923,232
Wyoming	23,094,568	-138	-5,162	-29,433	0	23,059,835
Ohio	-38,635,593	28,975,281	15,468,678	15,415,826	-17,683	21,206,509
Delaware	18,031,043	-1,373,991	-704,722	-10,853	0	15,941,477
Montana	11,167,420	-117,064	-10,142	1,948,042	0	12,988,256
West Virginia	23,312,194	-9,930,309	-2,289,012	-428,869	-14,212	10,649,792
Illinois	-52,561,182	-9,303,763	69,224,720	1,863,416	446,914	9,670,105
District of Columbia	9,444,201	0	750	245	0	9,445,196
Tennessee	16,301,657	-1,343,451	1,638,460	-7,485,396	-1,212	9,110,058
Idaho	1,943,180	-302,378	189,209	188,506	0	2,018,517
Nevada	552,264	-12,769	29,364	932,909	192	1,501,960
Florida	6,688,746	-1,439,978	-3,065,471	-1,047,650	-463	1,135,184
Total	500,039,389	37,929,012	69,701,507	8,397,105	-2,599,720	613,467,293

Table 1-11 presents the states that are net importers of TRI chemicals in wastes. 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 transfer category indicates that the state is a net exporter in that category, although it is a net importer overall. The District of Columbia appears in this table because it receives waste from facilities in other states, even though no facilities in the District of Columbia currently report to TRI.

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.

❽ Transfers reported without valid waste management codes.

Table 1-12. States with Net Exports of TRI Chemicals in Wastes (Transfers Sent Out of State Minus Transfers Received from Out of State), 1992 (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 Transfers❾ Pounds	Net Exports Pounds
North Carolina	70,558,811	7,493,342	3,595,383	458,998	213,610	82,320,144
Mississippi	60,086,895	3,255,272	608,244	526,005	-41,947	64,434,469
Louisiana	78,348,007	-5,128,682	-15,044,604	-825,279	-10,088	57,339,354
Texas	57,273,154	5,962,694	-1,873,093	-5,449,555	-29,795	55,883,405
Missouri	-26,740,202	1,683,090	71,862,676	666,640	17,564	47,489,768
New Jersey	54,743,917	-4,356,771	-3,605,702	610,797	-71,556	47,320,685
Kentucky	46,681,600	-13,761,716	3,424,441	458,553	117,624	36,920,502
Arkansas	41,549,182	-3,020,605	-5,504,556	971,578	40,476	34,036,075
Utah	30,597,187	327,609	-459,843	-769,120	0	29,695,833
Kansas	29,350,853	-3,145,446	1,173,183	167,976	99,854	27,646,420
Georgia	17,425,126	2,958,397	1,905,447	1,301,559	-57,637	23,532,892
New York	4,748,259	7,360,253	5,293,235	904,600	128,604	18,434,951
Iowa	12,734,782	3,558,832	1,015,640	340,600	45,300	17,695,154
Nebraska	12,816,527	1,032,017	216,437	2,440,199	238,790	16,743,970
Arizona	12,859,831	458,392	342,709	38,498	12,540	13,711,970
Virginia	14,712,722	-729,277	779,198	-1,550,499	-25,729	13,186,415
Maryland	11,998,982	642,523	-64,253	-122,699	1,580	12,456,133
Oregon	9,156,520	550,640	237,081	1,893,402	4,800	11,842,443
Massachusetts	3,932,935	4,415,969	2,304,444	89,625	-92,577	10,650,396
Oklahoma	5,409,338	95,440	487,900	4,631,384	3,661	10,627,723
Michigan	-17,188,188	24,037,520	2,745,754	1,014,872	-65,909	10,544,049
Rhode Island	8,305,565	386,223	337,496	354,761	6,928	9,390,973
Colorado	6,285,789	-572,098	1,811,255	32,621	-45,954	7,511,613
New Hampshire	5,866,515	428,063	531,983	172,438	1,000	6,999,999
Wisconsin	1,643,133	2,406,859	165,267	1,928,970	378,114	6,522,343
Puerto Rico	1,233,240	1,869,068	2,453,101	50,944	3,900	5,610,253
Washington	7,111,581	231,851	-89,826	-1,769,712	15,348	5,499,242
Vermont	4,289,285	531,800	121,247	24,997	0	4,967,329
Minnesota	1,963,323	423,455	-665,606	395,443	17,890	2,134,505
Maine	1,260,877	430,167	255,061	110,743	4,320	2,061,168
South Dakota	228,596	277,083	43,772	6,170	25,344	580,965
New Mexico	287,171	227,060	45,712	4,844	350	565,137
Alaska	242,373	0	-27,374	-367	0	214,632
Hawaii	26,749	0	15	159,697	0	186,461
Virgin Islands	703	0	176	57,180	0	58,059
North Dakota	10,953	60,184	34,096	-54,715	0	50,518
Total	569,812,091	40,389,208	74,456,096	9,272,148	936,405	694,865,948

❾ Transfers reported without valid waste management codes.

Table 1-13. TRI Releases by Industry, 1992.

SIC Code	Industry	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
20	Food	12,121,382	16,579,007	1,995,833	228,402	8,163,978	39,088,602
21	Tobacco	302,638	3,256,470	21,259	0	5	3,580,372
22	Textiles	5,820,846	15,294,690	262,379	0	89,453	21,467,368
23	Apparel	507,554	1,067,666	1,057	0	5	1,576,282
24	Lumber	7,498,943	25,859,509	95,525	16	102,460	33,556,453
25	Furniture	7,668,793	46,975,758	332	0	409,232	55,054,115
26	Paper	23,197,719	176,641,208	27,636,095	3,507	5,570,248	233,048,777
27	Printing	23,262,751	17,219,225	678	645	9,032	40,492,331
28	Chemicals	157,526,108	399,934,779	224,343,526	684,644,201	69,481,134	1,535,929,748
29	Petroleum	38,849,066	22,737,655	3,464,196	13,072,167	5,113,062	83,236,146
30	Plastics	41,685,463	95,521,370	479,230	5	491,329	138,177,397
31	Leather	3,508,282	6,660,831	272,260	0	68,922	10,510,295
32	Stone/Clay	2,661,129	15,401,168	78,024	6,077,195	1,471,005	25,688,521
33	Primary Metals	35,329,687	100,327,170	6,481,371	14,349,881	188,823,146	345,311,255
34	Fabricated Metals	38,582,706	62,094,172	178,940	3,691	1,107,121	101,966,630
35	Machinery	13,975,308	19,837,548	57,102	250	234,054	34,104,262
36	Electrical	16,055,696	37,425,870	201,334	1,077	577,545	54,261,522
37	Transportation Equip.	42,943,227	92,224,283	143,152	1,250	1,775,998	137,087,910
38	Measure/Photo	9,923,990	24,555,768	816,224	0	19,521	35,315,503
39	Miscellaneous	5,841,853	12,587,515	1,446	250	6,543	18,437,607
	Multiple Codes 20-39 (10)	57,633,420	97,058,239	6,035,539	7,319,840	50,689,007	218,736,045
	No Codes 20-39 (11)	4,455,168	6,346,706	367,451	244,038	3,606,253	15,019,616
	Total	549,351,729	1,295,606,607	272,932,953	725,946,415	337,809,053	3,181,646,757

1992 TRI DATA BY INDUSTRY

Tables 1-13 and 1-14 present TRI releases and transfers by industry, in SIC code order. Facilities that reported two or more two-digit SIC codes within the range of 20-39 [for example, paper (26) and chemicals (28)] are assigned to a "multiple codes" category, while facilities reporting no codes or codes outside the 20-39 range (e.g., voluntary reporters) are assigned to a "no codes" category.

The top five industries for total TRI releases are chemical manufacturing (SIC code 28), primary metals (33), paper manufacturing (26), plastics (30), and transportation equipment (37). Figure 1-6 clearly illustrates the predominance of the chemical manufacturing industry in TRI release and transfer reporting.

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

(11) Facilities that did not report an SIC code and facilities that reported SIC codes outside the 20 to 39 range.

Table 1-14. TRI Transfers by Industry, 1992.

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 Transfers⓬ Pounds	Total Transfers Pounds
20	Food	1,479,515	82,506	2,091,723	40,822,493	1,594,350	551	46,071,138
21	Tobacco	1,914	7,116	3,161	13,814	17,774	0	43,779
22	Textiles	1,354,829	1,316,811	721,011	8,407,234	543,406	467,721	12,811,012
23	Apparel	287,836	404,653	77,431	83,914	47,112	0	900,946
24	Lumber	1,042,593	4,878,859	1,086,021	101,620	1,483,842	10,399	8,603,334
25	Furniture	3,652,798	6,572,971	1,641,172	129,670	3,551,378	4,405	15,552,394
26	Paper	1,504,253	7,096,024	10,607,397	46,701,208	3,615,706	42,044	69,566,632
27	Printing	5,636,688	4,757,847	706,710	312,265	166,094	50,143	11,629,747
28	Chemicals	455,366,627	349,821,217	166,693,289	203,598,493	46,551,327	1,644,946	1,223,675,899
29	Petroleum	564,138,358	2,266,234	683,980	5,334,989	2,178,141	897	574,602,599
30	Plastics	17,486,862	11,092,206	5,353,750	4,226,147	9,824,968	193,214	48,177,147
31	Leather	837,350	891,895	112,761	6,527,021	1,550,587	41,766	9,961,380
32	Stone/Clay	3,684,248	3,398,880	2,898,894	2,049,603	6,726,991	707,446	19,466,062
33	Primary Metals	760,567,964	12,586,817	121,355,162	22,487,258	96,569,713	7,675,296	1,021,242,210
34	Fabricated Metals	218,666,641	12,661,683	19,698,762	5,005,574	20,748,770	1,915,514	278,696,944
35	Machinery	43,169,375	3,405,881	2,311,586	2,160,041	3,841,677	229,310	55,117,870
36	Electrical	300,588,511	11,785,813	14,544,821	7,409,061	11,191,096	1,549,146	347,068,448
37	Transportation Equip.	141,450,001	20,928,221	10,164,698	3,889,637	11,437,553	197,129	188,067,239
38	Measure/Photo	16,701,244	5,006,104	4,346,562	1,177,728	993,730	21,065	28,246,433
39	Miscellaneous	9,227,001	1,935,079	1,280,683	570,619	1,857,432	124,820	14,995,634
	Multiple Codes 20-39⓭	287,309,577	16,086,629	25,172,698	17,534,472	33,483,758	1,784,880	381,372,014
	No Codes 20-39⓮	5,671,734	655,818	1,914,268	2,553,962	667,172	272,798	11,735,752
	Total	2,839,825,919	477,639,264	393,466,540	381,096,823	258,642,577	16,933,490	4,367,604,613

⓬ Transfers reported without valid waste management codes.
⓭ Facilities that reported more than one two-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
⓮ Facilities that did not report an SIC code and facilities that reported SIC codes outside the 20 to 39 range.

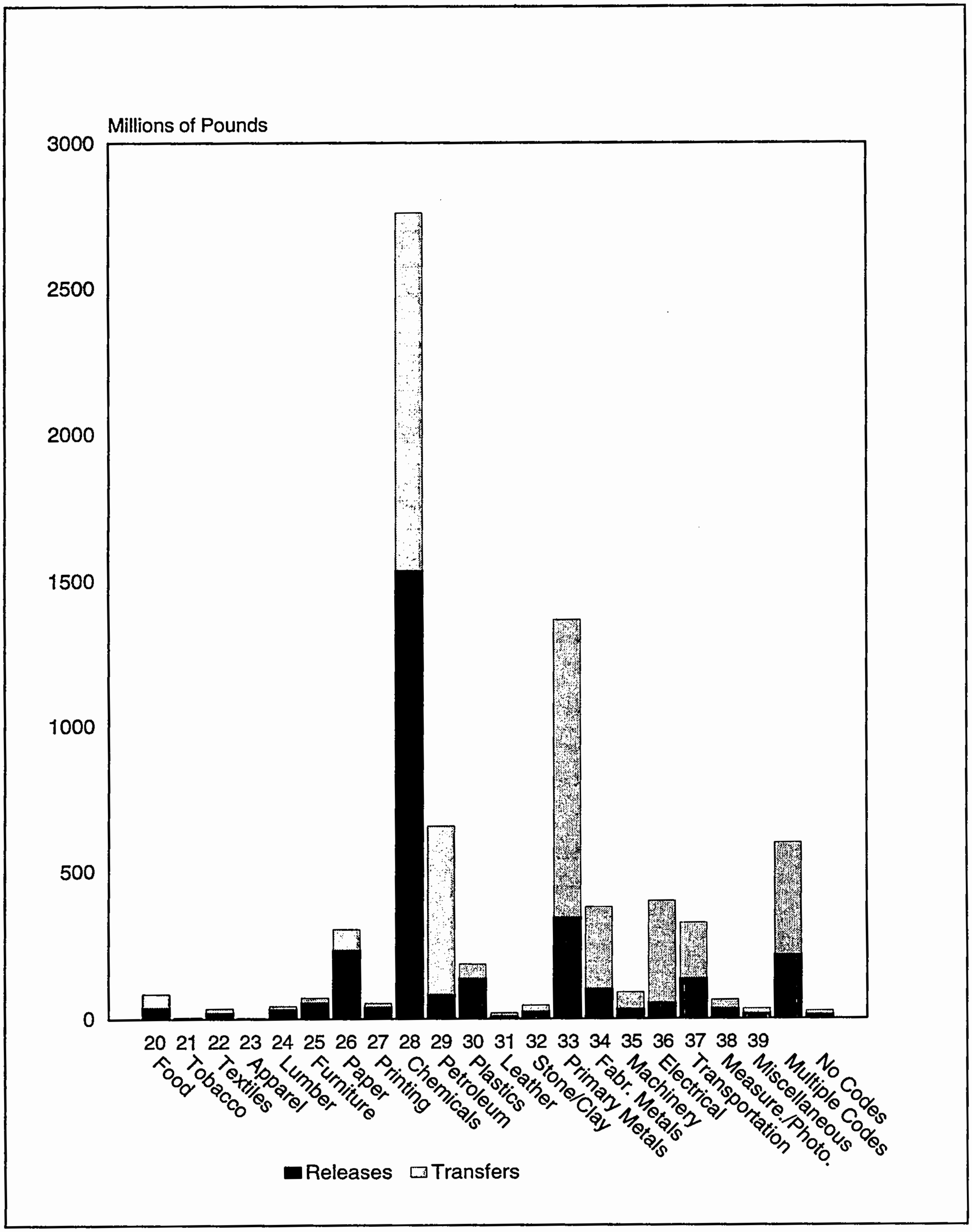


Figure 1-6. TRI Releases and Transfers by Industry, 1992.

Top 50 Facilities

Table 1-15 presents the top 50 facilities for releases to air, water, and land. These facilities represent substantially less than 1% of all facilities reporting to TRI, yet account for 31% of TRI releases to air, water, and land in aggregate.

Table 1-16 presents the top 50 facilities for total TRI releases, including underground injection of waste. These 50 facilities account for 42% of total TRI releases, including underground injection.

Top 10 Parent Companies

Tables 1-17 and 1-18 present releases and number of forms and facilities attributable to the top ten parent companies for releases to air, water, and land. These parent companies accounted for only 1.4% of all facilities and 3.7% of all forms, yet they accounted for 24% of TRI releases to air, water, and land.

Tables 1-19 and 1-20 present releases and number of forms and facilities attributable to the top ten parent companies for total TRI releases, including underground injection. These parent companies accounted for only 1.1% of all facilities and 2.8% of all forms, yet they accounted for 31% of total TRI releases, including underground injection.

Table 1-17. Top 10 TRI Parent Companies with the Largest Air/Water/Land Releases, 1992.

Company Name	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
Freeport-McMoran	438,365	7,287,700	141,726,923	5,943,073	155,396,061
Asarco Inc.	865,694	886,387	15,767	61,339,387	63,107,235
Renco Group Inc.	287,643	60,897,054	10,756	1,038,630	62,234,083
Arcadian Fertilizer L.P.	1,410,591	14,314,308	40,170,999	828,931	56,724,829
Eastman Kodak Company	23,594,685	30,019,187	1,208,666	252,685	55,075,223
Courtaulds Coatings Inc.	352,500	42,479,197	58,415	450,000	43,340,112
DuPont	7,962,319	33,979,081	1,152,377	183,128	43,276,905
General Motors Corp.	6,387,677	25,045,585	122,934	8,822,700	40,378,896
3M Co.	2,157,170	27,877,803	3,933,702	82,445	34,051,120
Inland Steel Co.	325,139	379,280	576,691	30,004,182	31,285,292
Subtotal	43,781,783	243,165,582	188,977,230	108,945,161	584,869,756
Total for All TRI Facilities	549,351,729	1,295,606,607	272,932,953	337,809,053	2,455,700,342

Table 1-18. Number of Facilities and Forms for the Top 10 TRI Parent Companies with the Largest Air/Water/Land Releases, 1992.

Company Name	Facilities Number	Forms Number	Total Air/ Water/Land Releases Pounds
Freeport-McMoran	4	21	155,396,061
Asarco Inc.	12	96	63,107,235
Renco Group Inc.	6	34	62,234,083
Arcadian Fertilizer L.P.	8	72	56,724,829
Eastman Kodak Company	21	315	55,075,223
Courtaulds Coatings Inc.	13	69	43,340,112
DuPont	82	859	43,276,905
General Motors Corp.	131	1,109	40,378,896
3M Co.	50	373	34,051,120
Inland Steel Co.	3	42	31,285,292
Subtotal	330	2,990	584,869,756
Total	23,630	81,016	2,455,700,342

Table 1-19. Top 10 TRI Parent Companies with the Largest Total Releases, 1992.

Company Name	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
DuPont	7,962,319	33,979,081	1,152,377	196,337,387	183,128	239,614,292
Freeport-McMoran Inc.	438,365	7,287,700	141,726,923	0	5,943,073	155,396,061
American Cyanamid	1,003,125	2,818,067	748,694	146,575,843	13,895	151,159,624
Monsanto Company	1,040,597	6,323,243	2,490,316	66,107,180	286,006	76,247,342
Asarco Inc.	865,694	886,387	15,767	5,808,239	61,339,387	68,915,474
Renco Group Inc.	287,643	60,897,054	10,756	0	1,038,630	62,234,083
Vulcan Materials Company	190,004	852,599	29,030	59,536,672	5	60,608,310
Arcadian Fertilizer L.P.	1,410,591	14,314,308	40,170,999	0	828,931	56,724,829
Eastman Kodak Company	23,594,685	30,019,187	1,208,666	0	252,685	55,075,223
BP America	2,453,760	4,428,650	408,010	47,130,834	8,077	54,429,331
Subtotal	39,246,783	161,806,276	187,961,538	521,496,155	69,893,817	980,404,569
Total for All TRI Facilities	549,351,729	1,295,606,607	272,932,953	725,946,415	337,809,053	3,181,646,757

Table 1-20. Number of Facilities and Forms for the Top 10 TRI Parent Companies with the Largest Total Releases, 1992.

Company Name	Facilities Number	Forms Number	Total Releases Pounds
DuPont	82	859	239,614,292
Freeport-McMoran Inc.	4	21	155,396,061
American Cyanamid	31	254	151,159,624
Monsanto Company	29	282	76,247,342
Asarco Inc.	12	96	68,915,474
Renco Group Inc.	6	34	62,234,083
Vulcan Materials Company	3	54	60,608,310
Arcadian Fertilizer L.P.	8	72	56,724,829
Eastman Kodak Company	21	315	55,075,223
BP America	58	280	54,429,331
Subtotal	254	2,267	980,404,569
Total for All TRI Facilities	23,630	81,016	3,181,646,757

1992 TRI DATA BY CHEMICAL

The following tables provide the 1992 TRI data by chemical. Tables 1-21 and 1-22 list the top 50 TRI chemicals with largest air, water, and land releases and largest total releases. Four of the top five chemicals remain the same on both tables.

Tables 1-23 to 1-31 provide the top 15 chemicals released to each media and transferred off-site for each waste management activity.

Use, Toxicity, and Environmental Fate Information on the Top 10 Chemicals with Largest Total Releases

The following information on use, toxicity, and environmental fate is provided for the top 10 chemicals with largest total releases. (See Table 1-22).

Ammonia

Uses. Ammonia is used in the manufacture of various nitrogen compounds including nitric acid, ammonium salts, urea, and chemicals that are used in the manufacture of nylon and plastics. Ammonia 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. 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.

Environmental Fate. Ammonia combines with sulfate ion 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.

Hydrochloric acid

Uses. Hydrochloric acid has various uses, including neutralization of wastestreams/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 (e.g., 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.

Methanol

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

Toxicity. Methanol is a flammable liquid that is likely to evaporate when exposed to air. Methanol, which is readily absorbed from the gastrointestinal tract and the respiratory tract, is toxic to humans in moderate to high doses. EPA review indicates low chronic toxicity. Observed toxic effects generally include central nervous system damage and blindness. EPA is currently assessing methanol for potential non-cancer, long-term effects when exposure occurs by inhalation.

Methanol is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to exceed 1 milligram methanol per liter of water. Methanol is not likely to persist in water or to bioaccumulate in aquatic life.

Environmental Fate. Methanol in the atmosphere can react with other atmospheric chemicals or can be washed out by rain. Methanol is readily degraded by microorganisms in soils and surface waters.

Phosphoric acid

Uses. Phosphoric acid is a phosphate chemical used to make phosphate fertilizers and agricultural chemicals; it is used in foods, i.e, soft drinks; it is used as a catalyst, and in the treatment of 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. Eutrophication is the 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.

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.

Toluene

Uses. Toluene is used in the manufacture of organic chemicals, such as benzoic acid and benzaldehyde, as a solvent for paint, gums, and resins, and as an additive for gasoline.

Toxicity. 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 breathed in by their mothers, although the same effects were not seen when the mothers were fed large quantities of toluene.

Reactions of toluene (see environmental fate) 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. Toluene is a volatile organic chemical. As such, toluene in the lower atmosphere will react with other atmospheric components contributing to the formation of ozone in the lower atmosphere and other air pollutants.

The majority of releases of toluene to land and water will evaporate. Toluene may also be degraded by microorganisms.

Sulfuric acid

Uses. Sulfuric acid is used as a catalyst, in the manufacture of fertilizers and other chemicals, in iron and steel pickling, in electroplating, in the production of rayon and film.

Toxicity. Concentrated sulfuric acid is corrosive. In its aerosol form, sulfuric acid has been implicated in causing and exacerbating a variety of respiratory ailments.

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

Sulfuric acid is also a component of acid rain. Acid rain can cause serious damage to crops and forests.

Environmental Fate. Releases of sulfuric 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.

In the atmosphere, aerosol forms of sulfuric acid contribute to acid rain. These aerosol forms can travel large distances from the point of release before the acid is deposited on land and surface waters in the form of rain.

Acetone

Uses. Acetone has many uses, including as a solvent in the manufacture of organic chemicals and as a solvent in adhesives and printing inks. Acetone is an ingredient in paint, varnish, and nail polish removers.

Toxicity. Symptoms of exposures to large quantities of acetone may include headache, lassitude, drowsiness, vomiting, and respiratory depression.

Reactions of acetone (see environmental fate) 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. If released into water, acetone will be degraded by microorganisms or will evaporate into the atmosphere. Degradation by microorganisms will be the primary removal mechanism.

Acetone is a volatile organic chemical. As such, acetone in the lower atmosphere will react with other atmospheric components, contributing to the formation of ozone in the lower atmosphere and other air pollutants. EPA is re-evaluating acetone's reactivity in the lower atmosphere to determine whether this contribution is negligible.

1,1,1-Trichloroethane

Uses. 1,1,1-Trichloroethane, which is also known as methyl chloroform, is used as a solvent, as a dry cleaning agent, and as a degreasing agent for metal parts. By the year 1996, 1,1,1-trichloroethane will no longer be made in the United States because of its effects on the ozone layer.

Toxicity. Exposure to large quantities of 1,1,1-trichloroethane for a short time may induce dizziness, light-headedness, a loss of balance and coordination.

1,1,1-Trichloroethane can react in the upper atmosphere (stratosphere) to deplete 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. Ultraviolet-B radiation has been shown to cause various adverse human health and environmental effects. (These effects are described in the section on ozone depleting chemicals later in this chapter.)

Environmental Fate. Releases to land and water will evaporate into the atmosphere. In the lower atmosphere, 1,1,1-trichloroethane will not degrade rapidly. Some of the 1,1,1-trichloroethane will enter the upper atmosphere, where it contributes to the depletion of stratospheric ozone.

Xylenes

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

Toxicity. Reactions of xylenes (see environmental fate) 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 evaporate, although some degradation by microorganisms will occur.

Xylenes are moderately mobile in soils and may leach into ground water, where they may persist for several years.

Xylenes are volatile organic chemicals. As such, xylenes in the lower atmosphere will react with other atmospheric components, contributing to the formation of ozone in the lower atmosphere and other air pollutants.

Carbon disulfide

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

Toxicity. Carbon disulfide can irritate the eyes and the upper respiratory system. Carbon disulfide may also affect the heart and the central nervous system. Studies indicate that carbon disulfide can adversely affect the developing fetus.

Environmental Fate. 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 atmospheric chemicals to form atmospheric pollutants.

Table 1-21. Top 50 TRI Chemicals with the Largest Air/Water/Land Releases, 1992.

CAS Number	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	33,921,970	160,868,717	16,422,600	3,328,541	214,541,828
7664-41-7	Ammonia	38,878,070	123,206,765	40,824,196	9,165,277	212,074,308
7664-38-2	Phosphoric acid	326,636	868,973	158,674,836	46,725,635	206,596,080
108-88-3	Toluene	64,986,449	126,010,712	84,024	708,278	191,789,463
67-64-1	Acetone	62,963,625	70,989,876	999,584	559,265	135,512,350
71-55-6	1,1,1-Trichloroethane	56,479,078	58,465,308	13,132	76,381	115,033,899
1330-20-7	Xylene (mixed isomers)	26,080,470	83,631,841	41,504	1,434,430	111,188,245
75-15-0	Carbon disulfide	2,636,114	90,240,923	45,087	21	92,922,145
78-93-3	Methyl ethyl ketone	31,107,484	59,397,157	153,249	241,794	90,899,684
	Zinc compounds	1,506,116	2,678,676	1,009,739	76,540,392	81,734,923
7647-01-0	Hydrochloric acid	4,393,471	72,715,559	1,927,193	432,770	79,468,993
75-09-2	Dichloromethane	27,495,557	46,467,648	221,192	79,313	74,263,710
7782-50-5	Chlorine	1,634,189	68,278,693	1,217,091	46,171	71,176,144
	Manganese compounds	501,113	1,297,031	733,225	61,485,334	64,016,703
7664-93-9	Sulfuric acid	1,570,940	22,150,513	32,719,526	1,737,032	58,178,011
	Glycol ethers	10,590,821	34,937,784	350,489	140,595	46,019,689
	Copper compounds	3,563,732	2,766,265	72,413	34,489,362	40,891,772
74-85-1	Ethylene	16,595,902	20,010,924	13,413	0	36,620,239
100-42-5	Styrene	13,149,414	19,185,202	23,502	304,179	32,662,297
71-36-3	n-Butyl alcohol	7,134,970	22,588,357	35,369	57,220	29,815,916
79-01-6	Trichloroethylene	15,269,203	14,305,372	8,153	20,726	29,603,454
108-10-1	Methyl isobutyl ketone	7,814,570	18,079,207	96,387	194,986	26,185,150
76-13-1	Freon 113	17,610,197	6,954,728	1,916	9,028	24,575,869
	Chromium compounds	128,783	334,902	269,667	23,165,988	23,899,340
115-07-1	Propylene	12,981,892	8,235,849	989	0	21,218,730
67-66-3	Chloroform	6,017,425	11,017,501	654,452	28,582	17,717,960
463-58-1	Carbonyl sulfide	4,222	16,198,944	0	0	16,203,166
7440-66-6	Zinc (fume or dust)	634,722	905,990	46,975	13,041,123	14,628,810
7440-50-8	Copper	476,395	1,018,974	41,474	12,647,313	14,184,156
110-82-7	Cyclohexane	5,004,598	8,596,357	21,039	107,748	13,729,742
	Lead compounds	447,167	986,955	60,934	11,913,242	13,408,298
71-43-2	Benzene	7,640,101	4,744,478	24,918	340,636	12,750,133
127-18-4	Tetrachloroethylene	5,198,796	7,112,439	10,207	9,354	12,330,796
107-21-1	Ethylene glycol	3,180,308	7,070,854	1,326,208	684,588	12,261,958
50-00-0	Formaldehyde	1,847,451	9,055,776	441,244	174,429	11,518,900
75-71-8	Dichlorodifluoromethane (CFC-12)	6,871,649	4,391,045	2,235	23	11,264,952
6484-52-2	Ammonium nitrate (solution)	57,029	1,273,889	6,762,487	2,624,432	10,717,837
100-41-4	Ethylbenzene	3,236,753	6,766,461	15,778	289,108	10,308,100
7664-39-3	Hydrogen fluoride	4,158,141	5,599,637	4,205	27,887	9,789,870
75-69-4	Trichlorofluoromethane (CFC-11)	3,655,417	5,809,097	1,448	19,761	9,485,723
7783-20-2	Ammonium sulfate (solution)	123,880	111,020	4,429,219	4,069,490	8,733,609
108-95-2	Phenol	2,990,363	4,749,651	165,074	190,230	8,095,318
7439-96-5	Manganese	570,920	299,310	234,925	6,521,605	7,626,760
75-07-0	Acetaldehyde	1,963,416	4,452,705	77,188	289	6,493,598
95-63-6	1,2,4-Trimethylbenzene	2,229,766	3,028,445	8,481	511,202	5,777,894
74-87-3	Chloromethane	1,325,645	4,317,830	30,961	0	5,674,436
	Barium compounds	235,555	404,462	120,428	4,825,948	5,586,393
91-20-3	Naphthalene	1,368,999	1,233,810	28,936	1,667,141	4,298,886
108-05-4	Vinyl acetate	1,079,209	3,073,769	7,208	5,249	4,165,435
106-42-3	p-Xylene	1,035,834	2,985,051	1,868	4,101	4,026,854
	Subtotal	520,674,527	1,249,871,432	270,476,368	320,646,199	2,361,668,526
	Total for All TRI Chemicals	549,351,729	1,295,606,607	272,932,953	337,809,053	2,455,700,342

Table 1-22. Top 50 TRI Chemicals with the Largest Total Releases, 1992.

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
7664-41-7	Ammonia	38,878,070	123,206,765	40,824,196	251,783,103	9,165,277	463,857,411
7647-01-0	Hydrochloric acid	4,393,471	72,715,559	1,927,193	207,817,749	432,770	287,286,742
67-56-1	Methanol	33,921,970	160,868,717	16,422,600	27,084,182	3,328,541	241,626,010
7664-38-2	Phosphoric acid	326,636	868,973	158,674,836	35,230	46,725,635	206,631,310
108-88-3	Toluene	64,986,449	126,010,712	84,024	1,573,901	708,278	193,363,364
7664-93-9	Sulfuric acid	1,570,940	22,150,513	32,719,526	98,631,395	1,737,032	156,809,406
67-64-1	Acetone	62,963,625	70,989,876	999,584	3,180,700	559,265	138,693,050
71-55-6	1,1,1-Trichloroethane	56,479,078	58,465,308	13,132	561	76,381	115,034,460
1330-20-7	Xylene (mixed isomers)	26,080,470	83,631,841	41,504	219,270	1,434,430	111,407,515
75-15-0	Carbon disulfide	2,636,114	90,240,923	45,087	2,704	21	92,924,849
78-93-3	Methyl ethyl ketone	31,107,484	59,397,157	153,249	365,395	241,794	91,265,079
	Zinc compounds	1,506,116	2,678,676	1,009,739	126,947	76,540,392	81,861,870
75-09-2	Dichloromethane	27,495,557	46,467,648	221,192	1,183,867	79,313	75,447,577
7782-50-5	Chlorine	1,634,189	68,278,693	1,217,091	48,252	46,171	71,224,396
	Manganese compounds	501,113	1,297,031	733,225	22,569	61,485,334	64,039,272
6484-52-2	Ammonium nitrate (solution)	57,029	1,273,889	6,762,487	37,531,805	2,624,432	48,249,642
	Glycol ethers	10,590,821	34,937,784	350,489	194,386	140,595	46,214,075
	Copper compounds	3,563,732	2,766,265	72,413	201,431	34,489,362	41,093,203
74-85-1	Ethylene	16,595,902	20,010,924	13,413	0	0	36,620,239
100-42-5	Styrene	13,149,414	19,185,202	23,502	83,170	304,179	32,745,467
71-36-3	n-Butyl alcohol	7,134,970	22,588,357	35,369	2,324,731	57,220	32,140,647
79-01-6	Trichloroethylene	15,269,203	14,305,372	8,153	466	20,726	29,603,920
108-10-1	Methyl isobutyl ketone	7,814,570	18,079,207	96,387	129,100	194,986	26,314,250
7697-37-2	Nitric acid	720,461	2,310,467	53,725	22,081,766	664,849	25,831,268
76-13-1	Freon 113	17,610,197	6,954,728	1,916	214	9,028	24,576,083
	Chromium compounds	128,783	334,902	269,667	32,137	23,165,988	23,931,477
75-05-8	Acetonitrile	733,502	394,331	48,976	20,111,640	29	21,288,478
115-07-1	Propylene	12,981,892	8,235,849	989	5	0	21,218,735
67-66-3	Chloroform	6,017,425	11,017,501	654,452	50,240	28,582	17,768,200
107-21-1	Ethylene glycol	3,180,308	7,070,854	1,326,208	4,923,321	684,588	17,185,279
50-00-0	Formaldehyde	1,847,451	9,055,776	441,244	4,916,248	174,429	16,435,148
463-58-1	Carbonyl sulfide	4,222	16,198,944	0	0	0	16,203,166
7440-66-6	Zinc (fume or dust)	634,722	905,990	46,975	120,000	13,041,123	14,748,810
7783-20-2	Ammonium sulfate (solution)	123,880	111,020	4,429,219	5,705,957	4,069,490	14,439,566
7440-50-8	Copper	476,395	1,018,974	41,474	16,736	12,647,313	14,200,892
110-82-7	Cyclohexane	5,004,598	8,596,357	21,039	230,985	107,748	13,960,727
108-95-2	Phenol	2,990,363	4,749,651	165,074	5,552,077	190,230	13,647,395
	Lead compounds	447,167	986,955	60,934	2,880	11,913,242	13,411,178
71-43-2	Benzene	7,640,101	4,744,478	24,918	355,683	340,636	13,105,816
127-18-4	Tetrachloroethylene	5,198,796	7,112,439	10,207	12,780	9,354	12,343,576
75-71-8	Dichlorodifluoromethane (CFC-12)	6,871,649	4,391,045	2,235	1,722	23	11,266,674
100-41-4	Ethylbenzene	3,236,753	6,766,461	15,778	193,882	289,108	10,501,982
7664-39-3	Hydrogen fluoride	4,158,141	5,599,637	4,205	1	27,887	9,789,871
75-69-4	Trichlorofluoromethane (CFC-11)	3,655,417	5,809,097	1,448	8	19,761	9,485,731
75-07-0	Acetaldehyde	1,963,416	4,452,705	77,188	1,905,859	289	8,399,457
7439-96-5	Manganese	570,920	299,310	234,925	304	6,521,605	7,627,064
95-63-6	1,2,4-Trimethylbenzene	2,229,766	3,028,445	8,481	14,409	511,202	5,792,303
108-05-4	Vinyl acetate	1,079,209	3,073,769	7,208	1,616,385	5,249	5,781,820
74-87-3	Chloromethane	1,325,645	4,317,830	30,961	86,709	0	5,761,145
	Barium compounds	235,555	404,462	120,428	1,251	4,825,948	5,587,644
	Subtotal	519,723,657	1,248,357,369	270,548,265	700,474,113	319,639,835	3,058,743,239
	Total for All TRI Chemicals	549,351,729	1,295,606,607	272,932,953	725,946,415	337,809,053	3,181,646,757

Table 1-23. Top 15 TRI Chemicals with the Largest Emissions to Air, 1992.

CAS Number	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Total Air Emissions Pounds
67-56-1	Methanol	33,921,970	160,868,717	194,790,687
108-88-3	Toluene	64,986,449	126,010,712	190,997,161
7664-41-7	Ammonia	38,878,070	123,206,765	162,084,835
67-64-1	Acetone	62,963,625	70,989,876	133,953,501
71-55-6	1,1,1-Trichloroethane	56,479,078	58,465,308	114,944,386
1330-20-7	Xylene (mixed isomers)	26,080,470	83,631,841	109,712,311
75-15-0	Carbon disulfide	2,636,114	90,240,923	92,877,037
78-93-3	Methyl ethyl ketone	31,107,484	59,397,157	90,504,641
7647-01-0	Hydrochloric acid	4,393,471	72,715,559	77,109,030
75-09-2	Dichloromethane	27,495,557	46,467,648	73,963,205
7782-50-5	Chlorine	1,634,189	68,278,693	69,912,882
	Glycol ethers	10,590,821	34,937,784	45,528,605
74-85-1	Ethylene	16,595,902	20,010,924	36,606,826
100-42-5	Styrene	13,149,414	19,185,202	32,334,616
71-36-3	n-Butyl alcohol	7,134,970	22,588,357	29,723,327
	Subtotal	398,047,584	1,056,995,466	1,455,043,050
	Total for All TRI Chemicals	549,351,729	1,295,606,607	1,844,958,336

Table 1-24. Top 15 TRI Chemicals with the Largest Discharges to Surface Water, 1992.

CAS Number	Chemical	Amount Not in Stormwater Pounds	Amount in Stormwater Pounds	Total SurfaceWater Discharges Pounds
7664-38-2	Phosphoric acid	86,162,576	72,512,260	158,674,836
7664-41-7	Ammonia	40,529,007	295,189	40,824,196
7664-93-9	Sulfuric acid	32,646,906	72,620	32,719,526
67-56-1	Methanol	16,419,684	2,916	16,422,600
6484-52-2	Ammonium nitrate (solution)	6,585,021	177,466	6,762,487
7783-20-2	Ammonium sulfate (solution)	4,429,218	1	4,429,219
7647-01-0	Hydrochloric acid	1,925,638	1,555	1,927,193
107-21-1	Ethylene glycol	1,303,082	23,126	1,326,208
7782-50-5	Chlorine	1,217,051	40	1,217,091
	Zinc compounds	988,022	21,717	1,009,739
67-64-1	Acetone	997,814	1,770	999,584
	Manganese compounds	725,717	7,508	733,225
67-66-3	Chloroform	653,843	609	654,452
123-91-1	1,4-Dioxane	447,065	1	447,066
50-00-0	Formaldehyde	437,491	3,753	441,244
	Subtotal	195,468,135	73,120,531	268,588,666
	Total for All TRI Chemicals	199,708,213	73,224,740	272,932,953

Table 1-25. Top 15 TRI Chemicals with the Largest Underground Injection, 1992.

CAS Number	Chemical	Underground Injection Pounds
7664-41-7	Ammonia	251,783,103
7647-01-0	Hydrochloric acid	207,817,749
7664-93-9	Sulfuric acid	98,631,395
6484-52-2	Ammonium nitrate (solution)	37,531,805
67-56-1	Methanol	27,084,182
7697-37-2	Nitric acid	22,081,766
75-05-8	Acetonitrile	20,111,640
7783-20-2	Ammonium sulfate (solution)	5,705,957
108-95-2	Phenol	5,552,077
107-21-1	Ethylene glycol	4,923,321
50-00-0	Formaldehyde	4,916,248
79-10-7	Acrylic acid	4,484,000
79-06-1	Acrylamide	4,188,680
107-13-1	Acrylonitrile	3,861,550
67-64-1	Acetone	3,180,700
	Subtotal	701,854,173
	Total for All TRI Chemicals	725,946,415

Table 1-26. Top 15 TRI Chemicals with the Largest Releases to Land, 1992.

CAS Number	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	20,357,694	255,532	10,360,696	45,566,470	76,540,392
	Manganese compounds	45,028,568	105,113	13,562,669	2,788,984	61,485,334
7664-38-2	Phosphoric acid	9,354,622	307,850	13,038,209	24,024,954	46,725,635
	Copper compounds	8,650,729	605,659	4,337,377	20,895,597	34,489,362
	Chromium compounds	3,106,881	243,576	19,727,213	88,318	23,165,988
7440-66-6	Zinc (fume or dust)	7,019,005	850	98,439	5,922,829	13,041,123
7440-50-8	Copper	724,703	246	11,657,180	265,184	12,647,313
	Lead compounds	2,564,930	22,676	1,180,564	8,145,072	11,913,242
7664-41-7	Ammonia	1,471,936	4,474,688	3,037,199	181,454	9,165,277
7439-96-5	Manganese	4,994,530	605	268,075	1,258,395	6,521,605
	Barium compounds	1,907,488	45,310	1,723,736	1,149,414	4,825,948
7783-20-2	Ammonium sulfate (solution)	0	3,618,487	450,753	250	4,069,490
67-56-1	Methanol	1,477,773	129,709	1,586,094	134,965	3,328,541
6484-52-2	Ammonium nitrate (solution)	28,850	1,528,008	1,025,157	42,417	2,624,432
	Arsenic compounds	77,943	27,010	1,700,706	646,732	2,452,391
	Subtotal	106,765,652	11,365,319	83,754,067	111,111,035	312,996,073
	Total for All TRI Chemicals	112,526,010	12,649,589	90,429,416	122,204,038	337,809,053

Table 1-27. Top 15 TRI Chemicals with the Largest Off-site Transfers for Recycling, 1992.

CAS Number	Chemical	Solvents/ Organics Recovery Pounds	Metals Recovery Pounds	Other Reuse or Recovery Pounds	Acid Regeneration Pounds	Transfer to Waste Broker-Recycling Pounds	Total Off-site Transfers to Recycling Pounds
7664-93-9	Sulfuric acid	599,989	714,858	49,155,955	869,730,583	1,177,146	921,378,531
	Lead compounds	2,020	368,679,473	2,491,389	5	848,938	372,021,825
7440-50-8	Copper	8,610	274,835,443	18,386,100	2,867	53,567,350	346,800,370
	Zinc compounds	77,764	189,972,847	33,321,861	994	3,774,726	227,148,192
	Copper compounds	591	88,236,793	1,234,260	19,450	16,773,452	106,264,546
107-21-1	Ethylene glycol	68,986,951	0	32,382,860	0	1,003,484	102,373,295
7440-47-3	Chromium	545	45,161,425	8,596,182	50,000	14,129,965	67,938,117
7440-66-6	Zinc (fume or dust)	16,980	60,081,581	575,394	0	1,910,174	62,584,129
7647-01-0	Hydrochloric acid	7,207	2,410,440	47,232,394	7,711,629	2,087,136	59,448,806
7440-02-0	Nickel	13,568	33,181,631	5,782,896	0	13,477,294	52,455,389
1330-20-7	Xylene (mixed isomers)	36,491,565	13,410	1,531,691	0	1,051,791	39,088,457
	Manganese compounds	174	20,521,353	12,388,746	0	3,158,526	36,068,799
7439-92-1	Lead	8,666	27,199,620	1,031,901	0	2,370,875	30,611,062
7439-96-5	Manganese	542	19,089,429	4,965,872	0	5,970,900	30,026,743
108-88-3	Toluene	27,529,926	3,569	1,492,213	0	923,517	29,949,225
	Subtotal	133,745,098	1,130,101,872	220,569,714	877,515,528	122,225,274	2,484,157,486
	Total for All TRI Chemicals	337,103,432	1,216,073,083	257,875,423	880,950,772	147,823,209	2,839,825,919

Table 1-28. Top 15 TRI Chemicals with the Largest Off-site Transfers for Energy Recovery, 1992.

CAS Number	Chemical	Energy Recovery Pounds	Transfer to Waste Broker-Energy Recovery Pounds	Total Off-site Transfers to Energy Recovery Pounds
108-88-3	Toluene	54,294,172	24,582,255	78,876,427
67-56-1	Methanol	58,703,949	10,566,899	69,270,848
1330-20-7	Xylene (mixed isomers)	44,907,229	19,344,823	64,252,052
67-64-1	Acetone	33,822,378	8,407,136	42,229,514
78-93-3	Methyl ethyl ketone	29,749,389	9,451,511	39,200,900
75-65-0	tert-Butyl alcohol	28,353,709	121,816	28,475,525
108-10-1	Methyl isobutyl ketone	6,686,291	10,657,238	17,343,529
74-85-1	Ethylene	14,003,679	3,738	14,007,417
	Glycol ethers	8,762,733	2,877,456	11,640,189
100-41-4	Ethylbenzene	6,727,969	2,055,053	8,783,022
100-42-5	Styrene	6,966,175	1,611,561	8,577,736
71-36-3	n-Butyl alcohol	6,423,828	1,672,611	8,096,439
107-21-1	Ethylene glycol	4,621,017	2,845,091	7,466,108
108-05-4	Vinyl acetate	5,293,395	604,309	5,897,704
7647-01-0	Hydrochloric acid	4,110	5,104,891	5,109,001
	Subtotal	309,320,023	99,906,388	409,226,411
	Total for All TRI Chemicals	368,111,613	109,527,651	477,639,264

Table 1-29. Top 15 TRI Chemicals with the Largest Off-site Transfers for Treatment, 1992.

CAS Number	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	1,280,013	79,763	132,919	8,160,970	14,437,517	18,472,102	42,563,284
7664-93-9	Sulfuric acid	9,108,696	1,718,023	28,486	20,703,751	9,360,925	538,152	41,458,033
67-56-1	Methanol	8,906	22,696,354	4,344,395	11,708,875	816,392	323,783	39,898,705
	Zinc compounds	32,985,556	193,385	835,725	1,231,782	1,436,515	209,569	36,892,532
	Antimony compounds	20,375,154	249,825	39,115	20,261	28,266	33,517	20,746,138
	Lead compounds	18,746,516	327,684	77,900	732,724	70,578	126,617	20,082,019
108-88-3	Toluene	59,008	17,025,436	1,700,080	348,772	476,562	167,314	19,777,172
67-64-1	Acetone	13,589	12,283,744	3,709,723	2,226,666	1,076,530	132,334	19,442,586
75-09-2	Dichloromethane	5,067	4,007,331	7,123,880	250,976	106,515	137,458	11,631,227
7697-37-2	Nitric acid	501,456	7,034	14,885	3,794,629	5,998,019	301,875	10,617,898
107-21-1	Ethylene glycol	1,003,041	1,034,601	386,637	4,179,433	183,082	207,555	6,994,349
7664-41-7	Ammonia	62,637	657,204	45,616	5,224,093	583,216	18,287	6,591,053
1330-20-7	Xylene (mixed isomers)	49,434	5,208,638	636,416	222,056	239,489	58,067	6,414,100
78-93-3	Methyl ethyl ketone	8,830	5,052,105	562,228	92,384	256,615	254,028	6,226,190
71-55-6	1,1,1-Trichloroethane	31,346	1,564,812	1,940,585	82,989	440,748	187,419	4,247,899
	Subtotal	84,239,249	72,105,939	21,578,590	58,980,361	35,510,969	21,168,077	293,583,185
	Total for All TRI Chemicals	100,521,880	122,409,549	31,602,579	70,577,964	41,483,326	26,871,242	393,466,540

Table 1-30. Top 15 TRI Chemicals with the Largest Off-site Transfers to Publicly Owned Treatment Works (POTWs), 1992.

CAS Number	Chemical	Transfers to POTWs Pounds
67-56-1	Methanol	113,917,241
7664-41-7	Ammonia	71,885,270
7783-20-2	Ammonium sulfate (solution)	37,330,411
7664-93-9	Sulfuric acid	35,866,416
7647-01-0	Hydrochloric acid	29,390,927
107-21-1	Ethylene glycol	19,775,302
	Glycol ethers	10,354,678
67-64-1	Acetone	9,431,457
6484-52-2	Ammonium nitrate (solution)	6,856,667
50-00-0	Formaldehyde	5,635,857
7664-38-2	Phosphoric acid	4,889,570
108-95-2	Phenol	4,547,598
7697-37-2	Nitric acid	3,739,898
75-65-0	tert-Butyl alcohol	2,104,895
71-36-3	n-Butyl alcohol	2,070,978
	Subtotal	357,797,165
	Total for All TRI Chemicals	381,096,823

Table 1-31. Top 15 TRI Chemicals with the Largest Off-site Transfers for Disposal, 1992.

CAS Number	Chemical	Storage Only Pounds	Underground Injection Pounds	Landfill/ Surface Impoundment Pounds	Land Treatment Pounds
	Zinc compounds	40,252	647,563	38,844,975	379,412
7664-93-9	Sulfuric acid	307,166	29,768,760	3,101,227	86,816
	Barium compounds	52,715	1,683	10,666,566	290
	Lead compounds	3,524	1,570	12,523,511	65,005
7440-50-8	Copper	6,688,646	6,609	4,765,325	37,656
7647-01-0	Hydrochloric acid	5,703	11,624,725	888,446	0
	Manganese compounds	128	56,074	12,389,456	75,126
7439-96-5	Manganese	293	15,046	8,829,701	260,942
	Chromium compounds	49,727	229,075	8,940,028	51,318
7783-20-2	Ammonium sulfate (solution)	0	5,300,000	50,301	2,236,409
1332-21-4	Asbestos (friable)	0	0	7,108,171	0
	Copper compounds	83,541	29,876	6,152,504	5,914
7440-66-6	Zinc (fume or dust)	2,100	22	1,952,109	1,620,395
	Nickel compounds	19,048	43,034	4,892,376	3,751
7440-47-3	Chromium	10,340	122,270	3,872,086	25,156
	Subtotal	7,263,183	47,846,307	124,976,782	4,848,190
	Total for All TRI Chemicals	8,696,804	57,100,146	162,489,061	8,506,916

Table 1-31.

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	1,625,081	55,305	492,681	421,180	42,506,449
Sulfuric acid	27,720	79,023	527,707	304,214	34,202,633
Barium compounds	4,838,656	5,596	219,206	20,482	15,805,194
Lead compounds	398,315	39	148,766	59,321	13,200,051
Copper	294,819	2,276	1,263,787	80,460	13,139,578
Hydrochloric acid	35,696	25,400	378,338	22,825	12,981,133
Manganese compounds	79,760	130	260,324	36,079	12,897,077
Manganese	1,498,014	5	47,556	21,992	10,673,549
Chromium compounds	81,955	0	70,995	456,943	9,880,041
Ammonium sulfate (solution)	3,938	0	0	0	7,590,648
Asbestos (friable)	0	0	2,298	0	7,110,469
Copper compounds	76,112	26,677	26,883	25,760	6,427,267
Zinc (fume or dust)	16,263	1,800,000	2,432	6,362	5,399,683
Nickel compounds	7,055	770	13,540	38,792	5,018,366
Chromium	208,973	6	89,801	36,954	4,365,586
Subtotal	9,192,357	1,995,227	3,544,314	1,531,364	201,197,724
Total for All TRI Chemicals	10,796,542	2,538,009	6,003,166	2,511,933	258,642,577

Metals and Metal Compounds

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 metal compounds 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 (which is a known carcinogen) to the less toxic trivalent form before release or transfer off-site. Other metal wastes 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.

As a result of the inherent persistence of metals, metals can either be recycled or (ultimately) disposed. This is clearly reflected in the reported releases and off-site transfers of metals. Seventy-two percent of these toxic metal releases and off-site transfers constituted transfers for recycling. On-site releases and off-site transfers for disposal accounted for 22% of all releases and transfers.

Facilities also reported transfers off-site for treatment and to POTWs (public sewage treatment plants). Treatment may remove the metal from a waste stream or convert the metal into a less toxic form, but it does not destroy the metal. For example, public sewage treatment plants will remove some fraction of the metals during treatment of the waste stream to remove solid matter. The removed metals are then generally sent to a landfill for disposal. The metal wastes that are not removed remain in the treated wastewater and will pass through the treatment plant and into the aquatic environment.

The potential adverse human health and environmental effects associated with the metals and metal compounds on TRI are listed in Box 1-1 and are indicated by a "✓ " mark.

Chemical	Acute	Cancer	Chronic	Develop-mental	Repro-ductive	Aquatic
Antimony and antimony compounds	✓	✓	✓	✓	✓	✓
Arsenic and arsenic compounds	✓	inorganic compounds	✓	✓	✓	
Barium and barium compounds	✓		✓			
Beryllium and beryllium compounds	✓	✓	✓			✓
Cadmium and cadmium compounds	✓	✓	✓	✓	✓	✓
Chromium and chromium compounds	✓	helavalent compounds	✓	✓	✓	✓
Cobalt and cobalt compounds	✓		✓	✓		✓
Copper and copper compounds	✓		✓			✓
Lead and lead compounds	✓	inorganic compounds	✓	✓	✓	✓
Manganese and manganese compounds	✓		✓	✓		✓
Mercury and mercury compounds	✓		✓			✓
Nickel and nickel compounds	✓ [15]	✓	✓	✓	✓	✓
Selenium and selenium compounds	✓		✓			✓
Silver and silver compounds	✓		✓			✓
Thallium and thallium compounds	✓		✓	✓	✓	✓
Zinc and zinc compounds	✓		✓	✓		✓

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

[15] Primarily nickel carbonyl.

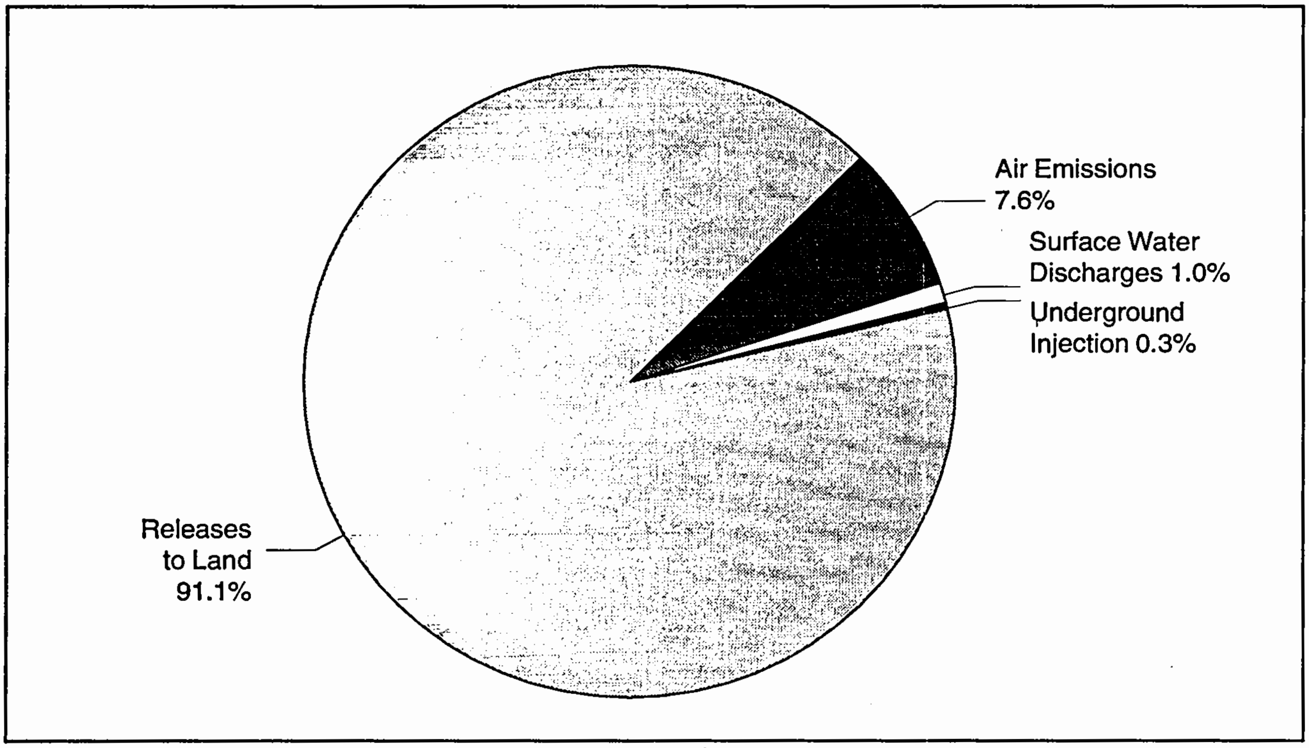
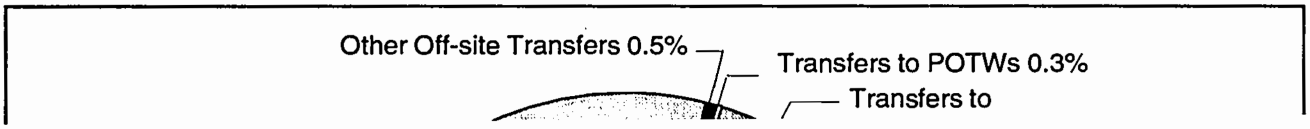


Figure 1-7. Releases of TRI Metals and Metal Compounds, 1992.



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 non-melanoma 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 percent change in ultraviolet-B radiation intensity, the incidence of melanoma could increase from 0.5 to 1 percent.

Other Health Effects. 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.

Uses

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 CFC-113 are used as industrial solvents in cleaning operations. The three major cleaning 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 as a sterilant 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.

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. As a result of new findings in 1991 by the National Aeronautics and Space Administration (NASA) that showed that ozone depletion in the previous decade was more severe than had previously been predicted, the production of Class I ozone depleters will be banned as of January 1, 1996. See Table 1-34 and Figures 1-9 and 1-10 for the TRI releases of Class I ozone depleters. Table 1-35 and Figure 1-11 provide TRI transfer data for these ozone depleters.

Interim substitutes, such as hydrochlorofluorocarbons (HCFCs), also decrease ozone in the stratosphere, but have much lower ozone depletion potentials. The HCFCs will serve as first generation substitutes, but will themselves be phased out. On November 30, 1993, EPA added the following 11 HCFCs to the TRI list because HCFCs decrease stratospheric ozone resulting in adverse health and environmental effects. The first TRI reports covering activities during the 1994 reporting year for these chemicals will be submitted by July 1, 1995. (See Chemical List questions in Appendix A).

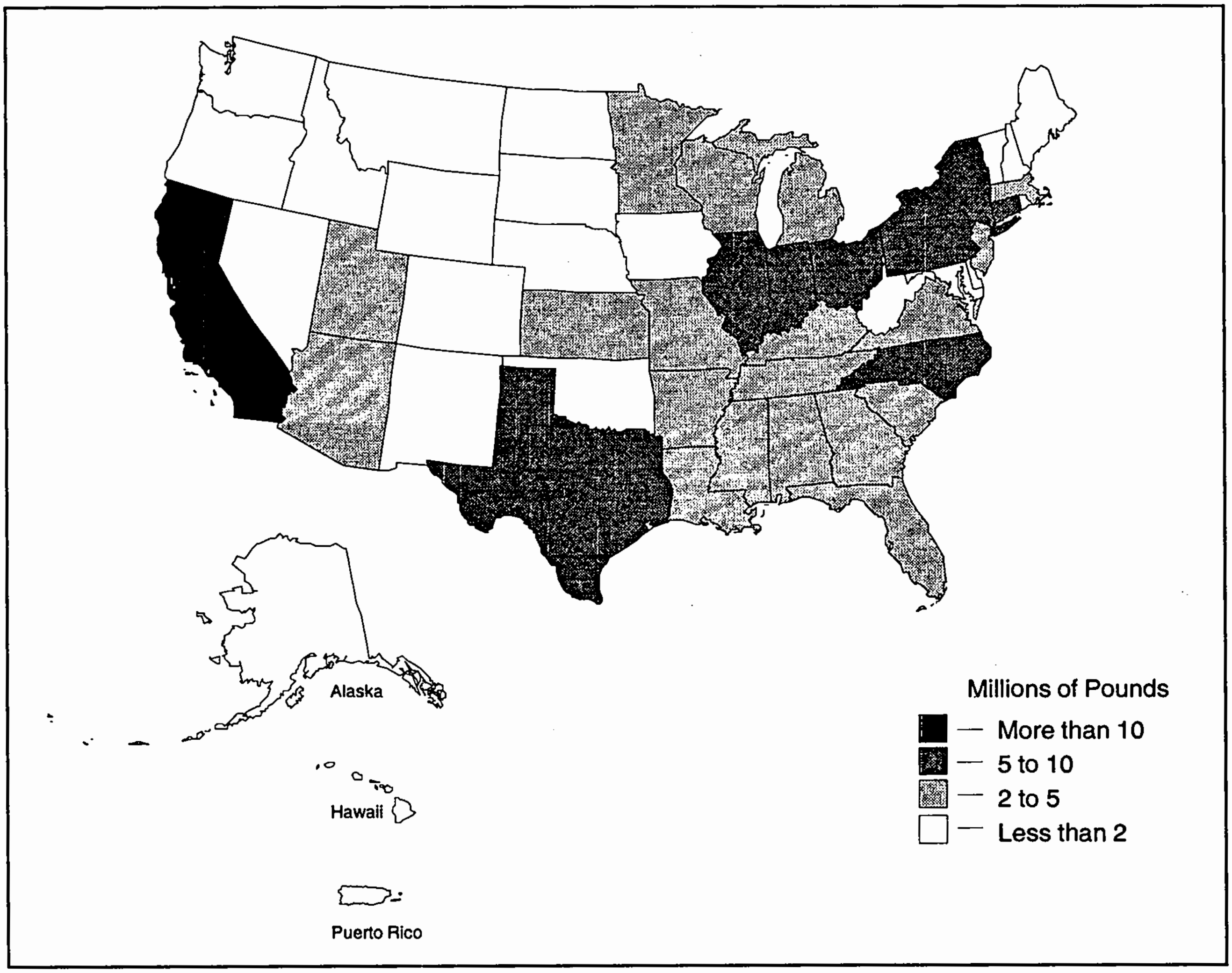
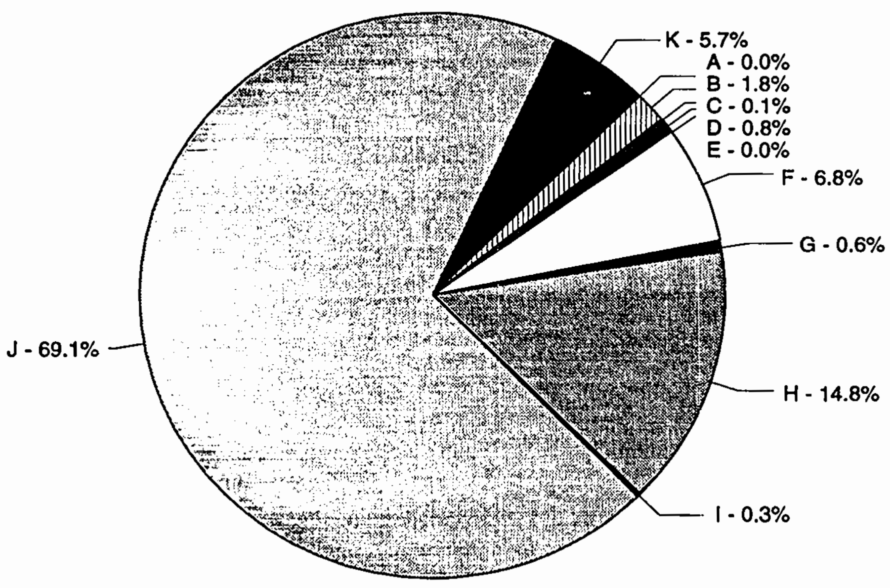


Figure 1-9. TRI Releases to Air of Ozone Depleters, by State, 1992.

Table 1-34. TRI Releases of Ozone Depleters, 1992.

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)	7,923	8,824	0	0	0	16,747
74-83-9	Bromomethane	528,321	2,472,829	390	1,000	0	3,002,540
75-63-8	Bromotrifluoromethane (Halon 1301)	105,490	4,661	0	0	0	110,151
56-23-5	Carbon tetrachloride	416,994	973,268	2,441	45,984	333	1,439,020
124-73-2	Dibromotetrafluoroethane (Halon 2402)	154	614	0	0	0	768
75-71-8	Dichlorodifluoromethane (CFC-12)	6,871,649	4,391,045	2,235	1,722	23	11,266,674
76-14-2	Dichlorotetrafluoroethane (CFC-114)	934,198	146,026	255	1	0	1,080,480
76-13-1	Freon 113	17,610,197	6,954,728	1,916	214	9,028	24,576,083
76-15-3	Monochloropentafluoroethane (CFC-115)	296,585	125,102	5	0	0	421,692
71-55-6	1,1,1-Trichloroethane	56,479,078	58,465,308	13,132	561	76,381	115,034,460
75-69-4	Trichlorofluoromethane (CFC-11)	3,655,417	5,809,097	1,448	8	19,761	9,485,731
	Total	86,906,006	79,351,502	21,822	49,490	105,526	166,434,346



A - Bromochlorodifluoromethane (Halon 1211)
B - Bromomethane
C - Bromotrifluoromethane (Halon 1301)
D - Carbon tetrachloride
E - Dibromotetrafluoroethane (Halon 2402)
F - Dichlorodifluoromethane (CFC-12)
G - Dichlorotetrafluoroethane (CFC-114)
H - Freon 113
I - Monochloropentafluoroethane (CFC-115)
J - 1,1,1-Trichloroethane
K - Trichlorofluoromethane (CFC-11)

Figure 1-10. TRI Releases of Ozone Depleters to Air, by Chemical, 1992.

Table 1-35. TRI Transfers of Ozone Depleters, 1992.

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 (19) Pounds	Total Transfers Pounds
353-59-3	Bromochlorodifluoromethane (Halon 1211)	0	0	0	0	0	0	0
74-83-9	Bromomethane	0	3,500	255	0	250	0	4,005
75-63-8	Bromotrifluoromethane (Halon 1301)	0	0	0	0	0	0	0
56-23-5	Carbon tetrachloride	345,452	24,455	839,388	1,054	11,955	0	1,222,304
124-73-2	Dibromotetrafluoroethane (Halon 2402)	0	0	0	0	0	0	0
75-71-8	Dichlorodifluoromethane (CFC-12)	343,086	2,095	84,976	102,473	1,975	0	534,605
76-14-2	Dichlorotetrafluoroethane (CFC-114)	521	0	8,188	0	37	0	8,746
76-13-1	Freon 113	5,637,865	385,048	777,851	22,961	94,831	5,116	6,923,672
76-15-3	Monochloropentafluoroethane (CFC-115)	0	0	128	0	0	0	128
71-55-6	1,1,1-Trichloroethane	23,082,207	3,639,456	4,247,899	118,253	611,054	173,815	31,872,684
75-69-4	Trichlorofluoromethane (CFC-11)	212,631	39,404	208,369	5,925	137,674	0	604,003
	Total	29,621,762	4,093,958	6,167,054	250,666	857,776	178,931	41,170,147

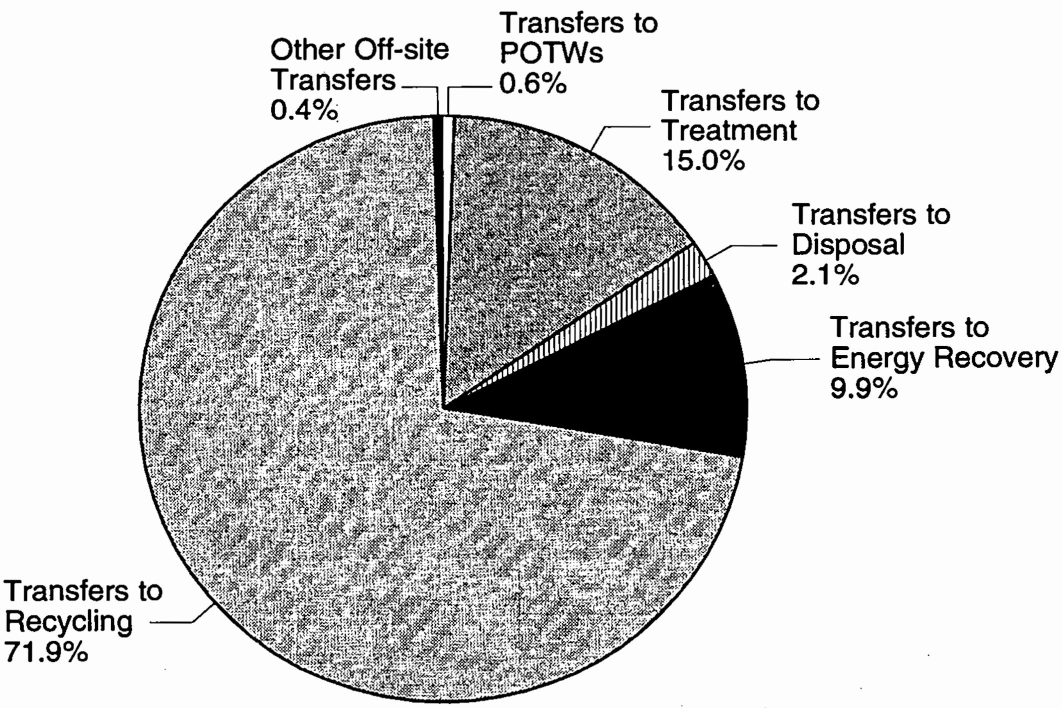


Figure 1-11. TRI Transfers of Ozone Depleters, 1992.

(19) Transfers reported without valid waste management codes.

Chemical	IARC[20]	NTP[21]	OSHA[22]
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	--
Hexachlorobenzene	2B	P	--
Hexamethylphosphoramide	2B	P	--
Hydrazine	2B	P	--
Hydrazine sulfate	--	P	--
Lead	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[23]	--
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	--

Box 1-2. Basis of OSHA Carcinogen Listing for Individual Chemicals, Continued.

Chemical	IARC⑳	NTP㉑	OSHA㉒
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 1-2. Basis of OSHA Carcinogen Listing for Individual Chemicals, Continued.

⑳ 1: The chemical is carcinogenic to humans; 2A: The chemical is probably carcinogenic to humans; 2B: The chemical is possibly carcinogenic to humans.

㉑ K: The chemical is known to be carcinogenic; P: The chemical may reasonably be anticipated to be carcinogenic.

㉒ Z: The chemical appears at 29 CFR Part 1910 Subpart Z.

㉓ Certain nickel compounds.

Table 1-36. TRI Releases of Known or Suspect Carcinogens to Air, Water, and Land, 1992 (Alphabetically Ordered).

CAS Number[24]	Chemical	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
75-07-0	Acetaldehyde	6,416,121	77,188	289	6,493,598
60-35-5	Acetamide	20	1	0	21
79-06-1	Acrylamide	28,554	10,324	963	39,841
107-13-1	Acrylonitrile	1,600,071	1,483	8,071	1,609,625
60-09-3	4-Aminoazobenzene	1	0	0	1
92-67-1	4-Aminobiphenyl	0	0	0	0
90-04-0	o-Anisidine	421	107	2,167	2,695
7440-38-2	Arsenic	5,656	1,236	1,814,303	1,821,195
1332-21-4	Asbestos (friable)	11,264	250	235,900	247,414
71-43-2	Benzene	12,384,579	24,918	340,636	12,750,133
98-07-7	Benzoic trichloride	6,079	0	0	6,079
7440-41-7	Beryllium	1,868	39	21,358	23,265
542-88-1	Bis(chloromethyl) ether	309	0	0	309
106-99-0	1,3-Butadiene	3,843,700	1,364	372	3,845,436
7440-43-9	Cadmium	8,756	638	7,036	16,430
56-23-5	Carbon tetrachloride	1,390,262	2,441	333	1,393,036
67-66-3	Chloroform	17,034,926	654,452	28,582	17,717,960
107-30-2	Chloromethyl methyl ether	1,221	10	0	1,231
—	Chlorophenols	9,283	290	0	9,573
7440-47-3	Chromium	524,039	19,104	961,167	1,504,310
8001-58-9	Creosote	1,293,564	11,835	2,634	1,308,033
120-71-8	p-Cresidine	340	5	255	600
135-20-6	Cupferron	10	0	0	10
101-80-4	4,4'-Diaminodiphenyl ether	269	312	0	581
25376-45-8	Diaminotoluene (mixed isomers)	18,483	695	85	19,263
95-80-7	2,4-Diaminotoluene	1,905	5	0	1,910
96-12-8	1,2-Dibromo-3-chloropropane	294	0	0	294
106-93-4	1,2-Dibromoethane	32,852	106	6	32,964
25321-22-6	Dichlorobenzene (mixed isomers)	4,521	0	0	4,521
106-46-7	1,4-Dichlorobenzene	337,946	2,021	622	340,589
91-94-1	3,3'-Dichlorobenzidine	10	0	0	10
107-06-2	1,2-Dichloroethane	3,165,207	12,296	1,858	3,179,361
75-09-2	Dichloromethane	73,963,205	221,192	79,313	74,263,710
542-75-6	1,3-Dichloropropylene	42,607	67	0	42,674
117-81-7	Di-(2-ethylhexyl) phthalate	873,783	947	101,712	976,442
64-67-5	Diethyl sulfate	13,236	5	5	13,246
119-90-4	3,3'-Dimethoxybenzidine	0	8	0	8
57-14-7	1,1-Dimethyl hydrazine	369	0	5	374
77-78-1	Dimethyl sulfate	7,023	161	0	7,184
123-91-1	1,4-Dioxane	684,485	447,066	3,297	1,134,848
106-89-8	Epichlorohydrin	522,653	3,165	1,655	527,473

Table 1-36. TRI Releases of Known or Suspect Carcinogens to Air, Water, and Land, 1992 (Alphabetically Ordered), Continued.

CAS Number[24]	Chemical	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
140-88-5	Ethyl acrylate	205,312	734	1,114	207,160
151-56-4	Ethyleneimine	0	0	0	0
75-21-8	Ethylene oxide	1,301,035	1,991	837	1,303,863
96-45-7	Ethylene thiourea	285	0	0	285
50-00-0	Formaldehyde	10,903,227	441,244	174,429	11,518,900
118-74-1	Hexachlorobenzene	4,471	227	0	4,698
302-01-2	Hydrazine	19,271	842	10	20,123
10034-93-2	Hydrazine sulfate	2	0	0	2
7439-92-1	Lead	412,804	11,641	2,045,059	2,469,504
58-89-9	Lindane	1,038	0	0	1,038
101-14-4	4,4'-Methylenebis (2-chloroaniline)	17	0	2	19
101-77-9	4,4'-Methylenedianiline	10,376	420	55	10,851
134-32-7	alpha-Naphthylamine	10	0	0	10
7440-02-0	Nickel	714,724	44,910	2,395,966	3,155,600
—	Nickel compounds	149,582	66,305	1,305,284	1,521,171
139-13-9	Nitrilotriacetic acid	4	4,069	0	4,073
79-46-9	2-Nitropropane	45,642	900	0	46,542
—	Polybrominated biphenyls	250	0	5	255
1336-36-3	Polychlorinated biphenyls (PCBs)	0	0	1	1
1120-71-4	Propane sultone	250	0	0	250
75-55-8	Propyleneimine	403	0	0	403
75-56-9	Propylene oxide	1,341,342	7,260	2,251	1,350,853
81-07-2	Saccharin (manufacturing)	323	0	0	323
100-42-5	Styrene	32,334,616	23,502	304,179	32,662,297
96-09-3	Styrene oxide	368	0	0	368
127-18-4	Tetrachloroethylene	12,311,235	10,207	9,354	12,330,796
62-56-6	Thiourea	952	727	256	1,935
584-84-9	Toluene-2,4-diisocyanate	14,032	0	250	14,282
91-08-7	Toluene-2,6-diisocyanate	5,319	0	250	5,569
26471-62-5	Toluenediisocyanate (mixed isomers)	48,209	0	275	48,484
95-53-4	o-Toluidine	7,492	310	6,823	14,625
88-06-2	2,4,6-Trichlorophenol	86	1	0	87
51-79-6	Urethane	3,200	0	0	3,200
593-60-2	Vinyl bromide	32,900	0	0	32,900
75-01-4	Vinyl chloride	1,101,156	902	3,106	1,105,164
	Subtotal	185,199,825	2,109,923	9,862,130	197,171,878
	Total for All TRI Chemicals	1,844,958,336	272,932,953	337,809,053	3,181,646,757

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

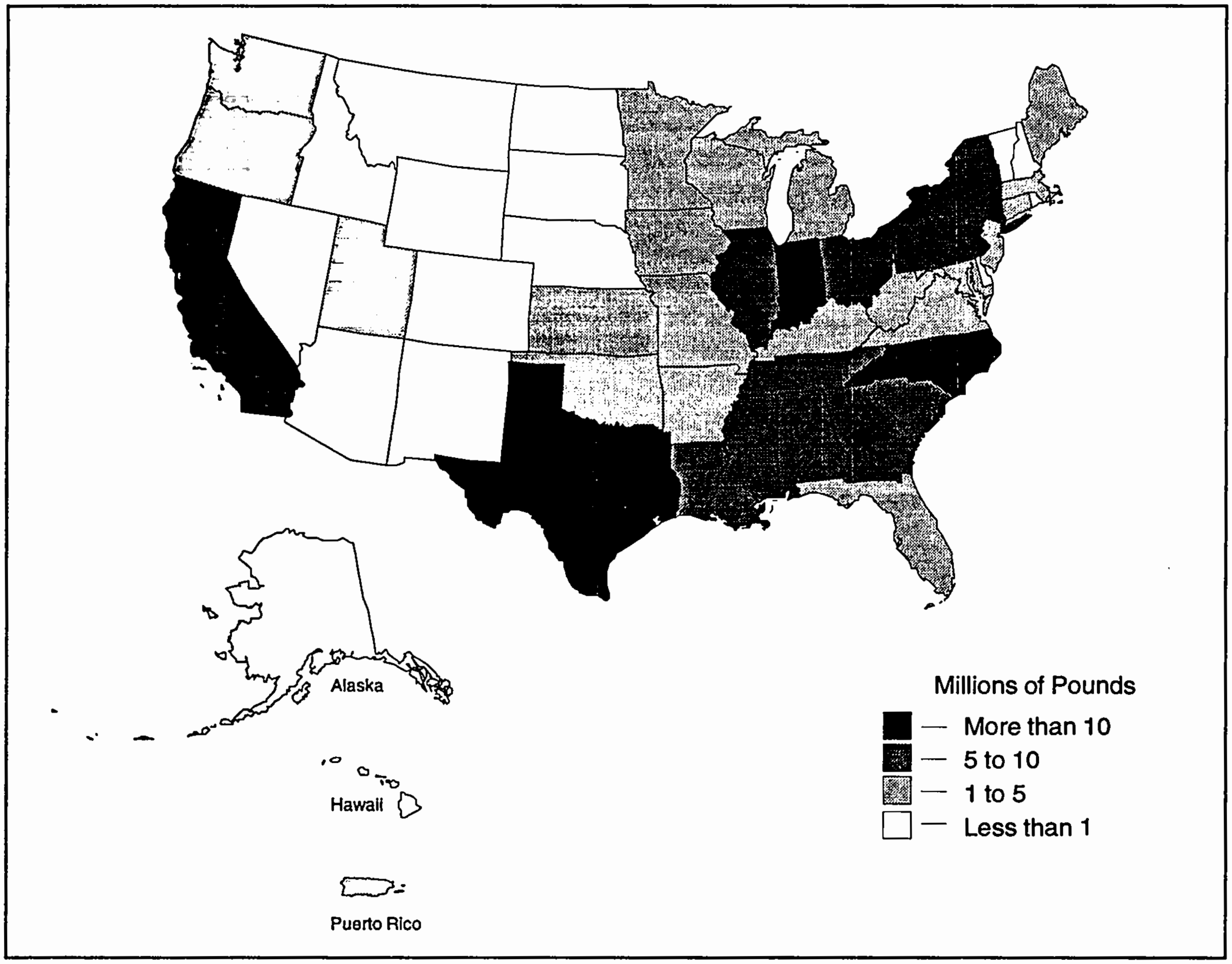


Figure 1-12. TRI Releases of Known or Suspect Carcinogens to Air, by State, 1992.

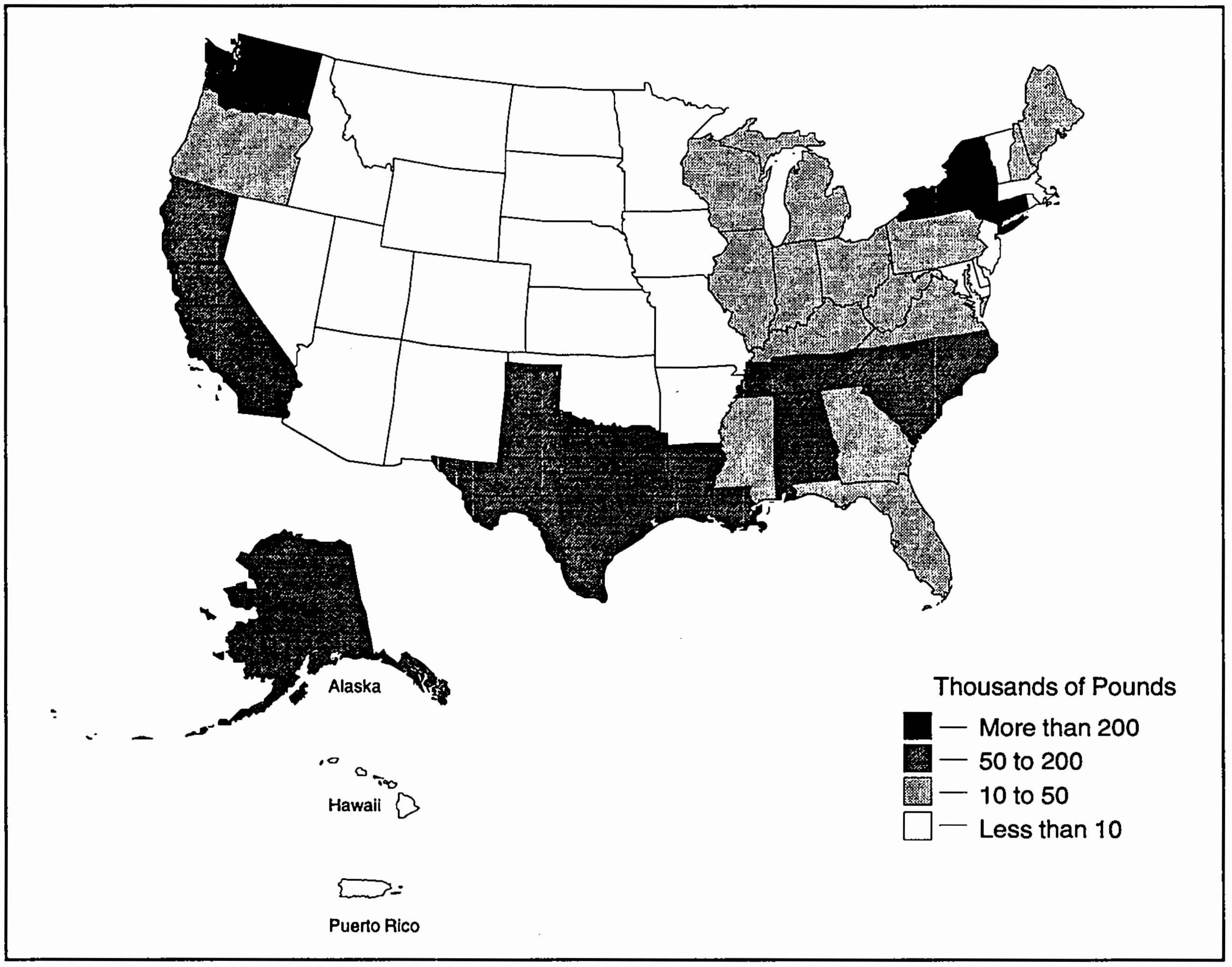


Figure 1-13. TRI Releases of Known or Suspect Carcinogens to Surface Water, by State, 1992.

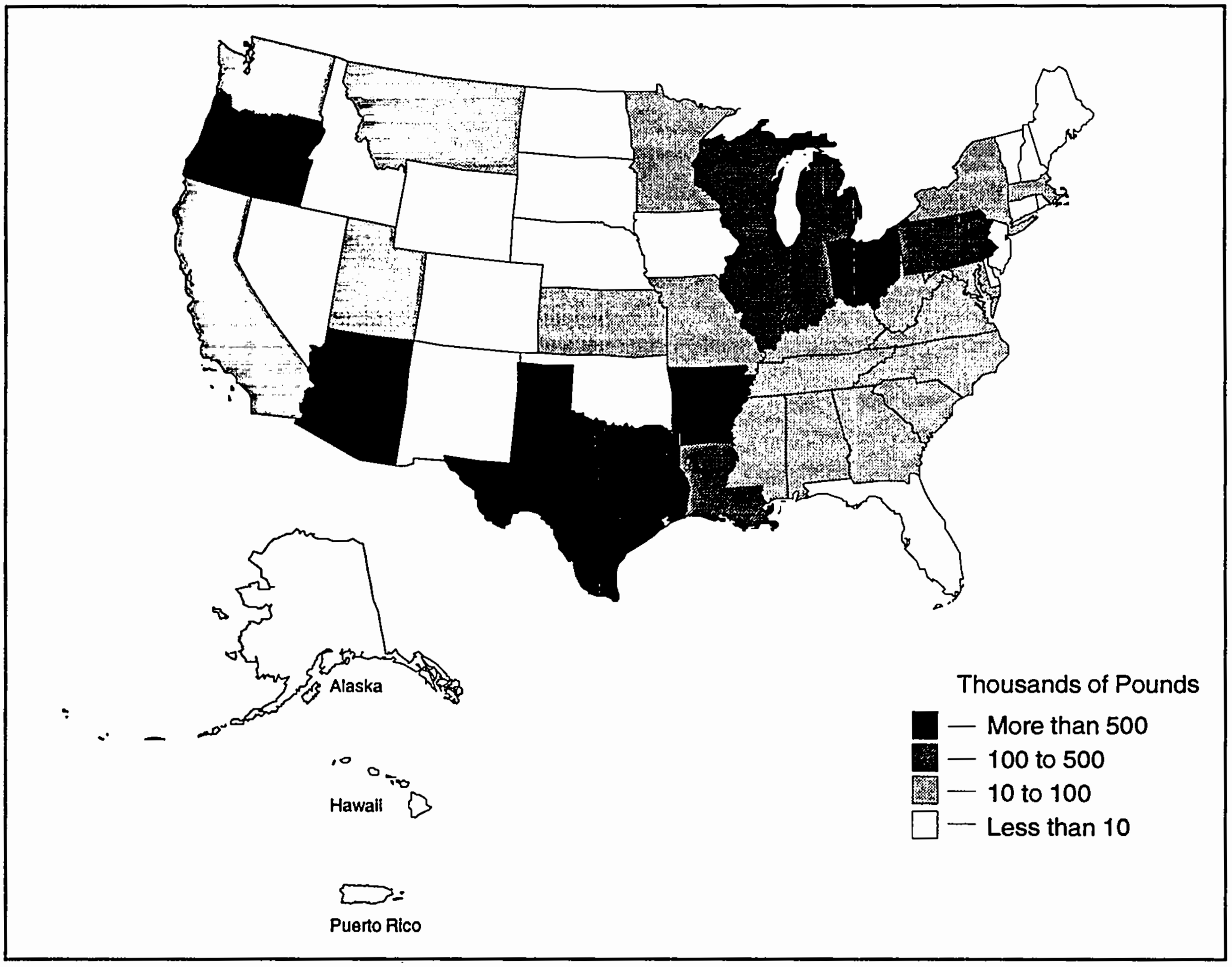


Figure 1-14. TRI Releases of Known or Suspect Carcinogens to Land, by State, 1992.

Bioaccumulators

Bioaccumulation is the accumulation of a chemical by an organism, in concentrations greater than are present in the environment. Bioaccumulation of chemicals can have significant adverse effects on both human health and the environment.

Bioaccumulation includes both uptake from dissolved chemicals in water and from ingestion by aquatic organisms of food and sediments. Bioaccumulators enter the food chain primarily through their introduction into water bodies (such as streams, lakes, rivers, etc.), which may be the result of releases of these chemicals to air and land, as well as discharges to water bodies. Air emissions may be atmospherically transported and subsequently deposited on the land or bodies of water (for example, atmospheric transport is believed to be the only source for some toxic chemicals in the Upper Great Lakes). Releases to land are also important for two reasons. First, there may be uptake and accumulation of these chemicals in plants which may then be consumed by other organisms. Second, there may be run-off from the soil which can reach a water body. This is also important when considering the magnitude of the releases to each media: in 1992, releases to water of the bioaccumulators listed on TRI were 23,095 pounds; while releases to air and land were 2,314,143 pounds and 649,769 pounds, respectively.

While exposure to certain chemical concentrations may not be toxic for the organism, the process of bioaccumulation may result in harmful concentrations for consumers of the organism. For example, in aquatic environments, phytoplankton take up not only nutrients but also toxic bioaccumulators that may be present in minute quantities. Small fish and zooplankton consume large quantities of phytoplankton, bioaccumulating the chemicals from the phytoplankton. These chemicals will continue to biomagnify as organisms consume organisms in the food chain. Predators at the end of the food chain, such as lake trout, salmon, and water fowl, including herring gulls, may accumulate levels of toxic chemicals that are hundreds or thousands of times greater than that present in the phytoplankton. These levels of toxic bioaccumulating chemicals may be high enough to cause adverse effects such as egg shell thinning and other serious deformities resulting in reduced survival of off-spring.

Table 1-37 shows the TRI chemicals that have been identified as chemicals which will bioaccumulate and their releases to air, water, and land. Figure 1-15 shows releases of bioaccumulators by state.

Table 1-37. TRI Releases of Bioaccumulators to Air, Water, and Land, 1992.

CAS Number㉕	Chemical	Total Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds	Total Air/ Water/Land Releases Pounds
309-00-2	Aldrin	0	0	0	0
120-12-7	Anthracene	54,034	1,030	3,070	58,134
98-07-7	Benzoic trichloride	6,079	0	0	6,079
57-74-9	Chlordane	1,713	1	0	1,714
1163-19-5	Decabromodiphenyl oxide	36,967	3,878	531,040	571,885
95-50-1	1,2-Dichlorobenzene	349,059	2,395	6,469	357,923
106-46-7	1,4-Dichlorobenzene	337,946	2,021	622	340,589
117-81-7	Di-(2-ethylhexyl) phthalate	873,783	947	101,712	976,442
76-44-8	Heptachlor	710	1	0	711
118-74-1	Hexachlorobenzene	4,471	227	0	4,698
87-68-3	Hexachloro-1,3-butadiene	4,134	1,911	0	6,045
77-47-4	Hexachlorocyclo-pentadiene	8,380	0	0	8,380
67-72-1	Hexachloroethane	21,022	3	0	21,025
7439-97-6	Mercury	12,471	266	3,117	15,854
—	Mercury compounds	3,249	297	17	3,563
72-43-5	Methoxychlor	818	5	5	828
101-14-4	4,4'-Methylenebis (2-chloroaniline)	17	0	2	19
87-86-5	Pentachlorophenol	13,694	3,127	270	17,091
1336-36-3	Polychlorinated biphenyls (PCBs)	0	0	1	1
8001-35-2	Toxaphene	0	0	0	0
120-82-1	1,2,4-Trichlorobenzene	415,297	995	2,680	418,972
	Total	2,314,143	23,095	649,769	2,987,007

㉕ Compound categories do not have CAS numbers (—).

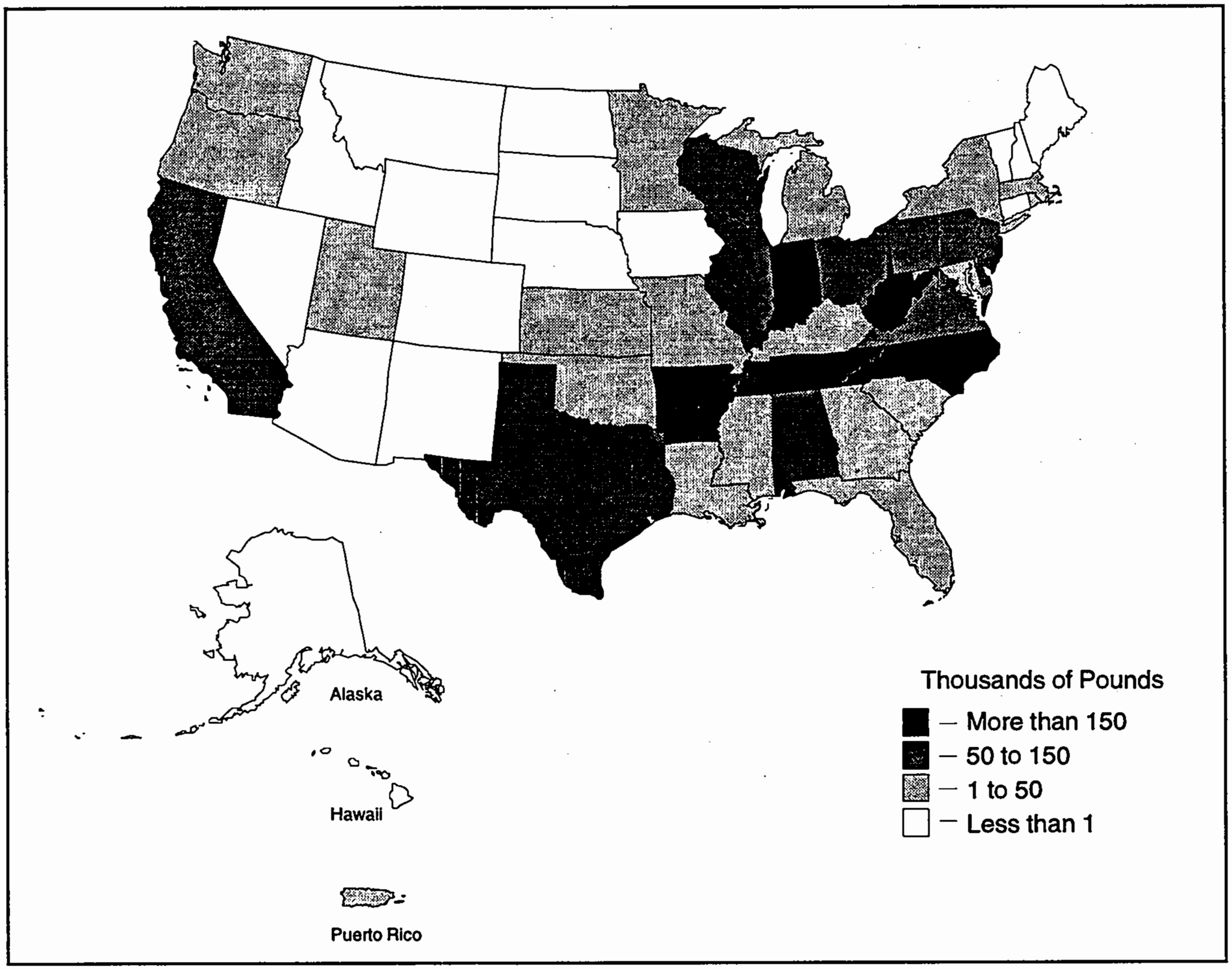


Figure 1-15. TRI Releases of Bioaccumulators to Air, Water, and Land, by State, 1992.

Table 1-38. Releases and Transfers of All TRI Chemicals, 1992 (Alphabetically Ordered).

CAS Number[26]	Chemical	Rank by Total Releases	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	45	1,963,416	4,452,705	77,188	1,905,859	289	8,399,457
60-35-5	Acetamide	143	3	17	1	100,800	0	100,821
67-64-1	Acetone	7	62,963,625	70,989,876	999,584	3,180,700	559,265	138,693,050
75-05-8	Acetonitrile	27	733,502	394,331	48,976	20,111,640	29	21,288,478
107-02-8	Acrolein	136	12,775	12,830	0	113,680	0	139,285
79-06-1	Acrylamide	54	24,374	4,180	10,324	4,188,680	963	4,228,521
79-10-7	Acrylic acid	52	284,227	264,012	19,147	4,484,000	407	5,051,793
107-13-1	Acrylonitrile	51	335,086	1,264,985	1,483	3,861,550	8,071	5,471,175
107-18-6	Allyl alcohol	132	48,016	48,088	9,839	73,060	0	179,003
107-05-1	Allyl chloride	138	96,328	25,306	5	833	0	122,472
7429-90-5	Aluminum (fume or dust)	59	494,503	1,959,744	82,140	250	1,192,193	3,728,830
1344-28-1	Aluminum oxide (fibrous forms)	130	5,843	14,007	265	0	195,538	215,653
60-09-3	4-Aminoazobenzene	252	0	1	0	250	0	251
92-67-1	4-Aminobiphenyl	270	0	0	0	3	0	3
7664-41-7	Ammonia	1	38,878,070	123,206,765	40,824,196	251,783,103	9,165,277	463,857,411
6484-52-2	Ammonium nitrate (solution)	16	57,029	1,273,889	6,762,487	37,531,805	2,624,432	48,249,642
7783-20-2	Ammonium sulfate (solution)	34	123,880	111,020	4,429,219	5,705,957	4,069,490	14,439,566
62-53-3	Aniline	76	181,632	227,372	16,261	1,195,676	1,173	1,622,114
90-04-0	o-Anisidine	218	405	16	107	0	2,167	2,695
104-94-9	p-Anisidine	263	5	6	5	0	0	16
120-12-7	Anthracene	153	20,386	33,648	1,030	0	3,070	58,134
7440-36-0	Antimony	160	4,994	16,779	7,879	0	10,246	39,898
—	Antimony compounds	75	48,363	348,106	45,835	3,773	1,260,253	1,706,330
7440-38-2	Arsenic	73	1,217	4,439	1,236	0	1,814,303	1,821,195
—	Arsenic compounds	68	10,578	127,046	6,597	33,000	2,452,391	2,629,612
1332-21-4	Asbestos (friable)	128	5,291	5,973	250	0	235,900	247,414
7440-39-3	Barium	120	61,459	31,787	5,514	0	232,547	331,307
—	Barium compounds	50	235,555	404,462	120,428	1,251	4,825,948	5,587,644
98-87-3	Benzal chloride	232	956	17	0	0	0	973
71-43-2	Benzene	39	7,640,101	4,744,478	24,918	355,683	340,636	13,105,816
98-07-7	Benzoic trichloride	205	5,851	228	0	0	0	6,079
98-88-4	Benzoyl chloride	189	11,738	1,900	5	0	0	13,643
94-36-0	Benzoyl peroxide	196	837	1,827	5	0	6,200	8,869
100-44-7	Benzyl chloride	165	25,003	10,099	15	50	43	35,210
7440-41-7	Beryllium	176	1	1,867	39	0	21,358	23,265
—	Beryllium compounds	155	0	511	5	0	48,000	48,516
92-52-4	Biphenyl	94	676,939	145,397	9,483	49,127	4,622	885,568
111-44-4	Bis(2-chloroethyl) ether	216	2,673	514	5	0	0	3,192
542-88-1	Bis(chloromethyl) ether	246	3	306	0	0	0	309
108-60-1	Bis(2-chloro-1-methyl-ethyl)ether	193	8,000	1,430	1,900	0	0	11,330
103-23-1	Bis(2-ethylhexyl) adipate	121	75,921	154,947	1,628	0	95,291	327,787
353-59-3	Bromochlorodifluoromethane (Halon 1211)	183	7,923	8,824	0	0	0	16,747
75-25-2	Bromoform	186	11,120	5	0	4,500	0	15,625
74-83-9	Bromomethane	64	528,321	2,472,829	390	1,000	0	3,002,540
75-63-8	Bromotrifluoromethane (Halon 1301)	141	105,490	4,661	0	0	0	110,151
106-99-0	1,3-Butadiene	57	2,229,847	1,613,853	1,364	1,000	372	3,846,436
141-32-2	Butyl acrylate	116	184,349	158,966	2,261	0	834	346,410
71-36-3	n-Butyl alcohol	21	7,134,970	22,588,357	35,369	2,324,731	57,220	32,140,647
78-92-2	sec-Butyl alcohol	97	208,247	460,823	15,706	25,450	762	710,988
75-65-0	tert-Butyl alcohol	70	1,245,810	426,219	147,629	640,123	14	2,459,795
85-68-7	Butyl benzyl phthalate	117	151,715	186,523	957	0	6,109	345,304
106-88-7	1,2-Butylene oxide	148	59,828	15,024	5,773	0	0	80,625
123-72-8	Butyraldehyde	100	214,563	281,946	470	128,051	256	625,286
569-64-2	C.I. Basic Green 4	261	5	5	40	0	0	50
989-38-8	C.I. Basic Red 1	273	0	0	0	0	0	0
2832-40-8	C.I. Disperse Yellow 3	228	428	0	23	0	780	1,231
81-88-9	C.I. Food Red 15	271	0	2	0	0	0	2

Table 1-38.

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(27) Pounds	Total Transfers Pounds
Acetaldehyde	9,750	170,728	270,925	157,031	549	0	608,983
Acetamide	0	0	421	0	0	0	421
Acetone	16,808,284	42,229,514	19,442,586	9,431,457	524,172	160,185	88,596,198
Acetonitrile	3,010,317	4,364,972	2,925,710	477,782	37,041	0	10,815,822
Acrolein	0	4,316	255	0	0	0	4,571
Acrylamide	171	123,891	48,955	88,928	37,317	0	299,262
Acrylic acid	5,899	4,198,882	200,466	38,058	29,659	0	4,472,964
Acrylonitrile	0	1,508,156	822,778	224,271	26,153	140	2,581,498
Allyl alcohol	0	114,823	325,658	66,726	50,900	0	558,107
Allyl chloride	0	31,300	380,035	9	166	0	411,510
Aluminum (fume or dust)	19,775,442	174,247	1,741,789	13,691	3,512,652	27,678	25,245,499
Aluminum oxide (fibrous forms)	702,912	2,159	1,422,118	10,845	1,302,096	41,000	3,481,130
4-Aminoazobenzene	0	0	0	0	0	0	0
4-Aminobiphenyl	0	0	0	0	0	0	0
Ammonia	8,556,802	111,091	6,591,053	71,885,270	3,613,161	1,040,750	91,798,127
Ammonium nitrate (solution)	250	0	69,280	6,856,667	2,394,025	0	9,320,222
Ammonium sulfate (solution)	383,870	0	3,311,004	37,330,411	7,590,648	991	48,616,924
Aniline	5	942,577	501,482	1,130,509	671,195	0	3,245,768
o-Anisidine	0	0	0	6,811	7	0	6,818
p-Anisidine	0	0	0	15	0	0	15
Anthracene	0	394,934	150,337	598	504,548	250	1,050,667
Antimony	2,033,338	1,325	52,593	11,617	199,480	2,021	2,300,374
Antimony compounds	5,666,477	11,509	20,746,138	85,102	2,429,116	664	28,939,006
Arsenic	14,470	5	133,828	457	43,298	0	192,058
Arsenic compounds	2,607,743	0	3,996,468	894	1,640,347	28,376	8,273,828
Asbestos (friable)	0	0	250	783	7,110,469	0	7,111,502
Barium	31,316	4,516	15,634	4,247	669,993	0	725,706
Barium compounds	806,244	158,525	1,705,425	498,994	15,805,194	1,014,069	19,988,451
Benzal chloride	0	34,000	4,343	0	0	0	38,343
Benzene	420,161	2,355,003	2,239,808	418,050	93,206	931,612	6,457,840
Benzoic trichloride	0	0	0	0	0	0	0
Benzoyl chloride	0	0	385,832	175	0	0	386,007
Benzoyl peroxide	6,400	2,422	16,834	38,327	9,337	0	73,320
Benzyl chloride	0	260,011	38,381	25,331	220	0	323,943
Beryllium	7,282	0	743	0	14,094	0	22,119
Beryllium compounds	18,485	0	438	250	4,050	0	23,223
Biphenyl	353,966	389,944	212,022	994,151	32,822	0	1,982,905
Bis(2-chloroethyl) ether	0	140	57,031	10,949	3	0	68,123
Bis(chloromethyl) ether	0	0	0	0	1	0	1
Bis(2-chloro-1-methyl-ethyl)ether	0	0	0	0	0	0	0
Bis(2-ethylhexyl) adipate	135,434	274,379	23,018	20,456	290,126	0	743,413
Bromochlorodifluoromethane (Halon 1211)	0	0	0	0	0	0	0
Bromoform	0	0	6,400	0	195,005	0	201,405
Bromomethane	0	3,500	255	0	250	0	4,005
Bromotrifluoromethane (Halon 1301)	0	0	0	0	0	0	0
1,3-Butadiene	18,386,640	177,839	194,778	20,583	7,666	0	18,787,506
Butyl acrylate	12,572	34,905	59,628	190,144	23,350	0	320,599
n-Butyl alcohol	2,524,614	8,096,439	2,942,954	2,070,978	500,583	48,427	16,183,995
sec-Butyl alcohol	3,025	4,844,222	100,138	11,880	6,662	0	4,965,927
tert-Butyl alcohol	3,058	28,475,525	353,220	2,104,895	63,908	0	31,000,606
Butyl benzyl phthalate	58,054	124,622	243,487	27,227	403,286	0	856,676
1,2-Butylene oxide	0	354,320	0	6,059	0	0	360,379
Butyraldehyde	5,850	3,839	3,804	250,480	11	0	263,984
C.I. Basic Green 4	0	0	499	3,006	3,025	0	6,530
C.I. Basic Red 1	0	309	0	0	382	0	691
C.I. Disperse Yellow 3	0	0	0	755	286	0	1,041
C.I. Food Red 15	0	0	0	1,700	0	0	1,700

Table 1-38. Releases and Transfers of All TRI Chemicals, 1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Rank by Total Releases	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
842-07-9	C.I. Solvent Yellow 14	273	0	0	0	0	0	0
7440-43-9	Cadmium	184	2,295	6,461	638	0	7,036	16,430
—	Cadmium compounds	137	11,347	49,037	780	1,211	65,407	127,782
156-62-7	Calcium cyanamide	163	8,000	405	0	0	30,005	38,410
133-06-2	Captan	192	1,647	5,189	10	5,000	10	11,856
63-25-2	Carbaryl	195	2,525	7,172	15	0	265	9,977
75-15-0	Carbon disulfide	10	2,636,114	90,240,923	45,087	2,704	21	92,924,849
56-23-5	Carbon tetrachloride	80	416,994	973,268	2,441	45,984	333	1,439,020
463-58-1	Carbonyl sulfide	32	4,222	16,198,944	0	0	0	16,203,166
120-80-9	Catechol	122	9,925	917	223,299	3,507	59,154	296,802
57-74-9	Chlordane	222	1,713	0	1	0	0	1,714
7782-50-5	Chlorine	14	1,634,189	68,278,693	1,217,091	48,252	46,171	71,224,396
10049-04-4	Chlorine dioxide	63	60,490	3,035,936	761	0	6	3,097,193
79-11-8	Chloroacetic acid	187	10,778	1,024	3,199	0	0	15,001
108-90-7	Chlorobenzene	71	1,026,324	1,201,951	20,799	72,000	817	2,321,891
75-00-3	Chloroethane	67	1,533,378	1,224,260	1,957	210	0	2,759,805
67-66-3	Chloroform	29	6,017,425	11,017,501	654,452	50,240	28,582	17,768,200
74-87-3	Chloromethane	49	1,325,645	4,317,830	30,961	86,709	0	5,761,145
107-30-2	Chloromethyl methyl ether	227	35	1,186	10	0	0	1,231
—	Chlorophenols	134	3,226	6,057	290	133,204	0	142,777
126-99-8	Chloroprene	78	152,543	1,344,852	47	54,000	1,811	1,553,253
1897-45-6	Chlorothalonil	181	3,185	2,695	6	0	12,250	18,136
7440-47-3	Chromium	79	411,832	112,207	19,104	333	961,167	1,504,643
—	Chromium compounds	26	128,783	334,902	269,667	32,137	23,165,988	23,931,477
7440-48-4	Cobalt	162	16,478	13,084	2,156	500	6,931	39,149
—	Cobalt compounds	124	7,840	23,471	99,289	18,420	126,946	275,966
7440-50-8	Copper	35	476,395	1,018,974	41,474	16,736	12,647,313	14,200,892
—	Copper compounds	18	3,563,732	2,766,265	72,413	201,431	34,489,362	41,093,203
8001-58-9	Creosote	84	565,353	728,211	11,835	5	2,634	1,308,038
120-71-8	p-Cresidine	237	240	100	5	0	255	600
1319-77-3	Cresol (mixed isomers)	87	193,663	298,657	2,747	614,578	1,097	1,110,742
108-39-4	m-Cresol	106	51,679	5,100	220	450,000	0	506,999
95-48-7	o-Cresol	105	20,426	3,061	14	490,000	3	513,504
106-44-5	p-Cresol	125	36,611	3,777	943	232,900	1,513	275,744
98-82-8	Cumene	58	1,245,131	2,479,290	2,250	15,100	783	3,742,554
80-15-9	Cumene hydroperoxide	119	66,077	12,009	217	259,000	21	337,324
135-20-6	Cupferron	267	0	10	0	0	0	10
—	Cyanide compounds	55	80,916	974,494	81,369	2,963,579	12,936	4,113,294
110-82-7	Cyclohexane	36	5,004,598	8,596,357	21,039	230,985	107,748	13,960,727
94-75-7	2,4-D (acetic acid)	175	3,292	3,493	262	1,200	15,302	23,549
1163-19-5	Decabromodiphenyl oxide	101	11,940	25,027	3,878	285	531,040	572,170
101-80-4	4,4'-Diaminodiphenyl ether	238	5	264	312	0	0	581
25376-45-8	Diaminotoluene (mixed isomers)	170	13,913	4,570	695	10,000	85	29,263
95-80-7	2,4-Diaminotoluene	220	1,150	755	5	0	0	1,910
132-64-9	Dibenzofuran	169	16,474	13,282	260	0	211	30,227
96-12-8	1,2-Dibromo-3-chloropropane	247	294	0	0	0	0	294
106-93-4	1,2-Dibromoethane	167	10,921	21,931	106	1,823	6	34,787
124-73-2	Dibromotetrafluoroethane (Halon 2402)	234	154	614	0	0	0	768
84-74-2	Dibutyl phthalate	123	104,628	65,671	5,991	110,000	764	287,054
25321-22-6	Dichlorobenzene (mixed isomers)	212	725	3,796	0	4	0	4,525
95-50-1	1,2-Dichlorobenzene	113	182,216	166,843	2,395	3,700	6,469	361,623
541-73-1	1,3-Dichlorobenzene	210	1,102	3,033	877	0	0	5,012
106-46-7	1,4-Dichlorobenzene	118	74,313	263,633	2,021	2,000	622	342,589
91-94-1	3,3'-Dichlorobenzidine	265	5	5	0	0	0	10
75-27-4	Dichlorobromomethane	254	194	0	0	0	0	194
75-71-8	Dichlorodifluoromethane (CFC-12)	41	6,871,649	4,391,045	2,235	1,722	23	11,266,674
107-06-2	1,2-Dichloroethane	60	650,901	2,514,306	12,296	6,927	1,858	3,186,288

Table 1-38, 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(27) Pounds	Total Transfers Pounds
C.I. Solvent Yellow 14	0	0	0	0	0	0	0
Cadmium	227,783	0	76,146	2,502	101,049	107	407,587
Cadmium compounds	1,819,291	3,302	435,404	43,313	280,064	11,527	2,592,901
Calcium cyanamide	0	0	0	0	0	0	0
Captan	0	0	4,095	255	5,087	0	9,437
Carbaryl	0	0	10,777	0	30,268	0	41,045
Carbon disulfide	64,455	145,128	16,526	193,442	1,717	0	421,268
Carbon tetrachloride	345,452	24,455	839,388	1,054	11,955	0	1,222,304
Carbonyl sulfide	0	0	0	0	0	0	0
Catechol	31	1,526	76,354	154,358	37,192	0	269,461
Chlordane	0	0	638	86	0	0	724
Chlorine	714,632	23	228,440	1,068,562	27,300	0	2,038,957
Chlorine dioxide	0	0	0	1,083	0	0	1,083
Chloroacetic acid	0	0	502	1,792	1,080	1,565	4,939
Chlorobenzene	849,468	849,084	3,725,515	22,055	51,985	0	5,498,107
Chloroethane	221,447	15,655	172,176	10	1	0	409,289
Chloroform	1,417,848	765,345	1,011,020	553,650	41,510	3	3,789,376
Chloromethane	7,000	31,308	225,152	84,895	1,323	0	349,678
Chloromethyl methyl ether	0	0	0	0	70	0	70
Chlorophenols	0	0	3,988	580	250	0	4,818
Chloroprene	1,384,119	19,200	193,907	22,912	2,709	0	1,622,847
Chlorothalonil	1,100	0	4,119	269	175,978	0	181,466
Chromium	67,938,117	2,449	1,326,072	132,754	4,365,586	491,230	74,256,208
Chromium compounds	28,139,690	88,398	2,479,235	809,513	9,880,041	68,353	41,465,230
Cobalt	4,895,246	4,111	22,716	12,169	105,487	250	5,039,979
Cobalt compounds	1,446,723	11,289	80,374	14,398	347,695	76	1,900,555
Copper	346,800,370	2,100	1,751,412	142,939	13,139,578	2,272,446	364,108,845
Copper compounds	106,264,546	119,463	3,087,861	245,515	6,427,267	106,594	116,251,246
Creosote	6,100	143,693	550,521	12,481	1,112,216	16,000	1,841,011
p-Cresidine	0	0	0	23,780	4,500	0	28,280
Cresol (mixed isomers)	38,462	329,156	207,196	40,759	22,891	0	638,464
m-Cresol	888	45,117	20,963	7,496	23,021	0	97,485
o-Cresol	0	28,607	4,529	33,565	13,382	0	80,083
p-Cresol	0	163,747	21,716	672,069	12,310	0	869,842
Cumene	62,769	664,283	102,082	42,645	18,072	0	889,851
Cumene hydroperoxide	0	255	1,790	260	42,686	0	44,991
Cupferron	0	0	0	69	0	0	69
Cyanide compounds	94,518	250	377,676	87,697	254,652	2,200	816,993
Cyclohexane	437,349	2,985,895	1,025,483	17,458	31,527	0	4,497,712
2,4-D (acetic acid)	0	0	28,201	300	51,900	5	80,406
Decabromodiphenyl oxide	20,282	7,406	53,759	126,872	714,384	0	922,703
4,4'-Diaminodiphenyl ether	0	0	4,226	5	1,193	0	5,424
Diaminotoluene (mixed isomers)	0	367,800	428,171	33,575	2,793	0	832,339
2,4-Diaminotoluene	0	0	10,388	0	0	0	10,388
Dibenzofuran	0	800	3,701	255	68,390	250	73,396
1,2-Dibromo-3-chloropropane	0	0	0	0	0	0	0
1,2-Dibromoethane	0	2,353	66,160	0	1,005	0	69,518
Dibromotetrafluoroethane (Halon 2402)	0	0	0	0	0	0	0
Dibutyl phthalate	1,345	117,926	140,581	8,829	74,981	0	343,662
Dichlorobenzene (mixed isomers)	0	92	212	250	11	0	565
1,2-Dichlorobenzene	1,904,907	776,316	1,897,342	29,794	64,582	0	4,672,941
1,3-Dichlorobenzene	950	0	4,626	480	18	0	6,074
1,4-Dichlorobenzene	3	0	132,587	1,603	751	77	135,021
3,3'-Dichlorobenzidine	0	250	16,600	260	5,850	0	22,960
Dichlorobromomethane	0	0	0	0	0	0	0
Dichlorodifluoromethane (CFC-12)	343,086	2,095	84,976	102,473	1,975	0	534,605
1,2-Dichloroethane	18,429,536	77,386	2,135,859	20,044	25,329	0	20,688,154

Table 1-38. Releases and Transfers of All TRI Chemicals, 1992 (Alphabetically Ordered), Continued.

CAS Number[23]	Chemical	Rank by Total Releases	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
540-59-0	1,2-Dichloroethylene	177	15,623	7,604	5	24	1	23,257
75-09-2	Dichloromethane	13	27,495,557	46,467,648	221,192	1,183,867	79,313	75,447,577
120-83-2	2,4-Dichlorophenol	194	274	303	0	9,735	0	10,312
78-87-5	1,2-Dichloropropane	99	205,467	414,450	6,089	0	1,206	627,212
78-88-6	2,3-Dichloropropene	133	160,000	326	1,600	745	0	162,671
542-75-6	1,3-Dichloropropylene	159	32,315	10,292	67	0	0	42,674
76-14-2	Dichlorotetrafluoroethane (CFC-114)	89	934,198	146,026	255	1	0	1,080,480
62-73-7	Dichlorvos	229	541	558	5	0	0	1,104
115-32-2	Dicofol	240	255	256	0	0	0	511
111-42-2	Diethanolamine	93	170,229	86,577	403,692	55,526	178,766	894,790
117-81-7	Di-(2-ethylhexyl) phthalate	91	149,292	724,491	947	35	101,712	976,477
84-66-2	Diethyl phthalate	145	10,824	82,934	470	0	505	94,733
64-67-5	Diethyl sulfate	191	3,284	9,952	5	0	5	13,246
119-90-4	3,3'-Dimethoxybenzidine	268	0	0	8	0	0	8
57-14-7	1,1-Dimethyl hydrazine	243	83	286	0	0	5	374
105-67-9	2,4-Dimethylphenol	146	19,320	8,390	4	66,000	10	93,724
131-11-3	Dimethyl phthalate	149	11,352	67,335	662	855	5	80,209
77-78-1	Dimethyl sulfate	201	6,050	973	161	0	0	7,184
99-65-0	m-Dinitrobenzene	226	502	749	0	0	0	1,251
528-29-0	o-Dinitrobenzene	255	51	106	0	0	0	157
100-25-4	p-Dinitrobenzene	256	50	80	0	0	0	130
534-52-1	4,6-Dinitro-o-cresol	260	2	31	20	0	0	53
51-28-5	2,4-Dinitrophenol	161	14,680	5,632	128	18,925	6	39,371
121-14-2	2,4-Dinitrotoluene	221	1,707	57	105	0	0	1,869
606-20-2	2,6-Dinitrotoluene	239	422	3	126	0	0	551
25321-14-6	Dinitrotoluene (mixed isomers)	150	5,928	10,816	291	50,000	0	67,035
123-91-1	1,4-Dioxane	86	410,648	273,837	447,066	0	3,297	1,134,848
106-89-8	Epichlorohydrin	103	402,097	120,556	3,165	0	1,655	527,473
110-80-5	2-Ethoxyethanol	112	117,490	279,496	18	0	35	397,039
140-88-5	Ethyl acrylate	131	107,913	97,399	734	3,200	1,114	210,360
100-41-4	Ethylbenzene	42	3,236,753	6,766,461	15,778	193,882	289,108	10,501,982
541-41-3	Ethyl chloroformate	214	2,231	1,138	26	0	5	3,400
74-85-1	Ethylene	19	16,595,902	20,010,924	13,413	0	0	36,620,239
107-21-1	Ethylene glycol	30	3,180,308	7,070,854	1,326,208	4,923,321	684,588	17,185,279
151-56-4	Ethyleneimine	273	0	0	0	0	0	0
75-21-8	Ethylene oxide	81	662,386	638,649	1,991	120,000	837	1,423,863
96-45-7	Ethylene thiourea	248	5	280	0	0	0	285
2164-17-2	Fluometuron	236	301	303	5	0	0	609
50-00-0	Formaldehyde	31	1,847,451	9,055,776	441,244	4,916,248	174,429	16,435,148
76-13-1	Freon 113	25	17,610,197	6,954,728	1,916	214	9,028	24,576,083
—	Glycol ethers	17	10,590,821	34,937,784	350,489	194,386	140,595	46,214,075
76-44-8	Heptachlor	235	460	250	1	0	0	711
118-74-1	Hexachlorobenzene	207	4,138	333	227	794	0	5,492
87-68-3	Hexachloro-1,3-butadiene	202	1,916	2,218	1,911	738	0	6,783
77-47-4	Hexachlorocyclopentadiene	197	7,112	1,268	0	5	0	8,385
67-72-1	Hexachloroethane	178	1,738	19,284	3	1,670	0	22,695
302-01-2	Hydrazine	179	13,033	6,238	842	0	10	20,123
10034-93-2	Hydrazine sulfate	139	0	2	0	120,000	0	120,002
7647-01-0	Hydrochloric acid	2	4,393,471	72,715,559	1,927,193	207,817,749	432,770	287,286,742
74-90-8	Hydrogen cyanide	62	65,822	2,275,468	3,947	801,646	17	3,146,900
7664-39-3	Hydrogen fluoride	43	4,158,141	5,599,637	4,205	1	27,887	9,789,871
123-31-9	Hydroquinone	126	4,533	8,985	3,967	250,750	0	268,235
78-84-2	Isobutyraldehyde	111	114,601	289,005	351	3,840	1	407,798
67-63-0	Isopropyl alcohol (manufacturing)[28]	82	381,879	998,990	15	0	330	1,381,214
80-05-7	4,4'-Isopropylidenediphenol	104	109,282	76,427	7,463	41,000	287,138	521,310
7439-92-1	Lead	69	167,966	244,838	11,641	1	2,045,059	2,469,505
—	Lead compounds	38	447,167	986,955	60,934	2,880	11,913,242	13,411,178
58-89-9	Lindane	231	507	531	0	0	0	1,038

Table 1-38, 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[27] Pounds	Total Transfers Pounds
1,2-Dichloroethylene	2,330	0	312	0	3	0	2,645
Dichloromethane	28,892,840	4,091,111	11,631,227	1,300,147	189,299	80,549	46,185,173
2,4-Dichlorophenol	0	0	0	0	0	0	0
1,2-Dichloropropane	0	0	53	1,389	1,952	0	3,394
2,3-Dichloropropene	0	0	531,620	0	0	0	531,620
1,3-Dichloropropylene	0	0	2,818	0	0	0	2,818
Dichlorotetrafluoroethane (CFC-114)	521	0	8,188	0	37	0	8,746
Dichlorvos	0	250	2,350	1	1,251	0	3,852
Dicofol	0	0	1,750	0	500	0	2,250
Diethanolamine	229,669	114,258	331,933	983,606	164,481	0	1,823,947
Di-(2-ethylhexyl) phthalate	3,318,190	388,743	194,931	30,306	1,204,709	0	5,136,879
Diethyl phthalate	297,764	57,808	54,135	474,407	45,251	250	929,615
Diethyl sulfate	4,942,698	33	815	547	172	0	4,944,265
3,3'-Dimethoxybenzidine	0	0	0	0	0	0	0
1,1-Dimethyl hydrazine	22	0	7,005	0	0	0	7,027
2,4-Dimethylphenol	304	72,669	10,351	5,445	1,503	0	90,272
Dimethyl phthalate	500	47,843	38,402	108,765	3,497	0	199,007
Dimethyl sulfate	48,266	0	0	10	0	0	48,276
m-Dinitrobenzene	0	0	1	0	0	0	1
o-Dinitrobenzene	0	0	1	0	0	0	1
p-Dinitrobenzene	0	0	0	0	0	0	0
4,6-Dinitro-o-cresol	0	210	2,166	4,910	5,550	0	12,836
2,4-Dinitrophenol	0	1	6,410	5	0	0	6,416
2,4-Dinitrotoluene	0	0	0	0	0	0	0
2,6-Dinitrotoluene	0	0	0	0	0	0	0
Dinitrotoluene (mixed isomers)	0	250	504,715	190,000	61	0	695,026
1,4-Dioxane	37,825	589,723	388,376	269,319	47,275	0	1,332,518
Epichlorohydrin	0	41,275	880,794	4,709	276	0	927,054
2-Ethoxyethanol	13,335	206,073	73,093	404,046	250	2	696,799
Ethyl acrylate	0	1,275,919	123,262	15,836	19,268	0	1,434,285
Ethylbenzene	3,214,813	8,783,022	1,355,782	100,113	142,199	12,476	13,608,405
Ethyl chloroformate	0	0	0	0	0	0	0
Ethylene	0	14,007,417	92,714	5	329	0	14,100,465
Ethylene glycol	102,373,295	7,466,108	6,994,349	19,775,302	920,298	33,744	137,563,096
Ethyleneimine	0	0	0	0	0	0	0
Ethylene oxide	21,866	0	14,288	84,915	1,650	0	122,719
Ethylene thiourea	0	1,682	6,042	12	7,060	0	14,796
Fluometuron	0	0	7,205	11,851	3,037	0	22,093
Formaldehyde	180,648	180,517	866,876	5,635,857	323,132	29,766	7,216,796
Freon 113	5,637,865	385,048	777,851	22,961	94,831	5,116	6,923,672
Glycol ethers	3,417,078	11,640,189	3,090,223	10,354,678	674,074	70,136	29,246,378
Heptachlor	0	0	93,737	69	0	0	93,806
Hexachlorobenzene	1	0	62,543	8	28,380	0	90,932
Hexachloro-1,3-butadiene	0	0	14,441	7	5	0	14,453
Hexachlorocyclopentadiene	0	1,000	33,818	653	2,740	0	38,211
Hexachloroethane	0	21,000	10,187	0	206	0	31,393
Hydrazine	22	455	131,085	1,308	2,559	0	135,429
Hydrazine sulfate	0	0	0	0	0	0	0
Hydrochloric acid	59,448,806	5,109,001	42,563,284	29,390,927	12,981,133	255,991	149,749,142
Hydrogen cyanide	0	168,250	470	330	874	0	169,924
Hydrogen fluoride	289,178	0	2,537,160	290,544	1,267,924	10,030	4,394,836
Hydroquinone	8,316	5,139	28,737	162,175	8,646	250	213,263
Isobutyraldehyde	400	1,096,087	35,010	3,265	250	0	1,135,012
Isopropyl alcohol (manufacturing)	225,917	238,756	99,184	68,302	1,318	8,099	641,576
4,4'-Isopropylidenediphenol	18,865	34,510	29,037	34,480	359,528	4	476,424
Lead	30,611,062	20,205	778,572	31,169	3,002,220	109,071	34,552,299
Lead compounds	372,021,825	39,856	20,082,019	326,787	13,200,051	412,721	406,083,259
Lindane	0	0	51,355	5	73	0	51,433

Table 1-38. Releases and Transfers of All TRI Chemicals, 1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Rank by Total Releases	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
108-31-6	Maleic anhydride	108	100,959	355,296	405	5	2,327	458,992
12427-38-2	Maneb	224	510	535	0	0	250	1,295
7439-96-5	Manganese	46	570,920	299,310	234,925	304	6,521,605	7,627,064
—	Manganese compounds	15	501,113	1,297,031	733,225	22,569	61,485,334	64,039,272
7439-97-6	Mercury	185	8,416	4,055	266	0	3,117	15,854
—	Mercury compounds	213	2,488	761	297	9	17	3,572
67-56-1	Methanol	3	33,921,970	160,868,717	16,422,600	27,084,182	3,328,541	241,626,010
72-43-5	Methoxychlor	233	261	557	5	0	5	828
109-86-4	2-Methoxyethanol	77	891,829	527,586	165,535	0	4	1,584,954
96-33-3	Methyl acrylate	127	129,009	136,816	1,279	77	705	267,886
1634-04-4	Methyl tert-butyl ether	65	829,786	1,990,920	102,851	68,445	288	2,992,290
101-14-4	4,4'-Methylenebis (2-chloroaniline)	262	12	5	0	0	2	19
101-68-8	Methylenebis(phenyl-isocyanate)	107	274,052	146,080	30	0	77,201	497,363
74-95-3	Methylene bromide	164	23,361	14,790	0	250	0	38,401
101-77-9	4,4'-Methylenedianiline	180	6,487	3,889	420	8,865	55	19,716
78-93-3	Methyl ethyl ketone	11	31,107,484	59,397,157	153,249	365,395	241,794	91,265,079
60-34-4	Methyl hydrazine	273	0	0	0	0	0	0
74-88-4	Methyl iodide	166	21,980	3,405	11	9,500	0	34,896
108-10-1	Methyl isobutyl ketone	23	7,814,570	18,079,207	96,387	129,100	194,986	26,314,250
624-83-9	Methyl isocyanate	198	6,851	803	0	0	0	7,654
80-62-6	Methyl methacrylate	66	734,794	1,820,951	34,595	220,000	4,003	2,814,343
1313-27-5	Molybdenum trioxide	115	50,338	59,606	59,441	162,705	14,651	346,741
76-15-3	Monochloropenta-fluoroethane (CFC-115)	109	296,585	125,102	5	0	0	421,692
91-20-3	Naphthalene	53	1,368,999	1,233,810	28,936	78,227	1,667,141	4,377,113
134-32-7	alpha-Naphthylamine	266	5	5	0	0	0	10
7440-02-0	Nickel	61	516,037	198,687	44,910	5,309	2,395,966	3,160,909
—	Nickel compounds	74	59,632	89,950	66,305	292,453	1,305,284	1,813,624
7697-37-2	Nitric acid	24	720,461	2,310,467	53,725	22,081,766	664,849	25,831,268
139-13-9	Nitrilotriacetic acid	203	4	0	4,069	2,700	0	6,773
99-59-2	5-Nitro-o-anisidine	264	5	10	0	0	0	15
98-95-3	Nitrobenzene	92	38,744	12,909	442	864,949	0	917,044
55-63-0	Nitroglycerin	152	2,059	27,073	12,906	0	16,150	58,188
88-75-5	2-Nitrophenol	258	5	7	48	0	0	60
100-02-7	4-Nitrophenol	219	715	105	1,700	0	0	2,520
79-46-9	2-Nitropropane	140	36,262	9,380	900	65,581	0	112,123
156-10-5	p-Nitrosodiphenylamine	211	24	0	0	4,900	0	4,924
121-69-7	N,N-Dimethylaniline	158	19,366	24,012	2,039	0	0	45,417
86-30-6	N-Nitrosodiphenylamine	273	0	0	0	0	0	0
56-38-2	Parathion	249	10	255	5	0	0	270
87-86-5	Pentachlorophenol	182	7,470	6,224	3,127	0	270	17,091
79-21-0	Peracetic acid	204	2,589	3,379	14	5	520	6,507
108-95-2	Phenol	37	2,990,363	4,749,651	165,074	5,552,077	190,230	13,647,395
106-50-3	p-Phenylenediamine	208	2,737	2,710	0	0	3	5,450
90-43-7	2-Phenylphenol	172	6,957	17,865	97	0	5	24,924
75-44-5	Phosgene	209	3,596	1,684	5	5	0	5,290
7664-38-2	Phosphoric acid	4	326,636	868,973	158,674,836	35,230	46,725,635	206,631,310
7723-14-0	Phosphorus (yellow or white)	114	25,507	2,397	2,861	5	327,970	358,740
85-44-9	Phthalic anhydride	95	116,352	633,112	5,240	0	1,079	755,783
88-89-1	Picric acid	90	2	1	2	1,068,674	2	1,068,681
—	Polybrominated biphenyls	251	0	250	0	0	5	255
1336-36-3	Polychlorinated biphenyls (PCBs)	272	0	0	0	0	1	1
1120-71-4	Propane sultone	253	250	0	0	0	0	250
123-38-6	Propionaldehyde	96	396,321	293,319	9	63,940	0	753,589
114-26-1	Propoxur	241	39	386	0	0	0	425
115-07-1	Propylene	28	12,981,892	8,235,849	989	5	0	21,218,735
75-55-8	Propyleneimine	242	17	386	0	0	0	403
75-56-9	Propylene oxide	83	603,914	737,428	7,260	200	2,251	1,351,053

Table 1-38, 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(27) Pounds	Total Transfers Pounds
Maleic anhydride	0	62,503	686,945	1,400	34,654	577	786,079
Maneb	0	0	3,070	5	14,092	0	17,167
Manganese	30,026,743	323	492,916	39,376	10,673,549	520,206	41,753,113
Manganese compounds	36,068,799	29,446	3,366,261	1,037,274	12,897,077	145,350	53,544,207
Mercury	14,455	0	13,584	15	29,343	22	57,419
Mercury compounds	37,000	1	60,394	7	135,641	0	233,043
Methanol	15,958,965	69,270,848	39,898,705	113,917,241	2,900,199	17,152	241,963,110
Methoxychlor	0	0	251	0	255	0	506
2-Methoxyethanol	6,174	727,772	329,204	1,054,043	750	17,845	2,135,788
Methyl acrylate	0	409,635	41,241	8,293	1,433	0	460,602
Methyl tert-butyl ether	17,250	346,392	32,688	80,414	14,469	0	491,213
4,4'-Methylenebis (2-chloroaniline)	0	2,559	2,390	5	0	0	4,954
Methylenebis(phenyl-isocyanate)	326,884	86,687	551,353	2,305	937,334	47,000	1,951,563
Methylene bromide	33	0	2,284	1,493	0	0	3,810
4,4'-Methylenedianiline	0	26,949	84,836	1,629	9,710	0	123,124
Methyl ethyl ketone	25,348,083	39,200,900	6,226,190	652,667	620,881	288,689	72,337,410
Methyl hydrazine	0	0	0	0	0	0	0
Methyl iodide	0	0	250	0	0	0	250
Methyl isobutyl ketone	20,065,393	17,343,529	1,449,180	776,557	107,897	205,272	39,947,828
Methyl isocyanate	0	0	0	0	0	0	0
Methyl methacrylate	359,902	1,047,331	658,495	252,175	96,623	40,862	2,455,388
Molybdenum trioxide	3,007,386	0	61,237	72,494	349,880	250	3,491,247
Monochloropenta-fluoroethane (CFC-115)	0	0	128	0	0	0	128
Naphthalene	140,690	2,395,500	554,118	88,371	667,206	2,850	3,848,735
alpha-Naphthylamine	0	0	0	0	0	0	0
Nickel	52,455,389	13,073	1,151,268	128,402	4,218,406	397,856	58,364,394
Nickel compounds	26,780,934	21,555	1,470,981	121,227	5,018,366	44,123	33,457,186
Nitric acid	3,259,058	539	10,617,898	3,739,898	3,986,437	15,194	21,619,024
Nitrilotriacetic acid	0	0	8,556	0	0	0	8,556
5-Nitro-o-anisidine	0	0	0	10	250	0	260
Nitrobenzene	2,881	27,210	435,854	23	14,297	0	480,265
Nitroglycerin	3,088	250	68,952	40	0	0	72,330
2-Nitrophenol	0	0	429	0	0	0	429
4-Nitrophenol	0	0	820,002	411	27	0	820,440
2-Nitropropane	2,230	0	4,100	0	63,962	4,120	74,412
p-Nitrosodiphenylamine	0	15,000	0	0	0	0	15,000
N,N-Dimethylaniline	0	954,379	132,993	161,693	0	0	1,249,065
N-Nitrosodiphenylamine	0	0	498,400	0	0	0	498,400
Parathion	0	0	6,502	0	0	0	6,502
Pentachlorophenol	1,250	2,406,652	23,221	900	99,640	0	2,531,663
Peracetic acid	0	0	4,553	2,474	0	2,312	9,339
Phenol	808,209	2,687,109	1,825,900	4,547,598	1,139,093	25,087	11,032,996
p-Phenylenediamine	0	0	409	4,298	4,800	0	9,507
2-Phenylphenol	0	505	1,500	2,667	515	0	5,187
Phosgene	0	0	1,538	0	10	0	1,548
Phosphoric acid	9,331,205	913	1,740,291	4,889,570	1,173,331	105,575	17,240,885
Phosphorus (yellow or white)	151,644	0	36,229	255	759	0	188,887
Phthalic anhydride	4,148	3,659,358	315,500	4,800	251,349	0	4,235,155
Picric acid	0	0	34	0	0	0	34
Polybrominated biphenyls	0	0	0	0	500	0	500
Polychlorinated biphenyls (PCBs)	18,920	0	1,243,879	0	427,320	0	1,690,119
Propane sultone	0	0	0	0	0	0	0
Propionaldehyde	0	14,339	0	12,906	4,961	0	32,206
Propoxur	0	0	1,000	250	5	0	1,255
Propylene	0	2,891,581	580,777	255	34	0	3,472,647
Propyleneimine	0	0	0	0	0	0	0
Propylene oxide	0	572,206	3,884	33,600	76,669	0	686,359

Table 1-38. Releases and Transfers of All TRI Chemicals, 1992 (Alphabetically Ordered), Continued.

CAS Number[23]	Chemical	Rank by Total Releases	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	98	55,984	78,252	10,218	508,615	9	653,078
91-22-5	Quinoline	144	20,702	17,471	75	59,000	46	97,294
106-51-4	Quinone	174	6,100	18,002	4	27	0	24,133
82-68-8	Quintozene	223	766	774	0	0	0	1,540
81-07-2	Saccharin (manufacturing)	245	63	260	0	0	0	323
7782-49-2	Selenium	230	30	1,033	0	0	5	1,068
—	Selenium compounds	135	4,498	28,385	5,963	3,700	99,116	141,662
7440-22-4	Silver	199	3,257	3,512	140	0	500	7,409
—	Silver compounds	151	6,924	22,673	9,639	24	20,318	59,578
100-42-5	Styrene	20	13,149,414	19,185,202	23,502	83,170	304,179	32,745,467
96-09-3	Styrene oxide	244	304	64	0	0	0	368
7664-93-9	Sulfuric acid	6	1,570,940	22,150,513	32,719,526	98,631,395	1,737,032	156,809,406
79-34-5	1,1,2,2-Tetrachloroethane	154	28,117	20,782	564	0	0	49,463
127-18-4	Tetrachloroethylene	40	5,198,796	7,112,439	10,207	12,780	9,354	12,343,576
961-11-5	Tetrachlorvinphos	217	260	2,575	5	0	0	2,840
—	Thallium compounds	225	255	500	0	0	505	1,260
62-56-6	Thiourea	200	650	302	727	5,300	256	7,235
1314-20-1	Thorium dioxide	269	0	5	0	0	0	5
7550-45-0	Titanium tetrachloride	171	23,889	4,094	0	0	0	27,983
108-88-3	Toluene	5	64,986,449	126,010,712	84,024	1,573,901	708,278	193,363,364
584-84-9	Toluene-2,4-diisocyanate	188	4,995	9,037	0	0	250	14,282
91-08-7	Toluene-2,6-diisocyanate	206	2,151	3,168	0	0	250	5,569
26471-62-5	Toluenediisocyanate (mixed isomers)	156	14,271	33,938	0	0	275	48,484
95-53-4	o-Toluidine	157	5,255	2,237	310	31,800	6,823	46,425
52-68-6	Trichlorfon	250	5	253	9	0	0	267
120-82-1	1,2,4-Trichlorobenzene	110	219,941	195,356	995	1,200	2,680	420,172
71-55-6	1,1,1-Trichloroethane	8	56,479,078	58,465,308	13,132	561	76,381	115,034,460
79-00-5	1,1,2-Trichloroethane	102	85,953	476,232	1,033	0	7	563,225
79-01-6	Trichloroethylene	22	15,269,203	14,305,372	8,153	466	20,726	29,603,920
75-69-4	Trichlorofluoromethane (CFC-11)	44	3,655,417	5,809,097	1,448	8	19,761	9,485,731
95-95-4	2,4,5-Trichlorophenol	273	0	0	0	0	0	0
88-06-2	2,4,6-Trichlorophenol	257	7	79	1	0	0	87
1582-09-8	Trifluralin	190	10,637	2,672	290	0	10	13,609
95-63-6	1,2,4-Trimethylbenzene	47	2,229,766	3,028,445	8,481	14,409	511,202	5,792,303
51-79-6	Urethane	215	3,200	0	0	0	0	3,200
7440-62-2	Vanadium (fume or dust)	142	2,015	11,930	4,250	0	83,250	101,445
108-05-4	Vinyl acetate	48	1,079,209	3,073,769	7,208	1,616,385	5,249	5,781,820
593-60-2	Vinyl bromide	168	28,300	4,600	0	0	0	32,900
75-01-4	Vinyl chloride	88	370,412	730,744	902	1	3,106	1,105,165
75-35-4	Vinylidene chloride	129	52,657	188,781	1,296	0	14	242,748
1330-20-7	Xylene (mixed isomers)	9	26,080,470	83,631,841	41,504	219,270	1,434,430	111,407,515
108-38-3	m-Xylene	85	874,061	386,780	1,387	5	6,189	1,268,422
95-47-6	o-Xylene	72	1,441,352	636,477	1,868	5	5,967	2,085,669
106-42-3	p-Xylene	56	1,035,834	2,985,051	1,868	5	4,101	4,026,859
87-62-7	2,6-Xylidine	259	33	26	0	0	0	59
7440-66-6	Zinc (fume or dust)	33	634,722	905,990	46,975	120,000	13,041,123	14,748,810
—	Zinc compounds	12	1,506,116	2,678,676	1,009,739	126,947	76,540,392	81,861,870
	Mixtures and other trade names	147	13,770	44,316	0	0	32,950	91,036
	Trade secret chemicals	173	3,650	485	0	0	20,000	24,135
	Total		549,351,729	1,295,606,607	272,932,953	725,946,415	337,809,053	3,181,646,757

Table 1-38, 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 Transfers㉗ Pounds	Total Transfers Pounds
Pyridine	0	506,091	331,554	199,015	4,541	0	1,041,201
Quinoline	0	210	5,001	260	2,160	250	7,881
Quinone	0	0	0	0	0	0	0
Quintozene	170,000	373	452,527	26	50	0	622,976
Saccharin (manufacturing)	0	0	9,550	279	1,300	0	11,129
Selenium	38,463	0	462	57	3,440	5	42,427
Selenium compounds	271,351	1,270	26,982	210	41,894	0	341,707
Silver	979,756	0	4,797	1,858	9,802	3,900	1,000,113
Silver compounds	976,578	0	1,912	4,224	8,190	500	991,404
Styrene	1,079,415	8,577,736	3,221,494	254,679	2,624,009	20,908	15,778,241
Styrene oxide	0	0	0	0	0	0	0
Sulfuric acid	921,378,531	520,391	41,458,033	35,866,416	34,202,633	3,703,090	1,037,129,094
1,1,2,2-Tetrachloroethane	1,446,254	0	65,142	8,113	273	0	1,519,782
Tetrachloroethylene	7,688,770	729,405	1,853,236	111,273	111,474	157,406	10,651,564
Tetrachlorvinphos	0	0	135,100	29	104,680	0	239,809
Thallium compounds	75,905	0	3,900	5	250	0	80,060
Thiourea	0	0	2,698	25,175	16,962	0	44,835
Thorium dioxide	0	0	0	5	64,000	0	64,005
Titanium tetrachloride	0	0	3,276,833	0	39,000	0	3,315,833
Toluene	29,949,225	78,876,427	19,777,172	984,843	936,544	129,989	130,654,200
Toluene-2,4-diisocyanate	7,400	1,020	45,644	0	1,499	0	55,563
Toluene-2,6-diisocyanate	1,770	48	15,433	0	475	0	17,726
Toluenediisocyanate (mixed isomers)	95,250	29,470	154,918	10	32,404	0	312,052
o-Toluidine	0	232,901	11,182	2,412	188	0	246,683
Trichlorfon	0	0	3,109	0	274	0	3,383
1,2,4-Trichlorobenzene	48,070	72,654	1,548,055	183,015	42,748	0	1,894,542
1,1,1-Trichloroethane	23,082,207	3,639,456	4,247,899	118,253	611,054	173,815	31,872,684
1,1,2-Trichloroethane	8,905,509	1,000	3,221,849	1,200	219	0	12,129,777
Trichloroethylene	6,610,826	969,233	1,728,770	69,639	248,714	49,621	9,676,803
Trichlorofluoromethane (CFC-11)	212,631	39,404	208,369	5,925	137,674	0	604,003
2,4,5-Trichlorophenol	0	0	0	0	0	0	0
2,4,6-Trichlorophenol	0	0	0	0	0	0	0
Trifluralin	250	5	44,573	32	25,332	0	70,192
1,2,4-Trimethylbenzene	448,846	2,234,938	231,171	180,428	52,706	4,415	3,152,504
Urethane	0	0	4,700	6,400	3,200	0	14,300
Vanadium (fume or dust)	92	0	849	5	9,769	0	10,715
Vinyl acetate	1,139,485	5,897,704	838,232	190,754	395,519	5,600	8,467,294
Vinyl bromide	0	0	0	0	0	0	0
Vinyl chloride	158,159	2,731	23,909	474	11,694	0	196,967
Vinylidene chloride	0	0	104,102	260	0	0	104,362
Xylene (mixed isomers)	39,088,457	64,252,052	6,414,100	860,674	1,240,922	119,128	111,975,333
m-Xylene	10,331	93,296	132,919	156,993	72,851	0	466,390
o-Xylene	135,247	2,327,216	48,805	53,212	11,067	0	2,575,547
p-Xylene	215	46,909	8,020	70,927	10,681	0	136,752
2,6-Xylidine	0	0	0	0	0	0	0
Zinc (fume or dust)	62,584,129	102,007	1,367,703	159,837	5,399,683	105,120	69,718,479
Zinc compounds	227,148,192	348,371	36,892,532	564,123	42,506,449	3,284,350	310,744,017
Mixtures and other trade names	349,327	39,342	638,294	1,872	1,552,607	0	2,581,442
Trade secret chemicals	68,000	23,000	14,000	5	0	0	105,005
Total	2,839,825,919	477,639,264	393,466,540	381,096,823	258,642,577	16,933,490	4,367,604,613

㉖ Compound categories do not have CAS numbers (—).
㉗ Transfers reported without valid waste management codes.
㉘ Only facilities that manufacture isopropyl alcohol by the "strong acid process" are required to report releases to TRI. Because no U.S. manufacturers use this process, no reports should have been filed for this chemical.

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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 management of TRI chemicals in wastes and efforts made to eliminate or reduce those quantities, beginning with the 1991 reporting year. The PPA also established as national policy that source reduction, the prevention of the generation of wastes, is the most preferable approach to managing wastes. When it is not feasible to implement source reduction, the PPA established as national policy a hierarchy of waste management. As elaborated by EPA Administrator Carol Browner: "Pollution prevention is not the only strategy for reducing risk but is the preferred one. Environmentally sound recycling shares many of the advantages of prevention — it can reduce the need for treatment or disposal, and conserve energy and natural resources. Where prevention or recycling are not feasible, treatment followed by safe disposal as a last resort will play an important role in achieving environmental goals." The hierarchy for making pollution prevention and waste management decisions is illustrated in Figure 2-1. Although the PPA did not specifically address the combustion of waste for energy recovery as a waste management option, EPA made this activity a specific action in the hierarchy, recognizing that energy recovery has aspects of both recycling and treatment.

The information required by the PPA can help facilities and the public assess progress in the prevention and management of TRI chemicals in waste by providing a more comprehensive look at the management of quantities of TRI chemicals in wastes. These data can be used to analyze trends in quantities recycled, combusted for energy recovery, treated, and released or disposed of, which can then indicate whether facilities are reducing wastes or moving up the waste management hierarchy. Trends in the total quantity of TRI chemicals in wastes can also be assessed. Using the information reported on efforts to reduce or eliminate the quantities of TRI chemicals in waste, data users can assess which industries and facilities are implementing source reduction and what types of source reduction activities they are implementing, and develop indicators of how effective those activities are in reducing TRI chemicals in waste. Using the information on how the source reduction activities were implemented, data users can assess how opportunities for source reduction are identified, which can then aid in determining the more successful routes of delivery for source reduction information, as well as technology transfer. The data reported for 1991 provide a baseline for such assessments.

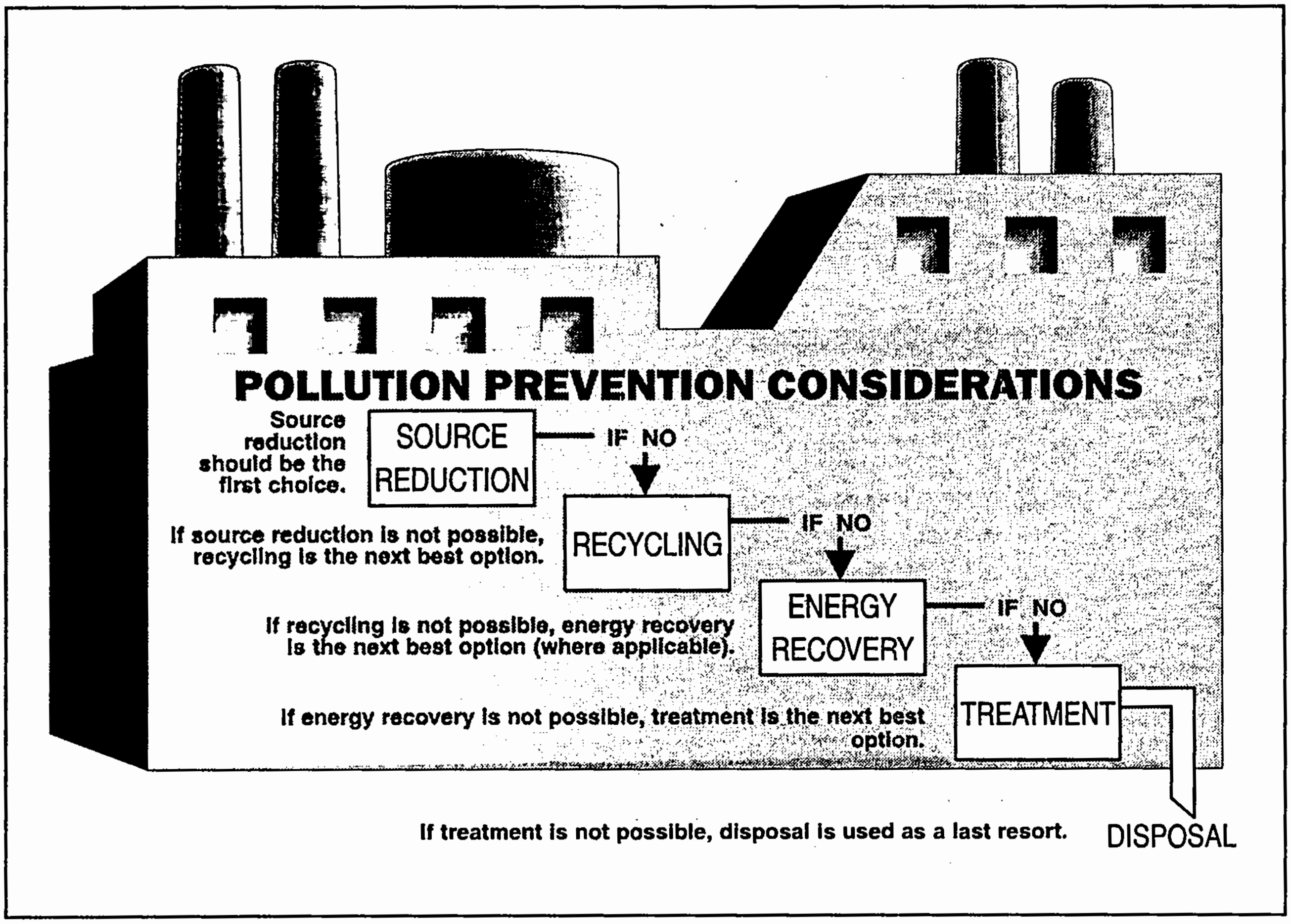


Figure 2-1. Waste Management Hierarchy.

WHAT WASTE MANAGEMENT INFORMATION IS COLLECTED?

This information is collected in Section 8 of the TRI reporting form (see EPA's Form R in Appendix F) and includes the following quantities:

- quantity released to the environment at the facility and sent off-site for disposal;
- quantity used for energy recovery at the facility;
- quantity sent off-site for energy recovery;
- quantity recycled at the facility;
- quantity sent off-site for recycling;
- quantity treated at the facility; and
- quantity 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. The individual quantities are mutually exclusive to avoid double-counting of TRI chemicals in wastes. This allows the summation of these quantities in order to calculate the total quantity of TRI chemicals in wastes from routine production operations that a

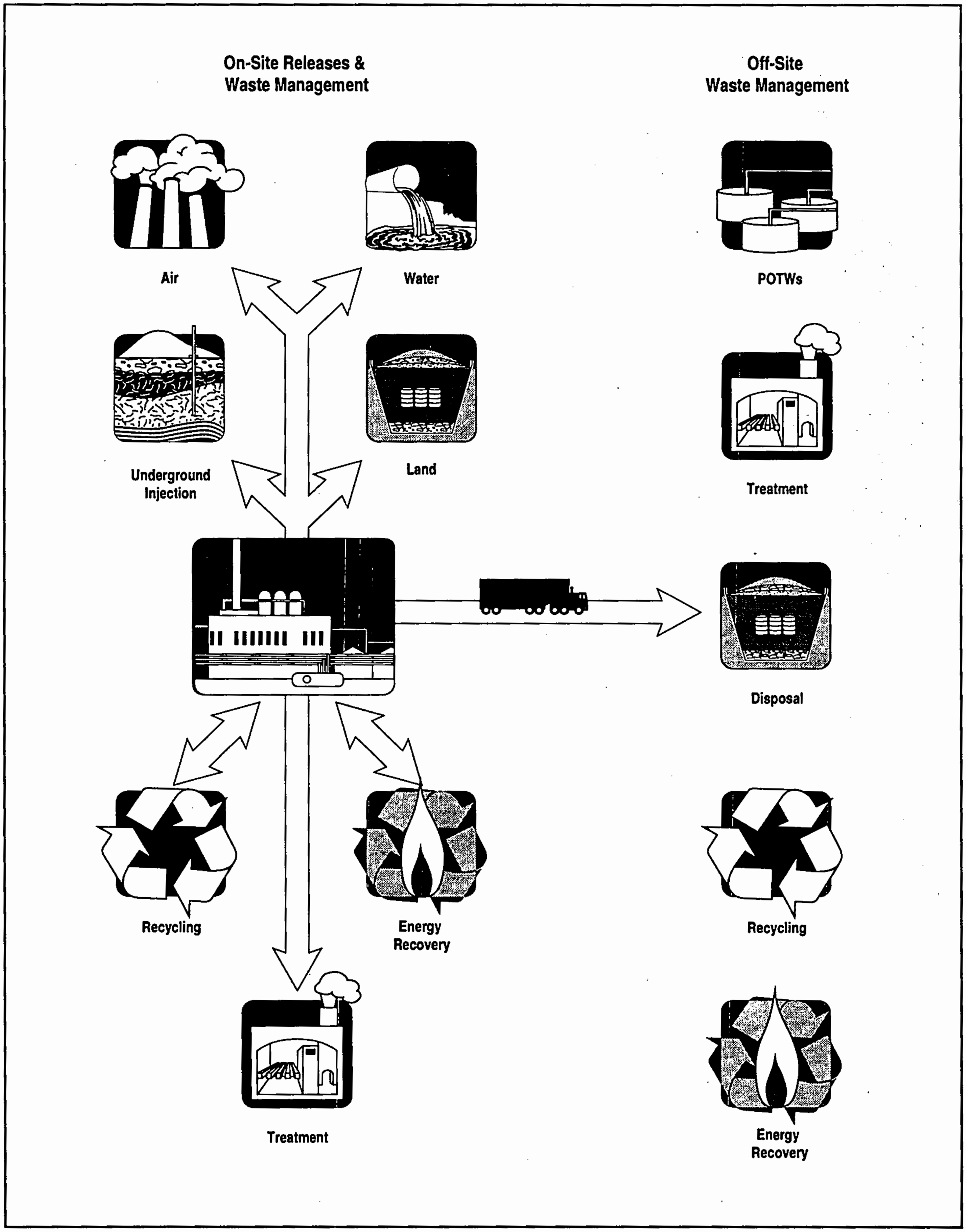


Figure 2-2. Waste Management Information Collected under TRI.

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 wastes, 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?

facility generates and manages during the calendar year. For the reporting year only, facilities are also required to report the quantity released to the environment at the facility or transferred off-site due to catastrophic events or remedial (clean-up) actions occurring at the facility. This quantity is referred to as non-production related waste because it is not associated with routine production operations at the facility. Such quantities are considered less amenable to source reduction because such quantities cannot be reasonably anticipated by facilities.

These production-related quantities are reported not only for the reporting year (1992), but for the year prior to the reporting year (1991) and the two years following the reporting year (1993 and 1994). While the quantities reported for 1991 and 1992 are actual estimates, the quantities reported for 1993 and 1994 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.

QUANTITIES OF TRI CHEMICALS IN WASTE

For 1992, a total of 37.334 billion pounds of toxic chemicals in production-related wastes were reported, compared with approximately 37.162 billion pounds reported for 1991. In addition, almost 34 million pounds of non-production related wastes were reported for 1992, compared to 31 million pounds for 1991. The quantities of TRI chemicals in waste reported for 1991 and 1992 are compared in Table 2-1.

These quantities are shown in Figure 2-3 as a percentage of total production-related waste. Looking at the quantities aggregated by the hierarchy of waste management, approximately 52% of the toxic chemicals in wastes (19.358 billion pounds) were reported as recycled; 10% (3.569 billion pounds) were reported as combusted for energy recovery; 29% (11.005 billion pounds) were reported as treated; and 9% (3.401 billion pounds) were reported as released or disposed of into the environment. This indicates that 62% of the toxic chemicals in waste were reported as recycled or used beneficially, while the remaining 38% were reported as either treated or released directly to the environment.

Table 2-1. Quantities of TRI Chemicals in Waste, 1991 and 1992.❶

Management Activity	**1991 Quantity** Billions of Pounds	**1992 Quantity** Billions of Pounds	**Percent Change** Percent
Recycled On-site	16.171	15.884	-1.8
Recycled Off-site	2.983	3.474	16.5
Used for Energy Recovery On-site	3.260	2.941	-9.8
Used for Energy Recovery Off-site	0.500	0.628	25.6
Treated On-site	9.895	10.327	4.4
Treated Off-site	0.710	0.678	-4.5
Released or Disposed Of	3.644	3.401	-6.7
Total Production-related Waste	37.162	37.334	0.5

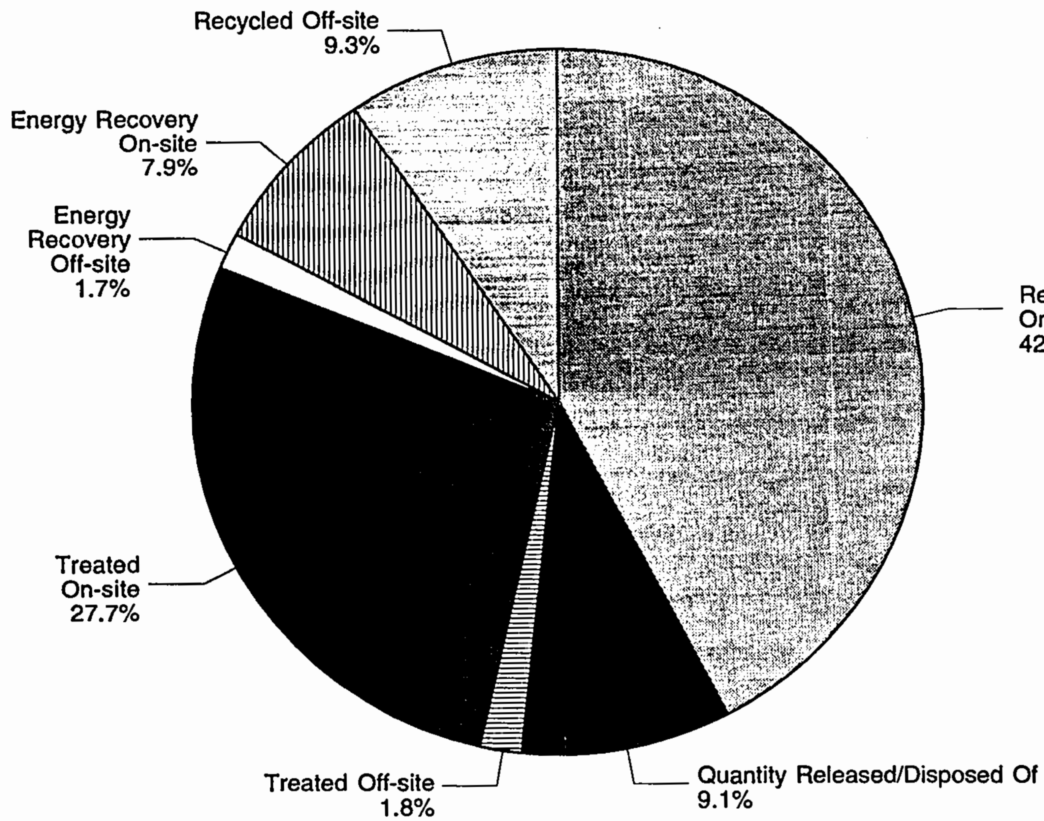


Figure 2-3. Management of TRI Chemicals in Waste, by Activity, 1992.

❶ 1991 amounts are as reported on the 1991 Form R and 1992 amounts are as reported on the 1992 Form R.

Tables 2-2 and 2-3 show the quantities of toxic chemicals in production-related wastes reported for 1991 through 1994 on the 1992 Form R, aggregated at the national level. All of the quantities reported for 1991 through 1994 are shown in Table 2-2, including quantities reported on forms that did not have information for all four years. Table 2-2 indicates an increase in production-related wastes from 1991 to 1992, with slight increases projected for 1993 and 1994. Table 2-3 shows the quantities for only those forms that provided quantities consistently for all four years, allowing for a consistent comparison to more accurately see potential trends in the quantities recycled, combusted for energy recovery, treated, and disposed of. Similar to Table 2-2, an increase in the quantities of toxic chemicals in wastes between 1991 and 1992, and a slight increase in projected quantities for 1993 and 1994 is shown in Table 2-3. Some movement up the waste management hierarchy is also indicated by Table 2-3. This is evident through some actual and projected decreases in the quantities released, projected decreases in the quantities treated on-site, and some actual and projected increases in off-site recycling.

While movement up the hierarchy is an improvement in how toxic chemicals in wastes are managed, there is no decrease in the total amount of wastes that must be managed. This suggests that, on a national scale and without consideration of increases or decreases in production, current source reduction efforts are not reducing the absolute quantities of toxic chemicals in wastes. Further comparison is necessary, however, to determine if increased production is responsible for the steadily climbing quantities of toxic chemicals in wastes rather than a failure in source reduction efforts. To assist in such a comparison, facilities are required to provide an indication of changes in production or activity at the facility. This information can help to assess the effect that production changes may have had on the amount of toxic chemicals generated in waste.

Table 2-2. Actual and Projected Quantities of TRI Chemicals in Waste, 1991-1994.

Management Activity	1991		1992		Projected Data❷ 1993		Projected Data❷ 1994	
	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent
Recycled On-site	15,852,682,387	43.7	15,884,194,888	42.5	16,777,659,985	44.8	16,911,850,011	45.1
Recycled Off-site	2,976,812,329	8.2	3,473,894,509	9.3	3,172,827,577	8.5	3,454,654,976	9.2
Energy Recovery On-site	2,842,457,939	7.8	2,941,222,113	7.9	2,909,306,636	7.8	3,091,684,371	8.3
Energy Recovery Off-site	580,710,271	1.6	627,954,600	1.7	597,471,908	1.6	589,834,167	1.6
Treated On-site	9,868,146,903	27.2	10,326,749,494	27.7	10,184,180,233	27.2	10,097,658,804	27.0
Treated Off-site	680,368,098	1.9	678,373,850	1.8	627,265,273	1.7	598,615,840	1.6
Quantity Released/Disposed Of	3,515,785,150	9.7	3,401,386,170	9.1	3,177,194,783	8.5	2,716,113,363	7.3
Total Production-related Waste	36,316,963,077	100.0	37,333,775,624	100.0	37,445,906,395	100.0	37,460,411,532	100.0

Table 2-3. Actual and Projected Quantities of TRI Chemicals in Waste, Forms Reporting Consistent Data, 1991-1994.❸

Management Activity	1991		1992		Projected Data❷ 1993		Projected Data❷ 1994	
	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent
Recycled On-site	6,758,227,266	30.4	6,843,195,956	29.6	7,211,431,102	30.8	7,224,414,490	30.7
Recycled Off-site	2,129,524,557	9.6	2,501,115,786	10.8	2,370,569,280	10.1	2,674,446,564	11.4
Energy Recovery On-site	2,085,792,015	9.4	2,116,925,453	9.2	2,225,104,861	9.5	2,312,687,664	9.8
Energy Recovery Off-site	384,439,882	1.7	410,309,181	1.8	400,429,425	1.7	395,294,428	1.7
Treated On-site	8,078,008,332	36.3	8,475,463,929	36.7	8,464,798,387	36.1	8,428,328,664	35.8
Treated Off-site	454,567,423	2.0	474,480,899	2.1	459,260,246	2.0	459,978,363	2.0
Quantity Released/Disposed Of	2,374,591,647	10.7	2,264,570,918	9.8	2,305,283,226	9.8	2,041,910,243	8.7
Total Production-related Waste	22,265,151,122	100.0	23,086,062,122	100.0	23,436,876,527	100.0	23,537,060,416	100.0

❷ All data as reported on the 1992 Form R. Data for 1993 and 1994 are projections reported by the facilities. As projections, those quantities do not represent estimates of actual quantities for the 1993 or 1994 reporting years.

❸ The data in this table represent those forms that consistently reported data either by entering a quantity or a zero for each year and each management activity or by leaving the management activity blank for all four years.

Looking beyond the national aggregates, the distributions of toxic chemicals in wastes by state, by industry, and by individual toxic chemical are shown in Tables 2-4 through 2-6.

Tables 2-7 through 2-10 show the top 25 toxic chemicals (by quantity) in each category of the waste management hierarchy: recycle; energy recovery; treatment; and release (including off-site disposal). Sulfuric acid was reported as recycled in the greatest quantity, both on-site and off-site. The amounts of sulfuric acid recycled on-site and off-site make up 36% and 38%, respectively, of the total amounts of all TRI chemicals recycled on-site and off-site. Propylene was reported as combusted for the purposes of energy recovery in the greatest quantity, both on-site and off-site. Sulfuric acid was reported as treated on-site in the greatest quantity, while methanol was reported as treated off-site in the greatest quantity. The top 25 chemicals released (including off-site disposal) are listed in Table 2-10. Comparing this group of chemicals to the top 50 chemicals released on-site (presented in Table 1-22 in Chapter 1) shows that these 25 are in the top 35 released on-site. The rankings of the chemicals in each of the tables are sometimes different due to the inclusion of off-site disposal in the quantities released as reported in Section 8 of Form R and presented in this chapter.

Table 2-4. Quantities of TRI Chemicals in Waste, by State, 1992 (Alphabetically Ordered).

State	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
Alabama	294,852,601	39,283,708	85,075,299	11,774,575
Alaska	8,739	242,373	1,522,000	0
American Samoa	0	0	0	0
Arizona	454,733,859	25,518,406	345,090	971,026
Arkansas	99,308,237	58,196,890	35,618,722	5,092,639
California	85,554,586	129,197,216	75,959,399	135,705,370
Colorado	22,494,840	9,503,098	8,653,400	2,048,948
Connecticut	201,523,913	24,564,766	5,918,299	4,409,037
Delaware	26,381,562	7,768,233	164,768	1,390,569
Florida	70,536,819	22,573,298	23,121,462	4,974,102
Georgia	371,278,014	60,974,809	49,823,661	6,979,833
Hawaii	3,766	26,749	1,600,000	0
Idaho	186,163	351,301	7	305,551
Illinois	177,903,370	157,513,868	164,946,248	64,625,696
Indiana	258,093,769	378,159,201	63,929,416	19,041,245
Iowa	21,625,258	19,360,970	1,579,358	3,599,343
Kansas	578,325,025	47,549,203	468,497,192	2,723,573
Kentucky	168,844,991	69,465,095	60,517,148	10,921,713
Louisiana	296,015,677	251,465,398	364,662,565	6,782,268
Maine	7,618,344	5,230,171	16,040,838	767,349
Maryland	44,500,808	23,082,530	9,280,033	1,221,418
Massachusetts	61,708,975	21,540,326	9,573,268	9,462,461
Michigan	330,817,210	196,800,836	66,761,085	68,930,729
Minnesota	100,741,120	18,163,842	8,261,143	4,950,943
Mississippi	4,211,725,514	67,777,089	21,934,282	3,409,032
Missouri	242,980,417	164,619,595	143,980,460	9,570,540
Montana	54,235,813	2,477,668	7,733,900	106,321
Nebraska	32,601,209	13,949,613	2,906,965	1,170,636
Nevada	2,998,665	3,600,722	0	12,769
New Hampshire	22,392,478	6,671,548	2,507,317	421,548
New Jersey	153,567,438	124,245,597	18,183,395	31,154,161
New Mexico	41,579,949	281,458	18,898,350	237,055
New York	537,230,073	59,100,681	18,387,095	10,563,804
North Carolina	186,728,290	119,247,339	23,379,714	10,450,740
North Dakota	35,769	139,690	0	70,727
Ohio	678,446,128	189,784,986	111,295,502	32,364,107
Oklahoma	25,753,108	17,963,266	21,108,693	1,262,554
Oregon	45,085,399	13,171,111	16,094,968	599,383
Pennsylvania	512,010,749	200,882,170	76,621,701	19,560,792
Puerto Rico	67,088,981	9,171,117	54,507	7,506,696
Rhode Island	9,516,459	12,372,023	281,411	405,737
South Carolina	301,485,103	87,092,555	65,011,780	8,633,429
South Dakota	512,567	268,633	0	276,635
Tennessee	177,683,665	58,427,129	57,177,550	12,130,349
Texas	4,268,140,060	492,513,094	634,996,412	82,144,973
Utah	55,718,999	35,114,437	24,221	311,725
Vermont	6,518,171	4,321,565	0	550,216
Virgin Islands	1,018,150	900,194	0	0
Virginia	109,310,974	25,192,289	55,581,490	8,969,976
Washington	98,572,475	69,177,522	100,896,066	851,285
West Virginia	314,508,554	37,419,363	10,098,004	10,009,900
Wisconsin	51,105,427	46,265,457	11,947,915	8,530,900
Wyoming	2,586,658	45,214,311	270,014	222
Total	15,884,194,888	3,473,894,509	2,941,222,113	627,954,600

Table 2-4.

State	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
Alabama	619,858,050	12,902,168	117,448,738	1,181,195,139	53,966
Alaska	3,320,827	20	14,876,809	19,970,768	60,805
American Samoa	0	0	22,000	22,000	0
Arizona	48,007,235	5,966,099	45,985,272	581,526,987	69,305
Arkansas	143,137,066	1,853,004	40,370,640	383,577,198	3,620,136
California	245,578,903	27,080,667	83,550,909	782,627,050	2,065,950
Colorado	20,451,873	3,509,733	5,885,771	72,547,663	2,255
Connecticut	32,469,675	7,542,618	18,766,210	295,194,518	160,382
Delaware	64,122,308	3,222,664	5,347,535	108,397,639	55,949
Florida	167,233,550	16,993,899	84,530,878	389,964,008	124,224
Georgia	328,302,455	7,058,289	65,795,128	890,212,189	259,817
Hawaii	5,646,951	5,004	1,063,921	8,346,391	115
Idaho	24,931,723	489,498	9,750,864	36,015,107	80,727
Illinois	742,791,769	86,935,542	147,902,784	1,542,619,277	852,447
Indiana	259,966,320	37,562,387	139,135,032	1,155,887,370	231,830
Iowa	130,557,978	8,728,703	37,808,714	223,260,324	143,470
Kansas	61,071,028	6,463,744	95,831,891	1,260,461,656	219,118
Kentucky	134,916,074	11,893,887	72,600,159	529,159,067	357,317
Louisiana	1,207,650,066	5,961,985	468,351,402	2,600,889,361	1,513,369
Maine	78,717,656	726,719	16,122,259	125,223,336	117,264
Maryland	339,107,811	6,534,614	13,314,879	437,042,093	21,788
Massachusetts	43,630,313	10,479,869	16,225,883	172,621,095	38,622
Michigan	336,521,622	31,192,534	102,066,219	1,133,090,235	248,237
Minnesota	56,946,869	7,901,803	32,041,235	229,006,955	27,050
Mississippi	173,749,487	2,905,379	111,756,199	4,593,256,982	579,503
Missouri	101,701,386	28,622,427	55,202,559	746,677,384	76,354
Montana	27,944,968	113,948	43,894,813	136,507,431	78,798
Nebraska	15,438,234	1,508,537	19,346,187	86,921,381	22,741
Nevada	20,675,905	26,846	3,804,218	31,119,125	1,599
New Hampshire	16,406,393	987,515	6,465,912	55,852,711	9,172
New Jersey	237,190,240	49,152,948	34,227,007	647,720,786	595,442
New Mexico	2,709,806	213,914	20,403,898	84,324,430	802
New York	233,092,526	16,719,391	64,324,120	939,417,690	338,054
North Carolina	456,541,092	11,217,054	105,778,442	913,342,671	112,638
North Dakota	2,244,829	192,756	1,942,968	4,626,739	1
Ohio	496,207,939	48,927,242	181,185,116	1,738,211,020	675,052
Oklahoma	60,581,292	3,130,389	29,535,173	159,334,475	72,314
Oregon	79,614,150	6,448,965	19,877,248	180,891,224	13,247
Pennsylvania	292,074,249	39,656,053	89,101,018	1,229,906,732	948,077
Puerto Rico	29,221,815	11,941,351	15,973,576	140,958,043	37,343
Rhode Island	18,628,986	843,872	5,932,205	47,980,693	103,289
South Carolina	172,197,342	11,641,796	66,102,726	712,164,731	1,216,478
South Dakota	36,656,570	197,148	3,001,585	40,913,138	300
Tennessee	211,025,714	23,390,920	203,242,913	743,078,240	974,554
Texas	1,553,154,669	66,444,091	406,646,461	7,504,039,760	16,385,392
Utah	130,489,559	1,202,177	82,210,618	305,071,736	969,224
Vermont	7,574,919	147,743	976,010	20,088,624	251
Virgin Islands	218,978	1,491	4,410,326	6,549,139	349
Virginia	318,960,295	21,479,870	68,846,360	608,341,254	58,439
Washington	202,834,587	7,182,973	27,265,961	506,780,869	58,940
West Virginia	192,838,736	4,050,416	27,635,912	596,560,885	139,714
Wisconsin	140,349,865	19,016,878	52,571,587	329,788,029	156,147
Wyoming	1,486,841	4,310	14,929,920	64,492,276	21,466
Total	10,326,749,494	678,373,850	3,401,386,170	37,333,775,624	33,969,823

Table 2-5. Quantities of TRI Chemicals in Waste, by Industry, 1992.

SIC Code	Industry	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
20	Food	31,701,726	1,330,241	156,082	124,261
21	Tobacco	55,317,334	1,914	0	6,882
22	Textiles	10,947,742	1,568,450	4,661,146	1,417,504
23	Apparel	197,228	285,177	0	404,996
24	Lumber	18,605,724	1,028,315	1,712,454	2,721,058
25	Furniture	2,281,916	3,118,595	40,450	7,095,848
26	Paper	169,536,888	3,249,614	250,582,639	7,629,470
27	Printing	190,153,960	4,417,365	664,580	4,812,175
28	Chemicals	11,293,387,355	504,361,461	1,111,234,613	342,662,500
29	Petroleum	385,462,126	917,389,170	682,916,702	149,862,827
30	Plastics	301,681,888	17,712,603	14,682,484	11,957,894
31	Leather	917,006	2,054,893	0	966,667
32	Stone/Clay	96,428,221	3,101,227	604,968,544	3,364,555
33	Primary Metals	1,800,647,752	866,344,562	48,372,554	18,778,573
34	Fabr. Metals	258,886,428	250,090,237	82,177,521	14,071,001
35	Machinery	98,341,170	44,237,595	256,042	3,443,282
36	Electrical	290,545,346	351,234,470	6,781,882	11,198,118
37	Transportation	64,405,030	163,632,927	2,068,304	22,707,040
38	Measure./Photo.	9,426,297	17,216,803	1,067,100	4,916,648
39	Miscellaneous	10,861,472	13,023,942	666,634	2,012,644
	Multiple codes 20-39 ❹	788,635,334	302,142,026	127,546,268	17,087,344
	No codes 20-39 ❺	5,826,945	6,352,922	666,114	713,313
	Total	15,884,194,888	3,473,894,509	2,941,222,113	627,954,600

Table 2-5.

Industry	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
Food	275,210,688	36,824,046	44,290,101	389,637,145	521,920
Tobacco	1,260,317	4,972	3,594,021	60,185,440	517
Textiles	49,652,644	7,290,569	24,685,875	100,223,930	44,464
Apparel	397,844	188,425	1,673,244	3,146,914	0
Lumber	4,488,763	912,590	33,622,710	63,091,614	102,048
Furniture	2,156,683	1,035,704	50,498,712	66,227,908	3,214,785
Paper	1,814,215,166	55,047,998	237,260,037	2,537,521,812	121,422
Printing	38,201,717	893,317	35,669,572	274,812,686	7,673
Chemicals	4,723,610,014	346,920,639	1,575,150,751	19,897,327,333	22,071,529
Petroleum	733,504,678	4,994,845	71,248,980	2,945,379,328	455,339
Plastics	67,890,609	4,715,631	148,653,273	567,294,382	212,285
Leather	25,541,620	4,703,821	18,296,212	52,480,219	5,627
Stone/Clay	196,493,241	5,076,399	26,144,430	935,576,617	701,214
Primary Metals	761,617,578	95,652,074	452,589,883	4,044,002,976	2,622,478
Fabr. Metals	211,593,558	26,881,626	118,956,136	962,656,507	964,492
Machinery	19,682,541	4,572,128	36,467,293	207,000,051	999,508
Electrical	216,438,100	17,689,982	69,688,465	963,576,363	91,425
Transportation	62,042,259	13,421,456	143,682,705	471,959,721	82,903
Measure./Photo.	51,609,272	5,995,031	35,508,526	125,739,677	513,576
Miscellaneous	7,148,715	1,517,754	19,783,346	55,014,507	246
Multiple codes 20-39❹	897,395,152	40,937,548	238,433,670	2,412,177,342	1,177,914
No codes 20-39❺	166,598,335	3,097,295	15,488,228	198,743,152	58,458
Total	10,326,749,494	678,373,850	3,401,386,170	37,333,775,624	33,969,823

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

Table 2-6. Quantities of TRI Chemicals in Waste, by Chemical, 1992 (Alphabetically Ordered).

CAS Number❻	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
75-07-0	Acetaldehyde	120,001	251	10,253,924	167,669
60-35-5	Acetamide	0	0	42,896	0
67-64-1	Acetone	213,067,646	18,005,963	133,281,260	40,177,385
75-05-8	Acetonitrile	2,508,586,088	2,880,190	29,839,722	4,346,283
107-02-8	Acrolein	7,100	0	1,669,496	38,566
79-06-1	Acrylamide	3,290	0	0	123,134
79-10-7	Acrylic acid	1,437,450	70,909	13,986,624	4,189,944
107-13-1	Acrylonitrile	21,231,972	700	2,137,971	1,510,170
107-18-6	Allyl alcohol	204,087	0	540,065	111,950
107-05-1	Allyl chloride	917,000	0	3,065,000	31,000
7429-90-5	Aluminum (fume or dust)	40,606,848	66,815,379	0	171,602
1344-28-1	Aluminum oxide (fibrous forms)	58,608	724,431	0	11,628
60-09-3	4-Aminoazobenzene	0	0	0	0
92-67-1	4-Aminobiphenyl	0	0	0	0
7664-41-7	Ammonia	211,456,668	18,117,158	53,293,518	262,578
6484-52-2	Ammonium nitrate (solution)	61,022,341	8,693,580	0	0
7783-20-2	Ammonium sulfate (solution)	879,902	976,312	0	0
62-53-3	Aniline	8,959,535	0	4,955,284	921,433
90-04-0	o-Anisidine	0	0	320	0
104-94-9	p-Anisidine	0	0	0	0
120-12-7	Anthracene	547,216	0	3,063,528	394,880
7440-36-0	Antimony	2,122,109	1,597,207	0	1,300
—	Antimony compounds	16,376,518	1,698,663	0	11,767
7440-38-2	Arsenic	.327,411	13,876	0	4
—	Arsenic compounds	5,644,011	591,489	0	2
1332-21-4	Asbestos (friable)	717,992	0	0	0
7440-39-3	Barium	32,567	59,453	0	328
—	Barium compounds	20,463,906	736,044	0	187,676
98-87-3	Benzal chloride	0	0	0	34,000
71-43-2	Benzene	59,012,822	487,209	36,703,579	4,347,690
98-07-7	Benzoic trichloride	0	0	0	0
98-88-4	Benzoyl chloride	0	0	0	0
94-36-0	Benzoyl peroxide	4,800	6,400	0	2,246
100-44-7	Benzyl chloride	2,110	0	0	274,730
7440-41-7	Beryllium	18,500	7,058	0	0
—	Beryllium compounds	12,000	10,540	0	0
92-52-4	Biphenyl	425,076	321,608	1,588,305	388,745
111-44-4	Bis(2-chloroethyl) ether	31	0	889,000	140
542-88-1	Bis(chloromethyl) ether	0	0	0	0
108-60-1	Bis(2-chloro-1-methylethyl)ether	2,400,000	0	5,590,000	0
103-23-1	Bis(2-ethylhexyl) adipate	1,716,068	143,555	52,350	222,515
353-59-3	Bromochlorodifluoromethane (Halon 1211)	45,000	0	0	0
75-25-2	Bromoform	0	0	0	0
74-83-9	Bromomethane	458,200	0	26,000	3,900
75-63-8	Bromotrifluoromethane (Halon 1301)	58,000	0	0	0
106-99-0	1,3-Butadiene	293,902,741	28,850,854	77,191,067	65,839
141-32-2	Butyl acrylate	143,267	80,026	1,230,659	44,990
71-36-3	n-Butyl alcohol	55,630,402	2,492,961	25,590,867	8,935,952
78-92-2	sec-Butyl alcohol	336,057	4,915	9,580,483	4,800,805
75-65-0	tert-Butyl alcohol	29,200	7,743	42,924,000	27,760,077
85-68-7	Butyl benzyl phthalate	1,895,154	55,920	14,031	98,679
106-88-7	1,2-Butylene oxide	8,200	0	51,000	350,012
123-72-8	Butyraldehyde	120,020	400	1,030,189	9,969

Table 2-6.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
Acetaldehyde	12,426,429	434,360	8,431,379	31,834,013	153
Acetamide	1	421	101,001	144,319	0
Acetone	105,711,876	22,784,463	139,039,676	672,068,269	257,235
Acetonitrile	11,122,888	3,118,155	21,429,372	2,581,322,698	12,758
Acrolein	1,455,260	255	135,163	3,305,840	1
Acrylamide	313,324	125,254	4,275,321	4,840,323	6,082
Acrylic acid	36,821,655	209,644	5,074,341	61,790,567	6,884
Acrylonitrile	15,182,383	1,032,266	5,442,217	46,537,679	4,477
Allyl alcohol	606,816	390,407	229,952	2,083,277	0
Allyl chloride	676,918	384,400	122,224	5,196,542	85
Aluminum (fume or dust)	16,406,505	1,856,716	5,967,550	131,824,600	1,546
Aluminum oxide (fibrous forms)	156,688	1,400,828	1,308,827	3,661,010	1
4-Aminoazobenzene	0	0	250	250	0
4-Aminobiphenyl	73,000	0	3	73,003	0
Ammonia	575,131,175	69,993,051	455,599,635	1,383,853,783	1,366,277
Ammonium nitrate (solution)	25,118,480	6,322,756	49,700,242	150,857,399	218,130
Ammonium sulfate (solution)	7,896,056	38,203,505	29,261,313	77,217,088	3,100
Aniline	2,844,826	2,164,070	1,783,054	21,628,202	40,844
o-Anisidine	3,858	6,818	2,637	13,633	0
p-Anisidine	1,040	33	55	1,128	0
Anthracene	7,561,977	135,950	569,044	12,272,595	12,578
Antimony	1,099,683	286,772	161,643	5,268,714	32
Antimony compounds	147,403	401,772	4,054,705	22,690,828	18,937
Arsenic	11,006	138,425	1,857,786	2,348,508	0
Arsenic compounds	338,342	655,364	4,106,260	11,335,468	40,407
Asbestos (friable)	776,955	1,951,539	4,949,097	8,395,583	374,618
Barium	66,039	12,779	966,414	1,137,580	552
Barium compounds	2,827,675	3,944,761	18,462,353	46,622,415	39,866
Benzal chloride	2,600	4,343	973	41,916	0
Benzene	29,725,777	1,434,236	13,390,673	145,101,986	122,584
Benzoic trichloride	290,001	0	6,070	296,071	0
Benzoyl chloride	856,743	386,002	14,308	1,257,053	0
Benzoyl peroxide	132,668	54,562	19,671	220,347	0
Benzyl chloride	349,757	36,033	45,254	707,884	9
Beryllium	631	0	37,213	63,402	0
Beryllium compounds	0	440	52,126	75,106	0
Biphenyl	2,103,926	890,790	1,258,180	6,976,630	34,165
Bis(2-chloroethyl) ether	239,288	57,333	13,798	1,199,590	400
Bis(chloromethyl) ether	21	0	310	331	0
Bis(2-chloro-1-methylethyl)ether	4,858,000	0	11,300	12,859,300	0
Bis(2-ethylhexyl) adipate	236,678	21,819	611,877	3,004,862	312
Bromochlorodifluoromethane (Halon 1211)	0	0	16,749	61,749	0
Bromoform	0	6,400	14,100	20,500	0
Bromomethane	89,045	0	3,005,194	3,582,339	0
Bromotrifluoromethane (Halon 1301)	100	0	110,445	168,545	0
1,3-Butadiene	49,305,988	264,217	4,046,531	453,627,237	137,163
Butyl acrylate	2,634,025	241,213	351,856	4,726,036	8,355
n-Butyl alcohol	24,190,929	3,754,351	32,300,656	152,896,118	116,654
sec-Butyl alcohol	1,443,516	94,302	710,251	16,970,329	313
tert-Butyl alcohol	1,165,448	2,414,214	2,606,556	76,907,238	670
Butyl benzyl phthalate	1,896,638	281,276	734,483	4,976,181	494
1,2-Butylene oxide	295,394	0	87,072	791,678	426
Butyraldehyde	1,201,586	251,961	624,770	3,238,895	60

Table 2-6. Quantities of TRI Chemicals in Waste, by Chemical, 1992 (Alphabetically Ordered), Continued.

CAS Number❻	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	723	0	0	0
989-38-8	C.I. Basic Red 1	0	0	0	309
2832-40-8	C.I. Disperse Yellow 3	0	0	0	0
81-88-9	C.I. Food Red 15	0	0	0	0
842-07-9	C.I. Solvent Yellow 14	0	0	0	0
7440-43-9	Cadmium	1,009,617	313,649	0	0
—	Cadmium compounds	10,801,005	1,700,327	0	3,193
156-62-7	Calcium cyanamide	0	0	0	0
133-06-2	Captan	1,335	0	0	0
63-25-2	Carbaryl	45,445	0	0	0
75-15-0	Carbon disulfide	18,175,987	1	5,594,160	139,047
56-23-5	Carbon tetrachloride	16,629,476	344,453	4,889,374	6,451
463-58-1	Carbonyl sulfide	0	0	1,985,780	0
120-80-9	Catechol	303,851	60	38,971,978	361,770
57-74-9	Chlordane	170	0	0	0
7782-50-5	Chlorine	108,182,213	633,929	77,480	23
10049-04-4	Chlorine dioxide	2,013,000	0	0	0
79-11-8	Chloroacetic acid	15,342	0	0	22
108-90-7	Chlorobenzene	5,167,071	849,499	1,060,070	831,098
75-00-3	Chloroethane	2,544,300	221,446	16,339,568	15,655
67-66-3	Chloroform	6,353,787	1,417,917	6,471,447	565,883
74-87-3	Chloromethane	445,437	7,000	4,521,171	31,993
107-30-2	Chloromethyl methyl ether	0	0	0	0
—	Chlorophenols	2,016,087	0	0	0
126-99-8	Chloroprene	85,380	1,384,120	53,826	19,200
1897-45-6	Chlorothalonil	2,516	1,750	0	0
7440-47-3	Chromium	19,957,024	76,535,146	0	335
—	Chromium compounds	43,448,554	34,129,168	9,410	101,881
7440-48-4	Cobalt	2,787,589	4,974,870	0	4,111
—	Cobalt compounds	741,749	1,703,799	0	10,908
7440-50-8	Copper	251,127,564	388,377,676	20,000	819
—	Copper compounds	185,313,401	126,262,362	0	52,758
8001-58-9	Creosote	14,440,400	6,100	2,000	114,746
120-71-8	p-Cresidine	0	0	6	0
1319-77-3	Cresol (mixed isomers)	1,009,054	102,197	2,993,404	355,670
108-39-4	m-Cresol	1,800,243	320,890	541,520	44,717
95-48-7	o-Cresol	64,520	0	441,000	29,959
106-44-5	p-Cresol	55,890	200,000	492,000	163,193
98-82-8	Cumene	308,360,195	64,499	4,925,583	706,018
80-15-9	Cumene hydroperoxide	25,000	0	0	125
135-20-6	Cupferron	0	0	0	0
—	Cyanide compounds	588,869	73,104	344,000	600
110-82-7	Cyclohexane	39,491,269	542,496	10,347,228	3,018,871
94-75-7	2,4-D (acetic acid)	88,061	0	0	0
1163-19-5	Decabromodiphenyl oxide	1,388,379	29,377	0	8,141
101-80-4	4,4'-Diaminodiphenyl ether	0	0	0	0
25376-45-8	Diaminotoluene (mixed isomers)	0	0	4,270,555	367,800
95-80-7	2,4-Diaminotoluene	0	0	0	0
132-64-9	Dibenzofuran	114,295	0	1,400	800
96-12-8	1,2-Dibromo-3-chloropropane	0	0	0	0
106-93-4	1,2-Dibromoethane	61	0	750	3,362
124-73-2	Dibromotetrafluoroethane (Halon 2402)	0	0	0	0
84-74-2	Dibutyl phthalate	81,080	445	234,702	143,982

Table 2-6, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
C.I. Basic Green 4	1,297	3,006	23,327	28,353	0
C.I. Basic Red 1	0	0	382	691	0
C.I. Disperse Yellow 3	1,088	1,041	1,231	3,360	0
C.I. Food Red 15	0	1,700	2	1,702	0
C.I. Solvent Yellow 14	0	0	0	0	0
Cadmium	131,868	48,199	153,619	1,656,952	985
Cadmium compounds	514,057	438,115	468,220	13,924,917	1,450
Calcium cyanamide	50,000	0	38,405	88,405	0
Captan	13,000	3,007	17,097	34,439	0
Carbaryl	432,942	9,916	37,436	525,739	0
Carbon disulfide	9,569,370	101,974	93,554,822	127,135,361	10,587
Carbon tetrachloride	15,007,086	833,039	1,426,570	39,136,449	83,930
Carbonyl sulfide	7,358,141	0	16,163,428	25,507,349	0
Catechol	29,836,026	204,568	363,130	70,041,383	245
Chlordane	10,000	720	1,700	12,590	0
Chlorine	249,878,302	908,902	71,168,030	430,848,879	35,581
Chlorine dioxide	31,908,704	84	3,112,849	37,034,637	966
Chloroacetic acid	979,519	657	16,746	1,012,286	1,566
Chlorobenzene	2,763,441	3,832,367	2,475,509	16,979,055	22,720
Chloroethane	22,750,982	172,186	2,758,993	44,803,130	126
Chloroform	21,854,747	1,612,837	17,802,805	56,079,423	46,723
Chloromethane	3,422,956	298,093	5,779,134	14,505,784	21,547
Chloromethyl methyl ether	34,858	0	1,301	36,159	0
Chlorophenols	162,557	4,843	146,232	2,329,719	150
Chloroprene	9,101,830	208,210	1,559,346	12,411,912	10,177
Chlorothalonil	16,600	2,925	181,152	204,943	6
Chromium	1,551,068	1,394,122	5,395,166	104,832,861	188,015
Chromium compounds	54,314,995	3,322,787	35,745,584	171,072,379	1,272,980
Cobalt	118,685	24,190	128,158	8,037,603	1
Cobalt compounds	725,114	84,755	557,487	3,823,812	186
Copper	3,865,763	2,234,533	29,512,497	675,138,852	491,213
Copper compounds	141,946,469	2,419,471	46,462,501	502,456,962	930,700
Creosote	327,654	510,461	2,153,138	17,554,499	77,840
p-Cresidine	1,009	23,780	6,725	31,520	2
Cresol (mixed isomers)	7,784,616	177,280	960,567	13,382,788	16,504
m-Cresol	21,580	26,196	566,861	3,322,007	260
o-Cresol	15,456	37,540	541,166	1,129,641	6,400
p-Cresol	35,348	693,382	305,048	1,944,861	420
Cumene	2,535,561	83,887	3,715,939	320,391,682	12,065
Cumene hydroperoxide	544,937	2,092	360,020	932,174	180
Cupferron	0	69	10	79	0
Cyanide compounds	9,197,904	464,501	4,241,284	14,910,262	366
Cyclohexane	26,288,355	966,582	14,061,768	94,716,569	23,347
2,4-D (acetic acid)	28,935	26,466	57,207	200,669	4,353
Decabromodiphenyl oxide	16,102	250,077	1,157,192	2,849,268	584
4,4'-Diaminodiphenyl ether	1,200	21,115	1,768	24,083	0
Diaminotoluene (mixed isomers)	564,736	464,052	29,760	5,696,903	82
2,4-Diaminotoluene	0	10,388	1,941	12,329	0
Dibenzofuran	5,000,652	3,700	96,995	5,217,842	348
1,2-Dibromo-3-chloropropane	0	0	294	294	0
1,2-Dibromoethane	34,972	65,218	36,874	141,237	0
Dibromotetrafluoroethane (Halon 2402)	0	0	0	0	0
Dibutyl phthalate	174,762	126,309	342,347	1,103,627	36

Table 2-6. Quantities of TRI Chemicals in Waste, by Chemical, 1992 (Alphabetically Ordered), Continued.

CAS Number❻	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
25321-22-6	Dichlorobenzene (mixed isomers)	0	0	236,220	88
95-50-1	1,2-Dichlorobenzene	3,290,581	820,977	165,232	659,100
541-73-1	1,3-Dichlorobenzene	8,613	950	68,000	0
106-46-7	1,4-Dichlorobenzene	757,285	3	85,520	0
91-94-1	3,3'-Dichlorobenzidine	0	0	0	430
75-27-4	Dichlorobromomethane	0	0	0	0
75-71-8	Dichlorodifluoromethane (CFC-12)	882,277	368,177	114	2,007
107-06-2	1,2-Dichloroethane	126,527,252	19,128,820	33,659,857	68,802
540-59-0	1,2-Dichloroethylene	2,568,000	2,330	1,378,993	0
75-09-2	Dichloromethane	121,863,677	26,109,091	11,832,816	3,247,710
120-83-2	2,4-Dichlorophenol	1,008	0	0	0
78-87-5	1,2-Dichloropropane	46,537,442	0	16,800,000	0
78-88-6	2,3-Dichloropropene	2,700,000	0	900,000	0
542-75-6	1,3-Dichloropropylene	3,871,000	0	13,340,000	0
76-14-2	Dichlorotetrafluoroethane (CFC-114)	823,600	521	0	0
62-73-7	Dichlorvos	0	0	92	0
115-32-2	Dicofol	34	0	0	0
111-42-2	Diethanolamine	62,427	227,653	53,864	29,284
117-81-7	Di-(2-ethylhexyl) phthalate	3,718,731	3,393,958	431,445	278,527
84-66-2	Diethyl phthalate	590,320	297,764	191,500	57,626
64-67-5	Diethyl sulfate	0	5,000,000	0	2,731
119-90-4	3,3'-Dimethoxybenzidine	0	0	0	0
57-14-7	1,1-Dimethyl hydrazine	0	20	0	0
105-67-9	2,4-Dimethylphenol	220,361	13,455	293,474	72,190
131-11-3	Dimethyl phthalate	12,712	0	361,940	67,702
77-78-1	Dimethyl sulfate	0	48,266	0	0
99-65-0	m-Dinitrobenzene	0	0	3,000	0
528-29-0	o-Dinitrobenzene	0	0	0	0
100-25-4	p-Dinitrobenzene	0	0	0	0
534-52-1	4,6-Dinitro-o-cresol	0	0	395,000	210
51-28-5	2,4-Dinitrophenol	0	0	660,002	0
121-14-2	2,4-Dinitrotoluene	0	0	18,000	0
606-20-2	2,6-Dinitrotoluene	0	0	0	0
25321-14-6	Dinitrotoluene (mixed isomers)	0	0	0	300
123-91-1	1,4-Dioxane	1,467,085	37,442	915,763	531,129
106-89-8	Epichlorohydrin	4,383,879	0	3,551,833	40,961
110-80-5	2-Ethoxyethanol	334,101	3,731	688,981	216,633
140-88-5	Ethyl acrylate	820	42,720	5,891,017	1,226,419
100-41-4	Ethylbenzene	20,982,288	3,340,218	40,936,634	9,084,334
541-41-3	Ethyl chloroformate	0	0	0	0
74-85-1	Ethylene	197,286,622	0	431,313,198	66,480,431
107-21-1	Ethylene glycol	345,926,377	102,553,538	6,337,919	7,264,756
151-56-4	Ethyleneimine	0	0	0	0
75-21-8	Ethylene oxide	286,701	0	86,000	0
96-45-7	Ethylene thiourea	0	0	0	1,764
2164-17-2	Fluometuron	0	0	0	0
50-00-0	Formaldehyde	169,263,509	99,101	10,551,830	242,614
76-13-1	Freon 113	28,660,893	5,177,481	4,776	333,448
—	Glycol ethers	15,419,302	3,395,663	17,950,349	12,018,285
76-44-8	Heptachlor	0	0	0	0
118-74-1	Hexachlorobenzene	316,600	1	162,000	0
87-68-3	Hexachloro-1,3-butadiene	1,124,000	0	0	0
77-47-4	Hexachlorocyclopentadiene	0	0	0	900

Table 2-6, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
Dichlorobenzene (mixed isomers)	396,826	224	3,842	637,200	0
1,2-Dichlorobenzene	2,976,118	3,084,228	482,566	11,478,802	130,708
1,3-Dichlorobenzene	10	4,718	5,022	87,313	0
1,4-Dichlorobenzene	1,698	134,374	351,236	1,330,116	1,118
3,3'-Dichlorobenzidine	5,722	16,035	5,700	27,887	0
Dichlorobromomethane	1	0	194	195	0
Dichlorodifluoromethane (CFC-12)	389,728	166,675	11,359,695	13,168,673	211,980
1,2-Dichloroethane	37,493,307	1,808,161	3,127,466	221,813,665	47,278
1,2-Dichloroethylene	4,697,043	410	23,222	8,669,998	33
Dichloromethane	35,365,596	12,445,135	75,729,079	286,593,104	56,850
2,4-Dichlorophenol	96,641	0	10,312	107,961	2,765
1,2-Dichloropropane	4,383,358	1,294	620,279	68,342,373	0
2,3-Dichloropropene	438,000	530,000	160,756	4,728,756	0
1,3-Dichloropropylene	440,267	2,810	41,720	17,695,797	0
Dichlorotetrafluoroethane (CFC-114)	240,000	8,277	1,080,021	2,152,419	6,633
Dichlorvos	940	2,135	1,455	4,622	0
Dicofol	0	370	209	613	0
Diethanolamine	2,011,464	890,307	1,561,157	4,836,156	3,301
Di-(2-ethylhexyl) phthalate	516,795	194,289	2,131,979	10,665,724	5,776
Diethyl phthalate	183,280	478,194	161,598	1,960,282	0
Diethyl sulfate	5,353	1,134	3,706	5,012,924	0
3,3'-Dimethoxybenzidine	79	0	8	87	0
1,1-Dimethyl hydrazine	9,806	7,000	251	17,077	2
2,4-Dimethylphenol	106,359	10,415	135,578	851,832	0
Dimethyl phthalate	283,970	120,114	85,416	931,854	0
Dimethyl sulfate	1,067,258	10	6,026	1,121,560	4
m-Dinitrobenzene	850,000	0	1,241	854,241	0
o-Dinitrobenzene	224,243	0	157	224,400	0
p-Dinitrobenzene	30,000	0	130	30,130	0
4,6-Dinitro-o-cresol	65,080	6,825	5,648	472,763	1
2,4-Dinitrophenol	81,700	10	45,964	787,676	0
2,4-Dinitrotoluene	87,987	0	1,863	107,850	6
2,6-Dinitrotoluene	62,874	0	549	63,423	2
Dinitrotoluene (mixed isomers)	181,404	698,410	66,431	946,545	8,490
1,4-Dioxane	1,017,103	681,073	1,134,027	5,783,622	35,274
Epichlorohydrin	9,191,403	887,636	525,985	18,581,697	1,866
2-Ethoxyethanol	518,498	463,098	377,400	2,602,442	34,810
Ethyl acrylate	915,187	125,782	221,369	8,423,314	3,726
Ethylbenzene	9,987,555	1,350,020	10,857,715	96,538,764	204,372
Ethyl chloroformate	127,424	0	1,953	129,377	1
Ethylene	449,198,814	92,714	35,854,137	1,180,225,916	687,169
Ethylene glycol	54,514,498	24,438,011	20,109,179	561,144,278	198,170
Ethyleneimine	0	0	0	0	0
Ethylene oxide	6,345,506	48,147	1,435,389	8,201,743	19,237
Ethylene thiourea	18	282	12,919	14,983	0
Fluometuron	0	8,220	2,808	11,028	0
Formaldehyde	95,456,352	6,143,347	16,913,837	298,670,590	29,434
Freon 113	230,231,075	1,348,284	23,906,231	289,662,188	20,170
Glycol ethers	21,160,629	11,587,825	49,847,660	131,379,713	204,006
Heptachlor	14,000	94,000	210	108,210	0
Hexachlorobenzene	3,541,588	46,342	50,210	4,116,741	1,905
Hexachloro-1,3-butadiene	7,761,458	14,186	6,534	8,906,178	540,364
Hexachlorocyclopentadiene	250,000	34,392	10,915	296,207	230

Table 2-6, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
Hexachloroethane	2,652,495	10,002	32,183	3,232,680	120,205
Hydrazine	10,264	132,698	25,608	168,820	290
Hydrazine sulfate	0	0	120,002	120,002	0
Hydrochloric acid	1,911,186,194	75,462,680	298,900,276	2,475,552,419	221,897
Hydrogen cyanide	10,791,230	309	3,123,903	37,573,237	1,152
Hydrogen fluoride	106,911,337	2,442,231	10,860,641	243,107,876	11,428
Hydroquinone	342,279	181,552	285,943	1,169,940	62
Isobutyraldehyde	246,311	38,274	406,607	6,168,559	0
Isopropyl alcohol (manufacturing)	15,733	141,341	1,222,666	4,822,449	0
4,4'-Isopropylidenediphenol	2,803,693	87,028	817,736	10,290,693	325
Lead	1,848,061	1,418,757	5,880,827	260,778,713	61,729
Lead compounds	34,392,942	3,788,206	26,999,354	1,107,360,694	1,287,095
Lindane	1,250	191	427	2,440	0
Maleic anhydride	33,328,347	621,104	460,619	36,880,348	87,141
Maneb	0	6	13,980	14,364	0
Manganese	851,050	946,165	20,320,149	92,712,389	48,056
Manganese compounds	376,756	5,337,587	75,565,406	237,882,578	11,393
Mercury	30,994	13,759	45,054	1,705,168	0
Mercury compounds	48	9,406	188,996	338,898	344
Methanol	953,847,754	135,191,045	259,001,005	2,238,505,652	639,753
Methoxychlor	0	253	178	431	0
2-Methoxyethanol	7,203,001	1,087,880	1,817,780	17,941,981	168
Methyl acrylate	1,961,993	42,433	270,844	3,080,550	824
Methyl tert-butyl ether	2,932,191	153,761	2,903,712	7,106,790	1,887
4,4'-Methylenebis(2-chloroaniline)	10	2,439	33,233	38,346	0
Methylenebis(phenylisocyanate)	239,022	664,888	2,040,760	3,633,780	24,923
Methylene bromide	96,754	3,831	37,612	2,738,197	0
4,4'-Methylenedianiline	35,943	86,221	26,608	234,442	55
Methyl ethyl ketone	50,463,297	6,274,738	88,491,478	465,413,844	121,088
Methyl hydrazine	0	0	1	1	0
Methyl iodide	43,873	0	34,230	79,303	0
Methyl isobutyl ketone	10,747,535	2,049,489	25,840,592	350,963,788	27,958
Methyl isocyanate	159,584	0	7,654	167,238	1
Methyl methacrylate	2,927,962	1,048,973	2,823,047	13,704,586	11,016
Molybdenum trioxide	1,165,373	119,935	720,580	10,315,038	174
Monochloropentafluoroethane (CFC-115)	19,000	130	419,169	491,599	900
Naphthalene	29,294,847	518,154	3,922,572	60,045,613	163,227
alpha-Naphthylamine	0	0	2	2	0
Nickel	1,925,038	1,102,546	6,051,436	87,495,571	6,611
Nickel compounds	1,044,151	1,513,795	4,293,605	63,460,089	2,173,457
Nitric acid	221,787,298	15,390,236	29,559,498	310,850,709	56,138
Nitrilotriacetic acid	791,761	8,556	6,773	807,090	0
5-Nitro-o-anisidine	43	2	39	84	0
Nitrobenzene	401,120	447,834	916,765	5,262,783	338
Nitroglycerin	375,208	70,314	41,802	507,407	0
2-Nitrophenol	10,367	429	47	24,170	0
4-Nitrophenol	119,475	620,133	2,530	742,718	99,000
2-Nitropropane	23,679	962	173,791	1,072,782	0
p-Nitrosodiphenylamine	0	0	4,924	28,424	0
N,N-Dimethylaniline	2,288	294,811	86,805	1,380,283	10
N-Nitrosodiphenylamine	0	500,000	0	500,000	0
Parathion	301	0	482	783	0
Pentachlorophenol	45,470	26,195	101,020	330,398	3,706

Table 2-6. Quantities of TRI Chemicals in Waste, by Chemical, 1992 (Alphabetically Ordered), Continued.

CAS Number❻	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
79-21-0	Peracetic acid	21,060	0	0	0
108-95-2	Phenol	30,576,995	770,875	18,210,523	2,631,184
106-50-3	p-Phenylenediamine	0	0	0	0
90-43-7	2-Phenylphenol	99	0	85	171
75-44-5	Phosgene	0	0	615,410	0
7664-38-2	Phosphoric acid	81,547,444	9,375,372	7,000	1,898
7723-14-0	Phosphorus (yellow or white)	661,058	214,794	0	0
85-44-9	Phthalic anhydride	726,821	1,080	1,581,851	3,650,357
88-89-1	Picric acid	0	0	579,002	35
—	Polybrominated biphenyls	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	0	18,920	0	0
1120-71-4	Propane sultone	0	0	0	0
123-38-6	Propionaldehyde	0	0	3,099,998	14,248
114-26-1	Propoxur	0	0	0	0
115-07-1	Propylene	343,447,371	0	642,776,137	101,936,982
75-55-8	Propyleneimine	0	0	0	0
75-56-9	Propylene oxide	13,854	880	5,309,500	567,596
110-86-1	Pyridine	4,738,597	0	797,701	522,737
91-22-5	Quinoline	3,390	0	250,300	210
106-51-4	Quinone	0	0	10,908	0
82-68-8	Quintozene	795	170,000	0	373
81-07-2	Saccharin (manufacturing)	0	0	0	0
7782-49-2	Selenium	20	38,463	0	0
—	Selenium compounds	172,795	300,238	0	1,300
7440-22-4	Silver	423,587	998,942	0	0
—	Silver compounds	267,784	1,364,917	0	0
100-42-5	Styrene	172,963,215	1,201,190	25,365,085	8,436,379
96-09-3	Styrene oxide	2,210	0	60,000	0
7664-93-9	Sulfuric acid	5,747,645,488	1,320,807,382	62,612	40,816
79-34-5	1,1,2,2-Tetrachloroethane	13,081,938	1,446,254	53,600	0
127-18-4	Tetrachloroethylene	81,782,280	10,259,945	9,655,330	560,816
961-11-5	Tetrachlorvinphos	73,000	0	110	0
—	Thallium compounds	2,200	76,000	0	0
62-56-6	Thiourea	0	0	0	0
1314-20-1	Thorium dioxide	0	0	0	0
7550-45-0	Titanium tetrachloride	0	0	0	0
108-88-3	Toluene	627,080,929	27,395,427	255,986,447	82,041,437
584-84-9	Toluene-2,4-diisocyanate	724	9,060	37,941	720
91-08-7	Toluene-2,6-diisocyanate	57	1,800	13,435	48
26471-62-5	Toluenediisocyanate (mixed isomers)	18,584	9,400	6,100,000	24,788
95-53-4	o-Toluidine	1,568,201	0	148,720	232,750
52-68-6	Trichlorfon	80	0	0	0
120-82-1	1,2,4-Trichlorobenzene	65,263	153,070	47,000	72,654
71-55-6	1,1,1-Trichloroethane	171,223,961	23,721,150	6,457,400	3,060,231
79-00-5	1,1,2-Trichloroethane	22,481,495	8,905,724	16,481,220	0
79-01-6	Trichloroethylene	225,757,972	8,109,967	1,421,546	884,498
75-69-4	Trichlorofluoromethane (CFC-11)	55,415,768	365,441	210,000	363,340
95-95-4	2,4,5-Trichlorophenol	0	0	0	0
88-06-2	2,4,6-Trichlorophenol	0	0	0	0
1582-09-8	Trifluralin	1,270	0	11,000	5
95-63-6	1,2,4-Trimethylbenzene	9,274,818	464,335	3,312,356	2,242,051
51-79-6	Urethane	0	0	0	0

Table 2-6, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
Peracetic acid	27,220	6,949	7,840	63,069	0
Phenol	102,456,730	6,065,012	15,654,693	176,366,012	39,447
p-Phenylenediamine	214,593	9,258	9,426	233,277	0
2-Phenylphenol	236,486	2,952	25,913	265,706	0
Phosgene	8,959,191	1,005	5,219	9,580,825	46
Phosphoric acid	389,135,391	5,248,000	196,807,410	682,122,515	12,122,137
Phosphorus (yellow or white)	40,545	2,106	359,033	1,277,536	34,382
Phthalic anhydride	25,672,226	353,698	927,214	32,913,247	30,702
Picric acid	2,200	0	1,068,681	1,649,918	0
Polybrominated biphenyls	0	0	500	500	0
Polychlorinated biphenyls (PCBs)	0	776,473	48,499	843,892	38,668
Propane sultone	0	0	120	120	0
Propionaldehyde	376,686	12,902	752,998	4,256,832	0
Propoxur	1	860	100	961	0
Propylene	505,338,217	580,279	21,295,605	1,615,374,591	183,465
Propyleneimine	0	0	398	398	0
Propylene oxide	9,025,126	30,818	1,425,929	16,373,703	989
Pyridine	1,209,072	399,206	665,418	8,332,731	2,307
Quinoline	133,226	5,057	98,177	490,360	91
Quinone	310	0	24,029	35,247	0
Quintozene	0	2,523	1,742	175,433	1,800
Saccharin (manufacturing)	9,000	9,559	1,429	19,988	0
Selenium	500	504	4,477	43,964	0
Selenium compounds	93,700	24,517	166,384	758,934	10,003
Silver	229,148	996	16,745	1,669,418	0
Silver compounds	2,652,109	6,154	63,392	4,354,356	185
Styrene	11,447,521	3,479,761	33,687,236	256,580,387	106,470
Styrene oxide	28,481	0	329	91,020	3
Sulfuric acid	2,938,612,362	74,779,970	187,976,508	10,269,925,138	3,522,137
1,1,2,2-Tetrachloroethane	10,509,865	65,260	56,561	25,213,478	0
Tetrachloroethylene	15,421,358	1,963,634	12,552,614	132,195,977	237,639
Tetrachlorvinphos	0	134,675	105,320	313,105	0
Thallium compounds	0	4,205	1,170	83,575	0
Thiourea	12,136	5,689	23,491	41,316	0
Thorium dioxide	0	10	64,000	64,010	0
Titanium tetrachloride	36,394,611	3,267,833	153,747	39,816,191	1,798
Toluene	125,358,145	18,618,495	186,681,857	1,323,162,737	479,129
Toluene-2,4-diisocyanate	12,819	42,222	13,189	116,675	391
Toluene-2,6-diisocyanate	2,985	6,934	2,874	28,133	25
Toluenediisocyanate (mixed isomers)	59,790	189,148	51,305	6,453,015	44,240
o-Toluidine	145,271	13,558	45,829	2,154,329	0
Trichlorfon	214	3,251	116	3,661	5
1,2,4-Trichlorobenzene	301,462	1,675,809	513,864	2,829,122	50
1,1,1-Trichloroethane	1,653,692	4,310,414	112,587,880	323,014,728	103,973
1,1,2-Trichloroethane	20,994,148	3,305,959	567,677	72,736,223	40
Trichloroethylene	5,675,129	1,881,112	28,162,324	271,892,548	71,831
Trichlorofluoromethane (CFC-11)	272,158	421,115	9,647,521	66,695,343	18,832
2,4,5-Trichlorophenol	0	0	0	0	0
2,4,6-Trichlorophenol	800,103	0	86	800,189	0
Trifluralin	1,530	45,318	36,718	95,841	0
1,2,4-Trimethylbenzene	23,550,500	306,682	6,042,898	45,193,640	180,165
Urethane	0	11,100	6,486	17,586	0

Table 2-6. Quantities of TRI Chemicals in Waste, by Chemical, 1992 (Alphabetically Ordered), Continued.

CAS Number❻	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds
7440-62-2	Vanadium (fume or dust)	268,000	92	0	0
108-05-4	Vinyl acetate	199,260	1,194,298	12,485,776	5,893,355
593-60-2	Vinyl bromide	0	0	0	0
75-01-4	Vinyl chloride	176,010,819	157,091	17,762,336	3,821
75-35-4	Vinylidene chloride	430,056	0	280,250	0
1330-20-7	Xylene (mixed isomers)	113,109,364	36,346,209	174,899,155	63,988,345
108-38-3	m-Xylene	1,749,357	23,148	364,366	84,074
95-47-6	o-Xylene	2,760,363	135,412	47,328,889	2,332,979
106-42-3	p-Xylene	1,389,350	485	167,563	53,417
87-62-7	2,6-Xylidine	0	0	0	0
7440-66-6	Zinc (fume or dust)	15,173,904	68,698,262	0	77,054
—	Zinc compounds	94,205,877	218,896,007	16,501	256,398
	Mixtures and other trade names	0	440,667	4,979,069	32,185
	Trade secret chemicals	1,147	68,000	451,000	23,000
	Total	15,884,194,888	3,473,894,509	2,941,222,113	627,954,600

Table 2-6, Cont.

Chemical	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released/ Disposed Of Pounds	Total Production Related Wastes Pounds	Non-Production Related Wastes Pounds
Vanadium (fume or dust)	426,236	830	45,379	740,537	2
Vinyl acetate	11,653,496	962,567	7,155,692	39,544,444	8,047
Vinyl bromide	96,000	0	33,300	129,300	0
Vinyl chloride	27,389,458	22,397	1,086,384	222,432,306	54,340
Vinylidene chloride	5,815,247	104,552	242,823	6,872,928	1,067
Xylene (mixed isomers)	43,449,368	9,310,790	108,789,871	549,893,102	661,016
m-Xylene	203,017	124,991	1,348,989	3,897,942	9,450
o-Xylene	845,934	92,671	2,068,548	55,564,796	981
p-Xylene	138,867	71,672	3,985,990	5,807,344	16,956
2,6-Xylidine	1,458	0	50	1,508	0
Zinc (fume or dust)	1,194,724	2,632,606	15,854,563	103,631,113	777,619
Zinc compounds	15,196,176	21,109,269	120,490,959	470,171,187	1,374,675
Mixtures and other trade names	72,894	1,762,733	1,694,943	8,982,491	87,879
Trade secret chemicals	131,064	14,000	4,110	692,321	20,000
Total	10,326,749,494	678,373,850	3,401,386,170	37,333,775,624	33,969,823

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

Table 2-7. Top 25 Chemicals Reported as Recycled, 1992.

CAS Number	Chemical	Recycled On-site Pounds	Recycled Off-site Pounds	Total Recycled Pounds
7664-93-9	Sulfuric acid	5,747,645,488	1,320,807,382	7,068,452,870
75-05-8	Acetonitrile	2,508,586,088	2,880,190	2,511,466,278
	Lead compounds	624,622,931	417,515,419	1,042,138,350
108-88-3	Toluene	627,080,929	27,395,427	654,476,356
7440-50-8	Copper	251,127,564	388,377,676	639,505,240
67-56-1	Methanol	476,357,827	14,418,924	490,776,751
107-21-1	Ethylene glycol	345,926,377	102,553,538	448,479,915
115-07-1	Propylene	343,447,371	0	343,447,371
106-99-0	1,3-Butadiene	293,902,741	28,850,854	322,753,595
	Zinc compounds	94,205,877	218,896,007	313,101,884
	Copper compounds	185,313,401	126,262,362	311,575,763
98-82-8	Cumene	308,360,195	64,499	308,424,694
7439-92-1	Lead	214,479,454	34,138,441	248,617,895
108-10-1	Methyl isobutyl ketone	223,939,338	19,724,864	243,664,202
79-01-6	Trichloroethylene	225,757,972	8,109,967	233,867,939
67-64-1	Acetone	213,067,646	18,005,963	231,073,609
7664-41-7	Ammonia	211,456,668	18,117,158	229,573,826
74-85-1	Ethylene	197,286,622	0	197,286,622
78-93-3	Methyl ethyl ketone	169,763,949	26,505,126	196,269,075
71-55-6	1,1,1-Trichloroethane	171,223,961	23,721,150	194,945,111
7647-01-0	Hydrochloric acid	125,740,840	64,204,456	189,945,296
75-01-4	Vinyl chloride	176,010,819	157,091	176,167,910
100-42-5	Styrene	172,963,215	1,201,190	174,164,405
50-00-0	Formaldehyde	169,263,509	99,101	169,362,610
	Manganese compounds	119,240,927	37,333,722	156,574,649
	Subtotal	14,196,771,709	2,899,340,507	17,096,112,216
	Total for All TRI Chemicals	15,884,194,888	3,473,894,509	19,358,089,397

Table 2-8. Top 25 Chemicals Reported as Used for Energy Recovery, 1992.

CAS Number	Chemical	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds	Total Energy Recovery Pounds
115-07-1	Propylene	642,776,137	101,936,982	744,713,119
74-85-1	Ethylene	431,313,198	66,480,431	497,793,629
67-56-1	Methanol	329,376,147	70,312,950	399,689,097
108-88-3	Toluene	255,986,447	82,041,437	338,027,884
1330-20-7	Xylene (mixed isomers)	174,899,155	63,988,345	238,887,500
67-64-1	Acetone	133,281,260	40,177,385	173,458,645
78-93-3	Methyl ethyl ketone	84,226,588	39,688,668	123,915,256
106-99-0	1,3-Butadiene	77,191,067	65,839	77,256,906
75-65-0	tert-Butyl alcohol	42,924,000	27,760,077	70,684,077
108-10-1	Methyl isobutyl ketone	51,018,601	17,643,369	68,661,970
7664-41-7	Ammonia	53,293,518	262,578	53,556,096
100-41-4	Ethylbenzene	40,936,634	9,084,334	50,020,968
95-47-6	o-Xylene	47,328,889	2,332,979	49,661,868
71-43-2	Benzene	36,703,579	4,347,690	41,051,269
120-80-9	Catechol	38,971,978	361,770	39,333,748
71-36-3	n-Butyl alcohol	25,590,867	8,935,952	34,526,819
75-05-8	Acetonitrile	29,839,722	4,346,283	34,186,005
100-42-5	Styrene	25,365,085	8,436,379	33,801,464
107-06-2	1,2-Dichloroethane	33,659,857	68,802	33,728,659
	Glycol ethers	17,950,349	12,018,285	29,968,634
74-90-8	Hydrogen cyanide	23,305,069	168,014	23,473,083
108-95-2	Phenol	18,210,523	2,631,184	20,841,707
108-05-4	Vinyl acetate	12,485,776	5,893,355	18,379,131
79-10-7	Acrylic acid	13,986,624	4,189,944	18,176,568
75-01-4	Vinyl chloride	17,762,336	3,821	17,766,157
	Subtotal	2,658,383,406	573,176,853	3,231,560,259
	Total for All TRI Chemicals	2,941,222,113	627,954,600	3,569,176,713

Table 2-9. Top 25 Chemicals Reported as Treated, 1992.

CAS Number	Chemical	Treated On-site Pounds	Treated Off-site Pounds	Total Treated Pounds
7664-93-9	Sulfuric acid	2,938,612,362	74,779,970	3,013,392,332
7647-01-0	Hydrochloric acid	1,911,186,194	75,462,680	1,986,648,874
67-56-1	Methanol	953,847,754	135,191,045	1,089,038,799
7664-41-7	Ammonia	575,131,175	69,993,051	645,124,226
115-07-1	Propylene	505,338,217	580,279	505,918,496
74-85-1	Ethylene	449,198,814	92,714	449,291,528
7664-38-2	Phosphoric acid	389,135,391	5,248,000	394,383,391
7782-50-5	Chlorine	249,878,302	908,902	250,787,204
76-13-1	Freon 113	230,231,075	1,348,284	231,579,359
7697-37-2	Nitric acid	221,787,298	15,390,236	237,177,534
	Copper compounds	141,946,469	2,419,471	144,365,940
108-88-3	Toluene	125,358,145	18,618,495	143,976,640
7664-39-3	Hydrogen fluoride	106,911,337	2,442,231	109,353,568
67-64-1	Acetone	105,711,876	22,784,463	128,496,339
108-95-2	Phenol	102,456,730	6,065,012	108,521,742
50-00-0	Formaldehyde	95,456,352	6,143,347	101,599,699
107-21-1	Ethylene glycol	54,514,498	24,438,011	78,952,509
	Chromium compounds	54,314,995	3,322,787	57,637,782
78-93-3	Methyl ethyl ketone	50,463,297	6,274,738	56,738,035
106-99-0	1,3-Butadiene	49,305,988	264,217	49,570,205
1330-20-7	Xylene (mixed isomers)	43,449,368	9,310,790	52,760,158
107-06-2	1,2-Dichloroethane	37,493,307	1,808,161	39,301,468
79-10-7	Acrylic acid	36,821,655	209,644	37,031,299
7550-45-0	Titanium tetrachloride	36,394,611	3,267,833	39,662,444
75-09-2	Dichloromethane	35,365,596	12,445,135	47,810,731
	Subtotal	9,500,310,806	498,809,496	9,999,120,302
	Total for All TRI Chemicals	10,326,749,494	678,373,850	11,005,123,344

Table 2-10. Top 25 Chemicals Reported as Released (Includes Off-site Disposal), 1992.

CAS Number	Chemical	Quantity Released/Disposed Of Pounds
7664-41-7	Ammonia	455,599,635
7647-01-0	Hydrochloric acid	298,900,276
67-56-1	Methanol	259,001,005
7664-38-2	Phosphoric acid	196,807,410
7664-93-9	Sulfuric acid	187,976,508
108-88-3	Toluene	186,681,857
67-64-1	Acetone	139,039,676
	Zinc compounds	120,490,959
71-55-6	1,1,1-Trichloroethane	112,587,880
1330-20-7	Xylene (mixed isomers)	108,789,871
75-15-0	Carbon disulfide	93,554,822
78-93-3	Methyl ethyl ketone	88,491,478
75-09-2	Dichloromethane	75,729,079
	Manganese compounds	75,565,406
7782-50-5	Chlorine	71,168,030
	Glycol ethers	49,847,660
6484-52-2	Ammonium nitrate (solution)	49,700,242
	Copper compounds	46,462,501
74-85-1	Ethylene	35,854,137
	Chromium compounds	35,745,584
100-42-5	Styrene	33,687,236
71-36-3	n-Butyl alcohol	32,300,656
7697-37-2	Nitric acid	29,559,498
7440-50-8	Copper	29,512,497
7783-20-2	Ammonium sulfate (solution)	29,261,313
	Subtotal	2,842,315,216
	Total for All TRI Chemicals	3,401,386,170

RELATIONSHIP OF THIS WASTE MANAGEMENT INFORMATION TO THE RELEASE AND TRANSFER DATA

While it may appear that different information is reported in several sections of the TRI reporting form, much of the information collected on waste management is an aggregation of information that is collected on releases to the environment and transfers off-site. It may be helpful to look at the TRI reporting form (Form R) in Appendix F to better understand how the release and transfer data relate to the waste management information. Releases of toxic chemicals to the environment on-site are reported in Section 5 of the form. Off-site transfers of toxic chemicals are reported in Section 6, and on- and off-site management of toxic chemicals in wastes is reported in Section 8.

Facilities estimate total releases of the toxic chemical to air, land, and water in Section 5 of Form R. The estimates include releases that are routine to production operations as well as those that are non-routine, such as releases due to catastrophic events like the collapse of a tank due to a tornado or remedial actions like the clean-up of contaminated soil. In Section 6, facilities estimate the total amounts of the toxic chemical transferred to POTWs or to other off-site locations for the purposes of recycling, energy recovery, treatment, or disposal. Again, the estimates would include quantities from routine production operations as well as non-routine events. The information reported in Sections 5 and 6 forms the basis for much of the information in Section 8, but is aggregated in different ways.

Quantities of the toxic chemical released to the environment or transferred off-site in waste for management "as a result of remedial actions, catastrophic events, or one-time events not associated with production processes" are aggregated and reported in Section 8 (8.8). If a facility reports a quantity in this section, then the release and transfer data in Sections 5 and 6 will not directly match the release and transfer data in Section 8. However, if a facility does not report a quantity in this section, the release and transfer data in Sections 5 and 6 should match the release and transfer data in Section 8.

ISSUES ASSOCIATED WITH THE WASTE MANAGEMENT INFORMATION REPORTED FOR 1992

Examination of the data reported for 1992 indicates that many facilities are reporting inconsistent data in the separate sections of Form R. To help address the continuing need for guidance from EPA for reporting these data, and to resolve many outstanding issues, EPA initiated a public dialogue process in early 1993. In this process, members of environmental groups, industry, states, and academia were brought together to discuss the issues associated with reporting the information required by the PPA and to provide EPA with advice and recommendations for resolving them. EPA provided some guidance for reducing discrepancies in data reported in separate sections of Form R during the 1993 reporting year and anticipates promulgation of final guidance for the data required by the PPA by early 1995.

Correlating Information in Different Sections of Form R

Through comparisons of the information presented in this chapter and the information provided in Chapter 1, it is evident that similar information reported in different sections of Form R is not always consistent. In some cases, information on quantities of the toxic chemicals transferred off-site (reported in Section 6) does not match with the information on waste management (reported in Section 8). Some facilities have reported quantities as sent off-site, but did not provide a code indicating the waste management activity to which the quantity was subject (recycle, energy recovery, treatment, or disposal). Some facilities reported quantities sent off-site, but provided codes that are not in the instructions for completing Form R; those codes cannot be assigned to any particular off-site activity and, along with the quantities that have no codes, are considered as "other" off-site activities.

Even with the use of valid codes, however, some discrepancies still exist. These are shown in Table 2-11. EPA believes that these discrepancies are primarily a problem in relating the data reported in different sections of Form R and that this problem will be reduced over time. Comparing 1991 and 1992 data, facilities appear to be improving the quality of the data reported as the gap between the quantities reported in different sections of Form R is narrowing. It must be realized, however, that quantities reported in Section 8 and those reported in Sections 5 and 6 cannot always correlate if non-production related wastes are reported in Section 8. When reported, non-production related wastes quantities are included in the amounts reported in Sections 5 and 6, but as discussed previously, those quantities are reported separately in Section 8.

Understanding What Specific Elements Mean

Quantities recycled. The largest discrepancy in the information provided in Form R is the difference between what is reported as recycled off-site in Section 8 and what is reported as sent off-site for recycling in Section 6. This discrepancy, about 634 million pounds, may be due to factors beyond just relating the data reported in different sections of Form R. Facilities may have interpreted what was to be reported as recycled off-site in Section 8 differently from what was to be reported as sent off-site as a transfer in wastes (Section 6). When reporting off-site transfers for the purposes of recycling, some facilities believe that what is to be reported in Section 8 is inherently different from what is to be reported in Section 6. They view off-site recycling reported in Section 6 as the recycling of the toxic chemical in wastes, while off-site recycling reported in Section 8 is viewed more broadly so as to include recycling of toxic chemicals in materials that are not considered wastes by the facility. For example, a facility ships silver residuals off-site to a jewelry manufacturer and reports the transfer in Section 8 but not in Section 6. The facility considers the silver recycled off-site, but does not consider the silver to be "in wastes." EPA is considering these issues as it develops final guidance for reporting quantities recycled both on- and off-site.

Quantities reported as recycled on-site may be greater than the actual amount of the toxic chemical used at the facility, depending on how the facility reported. For example, a facility used a total of 15,000 pounds of 1,1,1-trichloroethane for cleaning and other purposes during the reporting year. The toxic chemical was recycled in batches for a total of 15 batches, resulting in the recovery of 225,000 pounds of 1,1,1-trichloroethane during that year. This quantity is much greater than the amount of the toxic chemical that was used at the facility, but reflects the amounts of 1,1,1-trichloroethane in wastes managed at the facility during the reporting year. However, not all facilities have reported in this manner.

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, as is evident in Table 2-6. In the case of metal compounds, the parent metals do not contribute heating value to the combusted wastes and are either ultimately discharged to air or remain in the ash, which is usually disposed of.

Quantities treated on-site. While facilities were instructed to include only those quantities destroyed through treatment in this data element, some facilities have misinterpreted how to report these quantities. This is evident through examination of Table 2-9, the top 25 chemicals reported as treated, which reveals that two of the top chemicals reported as treated are metal compounds (copper compounds and chromium compounds). The parent metals in any of the compounds may be removed from wastes, but are not destroyed through on-site treatment and so these metal compounds should not be reported as treated on-site. Such misinterpretations can cause facilities to inflate the amount of TRI chemical in waste or to incorrectly characterize the ultimate disposition of the chemical in waste. For example, the parent metals in metal compounds are ultimately 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.

Table 2-11. Difference in Release and Transfer Data and Waste Management Data, 1992.

Management Activity	Quantity Reported in Sections 5 and 6 Pounds	Quantity Reported in Section 8 Pounds	Difference Pounds
Off-site recycling	2,839,825,919	3,473,894,509	634,068,590
Off-site energy recovery	477,639,264	627,954,600	150,315,336
Off-site treatment	774,563,36❼	678,373,850	96,189,513
Releases and off-site disposal	3,457,222,824❽	3,401,386,170	55,836,654

❼ Includes transfers to POTWs and other off-site locations.
❽ Includes "other" off-site transfers.

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 have been destroyed. Metal compounds and certain organic chemicals can be passed through a POTW, meaning that they were discharged directly from the POTW, or 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.

WHAT IS BEING DONE TO REDUCE THESE WASTES?

Facilities are required to provide information on any source reduction activity implemented during the reporting (calendar) year. (Source reduction is defined in Box 2-2.) Source reduction activities are those that reduced or prevented the need for a quantity of the reported toxic chemical to be recycled, used for energy recovery, treated, or released (including disposal). Of the 23,630 facilities that submitted Form Rs for 1992, 8,492 (36%) indicated that they implemented source reduction for at least one chemical. Of the 81,016 Form Rs submitted, 20,508 (25%) indicated that source reduction had been implemented. Comparing this to data submitted for the 1991 reporting year, slightly more Form Rs and facilities (26% of the total forms submitted and 37% of the facilities reporting for 1991) had indicated that source reduction was implemented during 1991. Of the Form Rs that could be matched across 1991 and 1992, just over 13,000 reported the implementation of source reduction in both 1991 and 1992.

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. The most frequently reported categories of source reduction activities were good operating practices, process modifications, and spill and leak prevention activities. These categories were also most frequently reported for 1991.

What is Source Reduction?

Through pollution prevention, 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. Pollution prevention is source reduction, which 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.

Pollution prevention 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 pollution prevention.

Box 2-2. What is Source Reduction?

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

Facilities are also required to report the method(s) used to identify the reported source reduction activity. The methods are:

- Internal pollution prevention opportunity audit(s)
- External pollution prevention opportunity audit(s)
- Materials balance audits
- Participative team management
- Employee recommendation (independent of a formal company program)
- Employee recommendation (under a formal company program)
- State government technical assistance program
- Federal government technical assistance program
- Trade association/industry technical assistance program
- Vendor assistance
- Other

The most frequently reported methods of identifying opportunities for source reduction measures were participative team management and internal pollution prevention opportunity audits. The frequency for these methods and the association between reported source reduction activities and the methods used to identify the opportunities for them are shown in Table 2-12.

The states of California, Ohio, Indiana, Illinois, Texas, and Pennsylvania had the greatest number of forms reporting source reduction activities. Good operating practices and process modifications were reported most frequently as the types of source reduction activities implemented (see Table 2-13). Consistent with the national picture, the most frequent methods of identifying opportunities for source reduction for facilities in these states were participative team management and internal pollution prevention opportunity audits (see Table 2-14).

Among industries, the greatest number of forms submitted indicating source reduction were from the chemical industry and the fabricated metals sector. However, the furniture, measurements/photographic equipment, and printing sectors had the greatest percentage of forms indicating source reduction. The measurements/photographic equipment and printing sectors also had the greatest percentage of facilities reporting source reduction activities (see Table 2-15).

The top 50 chemicals for which source reduction was reported are listed in Tables 2-17 and 2-18. The chemical for which source reduction was reported most frequently was 1,1,1-trichloroethane. The activities most frequently reported to reduce the amount of 1,1,1-trichloroethane entering wastes included cleaning and degreasing, good operating practices, and process modifications. The most frequent methods of identifying opportunities for source reduction for 1,1,1-trichloroethane were participative team management and internal pollution prevention opportunity audits.

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. Methods Used to Identify Source Reduction Activity for Each Source Reduction Activity (Number of Times Each Method was Reported), 1992.

Source Reduction Activity	Total Number of Times Reported	Percent of Total Reported	Pollution Prevention Opportunity Audit: Internal	Pollution Prevention Opportunity Audit: External	Materials Balance Audit	Participative Team Management
Good Operating Practices	**15,478**	**26.2**	**3,479**	**314**	**1,394**	**4,909**
W13	7,032	11.9	1,713	194	741	2,112
W14	2,552	4.3	518	19	232	960
W19	5,894	10.0	1,248	101	421	1,837
Inventory Control	**4,034**	**6.8**	**813**	**118**	**468**	**1,263**
W21	1,198	2.0	237	23	155	370
W22	497	0.8	94	12	76	154
W23	48	0.1	15	2	8	8
W24	457	0.8	93	31	10	189
W25	297	0.5	71	1	30	78
W29	1,537	2.6	303	49	189	464
Spill and Leak Prevention	**9,402**	**15.9**	**2,818**	**318**	**504**	**2,354**
W31	1,064	1.8	260	53	65	293
W32	1,996	3.4	619	60	104	552
W33	615	1.0	155	20	34	190
W35	978	1.7	284	38.0	95.0	177.0
W36	2,892	4.9	887	93	131	705
W39	1,857	3.1	613	54	75	437
Raw Material Modifications	**6,241**	**10.5**	**1,157**	**123**	**288**	**1,388**
W41	471	0.8	59	4	24	145
W42	4,848	8.2	936	102	222	1,071
W49	922	1.6	162	17	42	172
Process Modifications	**12,226**	**20.7**	**2,750**	**327**	**826**	**3,256**
W51	2,137	3.6	550	42	243	595
W52	4,381	7.4	1,016	141	274	1,162
W53	274	0.5	62	9	8	62
W54	466	0.8	110	5	34	129
W55	855	1.4	158	40	45	228
W58	4,113	7.0	854	90	222	1,080
Cleaning and Degreasing	**3,583**	**6.1**	**855**	**74**	**174**	**967**
W59	328	0.6	92	9	28	80
W60	142	0.2	32	2	4	29
W61	1,844	3.1	455	47	63	488
W63	242	0.4	52	7	16	59
W64	299	0.5	64	3	18	85
W65	168	0.3	41	2	5	50
W66	165	0.3	33	0	6	64
W67	128	0.2	19	1	5	33
W68	267	0.5	67	3	29	79
Surface Preparation/Finishing	**5,275**	**8.9**	**934**	**114**	**284**	**1,205**
W71	1,224	2.1	237	33	53	326
W72	1,377	2.3	229	26	100	264
W73	1,292	2.2	254	30	63	266
W74	879	1.5	121	12	54	215
W75	122	0.2	18	1	6	31
W78	381	0.6	75	12	8	103
Product Modifications	**2,930**	**5.0**	**480**	**54**	**105**	**696**
W81	876	1.5	143	10	38	206
W82	1,490	2.5	230	29	45	360
W83	33	0.1	2	3	4	9
W89	531	0.9	105	12	18	121
Total	59,169	100.0	13,286	1,442	4,043	16,038
Percent of Total	100.0		22.5	2.4	6.8	27.1

Table 2-12.

Source Reduction Activity	Employee Recommendation Informal	Employee Recommendation Formal Program	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other
Good Operating Practices	**1,783**	**1,021**	**90**	**17**	**395**	**891**	**1,185**
W13	819	453	50	10	152	384	404
W14	363	153	8	0	36	109	154
W19	601	415	32	7	207	398	627
Inventory Control	**334**	**218**	**20**	**1**	**133**	**344**	**322**
W21	101	83	4	1	16	141	67
W22	48	29	0	0	1	28	55
W23	8	1	0	0	0	0	6
W24	32	21	4	0	6	27	44
W25	24	14	9	0	5	36	29
W29	121	70	3	0	105	112	121
Spill and Leak Prevention	**1,013**	**466**	**54**	**18**	**232**	**451**	**1,174**
W31	142	44	12	2	20	49	124
W32	289	74	0	5	46	94	153
W33	66	56	3	2	14	32	43
W35	40	37	10	1	44	87	165
W36	264	158	15	5	75	121	438
W39	212	97	14	3	33	68	251
Raw Material Modifications	**499**	**364**	**23**	**11**	**242**	**1,537**	**609**
W41	83	19	0	0	13	105	19
W42	358	296	14	11	177	1,167	494
W49	58	49	9	0	52	265	96
Process Modifications	**1,322**	**811**	**62**	**12**	**361**	**1,148**	**1,351**
W51	244	150	8	2	43	141	119
W52	501	289	32	3	117	428	418
W53	27	21	4	0	10	51	20
W54	54	46	1	1	13	54	19
W55	106	58	3	2	14	148	53
W58	390	247	14	4	164	326	722
Cleaning and Degreasing	**347**	**277**	**32**	**10**	**138**	**532**	**177**
W59	24	30	3	0	8	38	16
W60	9	8	1	0	11	29	17
W61	110	124	15	8	78	356	100
W63	42	28	1	1	4	18	14
W64	62	20	4	0	16	21	6
W65	33	15	4	0	4	14	0
W66	18	11	0	1	5	23	4
W67	29	9	3	0	8	14	7
W68	20	32	1	0	4	19	13
Surface Preparation/Finishing	**432**	**278**	**45**	**7**	**267**	**1,332**	**377**
W71	125	130	17	6	35	168	94
W72	133	37	13	0	84	398	93
W73	59	38	2	0	69	433	78
W74	93	29	4	1	59	213	78
W75	9	6	0	0	8	35	8
W78	13	38	9	0	12	85	26
Product Modifications	**245**	**207**	**9**	**5**	**179**	**483**	**467**
W81	60	71	2	1	40	170	135
W82	139	98	6	3	122	246	212
W83	2	1	0	0	0	6	6
W89	44	37	1	1	17	61	114
Total	5,975	3,642	335	81	1,947	6,718	5,662
Percent of Total	10.1	6.2	0.6	0.1	3.3	11.4	9.6

Table 2-13. Number of TRI Facilities and Forms Reporting Source Reduction, by Source Reduction Category, by State, 1992.

State	Number of TRI Facilities	Facilities Reporting Source Reduction Activities: Number	Facilities Reporting Source Reduction Activities: Percent of All Facilities in the State	Number of TRI Forms	Forms Reporting Source Reduction Activities: Number	Forms Reporting Source Reduction Activities: Percent of All Forms in the State
Alabama	504	160	31.7	1,905	475	24.9
Alaska	6	5	83.3	50	20	40.0
American Samoa	2	1	50.0	2	1	50.0
Arizona	181	93	51.4	538	203	37.7
Arkansas	394	142	36.0	1,232	302	24.5
California	1,830	789	43.1	5,400	1,899	35.2
Colorado	192	68	35.4	540	149	27.6
Connecticut	416	170	40.9	1,215	323	26.6
Delaware	68	19	27.9	274	39	14.2
Florida	525	177	33.7	1,462	332	22.7
Georgia	739	261	35.3	2,395	584	24.4
Hawaii	21	5	23.8	76	32	42.1
Idaho	53	14	26.4	172	25	14.5
Illinois	1,401	428	30.5	4,915	1,145	23.3
Indiana	1,033	403	39.0	3,637	1,083	29.8
Iowa	423	137	32.4	1,304	299	22.9
Kansas	278	104	37.4	1,012	281	27.8
Kentucky	449	151	33.6	1,653	280	16.9
Louisiana	326	112	34.4	2,063	409	19.8
Maine	110	50	45.5	367	101	27.5
Maryland	229	74	32.3	724	143	19.8
Massachusetts	615	256	41.6	1,744	560	32.1
Michigan	969	337	34.8	3,747	996	26.6
Minnesota	539	252	46.8	1,570	604	38.5
Mississippi	319	120	37.6	1,072	260	24.3
Missouri	596	191	32.0	2,024	482	23.8
Montana	23	4	17.4	140	17	12.1
Nebraska	180	60	33.3	540	134	24.8
Nevada	44	14	31.8	111	32	28.8
New Hampshire	129	51	39.5	362	83	22.9
New Jersey	751	202	26.9	2,678	417	15.6
New Mexico	44	18	40.9	156	50	32.1
New York	907	350	38.6	2,741	809	29.5
North Carolina	978	372	38.0	2,970	834	28.1
North Dakota	36	11	30.6	97	19	19.6
Ohio	1,679	562	33.5	6,070	1,359	22.4
Oklahoma	260	76	29.2	858	173	20.2
Oregon	251	106	42.2	782	254	32.5
Pennsylvania	1,291	453	35.1	4,310	1,077	25.0
Puerto Rico	178	42	23.6	566	83	14.7
Rhode Island	169	67	39.6	440	131	29.8
South Carolina	501	181	36.1	1,904	451	23.7
South Dakota	56	21	37.5	111	33	29.7
Tennessee	667	263	39.4	2,245	602	26.8
Texas	1,238	415	33.5	5,927	1,315	22.2
Utah	130	47	36.2	489	106	21.7
Vermont	50	23	46.0	117	53	45.3
Virgin Islands	3	1	33.3	27	1	3.7
Virginia	474	154	32.5	1,626	364	22.4
Washington	332	134	40.4	1,035	319	30.8
West Virginia	148	62	41.9	724	147	20.3
Wisconsin	868	276	31.8	2,765	586	21.2
Wyoming	25	8	32.0	132	32	24.2
Total	23,630	8,492	35.9	81,016	20,508	25.3

Table 2-13.

State	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
	Category of Source Reduction Activity (number of forms reporting)							
Alabama	273	55	109	73	153	46	60	32
Alaska	7	0	7	0	21	0	0	0
American Samoa	0	0	1	0	0	0	0	0
Arizona	109	25	82	37	69	50	6	9
Arkansas	112	35	82	48	117	30	65	49
California	1,042	296	753	245	609	355	122	164
Colorado	62	9	51	24	59	19	33	9
Connecticut	160	35	53	49	120	97	22	26
Delaware	15	1	10	9	12	4	1	2
Florida	143	36	79	80	102	64	28	23
Georgia	275	65	213	99	212	73	41	39
Hawaii	18	1	45	0	9	0	0	1
Idaho	9	0	6	2	22	2	1	0
Illinois	536	161	348	219	441	148	78	108
Indiana	442	127	227	258	441	172	209	105
Iowa	120	18	81	86	90	31	43	28
Kansas	130	54	88	50	84	36	36	30
Kentucky	134	21	57	60	91	33	21	19
Louisiana	184	23	205	53	238	14	17	12
Maine	41	7	7	36	31	12	24	9
Maryland	57	32	43	30	69	19	7	20
Massachusetts	311	74	77	113	197	132	29	40
Michigan	510	217	216	192	407	131	118	144
Minnesota	300	68	143	134	225	97	102	46
Mississippi	125	32	140	43	70	16	64	12
Missouri	175	48	242	97	171	59	52	45
Montana	11	0	11	2	4	0	0	0
Nebraska	58	10	11	37	43	24	31	10
Nevada	15	0	11	3	12	2	1	0
New Hampshire	22	4	9	18	20	27	7	2
New Jersey	114	43	111	95	147	50	29	27
New Mexico	29	0	8	3	20	10	3	7
New York	382	92	152	152	277	130	80	82
North Carolina	298	148	209	221	272	86	169	67
North Dakota	4	1	0	4	12	3	6	2
Ohio	576	136	319	270	520	148	148	171
Oklahoma	71	36	54	29	43	23	43	28
Oregon	90	30	58	54	102	28	39	37
Pennsylvania	538	115	249	214	384	162	172	107
Puerto Rico	21	17	25	12	37	20	2	3
Rhode Island	64	18	49	16	39	32	5	8
South Carolina	198	49	135	74	185	45	18	53
South Dakota	6	1	14	4	14	6	13	2
Tennessee	306	61	167	112	195	44	81	58
Texas	540	85	585	163	588	131	70	66
Utah	41	14	15	17	51	12	8	9
Vermont	27	3	15	7	18	7	7	1
Virgin Islands	0	0	2	0	1	0	0	0
Virginia	147	48	82	81	103	46	76	28
Washington	142	62	90	62	147	51	34	32
West Virginia	65	10	40	26	84	5	8	6
Wisconsin	287	50	141	145	176	81	79	73
Wyoming	15	0	30	2	16	2	0	2
Total	9,357	2,473	5,957	3,860	7,570	2,815	2,308	1,853

Table 2-14. Methods Used to Identify Reported Source Reduction Activities, by State, 1992.

State	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
	Internal	External			Informal	Formal Program
Alabama	207	28	78	240	70	71
Alaska	13	0	5	1	8	0
American Samoa	0	0	0	0	1	0
Arizona	108	14	41	124	35	15
Arkansas	108	6	38	124	53	34
California	831	131	268	893	297	182
Colorado	55	5	16	64	39	20
Connecticut	130	13	34	173	58	44
Delaware	10	0	6	22	9	6
Florida	133	3	46	149	58	25
Georgia	208	20	64	234	97	53
Hawaii	30	0	0	21	0	0
Idaho	7	2	0	11	1	7
Illinois	447	48	122	521	247	171
Indiana	388	37	84	532	206	131
Iowa	90	22	50	126	55	31
Kansas	97	15	61	137	46	26
Kentucky	94	6	30	120	46	28
Louisiana	194	2	69	218	50	71
Maine	37	1	7	61	22	10
Maryland	56	4	11	73	24	21
Massachusetts	202	19	85	251	91	59
Michigan	372	47	101	454	181	103
Minnesota	301	27	43	314	183	64
Mississippi	104	8	45	131	57	15
Missouri	186	17	37	225	90	49
Montana	11	0	0	3	3	11
Nebraska	51	3	7	48	37	27
Nevada	10	0	0	21	6	2
New Hampshire	28	1	11	36	10	11
New Jersey	117	20	63	168	49	33
New Mexico	23	5	5	20	7	2
New York	328	27	96	367	140	106
North Carolina	288	14	106	350	134	60
North Dakota	1	0	1	11	3	2
Ohio	450	54	142	650	309	131
Oklahoma	74	1	37	69	39	26
Oregon	98	6	37	126	66	46
Pennsylvania	404	57	157	504	247	112
Puerto Rico	35	5	9	27	3	13
Rhode Island	54	15	16	50	43	11
South Carolina	220	17	92	236	72	39
South Dakota	7	0	1	10	11	2
Tennessee	208	26	90	241	126	44
Texas	620	44	196	554	222	152
Utah	48	11	19	48	22	13
Vermont	21	1	12	29	10	4
Virgin Islands	0	0	0	0	0	0
Virginia	131	5	57	151	30	23
Washington	181	20	40	147	54	37
West Virginia	56	7	25	68	28	10
Wisconsin	173	14	67	282	135	61
Wyoming	15	0	2	7	3	3
Total	8,060	828	2,629	9,442	3,833	2,217
Percent of Total	21.6	2.2	7.1	25.3	10.3	5.9

Table 2-14.

State	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other	Number of Forms	Percent of Total Forms
Alabama	1	0	24	83	77	879	2.4
Alaska	0	0	1	1	7	36	0.1
American Samoa	0	0	0	0	0	1	0.0
Arizona	0	1	11	37	23	409	1.1
Arkansas	1	2	17	69	58	510	1.4
California	17	5	136	353	443	3,556	9.5
Colorado	0	0	4	26	33	262	0.7
Connecticut	1	2	18	63	43	579	1.6
Delaware	0	0	0	6	11	70	0.2
Florida	5	2	14	67	55	557	1.5
Georgia	6	1	36	150	134	1,003	2.7
Hawaii	0	0	0	0	0	51	0.1
Idaho	0	0	4	3	8	43	0.1
Illinois	2	0	60	221	269	2,108	5.7
Indiana	3	5	65	334	209	1,994	5.3
Iowa	2	0	17	99	46	538	1.4
Kansas	2	1	10	65	76	536	1.4
Kentucky	2	1	9	62	50	448	1.2
Louisiana	1	0	31	50	83	769	2.1
Maine	1	0	4	43	19	205	0.5
Maryland	7	0	12	39	39	286	0.8
Massachusetts	27	2	21	96	133	986	2.6
Michigan	15	2	53	273	177	1,778	4.8
Minnesota	25	1	36	141	65	1,200	3.2
Mississippi	4	0	17	80	63	524	1.4
Missouri	0	0	16	108	97	825	2.2
Montana	0	0	0	2	1	31	0.1
Nebraska	2	0	10	49	20	254	0.7
Nevada	0	0	0	2	10	51	0.1
New Hampshire	1	1	4	23	15	141	0.4
New Jersey	6	0	12	70	96	634	1.7
New Mexico	0	0	2	7	5	76	0.2
New York	5	2	31	162	156	1,420	3.8
North Carolina	11	3	56	344	114	1,480	4.0
North Dakota	0	0	0	11	2	31	0.1
Ohio	5	4	48	344	298	2,435	6.5
Oklahoma	0	0	4	30	29	309	0.8
Oregon	7	1	25	54	51	517	1.4
Pennsylvania	7	5	55	245	204	1,997	5.4
Puerto Rico	0	0	1	12	20	125	0.3
Rhode Island	3	0	6	21	28	247	0.7
South Carolina	4	1	21	91	47	840	2.3
South Dakota	0	0	8	19	8	66	0.2
Tennessee	26	1	72	162	108	1,104	3.0
Texas	11	7	62	229	304	2,401	6.4
Utah	0	1	4	22	24	212	0.6
Vermont	0	0	2	13	2	94	0.3
Virgin Islands	0	1	0	0	0	1	0.0
Virginia	0	0	28	78	80	583	1.6
Washington	17	2	31	80	59	668	1.8
West Virginia	0	0	6	61	19	280	0.8
Wisconsin	1	0	33	182	121	1,069	2.9
Wyoming	0	0	5	14	11	60	0.2
Total	228	54	1,142	4,796	4,050	37,279	100.0
Percent of Total	0.6	0.1	3.1	12.9	10.9	100.0	

Table 2-15. Number of TRI Facilities and Forms Reporting Source Reduction, by Source Reduction Category, by Industry, 1992.

SIC Code	Industry	Number of TRI Facilities	Facilities Reporting Source Reduction Activities: Number	Facilities Reporting Source Reduction Activities: Percent of All Facilities in the Industry	Number of TRI Forms	Forms Reporting Source Reduction Activities: Number	Forms Reporting Source Reduction Activities: Percent of All Forms from the Industry
20	Food	2,036	414	20.3	3,781	589	15.6
21	Tobacco	21	4	19.0	42	7	16.7
22	Textiles	471	165	35.0	978	266	27.2
23	Apparel	48	10	20.8	89	13	14.6
24	Lumber	722	193	26.7	1,938	457	23.6
25	Furniture	547	245	44.8	1,751	713	40.7
26	Paper	583	251	43.1	2,468	547	22.2
27	Printing	374	181	48.4	724	267	36.9
28	Chemicals	4,193	1,670	39.8	22,609	5,816	25.7
29	Petroleum	425	163	38.4	3,333	790	23.7
30	Plastics	1,868	725	38.8	4,377	1,283	29.3
31	Leather	155	58	37.4	398	124	31.2
32	Stone/Clay	634	189	29.8	1,549	386	24.9
33	Primary Metals	1,886	460	24.4	6,753	1,243	18.4
34	Fabricated Metals	3,141	1,048	33.4	8,973	1,988	22.2
35	Machinery	1,094	385	35.2	2,974	718	24.1
36	Electrical	1,554	685	44.1	4,623	1,344	29.1
37	Transportation Equip.	1,251	567	45.3	4,856	1,377	28.4
38	Measure./Photo.	414	214	51.7	1,063	397	37.3
39	Miscellaneous	376	137	36.4	909	280	30.8
	Multiple codes 20-39 9	1,630	692	42.5	6,145	1,796	29.2
	No codes 20-39 10	207	36	17.4	683	107	15.7
	Total	23,630	8,492	35.9	81,016	20,508	25.3

PREVENTION

Table 2-15.

Industry	Category of Source Reduction Activity (number of forms reporting)							
	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
Food	366	40	314	33	211	31	8	29
Tobacco	2	0	3	2	3	1	0	0
Textiles	71	18	34	94	89	15	20	39
Apparel	7	0	4	6	2	1	0	0
Lumber	250	36	136	93	174	45	178	26
Furniture	218	188	89	200	130	43	561	80
Paper	222	38	70	190	206	28	15	47
Printing	101	11	32	136	43	57	7	15
Chemicals	2,787	901	2,366	960	2,654	446	26	724
Petroleum	336	48	599	66	363	27	3	45
Plastics	502	139	246	420	371	198	167	121
Leather	30	9	9	48	19	15	79	11
Stone/Clay	132	27	228	88	145	10	9	47
Primary Metals	588	81	360	209	522	88	63	64
Fabricated Metals	962	215	326	293	689	481	337	92
Machinery	307	53	76	123	175	187	107	96
Electrical	612	130	332	220	513	324	89	79
Transportation Equip.	625	204	189	226	350	315	316	119
Measure./Photo.	222	26	44	86	127	140	18	46
Miscellaneous	142	45	27	54	84	48	80	32
Multiple codes 20-39 ⑨	823	248	437	292	670	299	211	136
No codes 20-39 ⑩	52	16	36	21	30	16	14	5
Total	9,357	2,473	5,957	3,860	7,570	2,815	2,308	1,853

⑨ Facilities that reported more than one two-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

⑩ Facilities that did not report an SIC code and facilities that reported SIC codes outside the 20 to 39 range.

Table 2-16. Methods Used to Identify Reported Source Reduction Activities, by Industry, 1992.

SIC Code	Industry	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
		Internal	External			Informal	Formal Program
20	Food	218	15	84	258	96	47
21	Tobacco	2	0	1	3	2	0
22	Textiles	75	7	27	123	28	11
23	Apparel	3	0	3	6	2	0
24	Lumber	177	3	22	188	86	10
25	Furniture	217	22	129	238	145	26
26	Paper	185	13	51	229	110	62
27	Printing	89	7	34	97	40	44
28	Chemicals	2,355	247	728	2,908	1,236	746
29	Petroleum	332	35	31	278	134	70
30	Plastics	436	56	149	598	232	79
31	Leather	48	9	17	61	17	20
32	Stone/Clay	137	12	43	143	61	45
33	Primary Metals	515	59	151	507	185	105
34	Fabricated Metals	805	99	281	859	322	187
35	Machinery	261	35	71	323	170	76
36	Electrical	578	54	191	692	267	162
37	Transportation Equip.	570	42	185	696	197	186
38	Measure./Photo.	148	14	51	231	59	59
39	Miscellaneous	96	9	54	112	48	25
	Multiple codes 20-39 ⓫	782	85	309	844	373	232
	No codes 20-39 ⓬	31	5	17	48	23	25
	Total	8,060	828	2,629	9,442	3,833	2,217
	Percent of Total	21.6	2.2	7.1	25.3	10.3	5.9

Table 2-16.

Industry	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other	Number of Forms	Percent of Total Forms
Food	4	2	44	166	91	1,025	2.7
Tobacco	0	0	0	1	1	10	0.0
Textiles	0	4	15	104	63	457	1.2
Apparel	2	0	2	3	2	23	0.1
Lumber	4	5	49	213	71	828	2.2
Furniture	14	1	86	450	72	1,400	3.8
Paper	6	2	36	117	121	932	2.5
Printing	2	1	19	97	47	477	1.3
Chemicals	62	9	238	589	1,297	10,415	27.9
Petroleum	4	2	29	66	279	1,260	3.4
Plastics	9	2	96	454	173	2,284	6.1
Leather	2	1	12	74	8	269	0.7
Stone/Clay	0	0	13	59	138	651	1.7
Primary Metals	12	3	93	268	343	2,241	6.0
Fabricated Metals	42	6	139	603	299	3,642	9.8
Machinery	11	1	29	219	110	1,306	3.5
Electrical	10	0	69	314	203	2,540	6.8
Transportation Equip.	16	6	58	404	234	2,594	7.0
Measure./Photo.	7	3	9	83	88	752	2.0
Miscellaneous	1	0	19	111	57	532	1.4
Multiple codes 20-39 [11]	19	6	79	363	323	3,415	9.2
No codes 20-39 [12]	1	0	8	38	30	226	0.6
Total	228	54	1,142	4,796	4,050	37,279	100.0
Percent of Total	0.6	0.1	3.1	12.9	10.9	100.0	

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

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

Table 2-17. Number of Forms Reporting Source Reduction, by Source Reduction Category, for the Top 50 TRI Chemicals by Number of Forms Reporting Source Reduction Activities, 1992.

CAS Number	Chemical	Number of TRI Forms	Forms Reporting Source Reduction Activities: Number	Forms Reporting Source Reduction Activities: Percent of All Forms for the Chemical
71-55-6	1,1,1-Trichloroethane	3,131	1,477	47.2
108-88-3	Toluene	3,689	1,430	38.8
1330-20-7	Xylene (mixed isomers)	3,374	1,231	36.5
67-64-1	Acetone	2,540	930	36.6
7664-93-9	Sulfuric acid	5,643	907	16.1
78-93-3	Methyl ethyl ketone	2,447	907	37.1
7664-41-7	Ammonia	3,160	666	21.1
67-56-1	Methanol	2,437	642	26.3
	Glycol ethers	2,126	610	28.7
7647-01-0	Hydrochloric acid	3,274	574	17.5
76-13-1	Freon 113	855	517	60.5
	Zinc compounds	2,382	478	20.1
75-09-2	Dichloromethane	1,114	419	37.6
7664-38-2	Phosphoric acid	2,657	408	15.4
	Chromium compounds	1,462	366	25.0
108-10-1	Methyl isobutyl ketone	1,014	360	35.5
71-36-3	n-Butyl alcohol	1,166	359	30.8
100-42-5	Styrene	1,396	337	24.1
7697-37-2	Nitric acid	1,810	325	18.0
7440-50-8	Copper	2,279	323	14.2
100-41-4	Ethylbenzene	888	315	35.5
	Lead compounds	874	292	33.4
107-21-1	Ethylene glycol	1,325	286	21.6
	Copper compounds	1,439	250	17.4
79-01-6	Trichloroethylene	663	248	37.4
7782-50-5	Chlorine	1,535	247	16.1
	Barium compounds	1,007	239	23.7
7440-02-0	Nickel	1,531	205	13.4
95-63-6	1,2,4-Trimethylbenzene	634	200	31.5
7440-47-3	Chromium	1,494	194	13.0
127-18-4	Tetrachloroethylene	504	189	37.5
50-00-0	Formaldehyde	772	184	23.8
71-43-2	Benzene	472	154	32.6
	Manganese compounds	934	151	16.2
7439-92-1	Lead	777	151	19.4
108-95-2	Phenol	680	150	22.1
	Nickel compounds	778	143	18.4
91-20-3	Naphthalene	467	125	26.8
75-71-8	Dichlorodifluoromethane (CFC-12)	344	125	36.3
7439-96-5	Manganese	1,180	124	10.5
101-68-8	Methylenebis(phenylisocyanate)	767	119	15.5
	Antimony compounds	509	117	23.0
7664-39-3	Hydrogen fluoride	520	110	21.2
75-69-4	Trichlorofluoromethane (CFC-11)	254	110	43.3
110-82-7	Cyclohexane	352	105	29.8
	Cyanide compounds	258	76	29.5
117-81-7	Di-(2-ethylhexyl) phthalate	326	68	20.9
74-85-1	Ethylene	279	66	23.7
98-82-8	Cumene	217	66	30.4
115-07-1	Propylene	326	64	19.6
	Subtotal	70,062	18,139	25.9
	Total for All TRI Chemicals	81,016	20,508	25.3

Table 2-17.

Chemical	Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
	Category of Source Reduction Activity (number of forms reporting)							
1,1,1-Trichloroethane	554	100	139	363	240	777	130	149
Toluene	590	210	320	397	446	148	429	176
Xylene (mixed isomers)	514	190	285	294	373	112	430	154
Acetone	428	158	190	178	279	204	133	79
Sulfuric acid	461	87	311	103	408	77	19	29
Methyl ethyl ketone	424	177	159	226	274	128	303	95
Ammonia	345	35	287	57	308	15	5	22
Methanol	278	84	189	138	247	42	107	61
Glycol ethers	242	107	127	162	208	49	110	79
Hydrochloric acid	284	65	189	61	252	57	11	17
Freon 113	209	27	63	120	126	344	18	43
Zinc compounds	244	70	141	67	207	36	12	49
Dichloromethane	167	28	103	118	126	110	15	49
Phosphoric acid	213	52	152	47	154	34	9	23
Chromium compounds	167	46	100	89	154	23	16	46
Methyl isobutyl ketone	170	61	72	78	139	39	135	41
n-Butyl alcohol	151	68	85	86	121	35	119	38
Styrene	134	52	118	96	120	15	51	35
Nitric acid	177	41	103	16	133	41	13	6
Copper	215	44	59	35	136	22	10	29
Ethyl benzene	139	39	159	57	151	27	29	27
Lead compounds	125	45	95	89	125	6	7	42
Ethylene glycol	124	36	104	58	109	13	8	26
Copper compounds	148	27	110	17	127	12	9	20
Trichloroethylene	118	13	38	16	45	146	7	16
Chlorine	89	15	69	48	121	3	4	8
Barium compounds	104	43	66	49	99	7	24	30
Nickel	118	38	45	24	81	19	8	25
1,2,4-Trimethylbenzene	96	25	96	31	89	16	19	20
Chromium	113	37	28	31	63	17	14	25
Tetrachloroethylene	113	14	51	27	44	71	5	14
Formaldehyde	73	10	64	47	81	6	7	22
Benzene	52	6	126	8	88	2	3	7
Manganese compounds	89	11	46	18	67	3	0	10
Lead	63	18	23	46	59	2	3	28
Phenol	72	18	60	23	83	5	2	13
Nickel compounds	70	19	36	7	82	14	2	11
Naphthalene	47	7	84	18	50	5	6	7
Dichlorodifluoromethane (CFC-12)	44	3	66	20	42	0	0	11
Manganese	77	25	28	16	41	3	4	18
Methylenebis(phenylisocyanate)	57	17	25	14	42	4	4	13
Antimony compounds	66	11	43	19	49	4	2	12
Hydrogen fluoride	58	13	29	8	55	12	2	1
Trichlorofluoromethane (CFC-11)	26	7	29	51	25	2	3	19
Cyclohexane	40	8	78	7	49	1	3	10
Cyanide compounds	26	6	15	12	53	11	2	2
Di-(2-ethylhexyl) phthalate	24	7	17	26	20	2	2	6
Ethylene	24	4	46	0	30	1	0	1
Cumene	31	7	38	9	30	2	3	5
Propylene	25	5	44	1	24	1	0	0
Subtotal	8,218	2,236	4,950	3,528	6,475	2,725	2,257	1,669
Total for All TRI Chemicals	9,357	2,473	5,957	3,860	7,570	2,815	2,308	1,853

Table 2-18. Methods Used to Identify Source Reduction Activities for the Top 50 TRI Chemicals by Number of Forms Reporting Source Reduction Activities, 1992.

CAS Number	Chemical	Number of Forms Reporting Source Reduction Activities	Pollution Prevention Opportunity Audit: Internal	Pollution Prevention Opportunity Audit: External	Materials Balance Audit	Participative Team Management	Employee Recommendation: Informal	Employee Recommendation: Formal Program
71-55-6	1,1,1-Trichloroethane	1,477	606	79	173	681	223	200
108-88-3	Toluene	1,430	527	64	187	633	250	152
1330-20-7	Xylene (mixed isomers)	1,231	463	50	150	529	253	131
67-64-1	Acetone	930	338	39	127	439	156	104
7664-93-9	Sulfuric acid	907	367	35	108	421	195	84
78-93-3	Methyl ethyl ketone	907	341	38	144	422	183	106
7664-41-7	Ammonia	666	269	19	97	289	130	70
67-56-1	Methanol	642	227	13	96	291	131	62
	Glycol ethers	610	219	18	59	286	117	68
7647-01-0	Hydrochloric acid	574	234	22	82	239	131	56
76-13-1	Freon 113	517	231	20	73	283	83	84
	Zinc compounds	478	178	24	69	244	110	46
75-09-2	Dichloromethane	419	145	16	66	181	84	39
7664-38-2	Phosphoric acid	408	134	8	60	206	78	33
	Chromium compounds	366	164	20	48	165	77	35
108-10-1	Methyl isobutyl ketone	360	150	14	53	178	72	46
71-36-3	n-Butyl alcohol	359	135	16	41	167	62	46
100-42-5	Styrene	337	122	18	33	126	51	24
7697-37-2	Nitric acid	325	141	7	36	164	58	32
7440-50-8	Copper	323	122	26	53	166	58	41
100-41-4	Ethylbenzene	315	141	14	16	143	56	47
	Lead compounds	292	115	16	33	141	64	22
107-21-1	Ethylene glycol	286	116	5	41	141	55	37
	Copper compounds	250	120	12	32	115	59	22
79-01-6	Trichloroethylene	248	114	12	37	108	51	26
7782-50-5	Chlorine	247	101	4	26	100	33	24
	Barium compounds	239	82	12	37	117	53	27
7440-02-0	Nickel	205	66	8	31	115	45	22
95-63-6	1,2,4-Trimethylbenzene	200	79	8	13	78	34	25
7440-47-3	Chromium	194	56	4	33	103	40	23
127-18-4	Tetrachloroethylene	189	89	6	28	87	32	17
50-00-0	Formaldehyde	184	83	4	23	88	32	25
71-43-2	Benzene	154	72	11	13	52	16	22
	Manganese compounds	151	58	4	18	65	29	16
7439-92-1	Lead	151	58	11	17	76	32	19
108-95-2	Phenol	150	59	4	16	76	21	14
	Nickel compounds	143	66	4	23	76	30	14
91-20-3	Naphthalene	125	51	6	5	41	24	9
75-71-8	Dichlorodifluoromethane (CFC-12)	125	48	4	23	38	16	13
7439-96-5	Manganese	124	36	3	21	65	21	10
101-68-8	Methylenebis(phenyl-isocyanate)	119	39	2	14	60	17	14
	Antimony compounds	117	42	2	17	57	25	12
75-69-4	Trichlorofluoromethane (CFC-11)	110	30	0	13	32	19	8
7664-39-3	Hydrogen fluoride	110	48	3	10	53	22	17
110-82-7	Cyclohexane	105	52	3	8	35	17	13
	Cyanide compounds	76	38	2	8	28	12	9
117-81-7	Di-(2-ethylhexyl) phthalate	68	23	2	5	31	16	2
74-85-1	Ethylene	66	30	2	9	24	11	7
98-82-8	Cumene	66	29	2	4	25	18	13
115-07-1	Propylene	64	32	3	5	24	8	5
	Subtotal	18,139	7,086	719	2,334	8,304	3,410	1,993
	Total for All TRI Chemicals	20,508	8,060	828	2,629	9,442	3,833	2,217

Table 2-18.

Chemical	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other	Number of Forms	Percent of Total Forms
1,1,1-Trichloroethane	24	15	109	495	219	2,824	7.6
Toluene	18	3	89	479	287	2,689	7.2
Xylene (mixed isomers)	15	2	75	450	232	2,350	6.3
Acetone	18	2	64	271	154	1,712	4.6
Sulfuric acid	8	1	35	158	169	1,581	4.2
Methyl ethyl ketone	14	1	50	289	156	1,744	4.7
Ammonia	6	1	29	110	127	1,147	3.1
Methanol	6	1	25	152	121	1,125	3.0
Glycol ethers	5	2	37	162	116	1,089	2.9
Hydrochloric acid	6	1	32	82	106	991	2.7
Freon 113	7	4	29	137	96	1,047	2.8
Zinc compounds	1	0	26	77	99	874	2.3
Dichloromethane	4	2	14	98	101	750	2.0
Phosphoric acid	3	3	14	103	78	720	1.9
Chromium compounds	2	0	24	93	63	691	1.9
Methyl isobutyl ketone	6	2	25	104	59	709	1.9
n-Butyl alcohol	5	1	23	103	67	666	1.8
Styrene	4	2	42	124	73	619	1.7
Nitric acid	4	0	11	56	44	553	1.5
Copper	3	0	25	57	56	607	1.6
Ethylbenzene	4	1	10	59	92	583	1.6
Lead compounds	2	0	18	51	83	545	1.5
Ethylene glycol	1	0	13	37	58	504	1.4
Copper compounds	2	2	16	45	35	460	1.2
Trichloroethylene	8	0	12	54	40	462	1.2
Chlorine	2	2	17	44	57	410	1.1
Barium compounds	1	1	5	44	55	434	1.2
Nickel	1	0	15	31	35	369	1.0
1,2,4-Trimethylbenzene	4	0	15	27	60	343	0.9
Chromium	2	0	9	31	36	337	0.9
Tetrachloroethylene	4	0	20	48	34	365	1.0
Formaldehyde	2	0	5	40	39	341	0.9
Benzene	0	1	9	21	57	274	0.7
Manganese compounds	2	1	3	16	31	243	0.7
Lead	0	0	12	26	30	281	0.8
Phenol	1	1	6	32	37	267	0.7
Nickel compounds	1	0	7	24	33	278	0.7
Naphthalene	0	0	7	22	40	205	0.5
Dichlorodifluoromethane (CFC-12)	0	0	8	20	36	206	0.6
Manganese	2	0	8	25	26	217	0.6
Methylenebis(phenyl-isocyanate)	0	0	3	42	11	202	0.5
Antimony compounds	0	0	3	16	22	196	0.5
Trichlorofluoromethane (CFC-11)	0	0	15	46	23	186	0.5
Hydrogen fluoride	2	0	4	14	25	198	0.5
Cyclohexane	1	0	5	14	36	184	0.5
Cyanide compounds	0	0	9	21	12	139	0.4
Di-(2-ethylhexyl) phthalate	1	0	5	12	13	110	0.3
Ethylene	1	0	1	7	26	118	0.3
Cumene	0	0	3	5	19	118	0.3
Propylene	2	0	2	8	23	112	0.3
Subtotal	205	52	1,043	4,482	3,547	33,175	89.0
Total for All TRI Chemicals	228	54	1,142	4,796	4,050	37,279	100.0

ASSESSMENT OF PROGRESS IN SOURCE REDUCTION

The reporting of source reduction activities and the methods used to identify those activities yield an indication of what is being done to prevent the generation of pollution at the source. Quantifying progress in reducing wastes is a complex question that cannot be answered by simply comparing quantities over time. Many factors affect the quantity of toxic chemicals in wastes. One such factor is changes in production or activity at a facility. 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 1992 reporting year, the ratio is calculated by dividing the production or activity involving the reported toxic chemical in 1992 by the production or activity involving the reported toxic chemical in 1991. A ratio that is less than 1.0 indicates that production or activity is down in 1992 as compared to 1991. 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 2-19 shows the distribution of the ratios reported for 1992 and the total production-related wastes associated with the ratios.

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

Because of the complexity of quantifying progress in reducing toxic chemicals in wastes at the source, there is no one method for measuring progress. Comparing changes in quantities of toxic chemicals in wastes when source reduction has been implemented is one method, but this does not take production into account. There is also a method for using the information reported under TRI to assess changes in the quantities of toxic chemicals in wastes relative to changes in production or activity at a facility. This method has an implicit assumption that there is a direct relationship between the level of production or activity at a facility and the amount of toxic chemicals in wastes, including releases, generated by that production or activity. Thus, if production increases, wastes are assumed to increase by a direct proportion. Similarly, if production decreases, wastes are assumed to decrease proportionally. This assumption may hold for some, but not all, processes or facilities. There may be many instances where processes do not have a directly proportional relationship between the level of activity and wastes 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 be used to provide an indication of whether toxic chemicals in wastes are increasing or decreasing. To perform the following analysis, those forms that have complete data for both 1991 and 1992 must be selected. Data for those years must be comparable, meaning that a facility has to have reported quantities for the same activity, for example, on-site recycling, for both years. The calculations shown in Box 2-4 illustrate how the information reported on Form R can be used to assess changes in the quantities of toxic chemicals in wastes relative to changes in production or activity.

Because production may not be directly and linearly related to the quantity of chemical in waste, analysis of progress should also include simple comparison of reporting year and prior year data. A decrease could be an indication of progress while an increase could indicate that progress is

Table 2-19. Distribution of Production Index.

Index	Number of Forms Reporting Number	Percent of Forms Reporting Percent	Cumulative Percent of Forms Reporting Percent	Production Related Wastes 1992 Pounds	Percent of 1992 Waste Percent	Cumulative Percent of 1992 Waste Percent
0.1	379	0.5	0.5	49,745,231	0.1	0.1
0.2	313	0.4	0.9	26,176,341	0.1	0.2
0.3	416	0.6	1.5	62,639,029	0.2	0.4
0.4	530	0.7	2.2	54,719,908	0.1	0.5
0.5	1,101	1.5	3.7	176,649,327	0.5	1.0
0.6	1,352	1.8	5.6	132,089,234	0.4	1.4
0.7	2,375	3.2	8.8	522,287,943	1.4	2.8
0.8	4,319	5.9	14.7	1,011,562,251	2.7	5.5
0.9	7,896	10.7	25.4	3,048,642,034	8.3	13.8
1.0	19,721	26.8	52.2	12,700,936,160	34.4	48.2
1.1	13,726	18.7	70.8	7,250,005,721	19.7	67.9
1.2	7,634	10.4	81.2	3,082,812,013	8.4	76.2
1.3	4,067	5.5	86.7	1,382,290,436	3.7	80.0
1.4	2,158	2.9	89.7	706,593,350	1.9	81.9
1.5	1,497	2.0	91.7	733,964,114	2.0	83.9
1.6	1,003	1.4	93.1	247,116,922	0.7	84.5
1.7	709	1.0	94.0	564,612,829	1.5	86.1
1.8	462	0.6	94.7	41,173,940	0.1	86.2
1.9	303	0.4	95.1	330,713,940	0.9	87.1
2.0 - 2.9	1,521	2.1	97.1	226,095,957	0.6	87.7
3.0 - 3.9	448	0.6	97.7	81,845,602	0.2	87.9
4.0 - 4.9	229	0.3	98.1	62,324,709	0.2	88.1
5.0 - 9.9	396	0.5	98.6	44,158,748	0.1	88.2
10.0-24.9	204	0.3	98.9	25,504,720	0.1	88.3
25.0-49.9	73	0.1	99.0	74,243,472	0.2	88.5
50.0-99.9	343	0.5	99.4	106,495,248	0.3	88.8
>=100	416	0.6	100.0	4,142,008,898	11.2	100.0
Total	73,591	100.0		36,887,408,077	100.0	
Zero or Blank or NA for Index						
Zero	751			49,934,700		
Blank	4,053			249,666,321		
NA	2,593			145,933,271		
Total	7,397			445,534,292		
Negative Number for Index						
Total	28			833,255		

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 Wastes at the National Level

EPA performed an analysis of the data received for 1992 using the technique discussed in Box 2-4. Of the 81,016 Form Rs submitted for 1992, 57,041 forms had sufficient information for both 1991 and 1992 to perform an analysis of the changes of the quantity of toxic chemicals in wastes for those two years. Of those 57,041 forms, 14,409 (approximately 25%, or 18% of the total 81,016 forms submitted) indicated the implementation of a source reduction activity. For this subset of forms that reported source reduction and provided sufficient information for both 1991 and 1992, the quantity of toxic chemicals in wastes reported decreased by only 0.2% between 1991 and 1992 in absolute terms (see Table 2-20). Adjusting for production changes indicates a significantly greater decrease of 9.1%. Movement up the waste management hierarchy is indicated on these forms as well. This is evident as the quantities sent off-site for recycling and used for energy recovery on-site increased while the quantity released and the quantities treated (both on- and off-site) decreased.

As shown in Table 2-21, forms from facilities that did not indicate the implementation of source reduction showed a small increase (4.6%) in the total quantity of toxic chemicals entering

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

1) Sum Sections 8.1 through 8.7 for the prior year (1991)
2) Sum Sections 8.1 through 8.7 for the reporting year (1992)
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 wastes for the reporting year (1992) 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 wastes is occurring. If the result of step 4 is a positive number, this means that the amount of toxic chemical in wastes for the reporting year (1992) 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 wastes is not occurring.

Box 2-4. Calculating Changes in Quantities of TRI Chemicals in Waste Relative to Production

wastes in absolute terms. With an adjustment for production, this increase becomes a slight decrease of almost 1%. There is little movement up the waste management hierarchy indicated by this subset of forms.

EPA has further analyzed this subset of the 1992 data and has found that not all facilities reporting a source reduction activity have indicated a decrease in the total quantity of toxic chemicals in wastes. Similar to what was revealed with analysis of the 1991 data, some facilities that have reported the implementation of a source reduction activity have also indicated an increase in the total quantity of toxic chemicals in wastes. In addition, many facilities that did not indicate the implementation of a source reduction activity on Form R have indicated decreases in the total quantity of toxic chemicals in wastes.

EPA has also performed some preliminary comparisons of source reduction reporting for both 1991 and 1992. After matching a total of 70,814 forms across 1991 and 1992, 13,282 forms indicated the implementation of source reduction in both years. A total of 5,319 matched forms indicated the implementation of source reduction only in 1992. These two subsets of forms indicated a decrease in the total quantity of toxic chemicals in waste from 1991 to 1992. A total of 4,624 matched forms indicated the implementation of source reduction only in 1991. The remaining 47,589 matched forms did not indicate the implementation of source reduction in either year. For both those subsets of forms, the total quantity of toxic chemicals in waste increased from 1991 to 1992.

Table 2-20. Change in Quantities of TRI Chemicals in Wastes from 1991 to 1992 for Facilities Reporting Source Reduction Activities.⑬

Category of Waste Generated	1991 Reported Quantity Pounds	1991 Reported Percent of Total	1992 Reported Quantity Pounds	1992 Reported Percent of Total	Amount Expected for 1992 Quantity Pounds	Amount Expected for 1992 Percent of Total
Recycled On-site	2,398,466,724	29.7	2,386,593,031	29.6	2,499,374,496	28.4
Recycled Off-site	766,777,355	9.5	866,740,320	10.8	838,381,462	9.5
Energy Recovery On-site	655,990,521	8.1	747,211,295	9.3	735,259,736	8.4
Energy Recovery Off-site	257,806,250	3.2	257,375,483	3.2	274,352,047	3.1
Treated On-site	2,699,914,542	33.4	2,630,801,887	32.6	3,048,562,451	34.7
Treated Off-site	138,665,252	1.7	136,743,720	1.7	147,862,433	1.7
Quantity Released	1,156,903,631	14.3	1,032,904,359	12.8	1,248,541,555	14.2
Total	8,074,524,275	100.0	8,058,370,095	100.0	8,792,334,180	100.0

Category of Waste Generated	Absolute Change 1992-1991 Quantity Pounds	Absolute Change 1992-1991 Percent Change	Relative Change 1992 Rep. - 1992 Exp. Quantity Pounds	Relative Change 1992 Rep. - 1992 Exp. Percent Change
Recycled On-site	-11,873,693	-0.5	-112,781,465	-4.7
Recycled Off-site	99,962,965	13.0	28,358,858	3.7
Energy Recovery On-site	91,220,774	13.9	11,951,559	1.8
Energy Recovery Off-site	-430,767	-0.2	-16,976,564	-6.6
Treated On-site	-69,112,655	-2.6	-417,760,564	-15.5
Treated Off-site	-1,921,532	-1.4	-11,118,713	-8.0
Quantity Released	-123,999,272	-10.7	-215,637,196	-18.6
Total	-16,154,180	-0.2	-733,964,085	-9.1

Table 2-21. Change in Quantities of TRI Chemicals in Wastes from 1991 to 1992 for Facilities Not Reporting Source Reduction Activities.⑭

Category of Waste Generated	1991 Reported Quantity Pounds	1991 Reported Percent of Total	1992 Reported Quantity Pounds	1992 Reported Percent of Total	Amount Expected for 1992 Quantity Pounds	Amount Expected for 1992 Percent of Total
Recycled On-site	4,677,696,177	30.0	4,731,711,833	29.0	4,967,110,828	30.2
Recycled Off-site	1,607,188,245	10.3	1,776,464,357	10.9	1,693,742,893	10.3
Energy Recovery On-site	1,557,538,063	10.0	1,567,580,331	9.6	1,602,270,884	9.7
Energy Recovery Off-site	174,535,486	1.1	199,265,090	1.2	184,565,412	1.1
Treated On-site	5,702,114,185	36.6	6,149,061,868	37.7	6,013,004,171	36.6
Treated Off-site	371,963,206	2.4	389,810,045	2.4	389,799,455	2.4
Quantity Released	1,507,270,092	9.7	1,496,889,703	9.2	1,587,120,778	9.7
Total	15,598,305,454	100.0	16,310,783,227	100.0	16,437,614,421	100.0

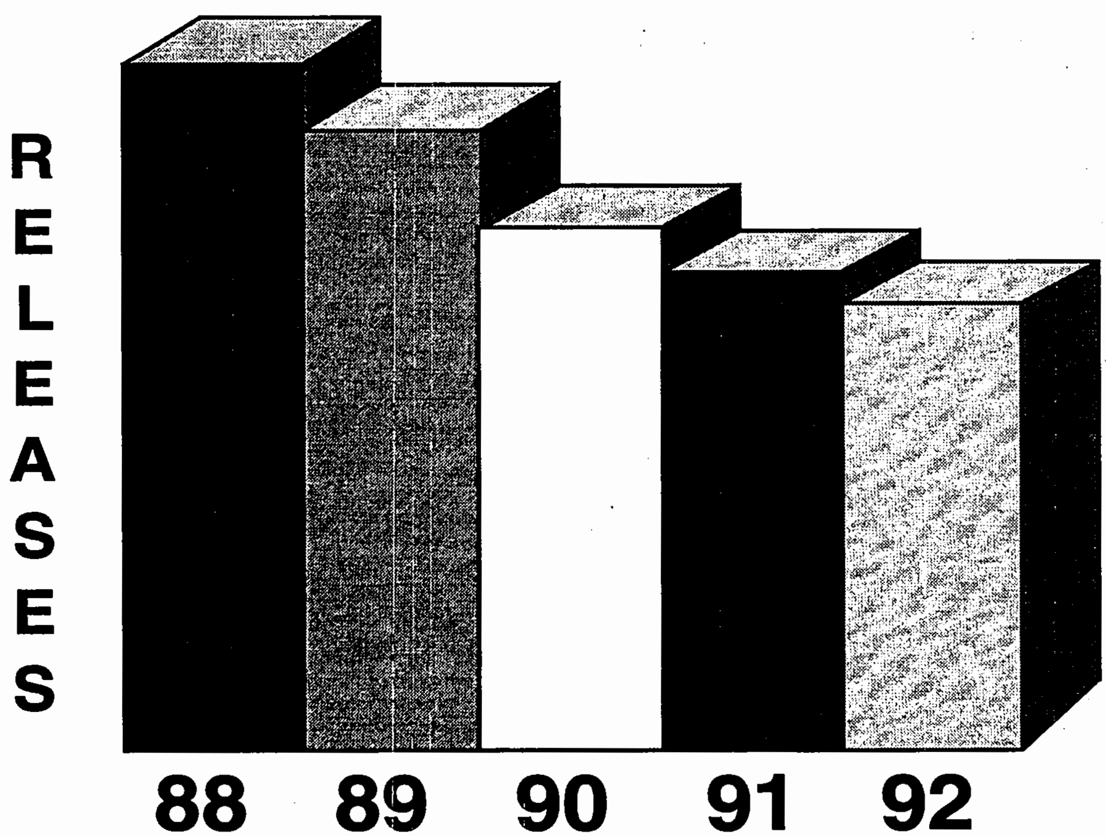
Category of Waste Generated	Absolute Change 1992-1991 Quantity Pounds	Absolute Change 1992-1991 Percent Change	Relative Change 1992 Rep. - 1992 Exp. Quantity Pounds	Relative Change 1992 Rep. - 1992 Exp. Percent Change
Recycled On-site	289,414,651	6.2	-235,398,995	-5.0
Recycled Off-site	86,554,648	5.4	82,721,464	5.1
Energy Recovery On-site	44,732,821	2.9	-34,690,553	-2.2
Energy Recovery Off-site	10,029,926	5.7	14,699,678	8.4
Treated On-site	310,889,986	5.5	136,057,697	2.4
Treated Off-site	17,836,249	4.8	10,590	0.0
Quantity Released	79,850,686	5.3	-90,231,075	-6.0
Total	712,477,773	4.6	-126,831,194	-0.8

⑬ 14,409 of the 57,041 Form Rs met these criteria.

⑭ 42,632 of the 57,041 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

Baseline Year

1992 marks the sixth reporting year for the TRI program. This section of the report summarizes the TRI data for 1988, and 1990 through 1992 to allow comparisons across years to help identify changes and trends. EPA has decided to present only four years of data for trend analysis as a practical matter, using a baseline year of 1988 and the latest three years: 1990, 1991, and 1992. Therefore, with few exceptions, TRI data for 1989 will not be presented. Although 1987 was the first year for TRI reporting, 1988 has been chosen as the baseline year because of concerns about the data quality of industry's submissions in the first year.

Chemical List Changes

Certain TRI reporting requirements have changed since the inception of the program. EPA has the authority to add chemicals to the reporting list if they meet the statutory criteria for toxicity, and to delete chemicals from the list if they are determined not to meet the toxicity criteria. Since 1987, in response to petitions, EPA has removed from the list eight individually listed chemicals, three members of the copper compounds category that did not meet the toxicity criteria, and di-n-octyl phthalate which was delisted October 5, 1993. Although facilities had submitted their 1992 reports for di-n-octyl phthalate before its delisting, data for this chemical are excluded from information presented in this chapter, as are data for other delisted chemicals. Also in response to a petition, EPA deleted non-fibrous aluminum oxide, but retained fibrous forms of aluminum oxide on the list. EPA added 16 chemicals to the list, nine of which were reportable beginning with the 1990 reporting year, and seven of which were reportable beginning with the 1991 reporting year. Recently added were 32 chemicals and two chemical categories which will first be reportable for the 1994 reporting year. More complete information about chemical list changes is included 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 list 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 the 1988-1992 comparison section differ slightly from totals seen in the 1991-1992 comparison section and from the totals presented in Chapter 1 of this report. The 1988 through 1992 comparison does not include aluminum oxide, any delisted chemicals, or chemicals added for 1990 and 1991 reporting years. The 1991-1992 comparison data do not include any delisted chemicals. There were no changes in the chemical list between 1991 and 1992.

Threshold Changes

Facilities are only required to report for a particular chemical if they meet the manufacturing, processing or otherwise use thresholds for that chemical. The otherwise use threshold has remained 10,000 pounds since the inception of the program. However, the manufacturing and process thresholds dropped from 75,000 pounds for 1987, to 50,000 pounds for 1988, and again to 25,000 pounds for 1989 and later. Declining thresholds until 1989 probably increased the number of facilities required to report to TRI each year, as well as the number of forms filed. However, thresholds did not change for the 1990 through 1992 reporting years, so threshold changes should not be a factor in comparing 1992 data to 1991, 1990, or 1989 data. Threshold changes may be a factor to consider when comparing 1992 data to 1988 data.

1991 TO 1992 DATA COMPARISONS

This section compares summary release and transfer data for the 1991 and 1992 reporting years (see Table 3-1) in order to highlight and help explain some of the reported changes. Because only two years of data are examined here, any identified changes should not be considered to be indicative of trends.

Tables and text in this section include only those chemicals listed for both reporting years 1991 and 1992. The nine chemicals added to the list for reporting year 1990 are included here, as is aluminum oxide (fibrous forms). The seven CFCs and halons added to the list for reporting year 1991 are also included here. All delisted chemicals (including di-n-octyl phthalate) are excluded from this analysis. This section includes releases to all media, as well as off-site transfers to POTWs and to other off-site locations for treatment, disposal, energy recovery and recycling. Off-site transfers reported without waste management codes or with invalid codes are included in a category called "other off-site transfers."

Total TRI reported releases declined 6.6% from 1991 to 1992, from 3.41 billion pounds to 3.18 billion pounds. This includes on-site stack air releases, fugitive air releases, releases to surface waters, amounts injected underground, and disposal to land on-site (landfill, surface impoundments, land treatment and other land disposal). Total reported transfers increased about 17% from 3.74 billion pounds in 1991 to 4.37 billion pounds in 1992. This includes transfers off-site for recycling, to energy recovery, to treatment, to POTWs, and to disposal and other off-site transfers.

1991 to 1992 Releases by Media

Air Releases

Air releases declined 9.4% or a net decrease of 192 million pounds, from 2.04 billion pounds in 1991 to 1.84 billion pounds in 1992. About 111.5 million pounds (58%) of this decline was attributable to decreased emissions of a variety of solvents, including 1,1,1-trichloroethane, acetone, toluene, methyl ethyl ketone, Freon 113, methanol, and xylene. Many of the solvents have been targeted by EPA, states, and industry for pollution prevention efforts, including EPA's 33/50 program of voluntary industrial toxics reduction. Ammonia alone accounted for more than 27 million pounds (14%) of the decrease, primarily due to large reductions from several facilities. Chlorine releases declined by more than 6 million pounds; most of this decrease appears to be due to reductions in chlorine emissions from Magnesium Corporation of America in Rowley, Utah (see 1992 Top Decreasers in Air/Water/Land Releases). Emissions of Freon 113, one of the ozone-depleting chemicals whose production is being phased out under Clean Air Act requirements, declined by more than 11 million pounds.

Chemicals with net increases in air releases included carbon disulfide (up 3.4 million pounds), styrene (up 3.2 million pounds) and copper compounds (up 2 million pounds).

Table 3-1. Comparison of TRI Releases and Transfers, 1991-1992.

	1991	1992	Change in Amount	Percent Change
	Number	Number	Number	Percent
Total Facilities	24,294	23,630	-664	-2.7
Total Forms	83,815	81,016	-2,799	-3.3
	Pounds	Pounds	Pounds	Percent
Total air emissions	2,036,678,204	1,844,958,336	-191,719,868	-9.4
Fugitive air	633,586,799	549,351,729	-84,235,070	-13.3
Point source air	1,403,091,405	1,295,606,607	-107,484,798	-7.7
Surface water discharges	243,351,148	272,932,953	29,581,805	12.2
Underground injection	710,366,770	725,946,415	15,579,645	2.2
Releases to land	414,844,420	337,809,053	-77,035,367	-18.6
Total Releases	3,405,240,542	3,181,646,757	-223,593,785	-6.6
Transfers to recycling	2,266,829,164	2,839,825,919	572,996,755	25.3
Transfers to energy recovery	443,311,526	477,639,264	34,327,738	7.7
Transfers to treatment	353,150,798	393,466,540	40,315,742	11.4
Transfers to POTWs	395,560,966	381,096,823	-14,464,143	-3.7
Transfers to disposal	267,586,409	258,642,577	-8,943,832	-3.3
Other off-site transfers [1]	10,316,150	16,933,490	6,617,340	64.1
Total Transfers	3,736,755,013	4,367,604,613	630,849,600	16.9
Total Releases and Transfers	7,141,995,555	7,549,251,370	407,255,815	5.7

[1] Transfers reported with no waste management codes or invalid codes.

Releases to Surface Waters

Surface water discharges increased 12.2%, from 243 million pounds in 1991 to nearly 273 million pounds in 1992, a net increase of nearly 30 million pounds. Phosphoric acid releases alone increased by 44.3 million pounds, due to releases from four facilities that manufacture phosphate fertilizers. This is an example of how large releases from a few facilities can have a disproportionate effect on total water releases. After factoring out the phosphoric acid water releases from these four facilities from the national totals, other water releases actually decreased by 11.5% or almost 15 million pounds. For more discussion about these facilities, see 1992 Top Increasers in Air/Water/Land Releases.

Sulfuric acid releases to surface waters decreased by 4.3 million pounds. Two of the four fertilizer facilities mentioned above reduced their sulfuric acid releases by 11.7 million pounds, while two others increased their sulfuric acid releases by 7.9 million pounds. Methanol, ammonium sulfate (solution), ammonium nitrate (solution), and ethylene glycol water releases together decreased by 8.8 million pounds.

Releases to Land

Releases to land decreased by 18.6% or by 77 million pounds, from 415 million pounds in 1991 to 338 million pounds in 1992. About 57% of this reported reduction appears to be due to reduced releases of zinc compounds (net decrease of 32 million pounds) and hydrochloric acid (net decrease of 11.7 million pounds). About 26.5 million pounds of the zinc compounds decrease is attributed to three metal smelters and a steel mill. Nearly all of the hydrochloric acid decrease of 11.7 million pounds is due to the closure of two Climax Chemical Co. metal mining facilities. Large decreases to land from specific facilities are discussed in another section of this chapter (see 1992 Top Decreasers in Air/Water/Land Releases).

Large reductions in releases to land of copper compounds (7.3 million pounds), manganese compounds (6.8 million pounds), sulfuric acid (6 million pounds), and ammonium nitrate (solution) (5.8 million pounds) also contributed to the overall decrease in land releases. Two metal smelters had a combined reduction of 8.2 million pounds of copper compounds. The sulfuric acid decrease is attributable to a 6 million pound spill that occurred in 1991 from an acid plant at a copper smelter facility. Land releases of zinc (fume or dust) increased by 3.8 million pounds.

Underground Injection

Underground injection of waste increased by 2.2% or by 15.6 million pounds, from 710 million pounds in 1991 to 726 million pounds in 1992. Underground injection of hydrochloric acid releases increased by 17.4 million pounds (four facilities had large increases totalling 22 million pounds), ammonia releases increased by 11.1 million pounds, and ammonium nitrate (solution) releases increased by 4.8 million pounds. The chemical with the largest decrease was acrylic acid, with nearly all of the 14.4 million pound decrease attributable to two facilities. Reasons for large changes in underground injection from specific facilities are discussed in a separate section in this chapter.

1991 to 1992 Transfers by Transfer Type

Transfers to Recycling

Transfers to recycling increased by 25.3% from 2.27 billion pounds in 1991 to 2.84 billion pounds in 1992. The large increase may be partially due to reporting by facilities who did not understand the reporting requirements for 1991 and may have not have reported recycling for 1991, the first year such reporting was required. The net increase of 573 million pounds is largely attributable to increases of 202 million pounds of sulfuric acid and 190 million pounds of lead compounds transferred off-site for recycling. Increases of 250 million pounds of sulfuric acid transfers to recycling were reported by two facilities that did not report these types of transfers for sulfuric acid in 1991. About 121 million pounds of the increase in lead compounds transferred is attributable to one secondary lead smelter. Another 73 million pounds of the lead compounds increase was from five other facilities. Three of these had not reported any transfers of lead compounds off-site in 1991. Transfers of copper and zinc compounds to recycling also increased by about 46 million pounds each.

Some of the larger decreases in transfers of chemicals for recycling were 7.4 million pounds less of lead, 6.4 million pounds less of manganese, and 6.4 million pounds less of zinc (fume or dust). Increases of 11.3 million pounds of lead transfers to recycling were attributable to three facilities. Seven other chemicals, mostly solvents, had total decreases of transfers to recycling totalling about 18 million pounds.

Transfers to Energy Recovery

Transfers to energy recovery increased by 7.7%, from 443 million pounds to 478 million pounds. This increase of 34.3 million pounds is partially due to a 14 million pound increase of ethylene, mostly from two facilities. Methanol, methyl ethyl ketone, and ethylene glycol transfers to energy recovery increased by a total of almost 12 million pounds.

Xylene (mixed isomers) decreased by 2.2 million pounds. Methyl isobutyl ketone, toluene, benzene, and phthalic anhydride each decreased by more than 1 million pounds, for a total of 5.6 million pounds.

Transfers to Treatment

Transfers to treatment increased by 11.4% from 353 million pounds in 1991 to 393 million pounds in 1992. This net increase of 40.3 million pounds is largely due to increases in transfers of zinc compounds, antimony compounds, and lead compounds totalling 66.7 million pounds. Increases of 64 million pounds of transfers of these three compounds for solidification/stabilization came from one lead smelter facility. There were also increases of hydrochloric acid, acetone, and arsenic compounds totalling another 16.4 million pounds.

Xylene (mixed isomers) transfers to treatment decreased by 12.7 million pounds, and transfers of methyl ethyl ketone, 1,2-dichloroethane, nitric acid, and ammonium sulfate (solution) decreased by a total of 14.1 million pounds.

Transfers to POTWs

Transfers to POTWs decreased 3.7% or by 14.5 million pounds, from 396 million pounds in 1991 to 381 million pounds in 1992. Transfers of ammonium sulfate (solution) to POTWs decreased by 10 million pounds; acetone by about 5 million pounds; nitric acid by 4.8 million pounds; ammonia by 3.4 million pounds; manganese compounds by 2.3 million pounds; and barium compounds by 1.5 million pounds. At least five facilities with large transfers of ammonium sulfate in 1991 did not report these transfers in 1992, accounting for 8.6 million pounds of the net decrease of ammonium sulfate to POTWs.

Transfers to POTWs of hydrochloric acid increased by 12.8 million pounds, with nearly all of this due to an increase from one facility. Sulfuric acid transfers to POTWs increased by 2.6 million pounds.

Transfers to Disposal

Transfers for disposal decreased 3.3% from 268 million pounds in 1991 to 259 million pounds in 1992. A large portion of the net decrease of 8.9 million pounds is due to a 7.8 million pound decrease in transfers of manganese compounds to disposal. Reductions of nearly 7.8 million pounds of transfers of manganese compounds to off-site landfills were attributable to two facilities. Decreases of lead, aluminum (fume or dust) and manganese accounted for another 7.3 million pounds.

Ammonium sulfate (solution) increased by 7 million pounds and much of this increase came from one facility (6.5 million pounds). Sulfuric acid, nickel compounds, lead compounds, and asbestos (friable) each increased by more than 1 million pounds, for a net decrease of 9.7 million pounds.

Other Transfers

This category includes transfers that are reported with missing or invalid waste management codes. These transfers increased by 6.6 million pounds from 1991 to 1992.

Changes in Releases and Transfers by State

For each state, Figure 3-1 illustrates whether TRI releases increased or decreased from 1991 to 1992. Figure 3-2 shows the relative change in each state's TRI transfers for 1991-1992. The data used to develop these figures exclude delisted chemicals but include aluminum oxide (fibrous forms) and chemicals added for the 1990 and 1991 reporting years. For more detailed information about each state's 1992 releases and transfers see Chapter 1 and the 1992 TRI State Fact Sheets document.

Changes in Air Emissions of 1,1,1-Trichloroethane

As an example to illustrate how net changes in the TRI data are the result of several offsetting factors, EPA did some detailed analysis of the change in 1,1,1-trichloroethane (TCA) air emissions from 1991 to 1992. TCA is the chemical with the second largest decrease in air emissions from 1991 to 1992, dropping from almost 141 million pounds in 1991 to almost 115 million pounds in 1992. This net decrease of 26 million pounds (-18.4%) can be attributed to reductions and increases from facilities that reported for TCA in 1991 and 1992, reductions due to facilities who reported in 1991 but not in 1992, and increases due to facilities who reported in 1992 but not in 1991. A breakdown of these increases and decreases in TCA air emissions is shown below:

Changes in TCA Air Emissions from 1991-1992

Reporting for	Number of Facilities	Pounds of Increases	Pounds of Decreases
Both years	1,521		-31 million
Both years	1,045	+14 million	
1991 only	833		-15 million
1992 only	308	+6 million	
	Total	+20 million	-46 million

The number of facilities reporting TCA dropped 14.4% from 1991 to 1992, from 3,656 to 3,131 (difference of 525). This net difference represents 833 facilities that reported for TCA in 1991, but not in 1992, minus 308 facilities that reported in 1992, but not in 1991. Facilities no longer reporting TCA in 1992 either no longer use the chemical, do not use enough TCA to exceed the reporting threshold, or are no longer in business. The decrease in TCA air emissions from those facilities who did not submit TCA forms in 1992 represents about 33% of the 46 million pounds of decreases in TCA air emissions.

For those facilities who reported TCA air emissions for both 1991 and 1992, the air emissions per facility per year are compared in Figure 3-3. Points on the graph to the right of the diagonal line represent facilities whose 1992 air emissions of TCA were less than their 1991 emissions. Points to the left of the diagonal represent facilities whose 1992 air emissions of TCA were more than their 1991 emissions. The further away a point appears from the diagonal, the greater the facility's increase or decrease from 1991 to 1992. Reduction from these facilities represents about 67% of the 46 million pounds of decreases in TCA air emissions. This graph does not include 89 facilities who reported zero TCA emissions either in 1991 or 1992 or in both years, in order to avoid plotting data points directly on either axis of the graph. The net reduction from these 89 facilities accounts for only about 1% of the total net reduction of 26 million pounds. There were 210 facilities in Figure 3-3 whose TCA air emissions did not change from 1991 to 1992. These emissions totalled about 1.2 million pounds for each year.

By comparing each facility's 1991 TCA air emissions to their 1992 TCA air emissions, one can get a better overall picture of facilities' progress in reducing TCA air emissions. For example, using Figure 3-3, one can determine if the total reduction is largely due to a few facilities with large reductions or whether many facilities are achieving reductions. For TCA, it appears that the latter is true. For the 1,940 facilities that had between 10,000 and 1 million pounds of TCA air emissions in 1991, 1,222 of these facilities show reductions totalling 28.5 million pounds. These reductions

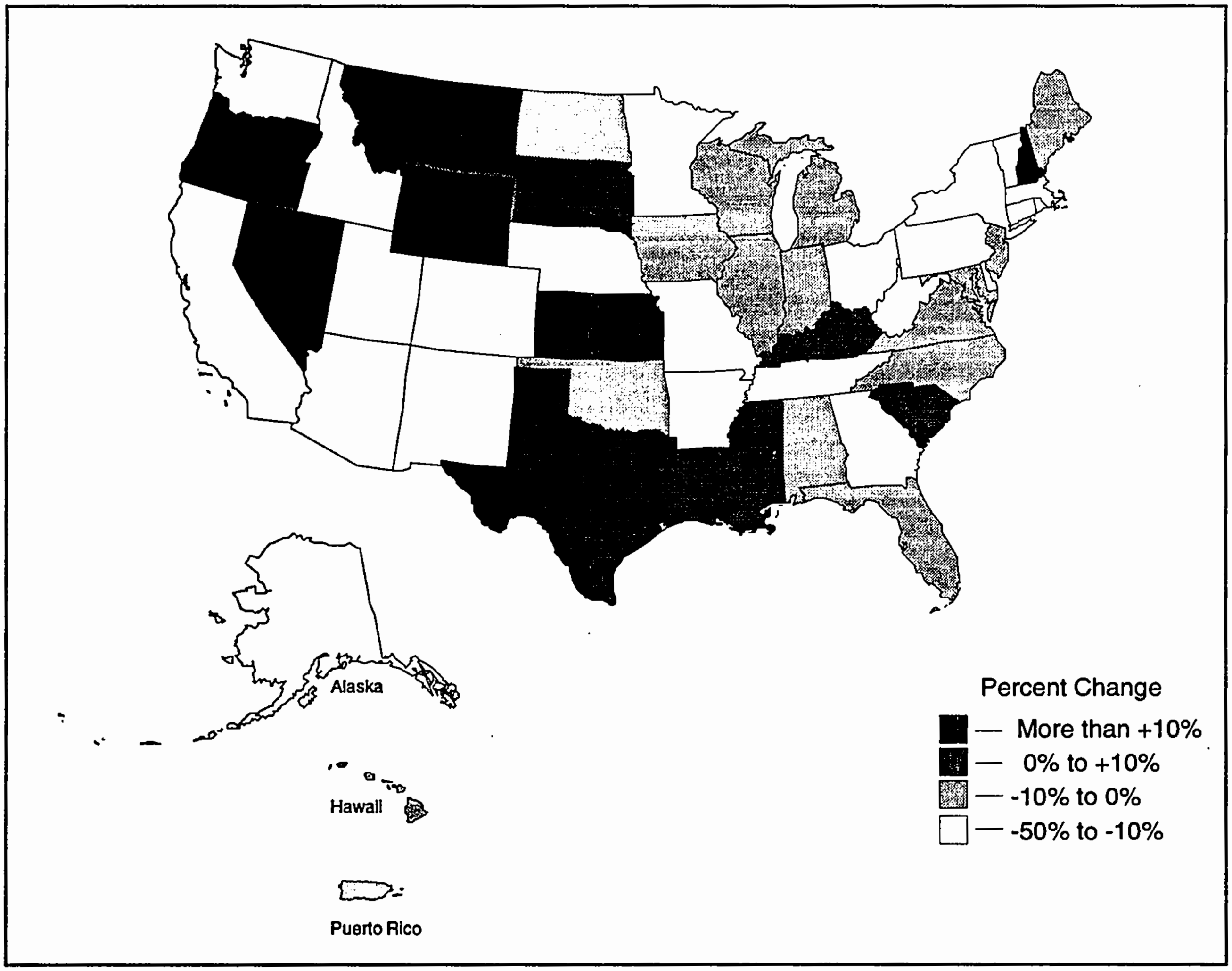

Figure 3-1. TRI Releases by State, Percent Change, 1991-1992.

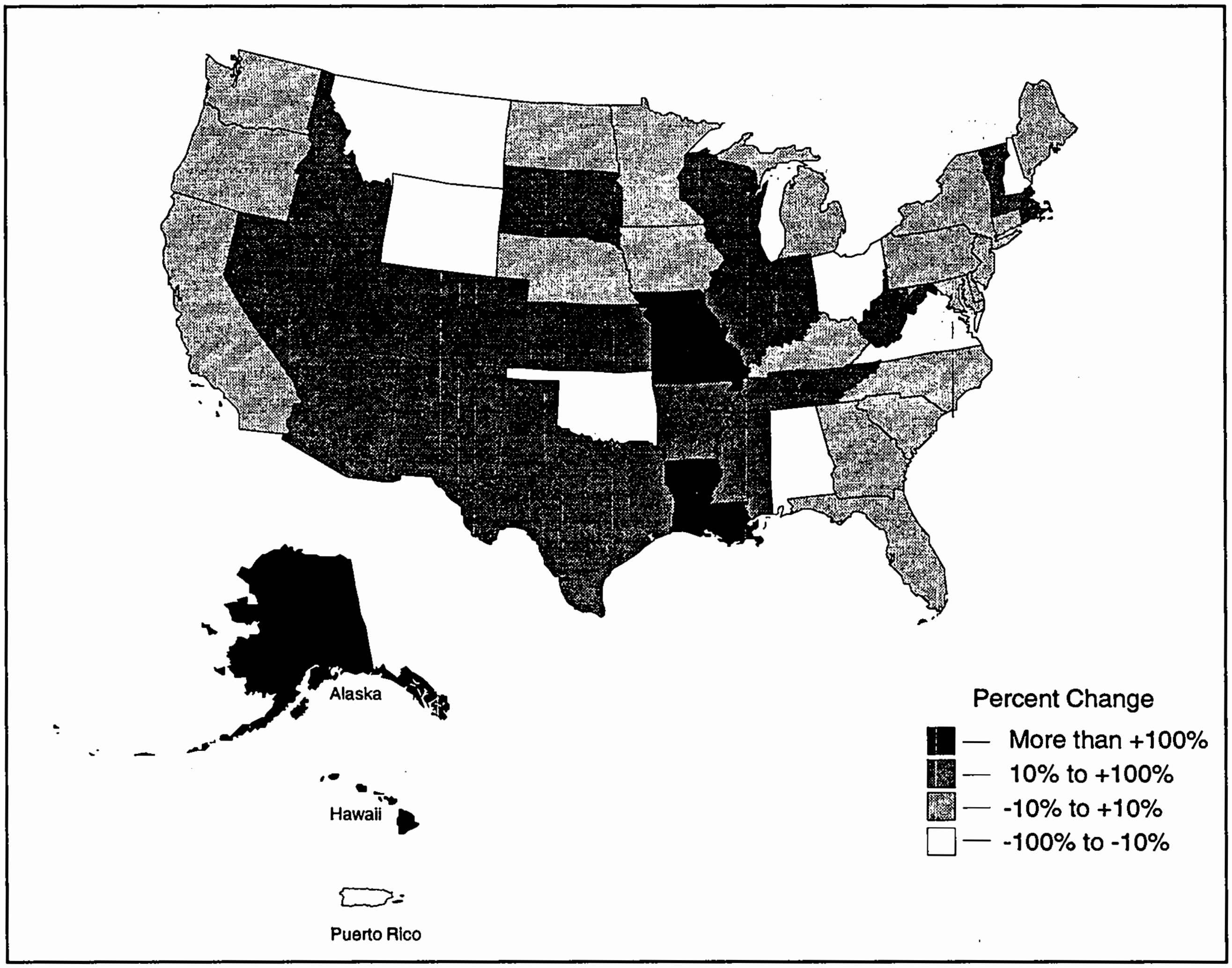

Figure 3-2. TRI Transfers by State, Percent Change, 1991-1992.

represent 63% of the total TCA decreases in air emissions. Figure 3-3 also shows the magnitude of each facility's reduction or increase. Some facilities do appear to show large increases, but most of these had TCA air emissions of less than 10,000 pounds in 1991.

1991 to 1992 Comparison of Number of Forms Submitted

This analysis includes chemicals that were added for first time reporting in 1990 and 1991, but excludes all delisted chemicals. From 1991 to 1992, the total number of forms filed dropped by 2,799. There was also a noticeable drop in the number of forms submitted per individual chemical. For example, of the 294 chemicals reported having at least one form per chemical submitted in any year 1988 through 1992, 176 (60%) showed some decrease in the number of reports from 1991 to 1992. However, some chemicals had a more significant decline than others in the number of reports submitted from 1991 to 1992.

Some of the decreases may be due to less usage of the chemical, so that a report is no longer required because thresholds are not exceeded. Less usage could be due to either changes in production, or to increased source reduction or recycling of the chemical. It is also possible that the chemical use may have been phased out. Many facilities are reducing the use of solvents to meet Clean Air Act requirements or pollution reduction goals, triggered either by industry or by state or federal agencies. Some of the other reasons listed below for changes in number of facilities can also explain why a single chemical report was submitted in one year, but not another.

Some chemicals with large decreases from 1991 to 1992 in the number of reports submitted are: 1,1,1-trichloroethane (-525 reports), Freon 113 (-226 reports), toluene (-190 reports), dichloromethane (-164 reports), xylene (mixed isomers) (-161 reports), acetone (-147 reports), and methyl ethyl ketone (-104 reports). Some chemicals that had large increases in the number of reports from 1991 to 1992 are: glycol ethers (+43 reports), manganese compounds (+42 reports), ethylbenzene (+40 reports), and antimony compounds (+31 reports).

EPA examined the number of forms filed by facilities that reported only in 1991 or only in 1992 to determine how much of the decline in number of forms filed in 1991 was due to the decline in number of facilities reporting. EPA determined that about 47% (or 1,313 forms) of the net reduction of 2,799 forms was associated with facilities dropping out of the reporting system. This is based on the 4,489 forms that were filed by facilities that reported in 1991, but not in 1992; and the 3,176 forms filed in 1992 that came from facilities that reported in 1992, but not in 1991.

1991 to 1992 Comparison of Number of Facilities

The universe of facilities submitting reports changes somewhat each year. Each year, some facilities submit reports for the first time, and other facilities that have reported in previous years do not submit reports for the current year. In some cases, a facility that is not required by law to report, such as a facility with fewer than 10 employees or a facility outside the covered industry groups, may choose to report voluntarily. Because such facilities are not obligated to report, they may choose to file TRI reports some years but not others. There may also be Federal facilities (government owned and operated) that are reporting voluntarily for the first time.

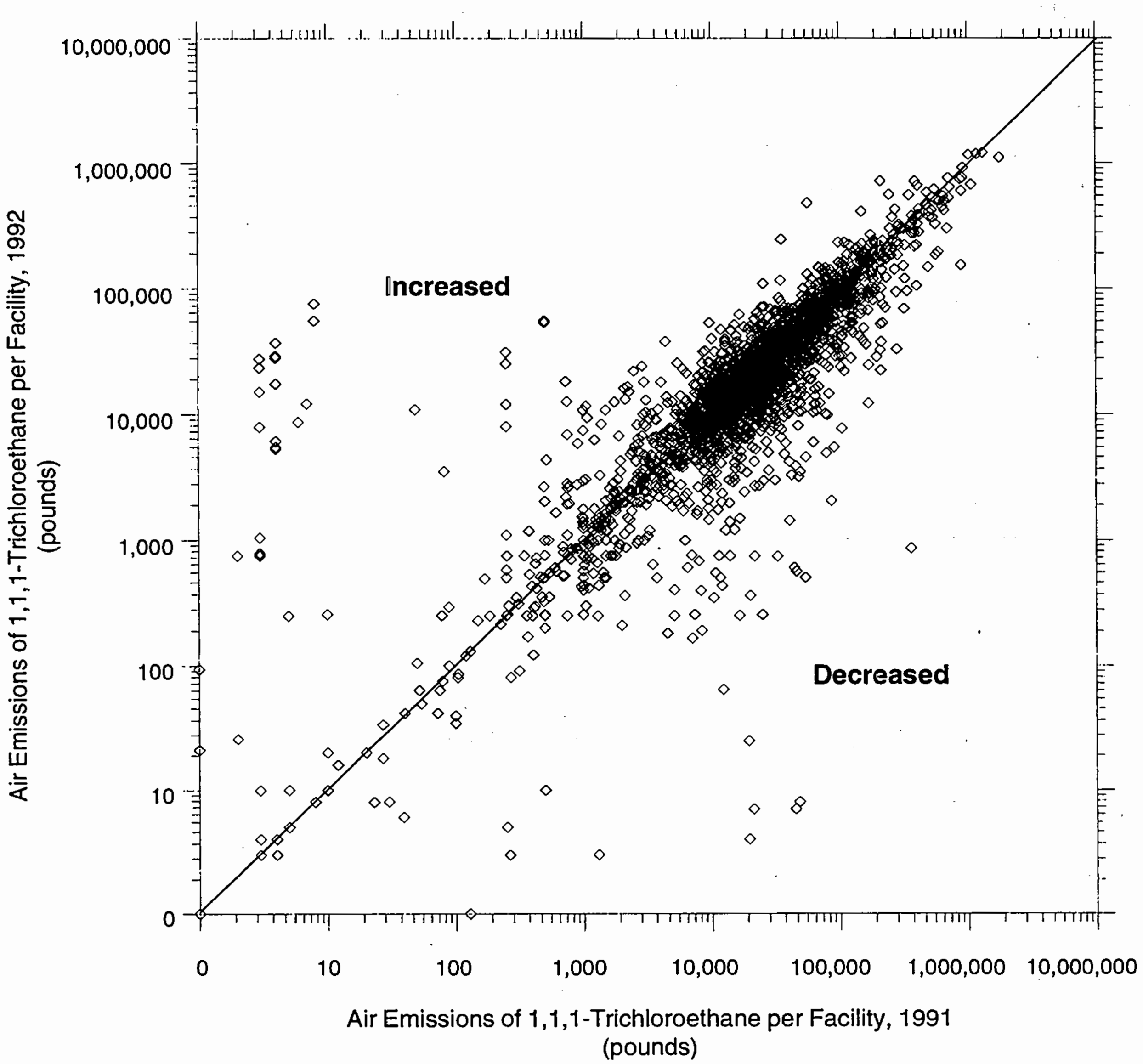

Figure 3-3. Changes in Facilities' TRI Air Emissions of 1,1,1-Trichloroethane (TCA), 1991 and 1992.❷

❷ Includes only those facilities reporting non-zero TCA air emissions in both years.

The total number of reporting facilities declined by 664 between 1991 and 1992, representing a 2.7% net decrease. 2,401 facilities that reported in 1991 did not report in 1992, while 1,737 facilities that reported in 1992 did not report in 1991. The difference between these two numbers, 664 facilities, is equal to the net decrease of total facilities apparent in the data.

Some facilities may not have reported in 1992 because they went out of business between the two reporting years. Of the 2,401 facilities reporting in 1991 but not in 1992, EPA has identified at least 139 (5.8%) that have closed down. Others may not have reported because they did not exceed the thresholds for any of the chemicals in 1992, no longer have ten full-time employees, have changed their business activity to a non-covered SIC code, have filed late submissions, or are out of compliance for some reason.

For example, the state of Illinois contacted TRI facilities in their state who filed 1991 reports but did not file 1992 reports. They received responses from 38 facilities explaining the following reasons why they did not report for 1992:

Explanations for Non-Reporting in Illinois❸

Primary Reason for Not Reporting in 1992	No. of Facilities
Reporting thresholds not exceeded	15
Eliminated use of chemical	6
Discontinued process using chemical	4
Reduced production or product demand	4
Process change	4
Less than 10 full-time employees	2
Source reduction activity	1
Substituted chemical as source reduction	1
Nonfibrous aluminum oxide delisted by EPA	1
Total	38

Sometimes after reporting in one year, facilities discover that they were not required to report because they were not in a covered SIC code or they qualified for an exemption. If they do not withdraw their previous submissions, or if EPA has not yet processed their withdrawals, they appear as part of the net decrease in facilities, because they filed in the previous year, but not the current one.

EPA attempted to determine how much of the change in reported release and transfer amounts between 1991 and 1992 was due to the decline in the number of facilities reporting. To do this, EPA excluded the release and transfer amounts reported by facilities that filed for only one of the two years, 1991 or 1992, but not both. The results of this analysis indicate that the decline in the number of facilities reporting had little overall impact on the release and transfer totals. After

❸ Source: Illinois EPA

adjusting for the change in the universe of reporting facilities, the decrease in releases between 1991 and 1992 is about 6.3% instead of 6.6%, while the increase in transfers is about 18.9% instead of 16.9%.

1992 TRI Top Decreasers in Air/Water/Land Releases

Table 3-2 lists the 50 TRI facilities with the greatest reported decreases in air/water/land releases from 1991 to 1992, ranked by the magnitude of their decrease. Facilities that reported voluntarily or reported for 1991 but not 1992 were not included in Table 3-2. Together, these 50 facilities accounted for reported reductions totalling 172.3 million pounds. Some of the reductions listed in Table 3-2 may be real and others may be due to changes in reporting or use of a different estimation method. EPA contacted some of these facilities to better understand how and why the decreases occurred and whether they were due to production changes, pollution prevention efforts, estimation method change, or reporting errors. Of the fifteen facilities contacted, a total of 23 reasons were given accounting for the changes. Twenty of these reasons represented real reductions of releases and three reasons could be attributed to "paper" changes.

BASF Corp. **Lowland, TN**

Total releases attributable to BASF decreased from almost 21 million pounds to 239 thousand pounds because in 1992 part of the facility (rayon manufacturing operations) was sold to Lenzing Fibers, which reports as a separate facility. Therefore, in 1992, BASF reported for only six of eleven chemicals that they had reported in 1991.

Asarco Inc. **Hayden, AZ**

Releases of zinc compounds to land disposal decreased from 14.4 to 8 million pounds and releases of copper compounds to land decreased from 6.7 to 2.5 million pounds, due to recycling of slag from the smelter. The recycling started in the beginning of 1992.

Phelps Dodge Mining Co. **Playas, NM**

Releases of zinc compounds to land disposal decreased from 8 million to zero pounds. The facility did not report for zinc compounds in 1992 for two reasons. (1) A chemical that does not contain zinc was substituted for zinc chromate which was used to treat cooling water. (2) The levels of zinc compounds in a slag concentrate processed by the smelter were below the de minimis concentration for reporting so the facility no longer reports for this source. The zinc compounds are impurities in the slag which is processed to make a copper product and are still released although the facility is no longer required to report for them.

Releases of copper compounds to land decreased from 14.7 to 10.7 million pounds due to a longer than normal plant shut down. The copper compounds are contained in smelter residual (slag) from the smelter. The plant was shut down for two months in 1992, so releases reported for 1992 were only for a 10-month period instead of 12-month period.

Table 3-2. Top 50 TRI Facilities with the Greatest Decrease in Air/Water/Land Releases from 1991 to 1992.

Facility	City	State	Net Change from 1991 to 1992: Fugitive Nonpoint Air Emissions Pounds	Stack Point Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds
BASF Corp.	Lowland	TN	-1,502,500	-18,024,245	-30,960	-1,393,400
Asarco Inc.	Hayden	AZ	36,377	-58,601	0	-13,476,180
Phelps Dodge Mining Co.	Playas	NM	0	-43,317	0	-12,011,975
Doe Run Co.	Herculaneum	MO	-48	-121,923	253	-9,873,707
Eastman Kodak Co.	Kingsport	TN	-15,658,333	7,464,942	-81,052	114,330
3M Co.	Hutchinson	MN	-538,704	-7,192,925	0	0
Molycorp. Inc.	Mountain Pass	CA	-151,727	-253,993	0	-4,963,011
Wheeling-Pittsburgh Steel Corp.	Mingo Junction	OH	-130	2	-46,314	-4,277,000
Westinghouse Electric Corp.	Ogden	UT	-245	-28,800	0	-4,276,100
Du Pont	Memphis	TN	-61,586	-4,044,534	2,970	0
Magnesium Corp. of America	Rowley	UT	-125,492	-3,903,400	0	-250
Kennecott Utah Copper	Magna	UT	1,900	-61,700	-1,900	-3,949,455
Baxter Healthcare Corp.	Johnson City	TN	-76,335	-3,821,812	0	0
General Motors Corp.	Defiance	OH	34,417	33,667	-43,532	-3,919,726
General Motors Corp.	Saginaw	MI	-4,823	-103,077	0	-3,080,961
Agrico Chemical Co.	Saint James	LA	-240	-5,209,900	2,150,600	16,000
General Electric Co. Plastics	Mount Vernon	IN	-1,198,679	-1,658,157	6,531	0
Miles Inc.	Orange	TX	-2,173,000	-454,945	-132	49
Armco Steel Co. L.P.	Middletown	OH	-450,580	-162,350	-160,974	-1,845,608
Unocal Petroleum Products	Kenai	AK	358,087	-2,941,800	43,961	-4,615
Texas Eastman Co.	Longview	TX	-827,267	-1,402,703	-30,074	-3,002
Upjohn Co.	Portage	MI	-4,000	-2,056,660	-164,490	0
Du Pont Delisle	Pass Christian	MS	-14,703	-2,200,400	0	-100
Du Pont Johnsonville Plant	New Johnsonville	TN	-950	-2,180,100	0	-1,250
Sabh Water Heater Group	Johnson City	TN	-312,272	-1,860,223	0	0
Phillips 66 Co.	Borger	TX	32,647	-2,118,412	-112	-2,211
International Paper Co.	Binghamton	NY	-917,195	-1,136,195	0	0
Reynolds Metals Co.	Muscle Shoals	AL	-185,742	-1,799,738	26	0
Mulberry Phosphates Inc.	Mulberry	FL	-1,999,000	41,037	-4,164	0
Westvaco Corp.	Covington	VA	-150	-1,897,280	3,940	808
Boeing Wichita	Wichita	KS	1,241,186	-2,998,428	11,890	0
Packaging Corp. of America	Clyattville	GA	7,850	-1,304,000	-285,400	4,950
Georgia-Pacific Corp.	Brunswick	GA	-5,890	-1,502,768	-9,700	-28,095
Triad Chemical	Donaldsonville	LA	-2,345	-1,507,839	-21,269	0
Magma Copper Co.	San Manuel	AZ	-20,513	41,750	0	-1,536,636
Wheeling-Pittsburgh Steel Corp.	Follansbee	WV	-121,733	-1,425,280	81,238	0
Cominco Fertilizers	Beatrice	NE	-14,400	-1,501,300	78,900	500
Geneva Steel	Orem	UT	20,897	-11,045	-27,023	-1,412,210
Agricultural Minerals Ltd.	Verdigris	OK	0	-1,412,000	-10,212	-250
Texasgulf Inc.	Aurora	NC	109,700	419,550	-16,650	-1,913,400
Occidental Chemical Corp.	White Springs	FL	-60,000	-14,000	-980	-1,300,000
Inland Steel Co.	East Chicago	IN	-241,246	32,080	-81,409	-1,075,273
Champion International Corp.	Courtland	AL	-273,636	-1,068,220	-5,760	-2,844
Farmland Ind. Inc.	Lawrence	KS	-9,914	-1,152,075	-175,290	-70
Arcadian Fertilizer L.P.	Lake Charles	LA	-180,136	-1,070,000	-63,000	-11
3M Co.	Brownwood	TX	-296	-1,287,955	0	-347
Kohler Co.	Kohler	WI	-351,969	-210,136	-51,296	-651,675
Du Pont Cape Fear Plant	Leland	NC	-101,466	-1,165,793	1,576	27,297
Marine Shale Processors Inc.	Amelia	LA	483	-1,224,435	48	0
Aristech Chemical Corp.	Haverhill	OH	230	-1,219,551	57	0
Total			-25,743,471	-76,778,987	1,070,297	-70,835,428

Table 3-2.

Facility	City	State	1991 Total Air/ Water/Land Releases Pounds	1992 Total Air/ Water/Land Releases Pounds	1991 to 1992 Change in Total Air/Water/Land Releases Pounds
BASF Corp.	Lowland	TN	21,190,120	239,015	-20,951,105
Asarco Inc.	Hayden	AZ	26,483,591	12,985,187	-13,498,404
Phelps Dodge Mining Co.	Playas	NM	23,847,647	11,792,355	-12,055,292
Doe Run Co.	Herculaneum	MO	16,473,112	6,477,687	-9,995,425
Eastman Kodak Co.	Kingsport	TN	40,582,580	32,422,467	-8,160,113
3M Co.	Hutchinson	MN	13,384,468	5,652,839	-7,731,629
Molycorp. Inc.	Mountain Pass	CA	6,388,368	1,019,637	-5,368,731
Wheeling-Pittsburgh Steel Corp.	Mingo Junction	OH	7,770,134	3,446,692	-4,323,442
Westinghouse Electric Corp.	Ogden	UT	4,376,865	71,720	-4,305,145
Du Pont	Memphis	TN	6,205,055	2,101,905	-4,103,150
Magnesium Corp. of America	Rowley	UT	64,937,205	60,908,063	-4,029,142
Kennecott Utah Copper	Magna	UT	14,234,230	10,223,075	-4,011,155
Baxter Healthcare Corp.	Johnson City	TN	3,902,357	4,210	-3,898,147
General Motors Corp.	Defiance	OH	7,364,915	3,469,741	-3,895,174
General Motors Corp.	Saginaw	MI	9,008,413	5,819,552	-3,188,861
Agrico Chemical Co.	Saint James	LA	93,843,660	90,800,120	-3,043,540
General Electric Co. Plastics	Mount Vernon	IN	4,965,224	2,114,919	-2,850,305
Miles Inc.	Orange	TX	4,928,554	2,300,526	-2,628,028
Armco Steel Co. L.P.	Middletown	OH	5,019,633	2,400,121	-2,619,512
Unocal Petroleum Products	Kenai	AK	11,455,765	8,911,398	-2,544,367
Texas Eastman Co.	Longview	TX	6,651,161	4,388,115	-2,263,046
Upjohn Co.	Portage	MI	5,147,475	2,922,325	-2,225,150
Du Pont Delisle	Pass Christian	MS	6,158,833	3,943,630	-2,215,203
Du Pont Johnsonville Plant	New Johnsonville	TN	7,217,900	5,035,600	-2,182,300
Sabh Water Heater Group	Johnson City	TN	2,521,685	349,190	-2,172,495
Phillips 66 Co.	Borger	TX	4,095,699	2,007,611	-2,088,088
International Paper Co.	Binghamton	NY	2,380,355	326,965	-2,053,390
Reynolds Metals Co.	Muscle Shoals	AL	2,830,297	844,843	-1,985,454
Mulberry Phosphates Inc.	Mulberry	FL	2,059,899	97,772	-1,962,127
Westvaco Corp.	Covington	VA	6,849,620	4,956,938	-1,892,682
Boeing Wichita	Wichita	KS	6,227,418	4,482,066	-1,745,352
Packaging Corp. of America	Clyattville	GA	2,360,710	784,110	-1,576,600
Georgia-Pacific Corp.	Brunswick	GA	4,495,896	2,949,443	-1,546,453
Triad Chemical	Donaldsonville	LA	5,658,778	4,127,325	-1,531,453
Magma Copper Co.	San Manuel	AZ	24,077,899	22,562,500	-1,515,399
Wheeling-Pittsburgh Steel Corp.	Follansbee	WV	2,704,874	1,239,099	-1,465,775
Cominco Fertilizers	Beatrice	NE	1,925,710	489,410	-1,436,300
Geneva Steel	Orem	UT	1,811,253	381,872	-1,429,381
Agricultural Minerals Ltd.	Verdigris	OK	2,954,598	1,532,136	-1,422,462
Texasgulf Inc.	Aurora	NC	15,841,460	14,440,660	-1,400,800
Occidental Chemical Corp.	White Springs	FL	8,973,510	7,598,530	-1,374,980
Inland Steel Co.	East Chicago	IN	32,549,405	31,183,557	-1,365,848
Champion International Corp.	Courtland	AL	2,110,361	759,901	-1,350,460
Farmland Ind. Inc.	Lawrence	KS	3,794,029	2,456,680	-1,337,349
Arcadian Fertilizer L.P.	Lake Charles	LA	4,023,162	2,710,015	-1,313,147
3M Co.	Brownwood	TX	2,520,455	1,231,857	-1,288,598
Kohler Co.	Kohler	WI	1,359,374	94,298	-1,265,076
Du Pont Cape Fear Plant	Leland	NC	5,661,502	4,423,116	-1,238,386
Marine Shale Processors Inc.	Amelia	LA	3,569,059	2,345,155	-1,223,904
Aristech Chemical Corp.	Haverhill	OH	2,651,831	1,432,567	-1,219,264
Total			567,546,104	395,258,515	-172,287,589

Doe Run Co. **Herculaneum, MO**

Releases of zinc compounds to land disposal decreased from 12.7 to 4.6 million pounds and releases of lead compounds to land disposal decreased from 3.1 to 1.6 million pounds due to lower production in 1992, primarily from recycling less slag received from another plant and partly from reduced processing of lead ore. By recycling less slag from another facility, they were able to recycle more of their own slag in 1992, resulting in less land releases.

Eastman Kodak Co. **Kingsport, TN**

Total air emissions of acetone decreased from 31.7 to 25.4 million pounds due to implementation of pollution prevention measures to reduce emissions. The acetone is used as a solvent to dissolve cellulose which is spun into fibers for further use in cigarette filters. The acetone evaporates during the spinning. To reduce emissions, the spinning machines are enclosed inside large plastic curtains to capture some of the acetone emissions and channel them to scrubbers that remove the acetone from the air. Air scrubbers and additional carbon bed systems to adsorb the acetone were installed. The acetone recovered is recycled on-site. Existing carbon beds are being upgraded with a constant monitoring system which will act as an early-warning sign if there is a problem in the carbon beds and which will also allow better monitoring of acetone emissions.

The manufacturing division responsible for the majority of the acetone emissions has committed to a 50 percent reduction based on their highest emissions level (26.2 million pounds in 1989) by year-end 1993. The $26 million acetone emission recovery project began in 1991 and is slated for completion in 1993, which should enable attainment of their 50% reduction goal. This division's 1992 acetone emissions were 17.1 million pounds, a 35% decrease since 1989.

3M Co. **Hutchinson, MN**

Releases of stack air emissions of methyl ethyl ketone decreased from 7.9 to 3 million pounds and of toluene decreased from 4.2 to 2.1 million pounds due to recovery and reuse of these solvents. 3M spent about $23 million to install a solvent recovery and distillation system, which began operating in 1992. 3M has a corporate goal to reduce all air emissions by 90% by 1995 as part of their "Pollution Prevention Pays" project. This goal will be achieved before 1995. The savings due to solvent recovery are enough to cover the cost of the additional distillation.

Molycorp. Inc. **Mountain Pass, CA**

Releases of ammonium nitrate (solution) to a surface impoundment decreased from 5.8 million to 682 thousand pounds due to shut down of a process operation. Molycorp also reduced chlorine air emissions from 304 thousand to 32 thousand pounds (89% reduction) due to a voluntary installation of a chlorine scrubber.

Wheeling-Pittsburgh Steel Corp. **Mingo Junction, OH**

Releases of zinc compounds to landfill decreased from 7 to 3 million pounds. The zinc compounds are in sludge from the basic oxygen furnace process. In 1992, 3 million pounds of zinc compounds were transferred to an off-site landfill in addition to the 3 million pounds landfilled on-site. Thus the total amount of zinc compounds from the sludge was 6 million pounds in 1992, resulting in an actual decrease of 1 million pounds being disposed of either on-site or off-site.

Westinghouse Electric Corp. **Ogden, UT**

Releases of ammonia to a surface impoundment decreased from 3.8 million to zero pounds. Westinghouse began biological treatment of its waste water effluent in 1992.

Du Pont **Memphis, TN**

Stack air emissions of methanol decreased from 1.9 million to 593 thousand pounds and stack air emissions of acetone decreased from 3.4 million to 802 thousand pounds for two reasons. The main reason is that a flare system became operational in July of 1992 that is 98% efficient in destroying volatile chemicals that had previously been emitted to the air. The secondary reason is that the methyl methacrylate process that used methanol and acetone as feedstocks was shut down for 8 weeks in 1992. The releases reported by the facility will decrease even further in 1993, since this methyl methacrylate operation was sold in July 1993.

Magnesium Corp. of America **Rowley, UT**

Stack air emissions of chlorine decreased from 61 to 57 million pounds due to installation in 1991 and operation in 1991 and 1992 of new chlorine reduction burners. Also, in 1992, a new chlorine compressor and Freon unit were installed that increased efficiency in recovering and liquefying chlorine for sale. A lower plant production rate also contributed to lower chlorine emissions.

Kennecott Utah Copper **Magna, UT**

Releases of sulfuric acid to land treatment and other land disposal decreased from 6 million to 150 thousand pounds. In 1991, the facility had a very large spill of sulfuric acid due to a tank failure. The releases to land in 1992 are the result of four different spill incidents. All spills underwent remedial action.

General Motors Corp. **Defiance, OH**

Releases of manganese compounds to land disposal decreased from 5 to 1.5 million pounds. The facility reports releases to an on-site landfill and to a settling basin which contains emission control sludges and slag. In 1991, the basin was dredged and solids removed to the landfill which resulted in a larger than normal land release. The facility did not dredge the basin in 1992, so their land releases were less than those for 1991.

General Motors Corp. **Saginaw, MI**

Releases of manganese to land disposal decreased from 2.2 to 1.2 million pounds due to increased efficiency in manganese use. GMC's Saginaw facility produces automotive castings and adds a manganese alloy to increase strength of the castings. Increased casting strength was achieved with the use of less manganese in 1992, resulting in less releases of manganese in waste water treatment sludge sent to a landfill.

Releases of zinc (fume or dust) to landfill decreased from 6 to 4.1 million pounds because the facility substituted a 100% zinc coating for galvanized steel with a coating containing 50% zinc/ 50% plaque iron. The reduction in manganese and zinc releases were motivated by GMC's efforts to reduce their overall releases of hazardous materials to land.

Agrico Chemical Co. **Saint James, LA**

Stack air releases of ammonia decreased from 11.6 to 6.4 million pounds and releases of sulfuric acid to water decreased from 14.2 to 11.3 million pounds. The ammonia is used to make ammoniated phosphate fertilizer. The ammonia decrease was due to a scrubber system that was installed at the end of 1991/beginning of 1992. The scrubber water is then reused in the process. The reason for reduction in sulfuric acid releases could not be determined.

1992 TRI Top Increasers in Air/Water/Land Releases

Table 3-3 lists the top 50 TRI facilities with the greatest reported increases in air/water/land releases from 1991 to 1992, ranked by the magnitude of their increase. Facilities that reported voluntarily or reported for 1992 but not 1991 were not included in Table 3-3. Together, these 50 facilities accounted for reported increases of 119.5 million pounds. Some of the increases listed in Table 3-3 may be real and others may be due to changes in reporting or use of a different estimation method. EPA contacted some of these facilities to better understand how and why the increases occurred and whether they were due to production changes, estimation method change, reporting errors, or other factors. Of the twelve facilities contacted, a total of 15 reasons were given accounting for the changes. Of these 15, ten represented real increases in releases and five reasons could be attributed to "paper" changes.

Lenzing Fibers Corp. **Lowland, TN**

Total releases increased from zero to 20.4 million pounds. The releases from this facility are from a rayon manufacturing operation that was sold by BASF to Lenzing in 1992. In 1992, Lenzing reported as a separate facility. Even though the ownership of the operation was split in 1992, Lenzing reported the releases for all of 1992.

Arcadian Fertilizer L.P. **Geismar, LA**

water from the clean rain water. The seepage water, which contains recoverable amounts of phosphoric acid and sulfuric acid, will be recycled to the production units to become raw materials and marketable product. The clean rain water will be discharged. By the end of 1993, the cover and closure work will have decreased the gypsum-stacking area that is active (uncovered) to 35%. This is expected to result in a 75% reduction in total discharges to water by the beginning of 1994 for the three Agrico plants in Louisiana.

Amoco Oil Co. **Texas City, TX**

Releases to land treatment and other land disposal of 17 chemicals increased by 4.4 million pounds. Napthalene releases increased by 1.5 million pounds, xylene releases increased by 1 million pounds, toluene releases increased by 517 thousand pounds, 1,2,4-trimethyl benzene increased by 340 thousand pounds, and ethyl benzene increased by 248 thousand pounds. Chromium compounds, zinc compounds, and vanadium (fume or dust) increased by 229 thousand pounds, 169 thousand pounds, and 23 thousand pounds, respectively. The increases for the 17 chemicals were due to site remediation and soil removal around storage basins and storage tanks.

IMC Fertilizer Inc. **Mulberry, FL**

Releases of phosphoric acid to land increased from 9.1 to 12.7 million pounds due to increased vertical seepage underground from an unlined clay recirculation pond containing gypsum stacks. The facility is a phosphate fertilizer plant. The increase was caused by the installation of a slurry wall around the pond to decrease the lateral seepage rate of water. The increase in vertical seepage was detected by a monitoring well system near the pond and corrective action was taken. A new recirculation pond was installed. Reductions in releases are expected for the 1994 calendar year.

Arcadian Fertilizer L.P. **Memphis, TN**

Stack air emissions of ammonia increased from 3.6 to 7.2 million pounds due to process equipment that was not functioning efficiently. The facility produces ammonia and converts it to urea. The ammonia losses are associated with the production of urea. The equipment problems have been fixed.

Cabot Corp. **Ville Platte, LA**

Releases of stack air emissions of carbon disulfide increased from 563 thousand to 2.2 million pounds. The facility burns fuel oil to make carbon black, and carbon disulfide is produced as a byproduct from the residual sulfur in the fuel oil. Some of the tail gas containing carbon disulfide is further burned in dryers and heaters and some is vented to the air. Stack testing at the facility 14 months ago resulted in a change in their method of estimating the amount of carbon disulfide plus two other pollutants, carbon oxides and hydrogen sulfide which resulted in a higher release estimate. In addition, there was a slight increase in production and in the amount of sulfur in the feedstock, which also increased the emissions reported.

Table 3-3. Top 50 TRI Facilities with the Greatest Increase in Air/Water/Land Releases from 1991 to 1992.

			Net Change from 1991 to 1992			
Facility	City	State	Fugitive Nonpoint Air Emissions Pounds	Stack Point Air Emissions Pounds	Surface Water Discharges Pounds	Releases to Land Pounds
Lenzing Fibers Corp.	Lowland	TN	1,600,510	18,800,255	27,500	0
Arcadian Fertilizer L.P.	Geismar	LA	272,370	94,040	16,078,550	479,860
Mobil Mining & Minerals Co.	Pasadena	TX	12,980	-307,300	13,864,810	-17,105
Agrico Chemical Co.	Uncle Sam	LA	-6,164	-405,660	9,664,523	2,604
Amoco Oil Co.	Texas City	TX	-58,979	-35,641	151,130	4,437,496
IMC Fertilizer Inc.	Mulberry	FL	147,000	-84,100	0	3,633,000
Arcadian Fertilizer L.P.	Memphis	TN	-41,703	3,652,400	9,701	0
Cabot Corp.	Ville Platte	LA	1,000	2,881,900	0	0
Asarco Inc.	East Helena	MT	-9,068	8,777	0	2,451,422
Nicca USA Inc.	Fountain Inn	SC	-5	750	0	2,235,040
Cabot Corp.	Franklin	LA	1,000	1,872,464	0	0
CPI	Wisconsin Rapids	WI	0	1,833,500	-350	0
Aqualon Co.	Hopewell	VA	1,499,037	239,794	-11	-2,075
Asarco Inc.	Annapolis	MO	104,020	43,252	-239	1,426,263
Grain Processing Corp.	Muscatine	IA	-22,033	1,555,745	0	0
Bowater Inc.	Catawba	SC	-5,915	290,297	96,053	1,106,674
Missouri Chemical Works	Louisiana	MO	1,487,740	-67,000	-813	12,000
Northway Cabinetry Div.	Rensselaer	IN	1,382,650	19,900	0	0
ITT Rayonier Inc.	Port Angeles	WA	-365	487,670	868,140	0
SCM Chemicals Americas	Ashtabula	OH	640	1,331,102	0	0
Arco Chemical Co.	Pasadena	TX	980,416	130,605	0	0
Chevron USA Products Co.	Port Arthur	TX	1,006,464	112,545	-1,892	-16,803
Du Pont Repauno Plant	Gibbstown	NJ	2,512	1,071,139	155	0
Georgia-Pacific Corp.	New Augusta	MS	-4,277	1,149,403	-100,729	-23,594
Degussa Carbon Black Ivanhoe	Louisa	LA	0	1,017,000	0	0
Union Camp Corp.	Eastover	SC	10,845	978,200	-100	-1,295
SCM Chemicals	Ashtabula	OH	635	973,570	-35	0
Mobil Chemical Co.	Beaumont	TX	238,421	728,589	-1,203	299
Northwestern Steel & Wire Co.	Sterling	IL	-8,020	-18,510	980	990,000
Mead Coated Board Inc.	Cottonton	AL	-2,915	930,000	6,161	-1,245
Hickory Springs Mfg. Co.	Conover	NC	-25,232	935,002	0	0
Holliston Mills Inc.	Church Hill	TN	4,319	859,125	-300	0
Ford Motor Co.	Claycomo	MO	99,721	736,990	0	0
SCM Chemicals	Baltimore	MD	141	809,286	275	0
Mobil Chemical Co.	Beaumont	TX	699,877	93,451	294	-4
Eli Lilly & Co.	Clinton	IN	-1,006,255	1,900,753	19,945	-122,375
Garden State Tanning	Fleetwood	PA	-37,019	814,341	0	0
Mt. Joy Wire Corp.	Mount Joy	PA	744,844	5,378	0	0
Chrysler Corp.	Detroit	MI	156,321	556,199	0	0
Sun Graphic Inc.	Pompano Beach	FL	96,700	589,844	0	0
Anchor Continental Inc.	Columbia	SC	20,118	649,001	0	0
Zexel USA Corp.	Grand Prairie	TX	663,202	375	0	0
Chino Mines Co.	Hurley	NM	0	-31,326	0	683,500
Griffin Wheel Co.	Bessemer	AL	0	0	0	647,800
Federal Paper Board Co. Inc.	Riegelwood	NC	-56,160	689,440	-6,648	9,500
James River U.S. Holdings Inc.	Berlin	NH	-33,898	677,874	14,145	-23,626
Rhone-Poulenc Ag Co.	Institute	WV	52,707	576,406	2,405	2,160
Lubrizol Petroleum Chemicals	Pasadena	TX	82,428	537,470	0	0
American Tape Co.	Marysville	MI	-1,930,150	2,544,272	0	0
Lubrizol Corp.	Deer Park	TX	48,200	545,764	783	0
Total			8,168,660	52,774,331	40,693,230	17,909,496

Table 3-3.

Facility	City	State	1991 Total Air/ Water/Land Releases Pounds	1992 Total Air/ Water/Land Releases Pounds	1991 to 1992 Change in Total Air/Water/Land Releases Pounds
Lenzing Fibers Corp.	Lowland	TN	0	20,428,265	20,428,265
Arcadian Fertilizer L.P.	Geismar	LA	23,563,341	40,488,161	16,924,820
Mobil Mining & Minerals Co.	Pasadena	TX	969,191	14,522,576	13,553,385
Agrico Chemical Co.	Uncle Sam	LA	49,187,528	58,442,831	9,255,303
Amoco Oil Co.	Texas City	TX	1,137,130	5,631,136	4,494,006
IMC Fertilizer Inc.	Mulberry	FL	10,074,105	13,770,005	3,695,900
Arcadian Fertilizer L.P.	Memphis	TN	4,220,148	7,840,546	3,620,398
Cabot Corp.	Ville Platte	LA	793,200	3,676,100	2,882,900
Asarco Inc.	East Helena	MT	38,623,430	41,074,561	2,451,131
Nicca USA Inc.	Fountain Inn	SC	5	2,235,790	2,235,785
Cabot Corp.	Franklin	LA	2,453,900	4,327,364	1,873,464
CPI	Wisconsin Rapids	WI	1,362,205	3,195,355	1,833,150
Aqualon Co.	Hopewell	VA	1,261,700	2,998,445	1,736,745
Asarco Inc.	Annapolis	MO	6,690,831	8,264,127	1,573,296
Grain Processing Corp.	Muscatine	IA	820,166	2,353,878	1,533,712
Bowater Inc.	Catawba	SC	2,461,883	3,948,992	1,487,109
Missouri Chemical Works	Louisiana	MO	385,015	1,816,942	1,431,927
Northway Cabinetry Div.	Rensselaer	IN	318,950	1,721,500	1,402,550
ITT Rayonier Inc.	Port Angeles	WA	2,506,835	3,862,280	1,355,445
SCM Chemicals Americas	Ashtabula	OH	49,961	1,381,703	1,331,742
Arco Chemical Co.	Pasadena	TX	1,493,394	2,604,415	1,111,021
Chevron USA Products Co.	Port Arthur	TX	1,883,910	2,984,224	1,100,314
Du Pont Repauno Plant	Gibbstown	NJ	79,319	1,153,125	1,073,806
Georgia-Pacific Corp.	New Augusta	MS	491,514	1,512,317	1,020,803
Degussa Carbon Black Ivanhoe	Louisa	LA	1,400,000	2,417,000	1,017,000
Union Camp Corp.	Eastover	SC	337,075	1,324,725	987,650
SCM Chemicals	Ashtabula	OH	18,679	992,849	974,170
Mobil Chemical Co.	Beaumont	TX	613,472	1,579,578	966,106
Northwestern Steel & Wire Co.	Sterling	IL	11,975,640	12,940,090	964,450
Mead Coated Board Inc.	Cottonton	AL	1,245,211	2,177,212	932,001
Hickory Springs Mfg. Co.	Conover	NC	451,837	1,361,607	909,770
Holliston Mills Inc.	Church Hill	TN	3,780,619	4,643,763	863,144
Ford Motor Co.	Claycomo	MO	1,726,251	2,562,962	836,711
SCM Chemicals	Baltimore	MD	86,200	895,902	809,702
Mobil Chemical Co.	Beaumont	TX	751,382	1,545,000	793,618
Eli Lilly & Co.	Clinton	IN	3,209,685	4,001,753	792,068
Garden State Tanning	Fleetwood	PA	975,601	1,752,923	777,322
Mt. Joy Wire Corp.	Mount Joy	PA	293,360	1,043,582	750,222
Chrysler Corp.	Detroit	MI	5,188	717,708	712,520
Sun Graphic Inc.	Pompano Beach	FL	14,612	701,156	686,544
Anchor Continental Inc.	Columbia	SC	2,279,583	2,948,702	669,119
Zexel USA Corp.	Grand Prairie	TX	66,440	730,017	663,577
Chino Mines Co.	Hurley	NM	6,826,658	7,478,832	652,174
Griffin Wheel Co.	Bessemer	AL	92,760	740,560	647,800
Federal Paper Board Co. Inc.	Riegelwood	NC	3,044,860	3,680,992	636,132
James River U.S. Holdings Inc.	Berlin	NH	582,773	1,217,268	634,495
Rhone-Poulenc Ag Co.	Institute	WV	890,453	1,524,131	633,678
Lubrizol Petroleum Chemicals	Pasadena	TX	204,662	824,560	619,898
American Tape Co.	Marysville	MI	3,296,894	3,911,016	614,122
Lubrizol Corp.	Deer Park	TX	266,959	861,706	594,747
Total			195,264,515	314,810,232	119,545,717

Asarco Inc. **East Helena, MT**

Releases of zinc compounds to land disposal increased from 31 to 32.7 million pounds due to lower quality of ore. The facility is a metal smelter and in 1992 the ore contained a higher concentration of metal compounds that they cannot smelt. The zinc compounds are removed in the slag from the smelter to a pile on the facility's property. Testing has shown that the metals are not leaching from the slag.

Nicca USA Inc. **Fountain Inn, SC**

Releases of ammonium sulfate (solution) to land treatment/application increased from zero to 2.2 million pounds due to a reporting error. The facility did not apply ammonium sulfate (solution) to the land. Rather, they transfer the chemical off-site to another facility that uses it as fertilizer. Nicca produces ammonium sulfate (solution) as a byproduct of the manufacture of textile chemicals. The facility has sent in a revision to correct their 1992 ammonium sulfate (solution) report.

Cabot Corp. **Franklin, LA**

Total stack air releases of carbon disulfide, carbonyl sulfide, hydrogen sulfide, and ethylene increased by 1.9 million pounds. Cabot produces carbon black from a heavy feedstock oil. The chemicals released are produced as byproducts as a result of incomplete combustion (flue gases). The increases were due to (1) increased production and (2) stack testing results.

CPI (Consolidated Papers Inc.) **Wisconsin Rapids, WI**

Reported releases of stack air emissions of methanol increased from 920 thousand to 2.8 million due to a change in estimation method. The methanol is a byproduct from the wood pulping process. Prior to 1992, the facility used emission factors developed by a pulp and paper industry association. In 1992, the methanol emissions were based on test monitoring data which resulted in a larger, but more accurate, estimate. The facility plans to revise their estimates for prior years using an emission factor based on the more accurate test data.

1992 TRI Top Decreasers in Underground Injection

Table 3-4 lists the 50 TRI facilities with the greatest reported decreases in underground injection from 1991 to 1992, ranked by the magnitude of their decrease. Facilities that reported voluntarily or reported for 1991 but not 1992 were not included in Table 3-4. Together, these 50 facilities accounted for reported reductions totalling 55.7 million pounds. Some of the decreases listed in Table 3-4 may be real and others may be due to changes in reporting or use of a different estimation method. EPA contacted some of these facilities to better understand how and why the decreases occurred and whether they were due to production changes, pollution prevention efforts, estimation method change, or reporting errors. Of the eight facilities contacted, a total of 10 reasons were given accounting for the changes. Of these 10, seven represented real decreases and three reasons could be attributed to "paper" changes.

BASF Corp. **Geismar, LA**

Underground injection of hydrochloric acid decreased from 12 to 0 million pounds due to favorable market conditions. Hydrochloric acid is produced as a byproduct that BASF was able to sell in 1992.

Table 3-4. Top 50 TRI Facilities with the Greatest Decrease in Underground Injection from 1991 to 1992.

Facility	City	State	1991 Underground Injection Pounds	1992 Underground Injection Pounds	1992 to 1991 Changes in Underground Injection Pounds
BASF Corp.	Geismar	LA	12,000,036	0	-12,000,036
Citgo Petroleum Corp.	Lake Charles	LA	9,284,726	3,930,990	-5,353,736
Du Pont Johnsonville Plant	New Johnsonville	TN	52,000,000	47,000,000	-5,000,000
BP Chemicals Inc.	Lima	OH	24,508,895	20,363,250	-4,145,645
Du Pont	La Porte	TX	7,681,000	3,710,700	-3,970,300
Du Pont	Victoria	TX	25,602,557	22,060,820	-3,541,737
Mobil Oil Corp.	Chalmette	LA	3,269,610	55,885	-3,213,725
Monsanto Co.	Cantonment	FL	8,644,827	6,028,556	-2,616,271
BP Chemicals Inc.	Port Lavaca	TX	28,963,776	26,767,584	-2,196,192
Great Lakes Chemical Corp.	El Dorado	AR	4,052,730	1,935,400	-2,117,330
Zeneca Inc.	Bucks	AL	7,982,277	6,269,383	-1,712,894
Engelhard Corp.	Jackson	MS	7,368,299	5,992,194	-1,376,105
Zeneca Specialties	Mount Pleasant	TN	17,528,207	16,508,125	-1,020,082
Texaco Refining & Marketing	Bakersfield	CA	1,692,592	738,005	-954,587
Celanese Engineering Resins	Bishop	TX	1,941,082	1,134,480	-806,602
Witco Corp.	Harvey	LA	1,023,000	290,000	-733,000
Borden Chemicals & Plastics	Geismar	LA	1,418,488	949,028	-469,460
Hoechst-Celanese Chemical	Bay City	TX	2,756,699	2,346,305	-410,394
Wil-Gro Fertilizer Inc.	Pryor	OK	1,223,200	823,270	-399,930
Merichem Co.	Houston	TX	3,719,400	3,327,300	-392,100
Ethyl Corp.	Magnolia	AR	1,837,800	1,500,000	-337,800
W. R. Grace & Co.	Deer Park	TX	575,686	238,771	-336,915
Aristech Chemical Corp.	Haverhill	OH	2,270,220	1,984,103	-286,117
Witco Corp.	Taft	LA	2,393,371	2,142,937	-250,434
Du Pont	La Place	LA	1,020,610	810,188	-210,422
Great Lakes Chemical Corp.	Marysville	AR	590,000	380,000	-210,000
Upjohn Co.	Portage	MI	2,635,900	2,465,990	-169,910
Great Lakes Chemical Corp.	El Dorado	AR	800,344	632,015	-168,329
Uniroyal Chemical Co. Inc.	Geismar	LA	9,769,920	9,617,920	-152,000
Agricultural Minerals Ltd.	Verdigris	OK	1,288,000	1,138,000	-150,000
Sandoz Agro Inc.	Beaumont	TX	756,660	653,440	-103,220
Texaco Refining & Marketing	Bakersfield	CA	242,128	143,276	-98,852
BHP Petroleum Americas	Kapolei	HI	140,030	45,030	-95,000
American Cyanamid Co.	Milton	FL	305,585	220,038	-85,547
Western Sugar Co.	Lovell	WY	81,450	0	-81,450
Plymouth Tube Co.	Streator	IL	77,791	0	-77,791
Asarco Inc.	Amarillo	TX	5,881,195	5,808,239	-72,956
Total Petroleum Inc.	Alma	MI	342,977	271,994	-70,983
Arco Chemical Co.	Channelview	TX	998,083	928,895	-69,188
Zeneca Inc.	Saint Gabriel	LA	83,278	23,866	-59,412
Chevron Chemical Co.	Belle Chasse	LA	357,053	299,810	-57,243
Cominco Fertilizers Inc.	Borger	TX	418,821	372,217	-46,604
Bit Mfg. Inc.	Copperhill	TN	34,000	250	-33,750
Du Pont	Orange	TX	4,376,529	4,347,083	-29,446
Imco Recycling Inc.	Sapulpa	OK	58,000	43,900	-14,100
BASF Corp.	Freeport	TX	13,000	520	-12,480
Martin Marietta Magnesia	Manistee	MI	96,000	85,000	-11,000
Gelman Sciences Inc.	Ann Arbor	MI	9,096	0	-9,096
Diamond Shamrock Inc.	Sunray	TX	614,620	606,448	-8,172
Oxy Petrochemical Inc.	Corpus Christi	TX	9,050	2,100	-6,950
Total			260,738,598	204,993,305	-55,745,293

Citgo Petroleum Corp. **Lake Charles, LA**

Underground injection of ammonia decreased from 8.8 to 3.8 million pounds due to on-site treatment of ammonia. The ammonia is in contact cooling water used in the refining process. The ammonia is stripped from the water with 99.9% efficiency and then sent to a furnace to be burned. Half of the remaining process water from the stripper is recycled back to the process for reuse. The other half is sent to waste water treatment where the ammonia is denitrified using biological treatment.

Du Pont Johnsonville Plant **New Johnsonville, TN**

Underground injection of hydrochloric acid decreased from 52 to 47 million pounds due to a change in raw materials.

BP Chemicals Inc. **Lima, OH**

Underground injection of acrylic acid decreased from 5.7 million to 500 thousand pounds due to a change in estimation methods. Reported acrylic acid releases decreased between 1991 and 1992 because BP had been over-reporting in the past. They conducted internal research to improve their analytical procedures for their deepwell stream and determined that their previous analytical technique was biased toward very high results. Their new analytical techniques were put into effect in 1992.

Du Pont **LaPorte, TX**

Underground injection of vinyl acetate decreased from 2.1 million to 840 thousand pounds and methanol to underground injection decreased from 5.1 to 2.6 million pounds due to less process upsets and improved wastewater stream monitoring. This was the result of extensive investigation of processes producing underground injection streams leading to better training of operating personnel and quicker response time to process upsets. The company expects to report an additional decrease of 1.4 million pounds of TRI chemicals from 1992 to 1993.

Du Pont **Victoria, TX**

Underground injection of nitric acid decreased from 19.8 million to 17.9 million pounds. One reason for the decline (accounting for 85% of the reduction) is better analytical techniques. More regular sampling is used to develop better data used to estimate releases. Another reason (accounting for 15% of the reduction) is a reduction of line purging prior to sampling and better housekeeping and maintenance.

Mobil Oil Corp. **Chalmette, LA**

Underground injection of ammonia decreased from 3 million to 12 thousand pounds due to installation of a sour water stripper which removed the ammonia. The ammonia is then converted to water and nitrogen in the facility's sulfur plant.

Monsanto Co. **Cantonment, FL**

Underground injection of ammonium nitrate (solution) decreased from 5.6 to 4.6 million pounds due to improved equalization of a waste stream without the addition of ammonia. Ammonia had been added to the waste stream containing nitric acid which reacted to form ammonium nitrate.

1992 TRI Top Increasers in Underground Injection

Table 3-5 lists the top 50 TRI facilities with the greatest reported increases in underground injection from 1991 to 1992, ranked by the magnitude of their increase. Facilities that reported voluntarily or reported for 1992 but not 1991 were not included in Table 3-5. Together, these 50 facilities accounted for reported increases of 72 million pounds. Some of the increases listed in Table 3-5 may be real and others may be due to changes in reporting or use of a different estimation method. EPA contacted some of these facilities to better understand how and why the increases occurred and whether they were due to production changes, estimation method change, reporting errors, or other factors. Of the 11 facilities contacted, a total of 17 reasons were given accounting for the changes. Of these 17, fourteen represented real increases and three reasons could be attributed to "paper" changes.

Vulcan Chemicals **Wichita, KS**

Underground injection of hydrochloric acid increased from 35 to 44.3 million pounds due to an increase in production in 1992 which resulted in production of hydrochloric acid in excess of sales demand.

Du Pont Delisle **Pass Christian, LA**

Underground injection of hydrochloric acid increased from 41 to 52 million pounds. The facility manufactures titanium dioxide and hydrochloric acid is a byproduct. The increase is due to an increase in production by a factor of 1.5 from 1991 to 1992. It is also due to changes in the quality of titanium ore as well as increased rainfall which leaches ore piles.

Du Pont Louisville Plant **Louisville, KY**

Underground injection of hydrochloric acid increased from 22 to 29 million pounds. Due to seasonal fluctuations in market conditions, Du Pont was unable to sell all of its byproduct hydrochloric acid, which is produced during the manufacture of Freon 22 and other CFCs. After developing additional storage for the acid so it can be sold when the market is more favorable, Du Pont was able to shut down its Louisville Deepwell in September 1992.

American Cyanamid Co. **Westwego, LA**

Underground injection of ammonia increased from 47 to 50 million pounds. An increased concentration of ammonia (at the parts per million level) in the deepwell stream resulted from fluctuations in the process. This produced a large change in the amount of ammonia injected. Also an increase in production increased the ammonia waste stream.

Cabot Corp. **Tuscola, IL**

Underground injection of hydrochloric acid increased from 14.2 to 18.9 million pounds due to poor market conditions for the sale of hydrochloric acid. The hydrochloric acid is a byproduct from their manufacturing process. Their 1992 production of hydrochloric acid remained the same as for 1991, and what could not be sold was deep well injected. The facility expects a dramatic decrease for the 1993 report, since they sold all the hydrochloric acid they made in 1993.

Angus Chemical Co. **Sterlington, LA**

Underground injection of nitric acid increased from 910 thousand to 4.1 million pounds due to an increase in production. The facility has three operations, one of which was not in operation from May 1991 until March 1992. This operation produces nitroparaffins and uses nitric acid as a reactant. The nitric acid injected underground comes from the organic sludge containing excess unreacted nitric acid which is separated from the nitroparaffin product. Therefore the increase reflects the difference in four months of production in 1991 as compared to ten months of production for 1992. The plant operated a full year in 1993, and so releases for 1993 should be larger and more typical than for either 1991 or 1992.

Du Pont Beaumont Plant **Beaumont, TX**

Underground injection of ammonia increased from 14.1 to 16.9 million pounds due to increased production rates and improved reporting methods. The plant produces ammonia, acrylonitrile, aniline, and synthetic rubbers.

Underground injection of ammonium nitrate (solution) increased from 14.7 to 17.3 million pounds due to (1) increased production rates, (2) increased operating efficiency which produced a larger amount of ammonium nitrate, and (3) improved monitoring of the process. Ammonium nitrate is a byproduct of acrylonitrile manufacturing.

Coastal Chemical Inc. **Cheyenne, WY**

Underground injection of ammonium nitrate (solution) increased from 7.3 to 10.3 million pounds due to two reasons: a production increase caused wastewater to increase and an evaporator that had been built as a waste minimization effort to concentrate this wastestream into product was taken out of service because it had been built without a permit. It is now permitted and operational, so releases of ammonium nitrate should decrease.

Amoco Oil Co. **Texas City, TX**

Underground injection of ammonia increased from 7.4 to 10.7 million pounds due to a 30% increase in sour water flow to their deep injection wells. This was caused by an increase in wash water flow for controlling corrosion at several process units. Another reason for the increase was that the concentration of ammonia in the sour water increased 12%. Amoco is pursuing projects to reduce the total flow of sour water sent to their deep wells.

Rubicon Inc. **Geismar, LA**

Underground injection of ammonium nitrate (solution) increased from 490 thousand to 2 million pounds and underground injection of ammonia increased from 1.8 to 3.1 million pounds. Overall, disposal of both chemicals has increased because (1) the plant has substituted ammonia solution in place of caustic solution for use in their scrubbers and (2) they have increased and improved monitoring which has made them realize that their previous ammonia estimates were low. In addition, in 1992 the facility began including the ammonia portion of ammonium sulfate in their report for ammonia rather than reporting the ammonium sulfate (solution).

Table 3-5. Top 50 TRI Facilities with the Greatest Increase in Underground Injection from 1991 to 1992.

Facility	City	State	1991 Underground Injection Pounds	1992 Underground Injection Pounds	1992 to 1991 Changes in Underground Injection Pounds
Vulcan Chemicals	Wichita	KS	44,860,820	59,536,672	14,675,852
Du Pont Delisle	Pass Christian	MS	41,000,000	52,000,000	11,000,000
Du Pont Louisville Plant	Louisville	KY	22,000,000	29,039,810	7,039,810
American Cyanamid Co.	Westwego	LA	141,330,450	146,355,805	5,025,355
Cabot Corp.	Tuscola	IL	14,217,020	18,915,780	4,698,760
Angus Chemical Co.	Sterlington	LA	1,834,000	6,023,000	4,189,000
Du Pont Beaumont Plant	Beaumont	TX	33,187,515	37,368,768	4,181,253
Coastal Chem Inc.	Cheyenne	WY	8,570,642	12,514,351	3,943,709
Amoco Oil Co.	Texas City	TX	7,937,000	11,203,000	3,266,000
Shell Oil Co.	Deer Park	TX	306,283	3,320,646	3,014,363
Rubicon Inc.	Geismar	LA	5,020,700	6,881,500	1,860,800
Hoechst-Celanese Chemical	Pasadena	TX	3,850,893	5,363,400	1,512,507
Monsanto Co.	Alvin	TX	54,019,610	55,343,664	1,324,054
National Steel Corp.	Portage	IN	606,100	1,918,535	1,312,435
Monsanto Co.	Luling	LA	3,485,800	4,734,960	1,249,160
Kaiser Aluminum & Chemical	Mulberry	FL	4,736,000	5,483,168	747,168
Ethyl Corp.	Magnolia	AR	5,834,300	6,468,971	634,671
Sterling Chemicals Inc.	Texas City	TX	35,383,465	35,929,070	545,605
ISP Tech. Inc.	Texas City	TX	2,426,638	2,843,330	416,692
Warner-Lambert Co.	Holland	MI	2,979,835	3,259,405	279,570
UOP	Blanchard	LA	4,301,039	4,550,163	249,124
Arkansas Chemicals Inc.	El Dorado	AR	916,325	1,079,062	162,737
Maui Pineapple Co. Ltd.	Kahului	HI	94,902	223,927	129,025
Bethlehem Steel Corp.	Burns Harbor	IN	1,750,300	1,857,100	106,800
Armco Steel Co. L.P.	Middletown	OH	2,600,000	2,700,000	100,000
LTV Steel Co.	Hennepin	IL	1,900,250	2,000,250	100,000
Jetco Chemicals	Corsicana	TX	2,921,048	3,017,733	96,685
Rexene Corp.	Odessa	TX	120,470	156,245	35,775
Elf Atochem N.A. Inc.	Crosby	TX	472,554	497,644	25,090
Fermi National Accelerator	Batavia	IL	0	24,000	24,000
Air Products & Chemicals Inc.	Wichita	KS	54,289	68,273	13,984
IBP Inc.	Holcomb	KS	19,650	33,250	13,600
Calumet Lubricants Co.	Princeton	LA	0	7,526	7,526
Phillips 66 Co.	Borger	TX	12,260	17,840	5,580
Zeneca Inc.	Perry	OH	38,625	43,004	4,379
IBP Inc.	Amarillo	TX	29,240	33,120	3,880
Louisiana-Pacific Corp.	Samoa	CA	0	3,500	3,500
Macklanburg-Duncan Co.	Oklahoma City	OK	0	3,062	3,062
Witco Oleo/Surfactant	Houston	TX	19,473	21,962	2,489
Morton International Inc.	Moss Point	MS	1,807	2,737	930
General Motors Corp.	Trenton	NJ	0	750	750
Imco Recycling Inc.	Morgantown	KY	0	693	693
McCain Foods Inc.	Presque Isle	ME	0	400	400
BASF Corp.	Holland	MI	702	1,101	399
Shieldalloy Metallurgical	Cambridge	OH	0	250	250
Fansteel Hydro Carbide Corp.	Latrobe	PA	0	250	250
Carboloy Inc.	Warren	MI	0	250	250
Vulcan-Brunswick	Antigo	WI	0	250	250
Cabot Corp.	Pampa	TX	0	250	250
Flor-Quim Inc.	Patillas	PR	0	250	250
Total			448,840,005	520,848,677	72,008,672

Monsanto Co. **Luling, LA**

Underground injection of formaldehyde increased from 1.3 to 2 million pounds and underground injection of ammonia increased from 2.1 to 2.6 million pounds due to an increase in production.

1988 TO 1992 DATA COMPARISONS

This section compares summary release and transfer data for the 1988 and 1990 through 1992 reporting years (see Table 3-6 and Figures 3-4 and 3-5) in order to highlight and help explain changes and possible trends.

Tables (except Table 3-14) and text in this section include only those chemicals listed for all reporting years from 1988 through 1992; any chemicals added, deleted, or whose listing was modified (aluminum oxide) during that time are not included. Data also do not include reports for di-n-octyl phthalate, which was reported all years but was delisted in October of 1993. Therefore totals reported here for years 1991 and 1992 will not exactly match totals reported in the 1991 to 1992 Data Comparisons section because the chemical set is different. Release and transfer data for added chemicals are listed in Table 3-14.

This section includes releases to all media, as well as transfers to POTWs and to other off-site locations for disposal, treatment, energy recovery and recycling. Off-site transfers reported without waste management codes, or with invalid codes, are included in a category called "other off-site transfers." For reporting years 1988 and 1990, this category also includes data reported with valid recycling and energy recovery codes if they were used. Transfers for energy recovery and recycling were not required for reporting years 1988 and 1990. They were required for the 1991 and 1992 reporting years.

1988, 1990 to 1992 Releases and Transfers

Since 1988, TRI reported releases have declined 35%, from 4.85 billion pounds in 1988 to 3.16 billion pounds in 1992. Reported transfers to POTWs, disposal and treatment have declined 34%, from 1.56 billion pounds in 1988 to 1.03 billion pounds in 1992.

Air emissions have declined 32%, from 2.68 billion pounds in 1988 to 1.82 billion pounds in 1992. Surface water discharges have declined about 12.3%, from 311 million pounds in 1988 to 273 million pounds in 1992. Reported releases to surface waters decreased 36.3% from 1988 to 1990, largely because facilities incorrectly reported mineral acid releases in the early years of the TRI program and because many facilities changed their reporting method for ammonium sulfate (solution) (see discussion below). However, releases to water have increased in each of the last three reporting years.

Table 3-6. Comparison of TRI Releases and Transfers, 1988, 1990-1992.❹

	1988 Number	1990 Number	1991 Number	1990-91 Percent Change Percent	1992 Number	1991-92 Percent Change❺ Percent	1988-92 Percent Change Percent
Total Facilities	22,395	24,713	24,181	-2.2	23,533	-2.7	5.1
Total Forms	77,873	86,051	82,658	-3.9	79,979	-3.2	2.7
	Pounds	Pounds	Pounds	Percent	Pounds	Percent	Percent
Total air emissions	2,683,451,601	2,304,480,107	2,005,088,636	-13.0	1,820,965,216	-9.2	-32.1
Fugitive air	829,601,355	713,869,291	616,663,149	-13.6	536,680,299	-13.0	-35.3
Point source air	1,853,850,246	1,590,610,816	1,388,425,487	-12.7	1,284,284,917	-7.5	-30.7
Surface water discharges	311,236,419	198,131,625	243,331,324	22.8	272,905,180	12.2	-12.3
Underground injection	1,343,657,667	754,523,494	710,237,637	-5.9	725,820,874	2.2	-46.0
Releases to land	514,592,116	436,018,244	414,576,639	-4.9	337,590,822	-18.6	-34.4
Total Releases	4,852,937,803	3,693,153,470	3,373,234,236	-8.7	3,157,282,092	-6.4	-34.9
Transfers to recycling❻	NA	NA	2,264,903,256	—	2,838,465,419	25.3	—
Transfers to energy recovery❻	NA	NA	442,199,308	—	477,307,370	7.9	—
Transfers to treatment	492,538,569	374,810,144	351,112,534	-6.3	389,675,327	11.0	-20.9
Transfers to POTWs	581,038,548	469,486,355	394,421,377	-16.0	380,708,363	-3.5	-34.5
Transfers to disposal	484,882,422	433,105,439	262,810,417	-39.3	256,005,214	-2.6	-47.2
Other off-site transfers❼	56,911,929	55,963,051	10,288,734	—	16,876,490	64.0	—
Total Transfers	1,615,371,468	1,333,364,989	3,725,735,626	—	4,359,038,183	17.0	—
Total Releases and Transfers	6,468,309,271	5,026,518,459	7,098,969,862	—	7,516,320,275	5.9	—

❹ Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

❺ Percent change is not the same as in Table 3-1 because the chemical set is different.

❻ NA: Transfers for recycling or energy recovery were not required to be reported for 1988 and 1990.

❼ For 1991 and 1992, 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.

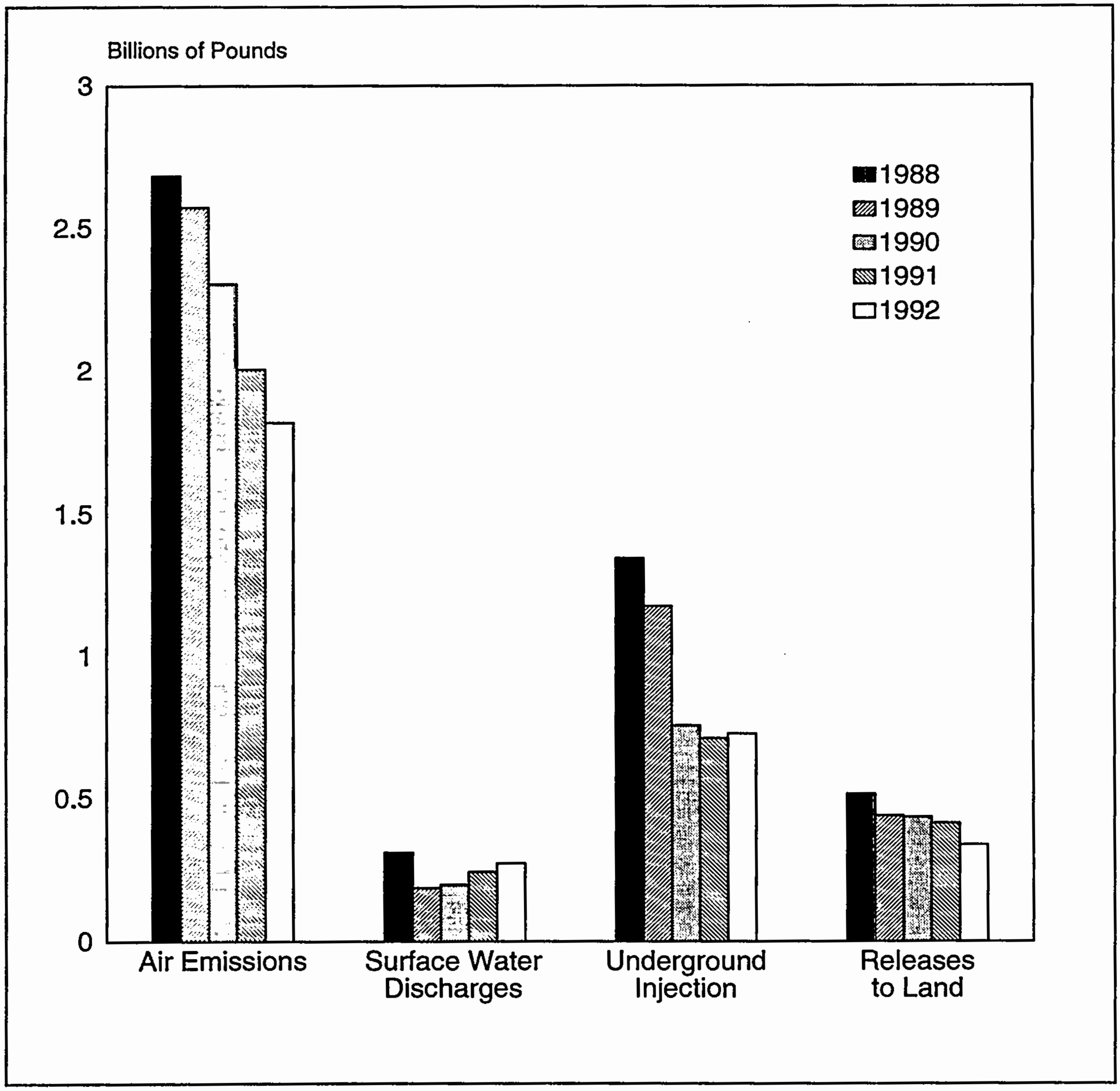

Figure 3-4. TRI Releases, 1988-1992.[8]

[8] Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

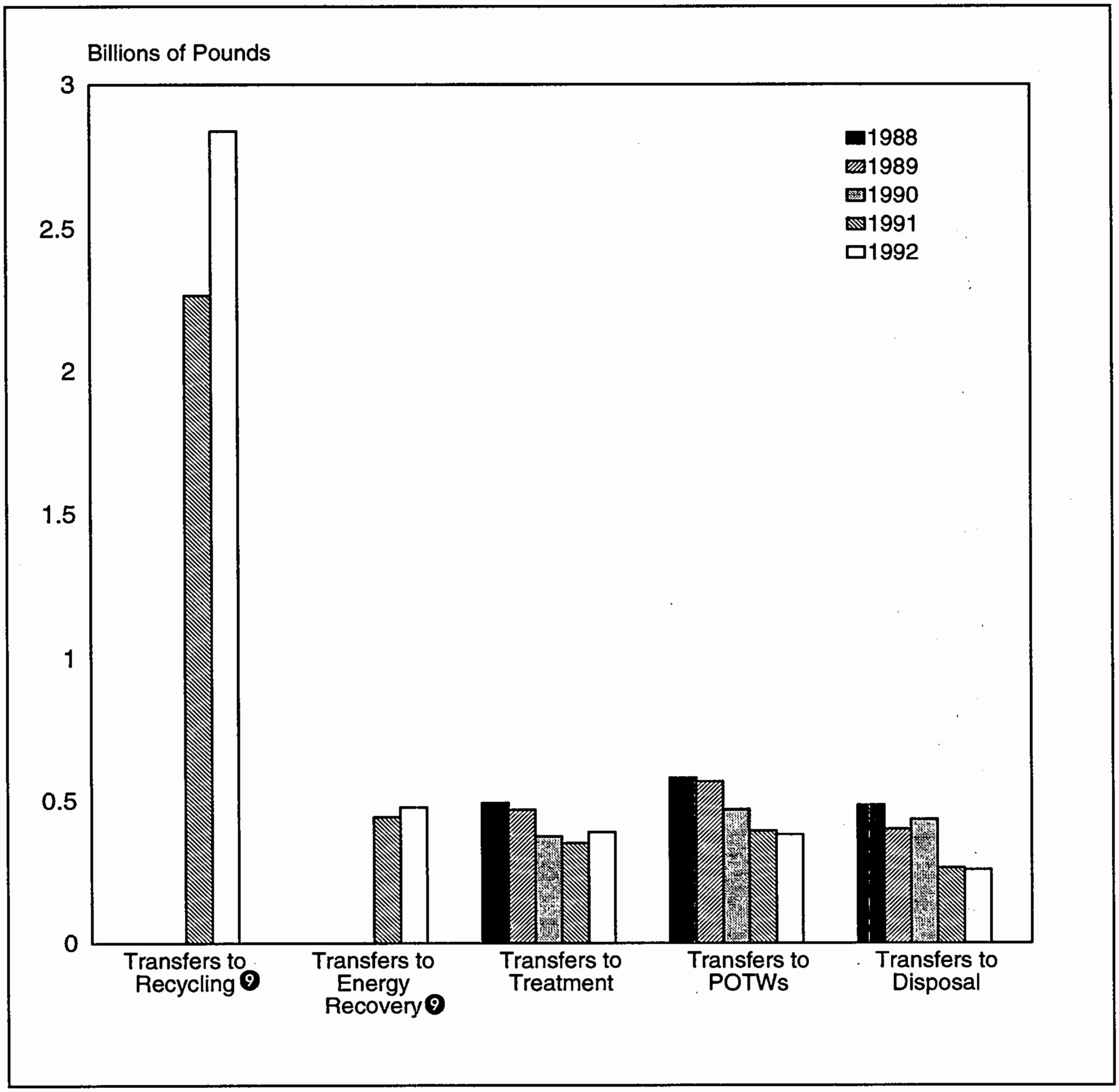

Figure 3-5. TRI Transfers, 1988-1992.⑩

❾ Transfers for recycling or energy recovery were not required to be reported for 1988-1990.

⑩ Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991. Does not include "Other Off-site Transfers."

Reported underground injection of waste has decreased about 46%, from 1.34 billion pounds in 1988 to 726 million pounds in 1992. Reported releases to land have declined about 34%, from 515 million pounds in 1988 to 338 million pounds in 1992. Transfers to POTWs decreased from 581 million pounds in 1988 to 381 million pounds in 1992, a decrease of 34%. Transfers to off-site locations for treatment declined almost 21%, from 493 million pounds in 1988 to 390 million pounds in 1992. Transfers to disposal declined about 47%, from 485 million pounds in 1988 to 256 million pounds in 1992. The other off-site transfers reported in 1988 and 1990 are not comparable to those reported in 1991 and 1992, since the 1988 and 1990 data included some transfers reported with recycling and energy recovery waste management codes.

Between 1988 and 1990, there were large decreases in releases to surface waters (-36%), to underground injection (-44%) and transfers to POTWs (-19%). A large portion of these decreases was attributable to a new reporting option for ammonium sulfate (solution). Beginning with the 1990 reporting year, facilities were given the option of reporting their releases and transfers of ammonium sulfate (solution) either as ammonium sulfate (solution) or as ammonia. Sulfate accounts for 73%, by weight, of ammonium sulfate. Thus, facilities that chose to report ammonium sulfate (solution) as ammonia would have reported releases and transfers of ammonia that were approximately one-quarter of the ammonium sulfate (solution) estimates.

1988, 1990 to 1992 Number of Facilities and Forms

In general, the number of reporting facilities and the number of forms filed increased in the first few years of the program and then declined somewhat. Below are the total numbers of reporting facilities and submitted forms for each reporting year 1988, 1990-1992 (including only those forms for chemicals which were reportable in all years 1988-1992 and excluding di-n-octyl phthalate):

	Baseline 1988	**1990**	**1991**	**1992**
Number of forms	77,873	86,051	82,658	79,979
Number of facilities	22,395	24,713	24,181	23,533

The number of facilities submitting at least one Form R increased between 1988 and 1990. However, between 1990 and 1991, and between 1991 and 1992 the number of reporting facilities declined. The 1991-1992 decline is examined in the 1991-1992 data comparison section of this chapter. The number of facilities and forms for 1992 will probably increase slightly by next year due to late submissions and corrections of forms that could not be processed due to serious errors.

Using data for only those chemicals reportable for all four years and excluding di-n-octyl phthalate, the total number of forms filed per year increased by more than 8,178 between 1988 and 1990; at least some of this increase was due to the lowered manufacturing and processing reporting thresholds. Between 1990 and 1991, the total number of reporting facilities dropped by 532 and the total number of forms filed dropped by 3,395. Between 1991 and 1992, there were 648 fewer reporting facilities and 2,679 fewer total forms. This decline is explored in the 1991-1992 data comparison section of this chapter.

Between 1988 and 1989, the number of forms filed **per chemical** increased for most chemicals; again, this would be expected since the manufacturing and processing thresholds dropped for 1989. Between 1989 and 1990, the number of forms filed per chemical increased for some chemicals and decreased for others. Between 1990 and 1991, and between 1991 and 1992 there was a noticeable drop in the number of forms submitted per chemical (see 1991-1992 Data Comparisons section).

Listed below are the number of reports per year for the 20 most frequently reported chemicals (Table 3-7) and for chemicals that are ozone depleters (Table 3-8).

There are also 42 chemicals (see Box 3-1) for which no reports have been received for all years, 1988-1992.

Table 3-7. Number of TRI Forms for 20 Most Frequently Reported Chemicals, 1988-1992.

CAS Number	Chemical	1988 TRI Forms Number	1989 TRI Forms Number	1990 TRI Forms Number	1991 TRI Forms Number	1992 TRI Forms Number
7664-93-9	Sulfuric acid	5,623	5,745	5,833	5,685	5,643
108-88-3	Toluene	3,964	4,184	4,201	3,879	3,689
1330-20-7	Xylene (mixed isomers)	3,430	3,746	3,727	3,535	3,374
7647-01-0	Hydrochloric acid	3,248	3,415	3,439	3,341	3,274
7664-41-7	Ammonia	2,932	3,274	3,396	3,265	3,160
71-55-6	1,1,1-Trichloroethane	3,869	4,149	4,124	3,656	3,131
7664-38-2	Phosphoric acid	2,516	2,748	2,734	2,684	2,657
67-64-1	Acetone	2,759	2,899	2,843	2,687	2,540
78-93-3	Methyl ethyl ketone	2,503	2,620	2,676	2,551	2,447
67-56-1	Methanol	2,487	2,634	2,630	2,518	2,437
	Zinc compounds	1,632	2,114	2,315	2,329	2,382
7440-50-8	Copper	1,887	2,252	2,295	2,315	2,279
	Glycol ethers	1,609	1,935	2,040	2,083	2,126
7697-37-2	Nitric acid	1,911	1,993	1,948	1,869	1,810
7782-50-5	Chlorine	1,798	1,819	1,763	1,628	1,535
7440-02-0	Nickel	1,124	1,447	1,472	1,517	1,531
7440-47-3	Chromium	1,177	1,466	1,441	1,475	1,494
	Chromium compounds	1,196	1,443	1,525	1,494	1,462
	Copper compounds	1,025	1,363	1,460	1,426	1,439
100-42-5	Styrene	1,227	1,420	1,448	1,413	1,396
	Subtotal	47,917	52,666	53,310	51,350	49,806
	Total for All TRI Chemicals (1)	77,873	86,497	86,051	82,658	79,979

(1) Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

Table 3-8. Number of TRI Forms for Ozone Depleters, 1988-1992.

CAS Number	Chemical	1988 TRI Forms[12] Number	1989 TRI Forms[12] Number	1990 TRI Forms[12] Number	1991 TRI Forms Number	1992 TRI Forms Number
353-59-3	Bromochlorodifluoromethane (Halon 1211)	NA	NA	NA	10	11
74-83-9	Bromomethane	35	37	44	50	49
75-63-8	Bromotrifluoromethane (Halon 1301)	NA	NA	NA	18	13
56-23-5	Carbon tetrachloride	96	106	99	102	90
124-73-2	Dibromotetrafluoroethane (Halon 2402)	NA	NA	NA	3	1
75-71-8	Dichlorodifluoromethane (CFC-12)[13]	NA	NA	1	380	344
76-14-2	Dichlorotetrafluoroethane (CFC-114)	NA	NA	NA	33	23
76-13-1	Freon 113	1,432	1,553	1,363	1,081	855
76-15-3	Monochloropentafluoro-ethane (CFC-115)	NA	NA	NA	16	16
71-55-6	1,1,1-Trichloroethane	3,869	4,149	4,124	3,656	3,131
75-69-4	Trichlorofluoromethane (CFC-11)	NA	NA	NA	301	254
	Total	5,432	5,845	5,631	5,650	4,787

[12] NA: Reports for these chemicals (halons and CFCs) were not required until 1991.

[13] Although dichlorodifluoromethane was not reportable for reporting year 1990, one TRI form was received and was inadvertently entered into the database.

Chemicals with No TRI Forms Submitted, 1988-1992

CAS Number	Chemical	CAS Number	Chemical
53-96-3	2-Acetylaminofluorene	91-59-8	beta-Naphthylamine
309-00-2	Aldrin	92-93-3	4-Nitrobiphenyl
117-79-3	2-Aminoanthraquinone	1836-75-5	Nitrofen
82-28-0	1-Amino-2-methylanthraquinone	51-75-2	Nitrogen mustard
134-29-2	o-Anisidine hydrochloride	924-16-3	N-Nitrosodi-n-butylamine
92-87-5	Benzidine	55-18-5	N-Nitrosodiethylamine
4680-78-8	C.I. Acid Green 3	621-64-7	N-Nitrosodi-n-propylamine
2602-46-2	C.I. Direct Blue 6	4549-40-0	N-Nitrosomethylvinylamine
16071-86-6	C.I. Direct Brown 95	59-89-2	N-Nitrosomorpholine
3761-53-3	C.I. Food Red 5	759-73-9	N-Nitroso-N-ethylurea
492-80-8	C.I. Solvent Yellow 34	684-93-5	N-Nitroso-N-methylurea
128-66-5	C.I. Vat Yellow 4	16543-55-8	N-Nitrosonornicotine
510-15-6	Chlorobenzilate	100-75-4	N-Nitrosopiperidine
2303-16-4	Diallate	2234-13-1	Octochloronaphthalene
334-88-3	Diazomethane	20816-12-0	Osmium tetroxide
60-11-7	4-Dimethylaminoazobenzene	57-57-8	beta-Propiolactone
79-44-7	Dimethylcarbamyl chloride	139-65-1	4,4'-Thiodianiline
122-66-7	1,2-Diphenylhydrazine	636-21-5	o-Toluidine hydrochloride
1335-87-1	Hexachloronaphthalene	68-76-8	Triaziquone
680-31-9	Hexamethylphosphoramide	126-72-7	Tris(2,3-dibromopropyl) phosphate
505-60-2	Mustard gas		

Box 3-1. Chemicals with No TRI Forms Submitted, 1988-1992.

1988, 1990-1992 Comparison of TRI Releases by Industry

Table 3-9 presents TRI releases for the base year 1988 and years 1990 to 1992 for each industry group as classified by its two-digit SIC code. Industries with the largest reported decreases for total on-site releases from 1988 to 1992 include the Electrical, Machinery, Textiles, and Measuring Instruments/Photographic industries. Industries with increases in releases from 1988 to 1992 include Food, Tobacco, and Apparel. The Lumber industry only decreased 1.5% over the five year reporting period.

Table 3-9. TRI Releases by Industry, 1988, 1990-1992.⓮

SIC Code	Industry	Total Releases 1988 Pounds	Total Releases 1990 Pounds	Total Releases 1991 Pounds	1990-91 Percent Change Percent	Total Releases 1992 Pounds	1991-92⓯ Percent Change Percent	1988-92 Percent Change Percent
20	Food	28,197,500	38,932,898	39,469,019	1.4	38,568,497	-2.3	36.8
21	Tobacco	1,831,154	2,482,331	2,289,357	-7.8	1,991,033	-13.0	8.7
22	Textiles	38,234,887	27,130,717	24,991,973	-7.9	21,467,273	-14.1	-43.9
23	Apparel	1,063,597	1,318,381	1,387,419	5.2	1,576,282	13.6	48.2
24	Lumber	32,869,791	35,584,688	32,553,570	-8.5	32,373,513	-0.6	-1.5
25	Furniture	66,790,165	61,722,622	55,856,765	-9.5	55,053,507	-1.4	-17.6
26	Paper	271,778,290	253,314,527	245,782,989	-3.0	233,048,527	-5.2	-14.3
27	Printing	60,971,335	51,410,968	46,598,727	-9.4	40,479,331	-13.1	-33.6
28	Chemicals	2,324,425,060	1,619,534,304	1,541,464,274	-4.8	1,527,344,618	-0.9	-34.3
29	Petroleum	92,777,209	85,789,682	78,166,045	-8.9	82,733,063	5.8	-10.8
30	Plastics	170,356,398	177,453,661	149,751,724	-15.6	134,412,512	-10.2	-21.1
31	Leather	15,806,499	12,745,990	9,855,927	-22.7	10,495,995	6.5	-33.6
32	Stone/Clay	39,237,562	31,228,021	29,420,142	-5.8	25,654,866	-12.8	-34.6
33	Primary Metals	565,850,483	476,277,191	424,141,581	-10.9	345,229,090	-18.6	-39.0
34	Fabricated Metals	136,899,670	128,220,910	110,990,161	-13.4	101,202,243	-8.8	-26.1
35	Machinery	60,578,676	48,833,857	38,622,092	-20.9	33,670,024	-12.8	-44.4
36	Electrical	125,705,476	82,327,303	65,987,104	-19.8	52,216,161	-20.9	-58.5
37	Transportation Equip.	216,578,872	175,274,491	149,517,702	-14.7	135,987,336	-9.0	-37.2
38	Measure/Photo	57,075,215	44,259,199	39,618,487	-10.5	32,984,291	-16.7	-42.2
39	Miscellaneous	31,302,399	25,808,397	20,299,522	-21.3	18,249,532	-10.1	-41.7
	Multiple Codes 20-39⓰	498,383,769	299,724,027	239,833,159	-20.0	217,833,016	-9.2	-56.3
	No Codes 20-39⓱	16,223,796	13,779,305	26,636,497	93.3	14,711,382	-44.8	-9.3
	Total	4,852,937,803	3,693,153,470	3,373,234,236	-8.7	3,157,282,092	-6.4	-34.9

1988, 1990-1992 Comparison of TRI Releases of Ozone Depleters and Carcinogens

Table 3-10 lists 1988, 1990-1992 releases to air, water, and land for 11 chemicals that are ozone depleters. Seven of these chemicals were added for reporting year 1991 and beyond, so only two years of data are available. Most of the chemicals show significant decreases due to Clean Air Act requirements for phaseout of their production and use.

Table 3-11 shows 1988, 1990-1992 air/water/land releases for 25 carcinogens with the largest air/water/land releases reported in 1992. Most of these chemicals show a significant decline from 1988 to 1992 especially asbestos (friable), chromium, ethylene oxide, and lead. Some chemicals, such as arsenic, nickel, and 1,4-dioxane, have large increases in air/water/land releases since 1988.

⓮ Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.
⓯ Percent change is not the same as in Table 3-1 because the chemicals set is different.
⓰ Facilities that reported more than one two-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].
⓱ Facilities that did not report an SIC code and facilities that reported SIC codes outside the 20 to 39 range.

Table 3-10. TRI Releases to Air/Water/Land for Ozone Depleters, 1988, 1990-1992.

CAS Number	Chemical	Total Air/Water/Land Releases 1988[18] Pounds	1990[18] Pounds	1991 Pounds	1990-91 Percent Change Percent	Total Air/Water/ Land Releases 1992 Pounds	1991-92 Percent Change Percent	1988-92 Percent Change Percent
353-59-3	Bromochlorodifluoro-methane (Halon 1211)	NA	NA	11,958	—	16,747	40.0	—
74-83-9	Bromomethane	2,772,795	2,988,363	3,038,283	1.7	3,001,540	-1.2	8.2
75-63-8	Bromotrifluoro-methane (Halon 1301)	NA	NA	180,107	—	110,151	-38.8	—
56-23-5	Carbon tetrachloride	3,807,039	1,744,949	1,552,870	-11.0	1,393,036	-10.3	-63.4
124-73-2	Dibromotetrafluoro-ethane (Halon 2402)	NA	NA	6,550	—	768	-88.3	—
75-71-8	Dichlorodifluoro-methane (CFC-12)	NA	NA	15,388,443	—	11,264,952	-26.8	—
76-14-2	Dichlorotetrafluoro-ethane (CFC-114)	NA	NA	1,900,333	—	1,080,479	-43.1	—
76-13-1	Freon 113	70,247,248	47,626,222	36,457,952	-23.4	24,575,869	-32.6	-65.0
76-15-3	Monochloropenta-fluoroethane (CFC-115)	NA	NA	375,168	—	421,692	12.4	—
71-55-6	1,1,1-Trichloroethane	178,596,202	166,284,259	141,150,514	-15.1	115,033,899	-18.5	-35.6
75-69-4	Trichlorofluoro-methane (CFC-11)	NA	NA	11,811,520	—	9,485,723	-19.7	—

Table 3-11. TRI Releases to Air/Water/Land for Carcinogens with Largest 1992 Air/Water/Land Releases, 1988, 1990-1992.

CAS Number	Chemical	Total Air/Water/Land Releases 1988 Pounds	1990 Pounds	1991 Pounds	1990-91 Percent Change Percent	Total Air/Water/ Land Releases 1992 Pounds	1991-92 Percent Change Percent	1988-92 Percent Change Percent
75-09-2	Dichloromethane	129,245,570	100,832,043	80,342,239	-20.3	74,263,710	-7.6	-42.5
100-42-5	Styrene	33,660,878	31,457,700	29,534,636	-6.1	32,662,297	10.6	-3.0
67-66-3	Chloroform	27,062,294	24,100,379	20,036,804	-16.9	17,717,960	-11.6	-34.5
71-43-2	Benzene	31,963,557	26,011,365	17,463,639	-32.9	12,750,133	-27.0	-60.1
127-18-4	Tetrachloroethylene	36,112,904	22,663,065	16,800,115	-25.9	12,330,796	-26.6	-65.9
50-00-0	Formaldehyde	13,518,262	13,563,753	11,329,957	-16.5	11,518,900	1.7	-14.8
75-07-0	Acetaldehyde	6,929,055	7,303,810	7,237,135	-0.9	6,493,598	-10.3	-6.3
106-99-0	1,3-Butadiene	7,518,475	5,280,296	3,961,024	-25.0	3,845,436	-2.9	-48.9
107-06-2	1,2-Dichloroethane	4,578,872	5,660,948	4,117,838	-27.3	3,179,361	-22.8	-30.6
7440-02-0	Nickel	1,766,717	3,522,808	952,811	-73.0	3,155,600	231.2	78.6
7439-92-1	Lead	7,839,835	5,717,317	3,778,525	-33.9	2,469,504	-34.6	-68.5
7440-38-2	Arsenic	190,236	58,016	1,743,023	2904.4	1,821,195	4.5	857.3
107-13-1	Acrylonitrile	4,217,126	3,153,912	2,203,837	-30.1	1,609,625	-27.0	-61.8
	Nickel compounds	2,786,469	2,388,670	1,601,533	-33.0	1,521,171	-5.0	-45.4
7440-47-3	Chromium	9,944,842	3,199,868	1,611,537	-49.6	1,504,310	-6.7	-84.9
56-23-5	Carbon tetrachloride	3,807,039	1,744,949	1,552,870	-11.0	1,393,036	-10.3	-63.4
75-56-9	Propylene oxide	3,398,316	1,479,897	1,485,630	0.4	1,350,853	-9.1	-60.2
8001-58-9	Creosote[19]	NA	2,036,151	1,767,001	-13.2	1,308,033	-26.0	—
75-21-8	Ethylene oxide	4,731,085	2,351,719	1,863,548	-20.8	1,303,863	-30.0	-72.4
123-91-1	1,4-Dioxane	827,655	970,021	1,064,667	9.8	1,134,848	6.6	37.1
75-01-4	Vinyl chloride	1,445,029	1,145,416	1,052,560	-8.1	1,105,164	5.0	-23.5
117-81-7	Di-(2-ethylhexyl) phthalate	1,165,141	1,342,608	1,325,102	-1.3	976,442	-26.3	-16.2
106-89-8	Epichlorohydrin	504,548	445,337	468,281	5.2	527,473	12.6	4.5
106-46-7	1,4-Dichlorobenzene	1,898,872	822,083	346,820	-57.8	340,589	-1.8	-82.1
1332-21-4	Asbestos (friable)	2,171,075	456,323	559,470	22.6	247,414	-55.8	-88.6

[18] NA: These chemicals (halons and CFCs) were not reportable until 1991.

[19] NA: This chemical (creosote) was not reportable until 1990.

REASONS FACILITY RELEASE/TRANSFER ESTIMATES CHANGE

A number of factors affect the release and transfer estimates provided by facilities. Some reported increases and decreases are real--that is, changes in the amounts reported reflect changes in the amounts actually released and transferred. Other reported increases and decreases are accounting or "paper" changes that do not reflect an actual change in releases and transfers from the prior year(s). Often, changes in amounts reported by facilities are due to a combination of several factors.

Real Changes

Real changes in TRI releases can result from a variety of factors. Source reduction activities, such as process changes, elimination of spills and leaks, inventory control, improved maintenance, and alternative methods of cleaning and degreasing can cause substantial real reductions in TRI releases.

Chemical substitution--that is, replacing a listed TRI chemical with another, possibly less toxic, chemical--will cause a real decrease in the listed TRI chemical that is no longer being used by the facility or is being used in smaller quantities.

However, it is important to look at what chemical or chemicals, if any, have replaced the listed TRI chemical. Sometimes a listed TRI chemical is replaced with another listed TRI chemical, resulting in decreased releases/transfers of one TRI chemical but possibly increased releases/transfers of the other. Sometimes listed TRI chemicals are replaced with chemicals that are also toxic, but are not yet included on the TRI list. In such cases, the substitution will cause a real decrease in releases/transfers of the listed chemical that is no longer being used, but these releases/transfers may be replaced by unreported releases/transfers of the unlisted substitute chemical.

Production increases and decreases can cause changes in reported facility releases/transfers. Releases/transfers are likely to increase when production increases, and decrease when production decreases, although the relationship is not necessarily linear. For 1991 and 1992, the TRI database includes production indices provided by facilities on each chemical reporting form to help relate reported releases/transfers to reported changes in production levels.

Releases/transfers may increase one year due to an abnormal event not related to normal production processes, such as an accidental release or a clean-up operation. These one-time events 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. The 1991 and 1992 TRI data provide estimates for these one-time, non-production related releases/transfers (see Chapter 2).

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

Increased recycling and reuse of wastes instead of disposal will result in real decreases in TRI releases and/or in transfers for treatment and disposal. Sometimes facilities are able to sell waste materials as usable raw materials or products, which may also result in real decreases in TRI emissions.

"Paper" Changes

A common type of "paper" change occurs when a facility changes the way it estimates or calculates its releases for reporting purposes. Changing estimation techniques, or changing from estimation to monitoring of releases, can cause a change in the amount reported without a corresponding change in actual releases.

Reported amounts may change without actual releases/transfers changing when reporting guidance is clarified or a facility changes its interpretation of the reporting guidance. For example, EPA revised its guidance for 1991 concerning the **de minimis** exemption and beneficiation activities, such as ore processing. These activities are no longer excluded from this exemption, which could result in lower reported releases for some facilities.

Apparent increases or decreases can occur if a facility makes a reporting error one year and does not submit a revision. Examples of common reporting errors include misunderstanding the reporting requirements and exemptions, mathematical miscalculations, and typographical errors.

Prior to 1991, total amounts reported to TRI may have decreased in part because facilities shifted their transfers of TRI chemicals to energy recovery or recycling instead of disposal or treatment. Until 1991, transfers for energy recovery or recycling were not required to be reported to TRI. However, for the 1991 reporting year and beyond, these transfers must be reported as part of the new pollution prevention data.

Survey Results of Reasons for Change for 1989-1990

In 1991, EPA surveyed a statistical sample of 1,206 facilities, 960 of which responded, to assess the comparative impact of various real and "paper" changes on the TRI data between 1989 and 1990. Specifically, the study focused on the comparative impact of measurement/estimation technique changes, production changes, and source reduction activities. The study estimated the number of forms and facilities associated with each reason for change and the quantity of change in pounds attributable to each reason for change. The results are shown in Box 3-2.

The survey found that the category of "other factors" accounted for more of the net change from 1989 to 1990 than any other reason assessed. In large part, this is probably because this category includes everything not included in the other categories, such as changes in reporting guidance, changes in facility interpretation and application of that guidance, reporting errors, accidental and one-time releases, increased recycling, and other unexplained reasons. This study was able to develop estimates for only a few of the various reasons within this "other" category. This category

Survey Results: Reasons for Change

Reason for Change	Percent of Facilities	Percent of Forms	Percent of Quantity 1989-90 Increase	Percent of Quantity 1989-90 Decrease
Production changes	70%	45%	19%	13%
Estimation method changes	24%	15%	7%	5%
Source reduction	40%	18%	2%	20%
Other factors[20]	NA	NA	73%	62%

Box 3-2. Survey Results: Reasons for Change.

included changes in reporting of ammonium sulfate (solution) as ammonia and facilities not being able to make quantitative allocations of their changes in releases according to the various factors, such as production variability, source reduction, or measurement changes.

1988, 1990-1992 TRI Releases and Transfers by State, Industry, and Chemical

The following four tables contain four year TRI release and transfer data categorized by state (Table 3-12), by industry (Table 3-13), by added chemical (Table 3-14) and by chemical reportable for 1988-1992 (Table 3-15). Each table contains 1988, 1990, 1991 and 1992 TRI data for each type of release (fugitive air, stack air, water, underground injection and land) and each category of transfer (recycling, energy recovery, treatment, POTW, disposal and other).

Tables 3-12, 3-13, and 3-15 do not contain data for any chemicals delisted (including di-n-octyl phthalate), added (see Table 3-14), or modified (aluminum oxide). Table 3-15 does not list any chemicals reportable for 1988-1992 for which no reports were received in all years 1988 through 1992. See Box 3-1 for a list of these chemicals.

Transfers for recycling and energy recovery were not required until the 1991 reporting year. "Other" off-site transfers include those reported with missing or invalid waste management codes. Data for the other off-site transfers for 1988 and 1990 in the tables may include those transfers reported with valid recycling and energy recovery codes. For these reasons, the total transfers for 1988 or 1990 are not comparable to total transfers for 1991 or 1992.

References

Louisiana Chemical Industry Emissions Report. A Compilation and Comparison of Toxics Release Inventory Data and Pollution Prevention Act Data 1991-1992. Prepared for the Louisiana Chemical Association (LCA) by Information Research, Baton Rouge, Louisiana. LCA, One American Place, Suite 2040, Baton Rouge, LA 70825.

Assessment of Changes in Reported TRI Releases and Transfers between 1989-1990. June 1993. Prepared by Research Triangle Institute, Research Triangle Park, NC, for USEPA, Office of Pollution Prevention Division, Washington, DC. EPA 745-R-93-002.

[20] NA: Not available.

Table 3-12. TRI Releases and Transfers by State, 1988, 1990-1992 (Alphabetically Ordered).

State	Year	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
Alabama	92	14,582,096	79,635,212	5,077,532	6,269,431	6,144,897	111,709,168
	91	16,563,304	82,759,283	4,260,308	7,988,920	6,653,866	118,225,681
	90	18,457,934	85,451,036	3,918,275	6,437,242	3,195,836	117,460,323
	88	19,250,988	86,755,034	7,074,182	6,139,021	4,615,038	123,834,263
Alaska	92	946,556	9,999,390	3,907,576	192	457	14,854,171
	91	582,728	12,643,715	4,795,973	150	5,132	18,027,698
	90	530,608	15,437,766	4,949,477	20	29,076	20,946,947
	88	516,975	22,528,589	4,466,815	1,018	1,720	27,515,117
American Samoa	92	11,240	0	0	0	0	11,240
	91	22,000	0	0	0	0	22,000
	90	19,300	0	5	0	0	19,305
	88	29,500	0	0	0	0	29,500
Arizona	92	3,988,062	4,333,636	5	0	37,721,228	46,042,931
	91	4,540,297	5,005,639	32,960	0	53,314,791	62,893,687
	90	4,355,401	8,472,916	158	30	44,088,781	56,917,286
	88	7,098,629	9,211,459	9,855	505	53,667,725	69,988,173
Arkansas	92	8,304,865	19,373,233	1,429,099	11,995,448	2,246,837	43,349,482
	91	9,199,140	22,756,465	2,419,047	14,031,499	1,692,683	50,098,834
	90	9,693,874	24,577,859	2,570,380	17,891,690	3,477,925	58,211,728
	88	11,331,132	37,429,447	7,448,161	10,521,284	1,938,900	68,668,924
California	92	24,231,556	30,030,532	10,212,644	884,806	3,409,861	68,769,399
	91	30,842,389	36,278,609	10,141,330	1,934,745	8,592,279	87,789,352
	90	34,241,625	48,450,149	9,997,586	1,763,307	5,122,836	99,575,503
	88	37,904,721	54,876,454	10,861,727	1,586,653	8,467,338	113,696,893
Colorado	92	2,143,847	2,768,931	139,955	500	277,861	5,331,094
	91	2,590,558	3,162,387	195,424	500	487,758	6,436,627
	90	2,977,075	3,746,007	209,080	280	490,791	7,423,233
	88	5,809,452	6,223,938	114,864	1,000	2,797,539	14,946,793
Connecticut	92	5,902,355	7,333,037	3,067,718	0	3,902	16,307,012
	91	7,103,212	8,855,032	3,894,543	50	3,355	19,856,192
	90	8,380,992	9,225,606	4,012,136	0	166,742	21,785,476
	88	13,745,859	12,502,587	6,081,914	250	1,687,641	34,018,251
Delaware	92	1,268,453	3,698,572	236,887	0	138,518	5,342,430
	91	1,499,164	4,341,235	349,040	0	154,958	6,344,397
	90	1,762,968	4,257,781	431,584	0	183,028	6,635,361
	88	1,743,401	5,821,194	574,601	0	240,117	8,379,313
District of Columbia	88	250	0	250	0	0	500
Florida	92	11,742,586	21,516,576	3,283,487	11,772,909	33,863,305	82,178,863
	91	14,842,427	23,403,587	3,144,145	13,728,636	32,813,651	87,932,446
	90	23,516,027	23,779,573	2,778,934	21,536,061	41,317,990	112,928,585
	88	22,776,973	28,944,166	6,955,162	34,651,616	36,884,073	130,211,990
Georgia	92	12,182,843	37,893,562	3,679,660	10	1,265,091	55,021,166
	91	14,024,944	44,208,022	4,728,054	0	1,168,237	64,129,257
	90	16,974,492	57,718,948	4,312,735	810	1,186,842	80,193,827
	88	19,775,134	65,281,581	3,019,425	59,467	9,284,114	97,419,721

Table 3-12.

State	Year	Transfers to Recycling㉒ Pounds	Transfers to Energy Recovery㉒ Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers㉓ Pounds	Total Transfers㉔ Pounds
Alabama	92	37,389,634	11,317,763	9,976,899	1,096,874	6,186,024	3,523,948	69,491,142
	91	38,737,858	45,324,489	9,532,989	963,687	6,040,315	160,364	100,759,702
	90	NA	NA	6,960,487	976,053	10,336,493	82,576	*18,355,609*
	88	NA	NA	8,849,328	1,155,334	6,748,740	153,791	*16,907,193*
Alaska	92	242,373	0	3,088	20	40	0	245,521
	91	0	0	1,036	0	20	0	1,056
	90	NA	NA	65	4	20	5	*94*
	88	NA	NA	0	1,000	1,750	0	*2,750*
American Samoa	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Arizona	92	25,567,756	958,400	2,217,865	488,744	132,571	14,362	29,379,698
	91	23,911,838	878,322	1,022,609	490,662	81,176	42,191	26,426,798
	90	NA	NA	847,462	1,196,725	292,270	89,980	*2,426,437*
	88	NA	NA	1,196,919	4,535,728	721,963	27,417	*6,482,027*
Arkansas	92	52,658,367	5,059,840	1,401,973	507,604	5,011,219	57,677	64,696,680
	91	30,892,859	3,513,792	2,252,532	576,636	2,170,812	4,124	39,410,755
	90	NA	NA	2,578,658	2,170,707	5,218,607	66,367	*10,034,339*
	88	NA	NA	2,475,995	1,274,323	5,178,899	291,047	*9,220,264*
California	92	123,818,483	12,450,251	6,829,123	21,250,543	5,701,713	114,136	170,164,249
	91	133,218,737	13,613,430	6,343,564	26,025,693	8,865,758	310,177	188,377,359
	90	NA	NA	12,623,138	31,944,859	8,885,644	414,024	*53,867,665*
	88	NA	NA	17,961,259	49,972,808	19,478,366	4,053,786	*91,466,219*
Colorado	92	9,183,768	2,012,002	3,074,333	513,807	166,211	250	14,950,371
	91	6,943,352	1,323,943	1,805,913	465,991	1,059,974	170,450	11,769,623
	90	NA	NA	1,779,453	568,705	812,025	292,016	*3,452,199*
	88	NA	NA	2,472,016	631,606	2,589,726	201,898	*5,895,246*
Connecticut	92	21,135,034	4,485,697	6,005,320	1,830,985	942,339	237,527	34,636,902
	91	22,416,958	3,586,484	6,549,162	1,568,527	1,014,267	191,209	35,326,607
	90	NA	NA	8,147,272	2,329,986	2,949,493	131,263	*13,558,014*
	88	NA	NA	11,027,779	3,313,329	5,933,915	313,164	*20,588,187*
Delaware	92	7,746,970	1,388,720	767,827	2,461,868	42,934	0	12,408,319
	91	7,053,510	1,186,088	742,594	2,369,900	28,746	0	11,380,838
	90	NA	NA	1,561,736	4,008,334	143,442	55,876	*5,769,388*
	88	NA	NA	2,429,914	3,276,713	1,722,689	19,894	*7,449,210*
District of Columbia	88	NA	NA	250	250	0	0	*500*
Florida	92	20,008,993	4,939,383	5,962,703	12,426,417	1,990,881	1,500	45,329,877
	91	15,200,851	5,041,258	7,231,046	13,850,171	2,612,458	18,154	43,953,938
	90	NA	NA	3,657,227	18,822,833	3,735,615	23,111	*26,238,786*
	88	NA	NA	8,813,059	16,229,362	2,773,703	1,652,325	*29,468,449*
Georgia	92	54,805,619	6,731,275	3,022,842	4,887,889	7,661,521	18,334	77,127,480
	91	53,377,762	6,949,753	3,352,649	8,327,526	8,665,873	260,938	80,934,501
	90	NA	NA	4,743,903	7,894,111	10,029,348	554,078	*23,221,440*
	88	NA	NA	8,820,675	8,328,983	19,565,550	777,801	*37,493,009*

Table 3-12. TRI Releases and Transfers by State, 1988, 1990-1992 (Alphabetically Ordered), Continued.

State	Year	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
Hawaii	92	449,878	146,108	7,210	269,261	1,510	873,967
	91	438,180	141,478	17,029	235,199	81,200	913,086
	90	542,617	137,994	15,985	111,500	33,759	841,855
	88	535,305	338,840	10,000	1,051,509	205,745	2,141,399
Idaho	92	587,695	4,620,389	160,405	0	2,875,528	8,244,017
	91	995,330	5,309,331	119,934	0	3,880,780	10,305,375
	90	1,962,943	3,778,002	474,398	0	5,434,670	11,650,013
	88	2,458,912	2,907,771	296,220	0	11,850,374	17,513,277
Illinois	92	22,863,759	49,214,725	5,744,227	20,942,170	18,273,623	117,038,504
	91	27,417,393	53,762,102	6,443,166	16,199,440	18,396,431	122,218,532
	90	32,893,434	56,898,654	6,335,421	9,449,685	15,326,504	120,903,698
	88	44,427,179	65,614,061	14,185,427	7,340,184	11,527,542	143,094,393
Indiana	92	27,582,121	57,090,991	1,057,160	3,777,831	33,534,069	123,042,172
	91	33,415,377	58,971,589	1,653,523	2,360,830	35,951,802	132,353,121
	90	41,714,800	67,206,688	2,892,316	9,175,688	46,769,872	167,759,364
	88	42,877,926	70,585,787	4,913,927	34,845,400	63,075,385	216,298,425
Iowa	92	5,755,913	26,712,383	1,276,714	0	1,528,882	35,273,892
	91	6,398,087	28,075,864	2,001,525	0	1,789,203	38,264,679
	90	7,307,921	32,263,790	2,448,455	25	279,801	42,299,992
	88	9,706,529	35,114,336	1,383,577	5	636,535	46,840,982
Kansas	92	9,275,820	15,547,020	733,170	59,640,479	1,300,740	86,497,229
	91	8,780,281	20,024,592	935,570	44,921,511	1,231,531	75,893,485
	90	9,799,192	20,653,835	1,044,876	58,706,062	1,321,986	91,525,951
	88	10,720,689	21,966,743	802,762	90,207,210	482,574	124,179,978
Kentucky	92	10,788,819	26,196,831	575,469	29,040,503	1,592,559	68,194,181
	91	10,412,174	27,424,705	675,392	22,000,000	1,633,259	62,145,530
	90	11,322,963	30,487,903	684,294	9,447,869	1,430,650	53,373,679
	88	15,427,316	33,100,709	1,700,777	30,000,250	5,762,706	85,991,758
Louisiana	92	20,565,412	67,051,050	186,325,317	186,623,578	2,497,703	463,063,060
	91	21,329,108	76,902,582	161,297,478	196,547,237	1,850,434	457,926,839
	90	23,543,980	87,899,259	101,052,627	226,922,147	2,103,543	441,521,556
	88	27,313,807	109,845,825	159,569,814	423,893,540	7,587,941	728,210,927
Maine	92	2,152,418	10,791,928	591,203	405	1,461,538	14,997,492
	91	2,430,017	11,372,601	821,541	0	1,617,947	16,242,106
	90	2,401,251	11,581,377	899,866	0	526,516	15,409,010
	88	3,393,656	14,042,820	437,488	0	960,950	18,834,914
Maryland	92	3,804,049	6,743,865	838,672	0	1,592,309	12,978,895
	91	4,571,782	7,118,571	682,953	0	1,293,351	13,666,657
	90	6,096,658	7,459,106	1,282,351	55	1,354,593	16,192,763
	88	5,570,852	12,810,388	3,955,551	2	2,668,375	25,005,168
Massachusetts	92	5,005,913	9,176,125	74,809	0	102,601	14,359,448
	91	6,357,725	10,162,285	396,842	0	167,529	17,084,381
	90	8,783,925	12,504,595	264,205	50	53,520	21,606,295
	88	10,350,182	17,584,002	674,240	4,000	907,907	29,520,331
Michigan	92	16,504,205	49,315,193	749,922	6,083,782	10,313,226	82,966,328
	91	18,397,982	51,974,170	944,952	6,699,997	13,946,243	91,963,344
	90	22,286,856	61,689,789	818,193	8,323,247	9,255,929	102,374,014
	88	27,408,752	71,905,166	1,151,606	6,326,978	5,668,797	112,461,299

Table 3-12, Cont.

State	Year	Transfers Recycling[22] Pounds	Transfers to Energy Recovery[22] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[23] Pounds	Total Transfers[24] Pounds
Hawaii	92	26,749	0	15	30,000	163,500	0	220,264
	91	42,781	185	20	31,250	12,388	0	86,624
	90	NA	NA	1,000	388,060	7,209	0	*396,269*
	88	NA	NA	0	835,250	13,682	0	*848,932*
Idaho	92	346,467	302,663	70,395	2,063,990	35,465	0	2,818,980
	91	475,283	283,187	61,501	1,561,850	5,065	0	2,386,886
	90	NA	NA	200,095	2,830,403	9,002	800	*3,040,300*
	88	NA	NA	56,281	437,263	65,184	750	*559,478*
Illinois	92	161,297,773	32,600,493	18,098,715	72,217,740	12,862,996	777,646	297,855,363
	91	75,716,824	26,734,202	15,714,392	59,604,615	19,872,479	336,241	197,978,753
	90	NA	NA	25,165,386	76,259,307	25,754,162	3,746,198	*130,925,053*
	88	NA	NA	27,346,153	60,061,067	26,728,738	4,101,562	*118,237,520*
Indiana	92	340,796,686	17,991,548	41,188,332	4,400,080	13,885,671	820,996	419,083,313
	91	302,730,334	19,451,187	35,453,165	4,546,604	10,385,563	1,372,819	373,939,672
	90	NA	NA	23,878,581	6,936,065	17,755,216	10,102,923	*58,672,785*
	88	NA	NA	26,373,956	13,995,887	24,536,964	1,185,181	*66,091,988*
Iowa	92	16,827,854	3,640,877	2,273,573	8,722,686	1,838,650	46,050	33,349,690
	91	16,172,750	4,210,402	2,525,045	8,973,207	1,844,365	41,510	33,767,279
	90	NA	NA	2,549,169	7,295,585	1,396,847	8,446	*11,250,047*
	88	NA	NA	2,690,853	6,569,558	4,489,589	140,866	*13,890,866*
Kansas	92	44,222,835	2,316,495	4,020,912	3,608,102	9,162,353	104,452	63,435,149
	91	32,326,835	1,859,737	3,074,117	1,961,904	7,418,496	34,120	46,675,209
	90	NA	NA	3,097,855	2,767,372	8,033,499	150,735	*14,049,461*
	88	NA	NA	2,336,629	3,114,461	1,831,455	186,506	*7,469,051*
Kentucky	92	62,742,467	11,126,093	9,542,491	2,414,313	3,150,742	676,902	89,653,008
	91	60,427,678	5,335,688	7,111,960	1,955,062	7,117,996	794,053	82,742,437
	90	NA	NA	10,810,860	2,353,998	12,405,256	211,380	*25,781,494*
	88	NA	NA	15,905,816	2,802,252	16,802,244	1,482,747	*36,993,059*
Louisiana	92	231,826,147	6,880,006	5,090,737	60,497	3,756,727	250	247,614,364
	91	60,691,308	5,125,335	9,159,689	109,452	4,462,455	9,627	79,557,866
	90	NA	NA	9,410,757	49,206	5,171,900	410,006	*15,041,869*
	88	NA	NA	3,308,753	3,533,503	10,211,663	195,152	*17,249,071*
Maine	92	2,539,404	430,462	262,611	662,867	902,685	4,320	4,802,349
	91	2,505,578	298,665	474,453	794,917	1,075,923	9,600	5,159,136
	90	NA	NA	563,559	898,682	860,731	4,650	*2,327,622*
	88	NA	NA	381,242	2,755,230	910,261	30,883	*4,077,616*
Maryland	92	24,123,689	1,139,762	1,765,294	4,603,586	419,248	1,830	32,053,409
	91	24,938,305	1,625,128	2,130,049	4,482,589	741,339	5,653	33,923,063
	90	NA	NA	2,392,068	4,450,476	845,344	7,270	*7,695,158*
	88	NA	NA	3,231,802	3,992,911	2,093,734	130,866	*9,449,313*
Massachusetts	92	19,512,246	8,908,572	5,581,381	5,079,142	1,699,677	205,583	40,986,601
	91	16,125,819	6,712,654	5,411,664	6,279,619	2,239,052	199,355	36,968,163
	90	NA	NA	9,966,556	6,221,761	3,519,521	48,014	*19,755,852*
	88	NA	NA	14,584,751	15,994,929	6,853,498	974,399	*38,407,577*
Michigan	92	121,991,203	73,937,783	21,369,891	14,603,160	19,992,119	596,888	252,491,044
	91	110,930,792	60,033,628	23,137,074	14,727,756	22,948,619	214,589	231,992,458
	90	NA	NA	18,567,514	13,986,058	38,136,787	1,372,900	*72,063,259*
	88	NA	NA	33,436,718	15,975,525	47,790,470	7,617,294	*104,820,007*

Table 3-12. TRI Releases and Transfers by State, 1988, 1990-1992 (Alphabetically Ordered), Continued.

State	Year	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
Minnesota	92	5,429,362	23,787,616	502,921	0	1,505,226	31,225,125
	91	7,113,726	31,942,234	728,269	0	1,447,561	41,231,790
	90	7,915,838	42,976,861	852,479	142	1,587,111	53,332,431
	88	9,388,738	45,532,922	2,735,819	0	3,138,268	60,795,747
Mississippi	92	12,290,794	41,034,823	1,545,389	57,994,938	5,803,832	118,669,776
	91	12,888,692	43,534,474	2,173,794	48,370,606	5,605,546	112,573,112
	90	14,684,553	45,628,443	2,416,779	40,396,040	5,240,979	108,366,794
	88	16,675,978	44,890,306	2,340,300	46,806,563	9,001,995	119,715,142
Missouri	92	11,239,686	24,950,137	1,119,222	250	14,896,013	52,205,308
	91	10,462,159	24,495,644	1,230,366	0	23,764,862	59,953,031
	90	11,955,550	33,953,474	1,518,988	20	22,725,607	70,153,639
	88	11,302,044	39,249,361	1,941,032	500	39,489,639	91,982,576
Montana	92	1,104,641	1,683,973	139,875	0	40,959,484	43,887,973
	91	1,552,448	808,406	147,484	0	38,533,803	41,042,141
	90	1,694,592	757,394	105,448	0	40,095,470	42,652,904
	88	1,796,668	591,749	125,124	0	32,910,857	35,424,398
Nebraska	92	3,344,042	9,220,859	444,578	0	105,502	13,114,981
	91	3,745,041	11,047,500	385,629	0	395,026	15,573,196
	90	4,625,108	12,293,892	492,995	0	70,168	17,482,163
	88	4,661,231	14,028,262	309,718	0	56,737	19,055,948
Nevada	92	327,794	503,501	370	0	2,768,641	3,600,306
	91	312,533	538,358	250	0	2,395,650	3,246,791
	90	385,232	360,435	251	0	2,547,192	3,293,110
	88	358,734	345,512	250	0	1,841,221	2,545,717
New Hampshire	92	1,666,075	4,269,547	74,669	0	7,859	6,018,150
	91	1,867,827	3,422,748	44,684	0	34,304	5,369,563
	90	2,402,694	5,717,767	254,513	40	106,480	8,481,494
	88	3,586,779	8,726,710	523,463	0	429,618	13,266,570
New Jersey	92	7,732,506	12,156,778	414,890	750	619,823	20,924,747
	91	8,185,225	13,087,788	492,883	1	506,148	22,272,045
	90	9,604,019	16,043,036	471,517	100	999,012	27,117,684
	88	13,993,879	25,663,343	1,417,516	2,950	2,886,190	43,963,878
New Mexico	92	478,578	1,385,961	6	0	18,395,674	20,260,219
	91	577,729	1,575,954	9,992	750	37,670,985	39,835,410
	90	651,551	1,916,227	14	20	37,621,753	40,189,565
	88	748,852	1,384,496	505	5	28,830,402	30,964,260
New York	92	15,926,463	38,814,398	1,779,412	0	1,575,410	58,095,683
	91	20,696,213	43,371,729	1,646,023	37	1,726,396	67,440,398
	90	24,901,555	50,865,011	1,950,731	140	1,739,681	79,457,118
	88	38,939,807	62,385,016	2,072,538	251	3,020,920	106,418,532
North Carolina	92	17,448,155	62,584,078	750,668	0	20,749,490	101,532,391
	91	19,804,507	63,058,002	776,022	0	23,599,779	107,238,310
	90	24,136,601	66,061,687	1,348,019	75	33,049,402	124,595,784
	88	27,303,330	72,322,824	699,061	0	16,839,067	117,164,282
North Dakota	92	492,407	1,262,958	118,022	0	30,759	1,904,146
	91	592,348	1,214,279	79,557	0	22,750	1,908,934
	90	490,126	991,151	4,349	0	87,307	1,572,933
	88	414,998	857,891	4,903	0	35,312	1,313,104

Table 3-12, Cont.

State	Year	Transfers Recycling[22] Pounds	Transfers to Energy Recovery[22] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[23] Pounds	Total Transfers[24] Pounds
Minnesota	92	18,409,594	4,952,100	2,883,127	5,077,928	634,031	23,295	31,980,075
	91	19,479,252	3,563,395	2,148,057	4,833,810	974,144	24,730	31,023,388
	90	NA	NA	3,422,413	5,898,491	854,008	86,366	*10,261,278*
	88	NA	NA	4,549,737	6,067,334	1,674,779	13,183	*12,305,033*
Mississippi	92	62,900,235	3,288,435	630,121	833,583	863,842	16,035	68,532,251
	91	44,129,816	3,834,169	1,756,689	1,070,325	700,871	98,955	51,590,825
	90	NA	NA	1,894,865	1,325,762	1,830,054	214,808	*5,265,489*
	88	NA	NA	3,760,213	1,500,255	3,578,807	436,404	*9,275,679*
Missouri	92	183,300,509	11,583,162	74,159,577	22,891,713	2,848,945	67,784	294,851,690
	91	38,739,197	9,732,955	6,395,346	26,111,574	2,341,379	133,959	83,454,410
	90	NA	NA	7,655,634	30,334,795	3,260,391	169,558	*41,420,378*
	88	NA	NA	5,800,329	67,045,208	6,551,067	2,116,815	*81,513,419*
Montana	92	2,481,824	117,064	10,142	27,798	154,333	0	2,791,161
	91	2,923,259	184,211	156,360	10,650	78,681	0	3,353,161
	90	NA	NA	312,753	30,042	30,409	0	*373,204*
	88	NA	NA	4,456	1,312	41,914	0	*47,682*
Nebraska	92	14,210,583	1,133,219	1,909,910	1,458,203	3,918,367	1,264,675	23,894,957
	91	13,640,103	1,004,157	3,875,356	1,295,347	4,098,736	6,866	23,920,565
	90	NA	NA	3,167,692	1,365,993	3,932,141	17,548	*8,483,374*
	88	NA	NA	647,509	901,304	3,783,694	25,850	*5,358,357*
Nevada	92	419,922	12,816	25,647	9,832	103,948	0	572,165
	91	387,776	8,274	24,787	8,612	62,693	800	492,942
	90	NA	NA	27,665	15,417	113,861	255	*157,198*
	88	NA	NA	608,807	20,611	63,885	0	*693,303*
New Hampshire	92	6,993,658	428,063	580,617	500,121	348,950	1,000	8,852,409
	91	7,553,935	329,441	1,668,725	451,114	386,509	38,650	10,428,374
	90	NA	NA	767,925	382,857	575,757	190,435	*1,916,974*
	88	NA	NA	1,458,296	496,122	718,666	74,804	*2,747,888*
New Jersey	92	102,922,016	28,815,517	17,160,166	37,864,066	2,602,037	262,619	189,626,421
	91	92,904,270	22,628,431	17,526,701	44,210,192	2,270,061	176,797	179,716,452
	90	NA	NA	19,722,691	56,774,593	8,194,655	2,504,100	*87,196,039*
	88	NA	NA	29,468,078	55,311,739	37,270,273	2,851,766	*124,901,856*
New Mexico	92	313,771	227,060	75,712	213,548	23,729	350	854,170
	91	188,434	147,996	61,401	129,891	31,920	25,444	585,086
	90	NA	NA	150,481	93,630	71,715	50,195	*366,021*
	88	NA	NA	117,340	35,871	144,690	15	*297,916*
New York	92	54,171,440	10,281,854	8,699,000	9,168,623	5,485,190	256,771	88,062,878
	91	46,168,909	10,034,043	8,642,507	11,405,357	5,649,626	522,252	82,422,694
	90	NA	NA	14,333,856	12,951,836	9,783,402	374,173	*37,443,267*
	88	NA	NA	36,221,109	23,071,486	12,403,235	666,978	*72,362,808*
North Carolina	92	109,649,280	10,518,383	6,177,184	4,232,954	4,563,573	778,514	135,919,888
	91	111,321,262	8,310,445	7,534,446	5,634,224	4,080,030	195,300	137,075,707
	90	NA	NA	5,623,127	5,853,798	5,375,539	348,674	*17,201,138*
	88	NA	NA	8,500,826	6,815,269	10,532,489	503,180	*26,351,764*
North Dakota	92	114,470	60,934	83,096	191,497	40,768	0	490,765
	91	337,150	36,120	38,860	108,820	5,070	399	526,419
	90	NA	NA	34,701	308,242	7,216	1,110	*351,269*
	88	NA	NA	79,047	52,832	65,740	12,500	*210,119*

Table 3-12. TRI Releases and Transfers by State, 1988, 1990-1992 (Alphabetically Ordered), Continued.

State	Year	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
Ohio	92	27,696,733	61,739,555	4,774,674	25,090,607	23,227,268	142,528,837
	91	32,395,625	67,316,912	5,892,003	29,417,995	35,527,756	170,550,291
	90	37,250,785	78,909,552	5,947,338	25,426,030	22,704,211	170,237,916
	88	43,657,768	99,188,747	5,824,367	56,920,298	30,452,908	236,044,088
Oklahoma	92	7,859,832	16,301,692	1,075,537	2,029,508	864,194	28,130,763
	91	7,266,534	18,719,429	508,701	2,597,370	1,449,534	30,541,568
	90	8,287,254	22,385,540	542,912	4,171,682	1,254,661	36,642,049
	88	9,078,195	26,700,396	365,705	6,353,464	1,790,414	44,288,174
Oregon	92	4,338,714	11,970,400	507,540	0	2,759,127	19,575,781
	91	4,943,235	12,924,910	386,860	0	1,316,394	19,571,399
	90	5,107,576	13,711,677	562,101	40	3,714,870	23,096,264
	88	6,880,330	14,309,379	349,951	1	1,361,132	22,900,793
Pennsylvania	92	25,272,475	35,365,592	1,351,025	250	4,795,555	66,784,897
	91	27,632,160	38,491,869	1,233,074	0	7,833,142	75,190,245
	90	33,557,028	43,198,722	1,626,114	115	15,151,575	93,533,554
	88	40,282,373	51,636,909	4,200,287	750	16,882,576	113,002,895
Puerto Rico	92	6,824,130	6,686,052	45,961	250	14,296	13,570,689
	91	8,538,403	7,307,766	119,417	0	130,650	16,096,236
	90	8,450,981	8,980,407	118,093	738	25,457	17,575,676
	88	8,437,356	5,863,612	123,114	0	110,825	14,534,907
Rhode Island	92	2,024,619	1,294,078	115,849	0	16,830	3,451,376
	91	2,669,938	1,686,273	121,277	0	2,447	4,479,935
	90	2,962,674	2,256,827	61,683	0	1,272	5,282,456
	88	4,084,786	3,695,659	586,245	0	115,048	8,481,738
South Carolina	92	16,751,297	44,960,223	1,052,902	0	4,934,161	67,698,583
	91	18,241,755	43,524,424	1,210,769	0	1,043,223	64,020,171
	90	20,555,612	48,733,154	1,105,948	42	1,498,701	71,893,457
	88	19,444,030	48,970,006	1,242,713	5	1,299,422	70,956,176
South Dakota	92	490,656	2,403,872	57,005	0	5	2,951,538
	91	452,409	2,285,894	9,038	0	27,440	2,774,781
	90	542,770	2,269,451	44,867	0	0	2,857,088
	88	707,529	1,863,848	2,400	0	1	2,573,778
Tennessee	92	35,599,941	91,402,289	2,625,582	63,508,375	678,950	193,815,137
	91	53,511,734	90,352,358	3,645,140	69,568,902	2,428,855	219,506,989
	90	55,027,147	93,880,252	5,020,403	63,068,506	9,154,392	226,150,700
	88	55,441,748	92,287,370	6,324,864	49,906,115	13,592,270	217,552,367
Texas	92	74,424,952	80,655,753	16,749,005	227,379,989	17,901,649	417,111,348
	91	77,785,070	89,004,151	2,916,334	224,981,140	13,750,068	408,436,763
	90	84,842,189	93,830,928	4,015,756	244,868,332	18,336,134	445,893,339
	88	102,677,734	108,907,762	5,544,317	509,921,691	35,412,217	762,463,721
Utah	92	3,640,858	65,273,204	103,845	0	10,087,907	79,105,814
	91	5,034,342	69,453,524	120,656	0	23,722,701	98,331,223
	90	5,465,395	100,852,078	278,735	45	20,259,632	126,855,885
	88	4,835,410	116,781,595	330,471	0	13,801,507	135,748,983
Vermont	92	338,926	486,575	32,363	0	7,753	865,617
	91	287,770	611,615	44,250	0	57,189	1,000,824
	90	266,538	671,353	91,158	5	44,038	1,073,092
	88	436,225	1,130,896	113,308	0	24,341	1,704,770

Table 3-12, Cont.

State	Year	Transfers Recycling[22] Pounds	Transfers to Energy Recovery[22] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[23] Pounds	Total Transfers[24] Pounds
Ohio	92	187,635,642	37,320,896	30,868,440	20,690,515	27,847,952	1,690,674	306,054,119
	91	224,768,362	26,591,578	43,036,901	24,390,436	22,084,071	255,456	341,126,804
	90	NA	NA	32,751,891	25,725,931	44,578,572	21,227,741	*124,284,135*
	88	NA	NA	48,389,504	25,176,165	60,719,974	17,533,993	*151,819,636*
Oklahoma	92	13,546,561	1,241,820	1,349,053	183,932	7,162,405	6,825	23,490,596
	91	15,657,857	1,296,393	1,876,052	156,243	13,845,471	250	32,832,266
	90	NA	NA	2,481,105	142,875	11,472,959	91,627	*14,188,566*
	88	NA	NA	2,824,462	503,489	8,969,718	80,865	*12,378,534*
Oregon	92	12,604,632	588,961	763,375	4,275,478	3,006,286	4,800	21,243,532
	91	11,918,637	457,672	926,737	4,134,050	4,019,904	58,943	21,515,943
	90	NA	NA	1,434,852	7,606,467	1,182,876	34,633	*10,258,828*
	88	NA	NA	1,717,939	7,113,907	3,738,694	12,879	*12,583,419*
Pennsylvania	92	119,897,711	18,167,786	29,246,333	13,205,041	23,833,685	3,164,684	207,515,240
	91	108,566,662	16,586,387	33,506,502	15,512,772	17,999,377	233,937	192,405,637
	90	NA	NA	41,214,850	17,612,645	31,748,692	320,757	*90,896,944*
	88	NA	NA	44,429,017	15,715,862	44,044,040	693,734	*104,882,653*
Puerto Rico	92	11,836,770	9,262,409	4,178,882	4,744,380	425,286	45,188	30,492,915
	91	13,013,644	7,367,620	8,002,150	6,206,936	473,411	250	35,064,011
	90	NA	NA	6,186,381	9,135,065	161,729	34,347	*15,517,522*
	88	NA	NA	5,064,641	8,029,098	168,717	26,200	*13,288,656*
Rhode Island	92	10,687,202	424,267	613,738	446,844	1,972,923	11,628	14,156,602
	91	8,177,750	462,785	735,021	678,968	413,262	16,602	10,484,388
	90	NA	NA	1,303,483	1,222,582	517,690	2,791	*3,046,546*
	88	NA	NA	2,536,696	1,938,667	2,021,287	24,858	*6,521,508*
South Carolina	92	73,904,607	8,477,487	6,040,427	4,376,467	5,500,977	422,353	98,722,318
	91	82,500,136	6,717,033	7,789,002	3,573,336	3,822,796	529,632	104,931,935
	90	NA	NA	6,151,880	3,068,927	4,167,701	9,848,942	*23,237,450*
	88	NA	NA	7,467,787	2,705,063	5,424,297	5,973,334	*21,570,481*
South Dakota	92	232,301	277,083	76,739	146,802	49,626	25,344	807,895
	91	216,054	207,533	33,264	199,789	47,121	21,150	724,911
	90	NA	NA	257,643	211,813	154,730	0	*624,186*
	88	NA	NA	193,764	156,884	208,020	250	*558,918*
Tennessee	92	51,786,906	11,918,119	2,968,570	21,157,009	16,700,171	45,619	104,576,394
	91	32,919,711	8,669,806	3,486,002	22,769,120	18,198,293	1,753,189	87,796,121
	90	NA	NA	6,593,197	18,527,875	10,618,429	53,070	*35,792,571*
	88	NA	NA	7,231,167	25,934,481	12,188,758	234,048	*45,588,454*
Texas	92	210,676,070	82,151,508	35,664,290	32,149,108	31,479,540	1,036,725	393,157,241
	91	169,259,103	72,211,006	41,824,225	30,402,041	35,176,687	1,287,160	350,160,222
	90	NA	NA	46,883,380	40,659,035	29,706,323	2,159,962	*119,408,700*
	88	NA	NA	52,814,931	48,877,006	28,019,246	1,074,293	*130,785,476*
Utah	92	32,283,024	329,018	397,231	613,380	4,247,283	0	37,869,936
	91	28,835,045	398,810	932,712	672,513	2,305,445	12,000	33,156,525
	90	NA	NA	918,044	1,051,232	87,189,503	14,005	*89,172,784*
	88	NA	NA	1,551,509	994,393	535,365	52,937	*3,134,204*
Vermont	92	4,317,515	531,800	155,838	53,662	37,273	0	5,096,088
	91	2,249,092	73,460	673,933	35,707	29,388	4,400	3,065,980
	90	NA	NA	362,544	43,208	77,543	1,955	*485,250*
	88	NA	NA	646,556	72,761	146,768	15,340	*881,425*

Table 3-12. TRI Releases and Transfers by State, 1988, 1990-1992 (Alphabetically Ordered), Continued. 21

State	Year	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
Virgin Islands	92	1,192,682	362,207	111,274	0	614	1,666,777
	91	794,692	315,396	394,318	0	15,610	1,520,016
	90	831,917	380,554	198,951	0	75,224	1,486,646
	88	914,550	790,606	4,700	0	140,342	1,850,198
Virginia	92	18,701,284	44,646,746	1,886,822	1	2,442,147	67,677,000
	91	17,245,712	49,955,213	2,442,250	0	2,021,911	71,665,086
	90	22,284,708	55,980,370	2,356,172	854	2,542,483	83,164,587
	88	23,138,068	102,528,931	20,165,474	1,373	6,280,413	152,114,259
Washington	92	7,064,664	14,808,296	4,036,928	0	475,674	26,385,562
	91	10,255,652	15,610,949	4,246,070	5	157,031	30,269,707
	90	11,757,287	16,721,673	12,627,447	25	614,308	41,720,740
	88	11,128,834	18,569,188	13,605,620	0	914,274	44,217,916
West Virginia	92	8,080,646	14,357,987	1,523,097	0	261,463	24,223,193
	91	9,961,173	17,194,717	1,558,664	0	323,166	29,037,720
	90	11,989,950	19,389,303	2,104,097	6,405	7,922,628	41,412,383
	88	14,975,801	22,869,880	4,045,736	0	895,391	42,786,808
Wisconsin	92	7,402,908	29,287,597	676,379	300	1,523,146	38,890,330
	91	8,167,806	28,968,212	710,646	25	2,173,582	40,020,271
	90	10,708,286	33,452,042	492,773	103	3,369,219	48,022,423
	88	12,990,794	34,639,776	506,523	250	6,845,406	54,982,749
Wyoming	92	854,018	1,438,881	120,529	12,514,351	36,125	14,963,904
	91	927,092	1,950,915	106,175	8,652,092	166,710	11,802,984
	90	966,939	3,762,922	127,657	6,818,227	328,087	12,003,832
	88	1,144,667	1,746,397	42,050	27,113,559	15,274,367	45,321,040
Total 25	92	536,680,299	1,284,284,917	272,905,180	725,820,874	337,590,822	3,157,282,092
	91	616,663,149	1,388,425,487	243,331,324	710,237,637	414,576,639	3,373,234,236
	90	713,869,291	1,590,610,816	198,131,625	754,523,494	436,018,244	3,693,153,470
	88	829,601,355	1,853,850,246	311,236,419	1,343,657,667	514,592,116	4,852,937,803

Table 3-12, Cont.

State	Year	Transfers Recycling[22] Pounds	Transfers to Energy Recovery[22] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[23] Pounds	Total Transfers[24] Pounds
Virgin Islands	92	703	0	176	0	57,180	0	58,059
	91	376,888	0	173	0	0	0	377,061
	90	NA	NA	0	0	13,200	0	*13,200*
	88	NA	NA	0	0	0	0	*0*
Virginia	92	24,372,222	8,142,682	2,525,439	18,950,994	1,590,501	16,074	55,597,912
	91	25,412,794	10,367,556	3,305,352	20,831,665	1,717,037	45,941	61,680,345
	90	NA	NA	3,284,903	17,444,437	4,924,139	47,957	*25,701,436*
	88	NA	NA	6,305,317	37,856,487	7,372,664	69,161	*51,603,629*
Washington	92	73,415,105	874,582	987,551	479,718	1,131,568	16,173	76,904,697
	91	67,870,056	841,073	1,664,103	367,577	827,274	4,311	71,574,394
	90	NA	NA	1,662,530	1,386,870	1,977,932	20,816	*5,048,148*
	88	NA	NA	4,720,822	978,070	2,519,403	264,952	*8,483,247*
West Virginia	92	36,676,921	9,950,309	2,566,802	1,911,753	2,392,062	21,812	53,519,659
	91	25,575,858	7,612,344	2,443,521	1,805,621	2,959,009	3,684	40,400,037
	90	NA	NA	8,590,472	3,074,249	3,712,122	47,730	*15,424,573*
	88	NA	NA	11,368,908	3,536,369	8,503,842	1,000	*23,410,119*
Wisconsin	92	39,886,093	7,611,813	10,346,662	10,894,340	11,210,516	494,897	80,444,321
	91	34,974,232	9,432,761	7,959,358	7,573,954	9,546,528	662,503	70,149,336
	90	NA	NA	8,094,686	12,883,728	10,569,219	326,856	*31,874,489*
	88	NA	NA	10,232,552	21,332,881	16,428,126	615,261	*48,608,820*
Wyoming	92	7,615	138	5,162	28,160	66,981	0	108,056
	91	0	4,297	1,068	173,115	2,484	0	180,964
	90	NA	NA	21,699	4,670	4,501	22	*30,892*
	88	NA	NA	127,102	10,350	1,481	0	*138,933*
Total[25]	92	2,838,465,419	477,307,370	389,675,327	380,708,363	256,005,214	16,876,490	4,359,038,183
	91	2,264,903,256	442,199,308	351,112,534	394,421,377	262,810,417	10,288,734	3,725,735,626
	90	NA	NA	374,810,144	469,486,355	433,105,439	55,963,051	*1,333,364,989*
	88	NA	NA	492,538,569	581,038,548	484,882,422	56,911,929	*1,615,371,468*

[21] Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

[22] NA: Transfers for recycling or energy recovery were not required to be reported for 1988 and 1990.

[23] For 1991 and 1992, 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.

[24] Because transfers for recycling or energy recovery were not required to be reported in 1988 and 1990, total transfers in those years are not comparable to total transfers reported for 1991 and 1992. (Total transfers for 1988 and 1990 appear in italics.)

[25] No reports received from Guam and the Northern Mariana Islands.

Table 3-13. TRI Releases and Transfers by Industry, 1988, 1990-1992.

SIC Code	Industry	Year	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
20	Food	92	11,672,659	16,507,625	1,995,833	228,402	8,163,978	38,568,497
		91	13,479,109	14,422,629	2,436,438	209,844	8,920,999	39,469,019
		90	15,202,706	11,554,221	3,824,113	35,258	8,316,600	38,932,898
		88	13,518,872	4,633,094	3,602,196	1,026,719	5,416,619	28,197,500
21	Tobacco	92	67,438	1,902,331	21,259	0	5	1,991,033
		91	73,809	2,200,965	14,583	0	0	2,289,357
		90	174,881	2,283,058	22,892	0	1,500	2,482,331
		88	101,907	1,715,447	13,050	0	750	1,831,154
22	Textiles	92	5,820,796	15,294,645	262,379	0	89,453	21,467,273
		91	6,035,329	18,628,316	260,941	0	67,387	24,991,973
		90	7,421,893	19,192,630	480,352	25	35,817	27,130,717
		88	10,796,423	26,283,397	1,004,717	0	150,350	38,234,887
23	Apparel	92	507,554	1,067,666	1,057	0	5	1,576,282
		91	419,521	953,006	182	0	14,710	1,387,419
		90	326,504	942,435	48,672	0	770	1,318,381
		88	281,096	741,402	250	0	40,849	1,063,597
24	Lumber	92	6,954,534	25,234,116	83,716	11	101,136	32,373,513
		91	6,412,977	25,947,506	111,629	0	81,458	32,553,570
		90	6,237,946	29,146,136	90,717	90	109,799	35,584,688
		88	6,127,470	26,456,113	230,978	0	55,230	32,869,791
25	Furniture	92	7,668,753	46,975,215	332	0	409,207	55,053,507
		91	8,076,864	47,516,240	625	0	263,036	55,856,765
		90	8,950,548	52,690,318	5,490	40	76,226	61,722,622
		88	9,502,468	57,209,710	3,051	0	74,936	66,790,165
26	Paper	92	23,197,469	176,641,208	27,636,095	3,507	5,570,248	233,048,527
		91	30,044,297	181,280,980	29,615,253	5	4,842,454	245,782,989
		90	36,805,840	171,892,730	36,984,058	120,133	7,511,766	253,314,527
		88	40,894,508	182,207,065	38,150,726	0	10,525,991	271,778,290
27	Printing	92	23,262,751	17,206,225	678	645	9,032	40,479,331
		91	27,384,761	19,190,073	406	1	23,486	46,598,727
		90	28,518,012	22,887,649	693	10	4,604	51,410,968
		88	33,146,141	27,711,537	32,091	40,000	41,566	60,971,335
28	Chemicals	92	151,023,884	398,012,277	224,327,848	684,519,410	69,461,199	1,527,344,618
		91	183,058,939	424,343,656	188,158,476	656,037,670	89,865,533	1,541,464,274
		90	203,728,571	489,447,027	132,191,062	687,793,304	106,374,340	1,619,534,304
		88	238,458,968	617,092,726	232,055,998	1,100,600,698	136,216,670	2,324,425,060
29	Petroleum	92	38,493,819	22,590,400	3,464,175	13,072,167	5,112,502	82,733,063
		91	36,879,602	22,710,367	3,330,707	14,261,706	983,663	78,166,045
		90	38,487,633	24,392,251	3,928,171	16,449,541	2,532,086	85,789,682
		88	45,721,147	20,653,547	3,270,668	20,486,919	2,644,928	92,777,209
30	Plastics	92	40,117,459	93,324,489	479,230	5	491,329	134,412,512
		91	46,620,167	102,045,882	574,946	15,795	494,934	149,751,724
		90	57,664,175	119,142,695	445,891	14,249	186,651	177,453,661
		88	50,310,178	119,240,037	630,380	2,754	173,049	170,356,398
31	Leather	92	3,503,982	6,650,831	272,260	0	68,922	10,495,995
		91	3,633,898	6,019,985	118,645	0	83,399	9,855,927
		90	3,692,071	8,623,919	409,397	0	20,603	12,745,990
		88	3,892,153	10,880,376	680,755	0	353,215	15,806,499

Table 3-13.

SIC Code	Industry	Year	Transfers to Recycling[27] Pounds	Transfers to Energy Recovery[27] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[28] Pounds	Total Transfers[29] Pounds
20	Food	92	1,370,875	82,506	2,091,723	40,806,993	1,594,350	551	45,946,998
		91	1,159,588	126,600	3,589,210	42,109,454	1,375,445	210,633	48,570,930
		90	NA	NA	2,332,049	40,451,487	2,158,895	176,912	*45,119,343*
		88	NA	NA	846,423	38,354,172	2,155,545	229,603	*41,585,743*
21	Tobacco	92	1,914	7,116	3,161	8,814	17,774	0	38,779
		91	1,932	7,681	0	9,744	20,295	0	39,652
		90	NA	NA	605	8,841	61,276	0	*70,722*
		88	NA	NA	121,958	791,940	191,024	0	*1,104,922*
22	Textiles	92	1,354,829	1,316,811	721,011	8,407,234	543,406	467,721	12,811,012
		91	1,208,093	2,341,897	876,515	6,773,627	1,905,994	12,255	13,118,381
		90	NA	NA	2,028,446	7,867,490	2,083,619	13,646	*11,993,201*
		88	NA	NA	2,049,724	14,650,933	1,861,271	109,478	*18,671,406*
23	Apparel	92	287,836	404,653	77,431	83,914	47,112	0	900,946
		91	3,013	58,278	198,598	91,861	58,271	11,635	421,656
		90	NA	NA	52,906	149,494	118,497	7,500	*328,397*
		88	NA	NA	68,940	471,546	103,568	5,351	*649,405*
24	Lumber	92	1,036,493	4,765,266	539,555	89,242	453,394	10,399	6,894,349
		91	1,294,185	2,896,305	523,441	131,311	653,814	18,169	5,517,225
		90	NA	NA	1,881,474	83,770	767,124	110,242	*2,842,610*
		88	NA	NA	2,507,824	213,016	1,959,605	397,450	*5,077,895*
25	Furniture	92	3,557,798	6,572,971	1,640,822	129,670	3,551,378	4,405	15,457,044
		91	3,519,648	5,909,278	1,978,847	150,574	805,549	97,292	12,461,188
		90	NA	NA	3,254,465	350,472	1,010,082	281,567	*4,896,586*
		88	NA	NA	4,134,132	451,981	1,095,214	1,215,512	*6,896,839*
26	Paper	92	1,504,253	7,096,024	10,607,147	46,692,228	3,600,984	1,044	69,501,680
		91	2,929,176	6,611,419	7,440,613	44,980,314	4,024,834	81,183	66,067,539
		90	NA	NA	9,338,377	55,954,337	3,675,518	48,429	*69,016,661*
		88	NA	NA	14,942,767	55,519,582	6,293,272	128,828	*76,884,449*
27	Printing	92	5,636,688	4,757,847	706,710	312,265	166,094	50,143	11,629,747
		91	5,152,170	4,299,853	1,766,210	337,025	266,516	9,517	11,831,291
		90	NA	NA	3,470,777	349,419	794,019	26,938	*4,641,153*
		88	NA	NA	4,574,334	3,512,991	506,324	401,933	*8,995,582*
28	Chemicals	92	455,167,827	349,639,784	165,851,880	203,395,743	46,393,503	1,644,946	1,222,093,683
		91	423,195,743	323,416,788	187,041,734	219,185,146	50,995,637	3,234,781	1,207,069,829
		90	NA	NA	174,860,735	284,295,269	71,842,849	5,088,230	*536,087,083*
		88	NA	NA	224,562,968	333,629,731	115,086,305	18,040,803	*691,319,807*
29	Petroleum	92	563,482,633	2,263,951	682,880	5,334,891	2,148,141	897	573,913,393
		91	450,790,545	1,618,348	621,336	7,357,446	2,958,311	47,387	463,393,373
		90	NA	NA	474,362	7,136,801	4,767,145	38,309	*12,416,617*
		88	NA	NA	2,949,850	10,862,362	4,791,436	905,499	*19,509,147*
30	Plastics	92	17,481,382	11,084,447	5,329,459	4,225,637	9,787,283	193,214	48,101,422
		91	14,584,897	10,470,546	4,951,818	5,059,610	9,278,092	72,532	44,417,495
		90	NA	NA	8,757,175	4,533,920	11,177,648	852,737	*25,321,480*
		88	NA	NA	11,258,546	4,830,498	12,655,514	788,871	*29,533,429*
31	Leather	92	837,350	890,195	112,761	6,527,021	1,550,587	41,766	9,959,680
		91	952,435	1,126,552	626,013	5,665,161	1,281,330	87,043	9,738,534
		90	NA	NA	925,562	8,277,155	1,318,409	93,222	*10,614,348*
		88	NA	NA	1,238,373	10,021,152	1,048,931	6,912	*12,315,368*

Table 3-13. TRI Releases and Transfers by Industry, 1988, 1990-1992 (Continued). 26

SIC Code	Industry	Year	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
32	Stone/Clay	92	2,633,777	15,395,365	77,774	6,077,195	1,470,755	25,654,866
		91	3,857,270	15,638,908	156,545	7,464,305	2,303,114	29,420,142
		90	6,535,279	14,490,989	166,221	7,488,065	2,547,467	31,228,021
		88	8,414,286	18,979,826	1,178,292	6,580,250	4,084,908	39,237,562
33	Primary Metals	92	35,266,082	100,323,898	6,481,371	14,349,881	188,807,858	345,229,090
		91	41,738,291	112,281,076	8,501,637	13,536,541	248,084,036	424,141,581
		90	54,717,434	153,765,738	10,773,456	15,627,800	241,392,763	476,277,191
		88	65,798,669	174,101,153	17,681,684	41,632,936	266,636,041	565,850,483
34	Fabricated Metals	92	38,306,338	61,756,403	178,940	3,691	956,871	101,202,243
		91	43,911,859	65,621,301	107,034	574	1,349,393	110,990,161
		90	48,843,531	78,033,099	513,854	832	829,594	128,220,910
		88	51,177,582	79,613,799	1,516,890	386,120	4,205,279	136,899,670
35	Machinery	92	13,547,039	19,832,183	57,097	250	233,455	33,670,024
		91	14,674,078	23,747,933	51,280	35	148,766	38,622,092
		90	20,162,441	28,369,704	206,719	518	94,475	48,833,857
		88	25,511,246	34,475,880	375,432	0	216,118	60,578,676
36	Electrical	92	15,722,687	35,713,523	201,329	1,077	577,545	52,216,161
		91	21,785,169	42,438,080	298,136	2,224	1,463,495	65,987,104
		90	26,242,433	53,025,961	307,463	18,413	2,733,033	82,327,303
		88	37,066,219	86,465,528	686,663	43,720	1,443,346	125,705,476
37	Transport. Equip.	92	42,072,256	91,994,680	143,152	1,250	1,775,998	135,987,336
		91	48,560,099	98,901,584	140,234	1,000	1,914,785	149,517,702
		90	63,141,406	110,244,775	193,621	315	1,694,374	175,274,491
		88	76,576,252	137,095,799	369,958	81,850	2,455,013	216,578,872
38	Measure/Photo	92	9,572,669	22,575,877	816,224	0	19,521	32,984,291
		91	12,100,933	26,742,451	735,088	0	40,015	39,618,487
		90	13,661,030	30,171,335	401,809	20	25,005	44,259,199
		88	17,268,617	38,744,986	688,569	250	372,793	57,075,215
39	Miscellaneous	92	5,816,053	12,425,240	1,446	250	6,543	18,249,532
		91	6,549,109	13,693,675	5,608	0	51,130	20,299,522
		90	8,392,417	17,400,968	11,583	65	3,364	25,808,397
		88	10,032,434	20,954,208	54,024	1	261,732	31,302,399
Multiple Codes 20-39 30		92	57,073,393	96,745,987	6,035,534	7,319,095	50,659,007	217,833,016
		91	57,348,554	115,075,968	8,343,641	9,607,187	49,457,809	239,833,159
		90	61,525,382	144,162,332	6,952,076	25,932,079	61,152,158	299,724,027
		88	80,883,456	159,339,475	8,716,144	172,774,638	76,670,056	498,383,769
No Codes 20-39 31		92	4,378,907	6,114,733	367,451	244,038	3,606,253	14,711,382
		91	4,018,514	9,024,906	369,290	9,100,750	4,123,037	26,636,497
		90	3,437,158	8,750,846	173,315	1,042,737	375,249	13,779,305
		88	4,121,263	9,255,141	293,903	812	2,552,677	16,223,796
	Total	92	536,680,299	1,284,284,917	272,905,180	725,820,874	337,590,822	3,157,282,092
		91	616,663,149	1,388,425,487	243,331,324	710,237,637	414,576,639	3,373,234,236
		90	713,869,291	1,590,610,816	198,131,625	754,523,494	436,018,244	3,693,153,470
		88	829,601,355	1,853,850,246	311,236,419	1,343,657,667	514,592,116	4,852,937,803

Table 3-13, Cont.

SIC Code	Industry	Year	Transfers to Recycling[27] Pounds	Transfers to Energy Recovery[27] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[28] Pounds	Total Transfers[29] Pounds
32	Stone/Clay	92	3,684,248	3,398,880	2,897,024	2,048,011	6,704,125	691,446	19,423,734
		91	4,390,498	4,724,425	6,324,165	1,661,975	7,390,047	20,966	24,512,076
		90	NA	NA	1,571,047	1,083,233	8,101,676	4,146	*10,760,102*
		88	NA	NA	2,835,719	1,346,738	17,158,912	84,461	*21,425,830*
33	Primary Metals	92	760,567,964	12,586,817	119,936,573	22,487,243	96,008,213	7,675,296	1,019,262,106
		91	611,208,622	7,722,527	52,499,711	21,626,391	86,215,378	2,377,747	781,650,376
		90	NA	NA	55,221,119	9,619,270	223,547,702	32,600,028	*320,988,119*
		88	NA	NA	69,143,095	22,922,302	186,126,035	18,438,071	*296,629,503*
34	Fabricated Metals	92	218,626,454	12,660,416	19,690,257	5,005,569	20,522,635	1,915,514	278,420,845
		91	208,630,962	12,141,701	20,329,086	4,894,719	22,289,421	1,143,817	269,429,706
		90	NA	NA	29,138,148	6,339,021	31,745,338	4,074,133	*71,296,640*
		88	NA	NA	34,331,696	17,149,216	38,421,769	7,781,651	*97,684,332*
35	Machinery	92	43,167,026	3,403,252	2,310,831	2,159,789	3,680,651	229,310	54,950,859
		91	36,445,061	3,044,818	3,317,682	2,379,399	4,624,239	381,661	50,192,860
		90	NA	NA	5,633,592	2,580,231	6,878,530	430,789	*15,523,142*
		88	NA	NA	9,620,638	2,705,451	10,094,659	959,989	*23,380,737*
36	Electrical	92	300,540,851	11,764,605	14,530,137	7,409,056	11,029,304	1,549,146	346,823,099
		91	243,040,165	11,154,589	17,713,055	7,078,576	14,948,195	942,728	294,877,308
		90	NA	NA	17,833,439	12,068,268	16,032,159	879,144	*46,813,010*
		88	NA	NA	21,171,154	18,844,484	20,210,743	1,593,405	*61,819,786*
37	Transport. Equip.	92	141,441,501	20,928,199	10,160,121	3,889,637	11,251,755	197,129	187,868,342
		91	108,525,307	22,638,356	13,138,602	6,348,132	12,378,759	285,508	163,314,664
		90	NA	NA	18,626,369	8,557,333	16,628,954	742,386	*44,555,042*
		88	NA	NA	31,067,061	7,423,697	20,635,907	3,708,458	*62,835,123*
38	Measure/Photo	92	16,546,893	5,006,104	4,346,497	1,172,578	993,727	21,065	28,086,864
		91	17,694,346	3,902,857	4,675,804	1,521,531	1,383,430	23,591	29,201,559
		90	NA	NA	7,507,094	1,887,980	1,661,209	165,227	*11,221,510*
		88	NA	NA	7,811,085	3,733,209	11,494,854	270,807	*23,309,955*
39	Miscellaneous	92	9,227,001	1,935,079	1,279,178	488,826	1,857,182	124,820	14,912,086
		91	8,626,476	2,611,769	1,339,609	782,002	1,611,612	205,554	15,177,022
		90	NA	NA	3,352,029	626,552	2,925,301	179,059	*7,082,941*
		88	NA	NA	6,795,886	462,054	2,138,595	331,197	*9,727,732*
Multiple Codes 20-39[30]		92	287,271,869	16,086,629	24,245,906	17,480,040	33,436,444	1,784,880	380,305,768
		91	118,322,697	14,643,025	21,212,100	15,260,219	34,010,149	774,401	204,222,591
		90	NA	NA	27,043,984	16,549,535	25,164,975	10,140,522	*78,899,016*
		88	NA	NA	36,893,711	31,017,598	29,908,417	1,473,555	*99,293,281*
No Codes 20-39[31]		92	5,671,734	655,818	1,914,263	2,553,962	667,172	272,798	11,735,747
		91	3,227,697	731,696	948,385	1,017,160	4,335,099	250,334	10,510,371
		90	NA	NA	1,506,390	716,477	644,514	9,885	*2,877,266*
		88	NA	NA	3,612,685	2,123,895	944,522	40,095	*6,721,197*
	Total	92	2,838,465,419	477,307,370	389,675,327	380,708,363	256,005,214	16,876,490	4,359,038,183
		91	2,264,903,256	442,199,308	351,112,534	394,421,377	262,810,417	10,288,734	3,725,735,626
		90	NA	NA	374,810,144	469,486,355	433,105,439	55,963,051	*1,333,364,989*
		88	NA	NA	492,538,569	581,038,548	484,882,422	56,911,929	*1,615,371,468*

[26] Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

[27] NA: Transfers for recycling or energy recovery were not required to be reported for 1988 and 1990.

[28] For 1991 and 1992, 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.

[29] Because transfers for recycling or energy recovery were not required to be reported in 1988 and 1990, total transfers in those years are not comparable to total transfers reported for 1991 and 1992. (Total transfers for 1988 and 1990 appear in italics.)

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

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

Table 3-14. Releases and Transfers of Added Chemicals, 1990-1992 (Alphabetically Ordered).

CAS Number	Chemical	Year	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
107-18-6	Allyl alcohol	92	48,016	48,088	9,839	73,060	0	179,003
		91	28,452	47,688	8,924	44,560	100	129,724
		90	14,138	38,028	6,105	0	0	58,271
353-59-3	Bromochlorodifluoro-	92	7,923	8,824	0	0	0	16,747
	methane (Halon 1211)	91	8,388	3,570	0	0	0	11,958
75-63-8	Bromotrifluoromethane	92	105,490	4,661	0	0	0	110,151
	(Halon 1301)	91	171,287	8,820	0	0	0	180,107
8001-58-9	Creosote	92	565,353	728,211	11,835	5	2,634	1,308,038
		91	625,580	1,126,779	3,862	0	10,780	1,767,001
		90	578,178	1,439,286	3,105	5	15,582	2,036,156
124-73-2	Dibromotetrafluoro-	92	154	614	0	0	0	768
	ethane (Halon 2402)	91	250	6,300	0	0	0	6,550
75-71-8	Dichlorodifluoromethane	92	6,871,649	4,391,045	2,235	1,722	23	11,266,674
	(CFC-12)[32]	91	8,779,892	6,575,657	89	16,008	32,805	15,404,451
		90	0	0	0	0	0	0
78-88-6	2,3-Dichloropropene	92	160,000	326	1,600	745	0	162,671
		91	4,600	486	47	7,132	0	12,265
		90	89,740	870	590	37,170	0	128,370
76-14-2	Dichlorotetrafluoro-	92	934,198	146,026	255	1	0	1,080,480
	ethane (CFC-114)	91	1,693,035	207,258	35	5	5	1,900,338
99-65-0	m-Dinitrobenzene	92	502	749	0	0	0	1,251
		91	502	899	0	0	309	1,710
		90	505	7,361	0	0	358	8,224
528-29-0	o-Dinitrobenzene	92	51	106	0	0	0	157
		91	51	116	0	0	509	676
		90	51	1,040	0	0	49	1,140
100-25-4	p-Dinitrobenzene	92	50	80	0	0	0	130
		91	50	88	0	0	24	162
		90	50	759	0	0	14	823
25321-14-6	Dinitrotoluene	92	5,928	10,816	291	50,000	0	67,035
	(mixed isomers)	91	4,593	10,386	135	60,000	0	75,114
		90	3,839	320	7,112	0	363	11,634
120-58-1	Isosafrole	92	No Reports Received					
		91	5	5	0	0	0	10
		90	5	0	0	0	0	5
76-15-3	Monochloropentafluoro-	92	296,585	125,102	5	0	0	421,692
	ethane (CFC-115)	91	203,872	171,291	5	0	0	375,168

Table 3-14.

Chemical	Year	Transfers to Recycling (33) Pounds	Transfers to Energy Recovery (33) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers (34) Pounds	Total Transfers (35) Pounds
Allyl alcohol	92	0	114,823	325,658	66,726	50,900	0	558,107
	91	0	370,214	376,143	119,183	107,580	0	973,120
	90	NA	NA	253,299	118,005	190,540	0	*561,844*
Bromochlorodifluoromethane (Halon 1211)	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
Bromotrifluoromethane (Halon 1301)	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
Creosote	92	6,100	143,693	550,521	12,481	1,112,216	16,000	1,841,011
	91	471,700	663,755	586,725	17,024	1,995,572	13,680	3,748,456
	90	NA	NA	732,450	18,929	3,574,453	330,648	*4,656,480*
Dibromotetrafluoroethane (Halon 2402)	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
Dichlorodifluoromethane (CFC-12) (32)	92	343,086	2,095	84,976	102,473	1,975	0	534,605
	91	91,660	1,841	98,414	90,831	34,275	0	317,021
	90	NA	NA	0	0	0	0	*0*
2,3-Dichloropropene	92	0	0	531,620	0	0	0	531,620
	91	0	0	454,340	0	0	0	454,340
	90	NA	NA	164,340	0	0	0	*164,340*
Dichlorotetrafluoroethane (CFC-114)	92	521	0	8,188	0	37	0	8,746
	91	0	0	17,400	250	7	0	17,657
m-Dinitrobenzene	92	0	0	1	0	0	0	1
	91	0	0	26,700	0	0	0	26,700
	90	NA	NA	0	0	0	0	*0*
o-Dinitrobenzene	92	0	0	1	0	0	0	1
	91	0	0	340	0	0	0	340
	90	NA	NA	0	0	0	0	*0*
p-Dinitrobenzene	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
Dinitrotoluene (mixed isomers)	92	0	250	504,715	190,000	61	0	695,026
	91	0	0	14,720	890,000	55	0	904,775
	90	NA	NA	252	690,000	15,832	0	*706,084*
Isosafrole	92	No Reports Received						
	91	0	5	0	0	0	0	5
	90	NA	NA	0	250	0	0	*250*
Monochloropentafluoroethane (CFC-115)	92	0	0	128	0	0	0	128
	91	0	0	0	0	0	0	0

Table 3-14. Releases and Transfers of Added Chemicals, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
26471-62-5	Toluenediisocyanate (mixed isomers)	92	14,271	33,938	0	0	275	48,484
		91	18,359	29,806	0	0	10	48,175
		90	17,564	33,248	10	0	255	51,077
75-69-4	Trichlorofluoromethane (CFC-11)	92	3,655,417	5,809,097	1,448	8	19,761	9,485,731
		91	5,360,963	6,435,448	5,156	1,428	9,953	11,812,948
	Total for All Added Chemicals	92	12,665,587	11,307,683	27,508	125,541	22,693	24,149,012
		91	16,899,879	14,624,597	18,253	129,133	54,495	31,726,357
		90	704,070	1,520,912	16,922	37,175	16,621	2,295,700

Table 3-14, Cont.

Chemical	Year	Transfers to Recycling(33) Pounds	Transfers to Energy Recovery(33) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers(34) Pounds	Total Transfers(35) Pounds
Toluenediisocyanate (mixed isomers)	92	95,250	29,470	154,918	10	32,404	0	312,052
	91	11,129	22,289	200,231	6	15,387	0	249,042
	90	NA	NA	115,914	16	33,633	5	*149,568*
Trichlorofluoromethane (CFC-11)	92	212,631	39,404	208,369	5,925	137,674	0	604,003
	91	175,082	32,314	175,662	10,252	426,071	0	819,381
Total for All Added Chemicals	92	657,588	329,735	2,369,095	377,615	1,335,267	16,000	5,085,300
	91	749,571	1,090,418	1,950,675	1,127,546	2,578,947	13,680	7,510,837
	90	0	0	1,266,255	827,200	3,814,458	330,653	*6,238,566*

(32) Although dichlorodifluoromethane was not reportable for reporting year 1990, one TRI form was received and was inadvertently entered into the database.

(33) NA: Transfers for recycling or energy recovery were not required for 1990.

(34) For 1991 and 1992 transfers reported with no waste management codes or invalid codes. For 1990, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1990.

(35) Because transfers for recycling or energy recovery were not required to be reported in 1990, total transfers in that year are not comparable to total transfers reported for 1991 and 1992. (Total transfers for 1990 appear in italics.)

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered).

CAS Number	Chemical	Year	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	92	1,963,416	4,452,705	77,188	1,905,859	289	8,399,457
		91	2,366,247	4,757,670	75,314	2,328,187	37,904	9,565,322
		90	2,389,094	4,801,983	83,068	1,963,498	29,665	9,267,308
		88	2,530,858	4,119,010	84,236	2,219,105	194,951	9,148,160
60-35-5	Acetamide	92	3	17	1	100,800	0	100,821
		91	10	25	5	0	0	40
		90	12	23	5	0	0	40
		88	0	0	0	0	0	0
67-64-1	Acetone	92	62,963,625	70,989,876	999,584	3,180,700	559,265	138,693,050
		91	80,753,166	76,576,197	1,187,541	3,463,348	420,483	162,400,735
		90	94,449,400	96,098,589	1,278,515	4,688,464	215,992	196,730,960
		88	98,441,032	110,608,187	1,150,371	3,117,741	377,439	213,694,770
75-05-8	Acetonitrile	92	733,502	394,331	48,976	20,111,640	29	21,288,478
		91	743,754	624,183	21,991	19,090,831	5,620	20,486,379
		90	866,270	868,372	19,430	19,445,260	248	21,199,580
		88	1,406,588	786,151	42,223	16,739,010	1,790	18,975,762
107-02-8	Acrolein	92	12,775	12,830	0	113,680	0	139,285
		91	8,179	20,321	7	205,898	0	234,405
		90	5,816	16,213	5	103,059	5	125,098
		88	17,352	16,300	0	68,950	500	103,102
79-06-1	Acrylamide	92	24,374	4,180	10,324	4,188,680	963	4,228,521
		91	60,673	3,496	4,635	4,594,900	1,500	4,665,204
		90	42,155	6,958	3,814	4,214,305	525	4,267,757
		88	17,298	8,721	3,124	2,198,000	756	2,227,899
79-10-7	Acrylic acid	92	284,227	264,012	19,147	4,484,000	407	5,051,793
		91	232,485	178,113	712	18,923,000	94	19,334,404
		90	228,251	203,065	43,888	21,525,000	94,334	22,094,538
		88	585,041	215,005	16,646	22,262,010	15,950	23,094,652
107-13-1	Acrylonitrile	92	335,086	1,264,985	1,483	3,861,550	8,071	5,471,175
		91	520,845	1,667,740	1,959	4,732,983	13,293	6,936,820
		90	642,530	2,507,222	3,892	4,925,276	268	8,079,188
		88	1,006,698	3,201,787	6,491	4,562,713	2,150	8,779,839
107-05-1	Allyl chloride	92	96,328	25,306	5	833	0	122,472
		91	155,176	24,977	5	145	0	180,303
		90	169,368	36,656	135	1,200	0	207,359
		88	93,811	55,558	430	250	200	150,249
7429-90-5	Aluminum (fume or dust)	92	494,503	1,959,744	82,140	250	1,192,193	3,728,830
		91	532,645	1,646,126	56,841	0	1,420,310	3,655,922
		90	745,815	1,696,919	56,810	10	1,314,181	3,813,735
		88	1,225,410	2,441,347	91,518	250	3,177,625	6,936,150
60-09-3	4-Aminoazobenzene	92	0	1	0	250	0	251
		91	0	1	0	440	0	441
		90	0	1	0	510	0	511
		88	0	0	0	537	0	537
92-67-1	4-Aminobiphenyl	92	0	0	0	3	0	3
		91	0	0	0	4	0	4
		90	0	0	0	11	0	11
		88	0	10	0	4	0	14
7664-41-7	Ammonia	92	38,878,070	123,206,765	40,824,196	251,783,103	9,165,277	463,857,411
		91	47,550,034	142,074,895	41,280,984	240,682,883	14,747,164	486,335,960
		90	52,983,942	157,168,413	45,544,928	265,650,125	17,691,246	539,038,654
		88	54,596,251	199,789,061	25,164,058	55,720,094	14,125,710	349,395,174

Table 3-15.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Acetaldehyde	92	9,750	170,728	270,925	157,031	549	0	608,983
	91	12,300	128,185	250,717	164,583	1,043	0	556,828
	90	NA	NA	170,070	155,435	594	0	*326,099*
	88	NA	NA	161,761	160,438	25,162	0	*347,361*
Acetamide	92	0	0	421	0	0	0	421
	91	0	0	2,638	29,000	0	0	31,638
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	250	0	*250*
Acetone	92	16,808,284	42,229,514	19,442,586	9,431,457	524,172	160,185	88,596,198
	91	18,108,234	40,146,870	13,419,545	14,385,040	510,372	106,480	86,676,541
	90	NA	NA	19,541,092	12,660,981	2,422,289	940,057	*35,564,419*
	88	NA	NA	25,669,493	14,104,037	5,529,580	3,103,882	*48,406,992*
Acetonitrile	92	3,010,317	4,364,972	2,925,710	477,782	37,041	0	10,815,822
	91	5,224,305	2,434,262	2,540,160	581,095	150,672	0	10,930,494
	90	NA	NA	1,591,514	825,013	131,349	3,502	*2,551,378*
	88	NA	NA	3,772,221	600,450	416,333	214,260	*5,003,264*
Acrolein	92	0	4,316	255	0	0	0	4,571
	91	0	10,681	13	0	3	0	10,697
	90	NA	NA	103	5	5	0	*113*
	88	NA	NA	250	250	0	0	*500*
Acrylamide	92	171	123,891	48,955	88,928	37,317	0	299,262
	91	138	1,019	35,230	95,578	9,175	0	141,140
	90	NA	NA	41,599	37,105	25,363	344	*104,411*
	88	NA	NA	14,458	13,540	97,582	0	*125,580*
Acrylic acid	92	5,899	4,198,882	200,466	38,058	29,659	0	4,472,964
	91	6,690	5,010,030	349,226	47,444	63,956	0	5,477,346
	90	NA	NA	157,618	128,248	113,049	0	*398,915*
	88	NA	NA	108,914	23,262	134,139	0	*266,315*
Acrylonitrile	92	0	1,508,156	822,778	224,271	26,153	140	2,581,498
	91	16,540	81,902	2,034,833	297,197	21,244	0	2,451,716
	90	NA	NA	774,667	342,107	87,782	40	*1,204,596*
	88	NA	NA	935,641	955,739	162,349	0	*2,053,729*
Allyl chloride	92	0	31,300	380,035	9	166	0	411,510
	91	0	33,000	302,388	11,754	240	0	347,382
	90	NA	NA	233,529	6,459	471	0	*240,459*
	88	NA	NA	208,328	14,900	747	0	*223,975*
Aluminum (fume or dust)	92	19,775,442	174,247	1,741,789	13,691	3,512,652	27,678	25,245,499
	91	9,604,699	310	423,776	13,271	5,960,146	3,963	16,006,165
	90	NA	NA	510,595	28,531	14,423,087	52,169	*15,014,382*
	88	NA	NA	2,457,125	15,217	14,244,041	12,921	*16,729,304*
4-Aminoazobenzene	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
4-Aminobiphenyl	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Ammonia	92	8,556,802	111,091	6,591,053	71,885,270	3,613,161	1,040,750	91,798,127
	91	7,218,751	100,788	6,880,932	75,308,764	5,080,413	102,728	94,692,376
	90	NA	NA	5,526,610	83,110,024	4,904,112	105,172	*93,645,918*
	88	NA	NA	2,948,309	25,743,793	3,189,503	290,136	*32,171,741*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
6484-52-2	Ammonium nitrate (solution)	92	57,029	1,273,889	6,762,487	37,531,805	2,624,432	48,249,642
		91	55,195	1,707,759	7,808,136	32,736,428	8,454,270	50,761,788
		90	381,382	2,043,472	7,625,027	39,757,210	4,168,550	53,975,641
		88	418,788	2,527,619	8,436,598	67,941,000	15,896,204	95,220,209
7783-20-2	Ammonium sulfate (solution)	92	123,880	111,020	4,429,219	5,705,957	4,069,490	14,439,566
		91	19,639	265,910	7,593,307	7,523,816	2,180,675	17,583,347
		90	51,868	355,717	9,189,813	5,221,976	2,939,819	17,759,193
		88	313,237	482,350	71,840,865	520,144,631	13,422,824	606,203,907
62-53-3	Aniline	92	181,632	227,372	16,261	1,195,676	1,173	1,622,114
		91	130,517	496,659	26,801	1,603,259	1,068	2,258,304
		90	214,269	266,511	36,008	2,471,752	3,099	2,991,639
		88	323,900	388,869	16,105	3,582,975	12,822	4,324,671
90-04-0	o-Anisidine	92	405	16	107	0	2,167	2,695
		91	765	260	187	0	3,800	5,012
		90	500	1,341	141	0	250	2,232
		88	501	1,792	285	0	250	2,828
104-94-9	p-Anisidine	92	5	6	5	0	0	16
		91	5	8	5	0	0	18
		90	5	10	5	0	0	20
		88	0	10	250	0	250	510
120-12-7	Anthracene	92	20,386	33,648	1,030	0	3,070	58,134
		91	25,028	29,716	1,158	0	2,374	58,276
		90	27,065	38,245	1,360	0	4,806	71,476
		88	146,178	55,950	4,382	0	10,856	217,366
7440-36-0	Antimony	92	4,994	16,779	7,879	0	10,246	39,898
		91	3,964	17,302	1,223	120	5,745	28,354
		90	6,824	45,249	5,219	170	182,292	239,754
		88	10,789	59,127	11,178	2,100	903,916	987,110
	Antimony compounds	92	48,363	348,106	45,835	3,773	1,260,253	1,706,330
		91	33,066	243,454	45,703	6,509	1,522,871	1,851,603
		90	42,572	105,850	32,488	6,868	1,339,526	1,527,304
		88	58,941	106,587	31,178	9,200	1,935,018	2,140,924
7440-38-2	Arsenic	92	1,217	4,439	1,236	0	1,814,303	1,821,195
		91	3,836	3,734	940	0	1,734,513	1,743,023
		90	1,969	3,877	1,640	10	50,530	58,026
		88	2,608	5,079	1,282	0	181,267	190,236
	Arsenic compounds	92	10,578	127,046	6,597	33,000	2,452,391	2,629,612
		91	25,262	166,425	4,606	23,000	2,690,486	2,909,779
		90	51,004	114,826	4,103	23,276	2,640,888	2,834,097
		88	43,461	223,791	6,243	27,400	4,946,434	5,247,329
1332-21-4	Asbestos (friable)	92	5,291	5,973	250	0	235,900	247,414
		91	5,610	7,202	252	0	546,406	559,470
		90	6,631	11,895	515	5	437,282	456,328
		88	11,043	37,453	10,699	0	2,111,880	2,171,075
7440-39-3	Barium	92	61,459	31,787	5,514	0	232,547	331,307
		91	94,600	21,801	5,093	0	261,283	382,777
		90	49,824	32,008	54,102	10	362,509	498,453
		88	174,401	92,410	18,650	0	6,721,686	7,007,147
	Barium compounds	92	235,555	404,462	120,428	1,251	4,825,948	5,587,644
		91	248,937	635,787	102,092	408	4,040,755	5,027,979
		90	289,409	940,320	78,434	303	7,030,077	8,338,543
		88	152,891	895,966	99,428	2,773	5,651,655	6,802,713

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling (37) Pounds	Transfers to Energy Recovery (37) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers (38) Pounds	Total Transfers (39) Pounds
Ammonium nitrate (solution)	92	250	0	69,280	6,856,667	2,394,025	0	9,320,222
	91	740,250	0	557,468	5,984,649	2,457,767	0	9,740,134
	90	NA	NA	1,030,527	7,441,767	552,403	0	*9,024,697*
	88	NA	NA	671,001	7,678,062	1,539,188	1,670	*9,889,921*
Ammonium sulfate (solution)	92	383,870	0	3,311,004	37,330,411	7,590,648	991	48,616,924
	91	400,000	0	6,590,092	47,355,858	503,522	33,971	54,883,443
	90	NA	NA	3,215,615	62,928,669	849,244	48,686	*67,042,214*
	88	NA	NA	3,130,312	187,983,379	1,534,654	2,300	*192,650,645*
Aniline	92	5	942,577	501,482	1,130,509	671,195	0	3,245,768
	91	0	1,632,669	383,469	1,306,755	71,241	2,442	3,396,576
	90	NA	NA	389,354	1,706,763	313,458	0	*2,409,575*
	88	NA	NA	468,311	2,106,510	346,206	16,050	*2,937,077*
o-Anisidine	92	0	0	0	6,811	7	0	6,818
	91	0	0	10	3,395	71	0	3,476
	90	NA	NA	6	5,610	93	0	*5,709*
	88	NA	NA	0	768	3	0	*771*
p-Anisidine	92	0	0	0	15	0	0	15
	91	0	0	0	8	0	0	8
	90	NA	NA	0	5	0	0	*5*
	88	NA	NA	0	0	0	0	*0*
Anthracene	92	0	394,934	150,337	598	504,548	250	1,050,667
	91	100	398,793	25,292	597	96,353	0	521,135
	90	NA	NA	22,002	18,427	530,365	307,866	*878,660*
	88	NA	NA	73,023	20,419	204,665	1,250	*299,357*
Antimony	92	2,033,338	1,325	52,593	11,617	199,480	2,021	2,300,374
	91	887,565	1,997	10,097	3,228	514,611	12,350	1,429,848
	90	NA	NA	7,220	10,592	377,482	505	*395,799*
	88	NA	NA	20,879	40,228	528,425	500	*590,032*
Antimony compounds	92	5,666,477	11,509	20,746,138	85,102	2,429,116	664	28,939,006
	91	1,960,365	75,810	290,953	88,522	1,884,896	1,621	4,302,167
	90	NA	NA	225,420	37,856	2,490,579	4,244	*2,758,099*
	88	NA	NA	138,456	67,108	2,179,268	1,450	*2,386,282*
Arsenic	92	14,470	5	133,828	457	43,298	0	192,058
	91	152,623	18	160,462	566	464,151	0	777,820
	90	NA	NA	15,897	1,034	355,508	5	*372,444*
	88	NA	NA	1,020	1,928	62,664	35	*65,647*
Arsenic compounds	92	2,607,743	0	3,996,468	894	1,640,347	28,376	8,273,828
	91	949,197	250	391,954	1,384	1,200,437	157	2,543,379
	90	NA	NA	103,711	1,961	16,566,937	79,926	*16,752,535*
	88	NA	NA	11,887	3,126	1,402,790	9,323	*1,427,126*
Asbestos (friable)	92	0	0	250	783	7,110,469	0	7,111,502
	91	0	0	33,790	1,707	5,024,698	0	5,060,195
	90	NA	NA	24,250	4,652	6,093,822	0	*6,122,724*
	88	NA	NA	170,934	68,148	11,855,457	1,010,000	*13,104,539*
Barium	92	31,316	4,516	15,634	4,247	669,993	0	725,706
	91	35,691	4,603	70,142	85,776	557,966	2,400	756,578
	90	NA	NA	120,385	13,083	360,788	3,404	*497,660*
	88	NA	NA	89,295	205,209	1,663,835	10,412	*1,968,751*
Barium compounds	92	806,244	158,525	1,705,425	498,994	15,805,194	1,014,069	19,988,451
	91	933,021	177,809	2,443,984	2,042,051	17,030,279	30,134	22,657,278
	90	NA	NA	912,011	3,010,291	19,239,584	59,805	*23,221,691*
	88	NA	NA	820,370	823,073	16,512,327	290,982	*18,446,752*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
98-87-3	Benzal chloride	92	956	17	0	0	0	973
		91	1,550	11	0	0	0	1,561
		90	1,744	11	0	0	0	1,755
		88	5,252	6	0	0	0	5,258
55-21-0	Benzamide	92	No Reports Received					
		91	No Reports Received					
		90	No Reports Received					
		88	250	250	250	250	0	1,000
71-43-2	Benzene	92	7,640,101	4,744,478	24,918	355,683	340,636	13,105,816
		91	9,730,501	7,594,244	26,966	824,342	111,928	18,287,981
		90	14,509,387	10,759,685	25,286	689,066	717,007	26,700,431
		88	20,384,441	11,404,198	46,998	825,035	127,920	32,788,592
98-07-7	Benzoic trichloride	92	5,851	228	0	0	0	6,079
		91	7,686	261	0	0	0	7,947
		90	8,310	25	0	0	0	8,335
		88	24,542	421	0	0	0	24,963
98-88-4	Benzoyl chloride	92	11,738	1,900	5	0	0	13,643
		91	23,446	3,420	5	0	250	27,121
		90	17,667	5,657	0	67,501	260	91,085
		88	28,295	4,719	0	130,000	250	163,264
94-36-0	Benzoyl peroxide	92	837	1,827	5	0	6,200	8,869
		91	648	1,656	5	0	13,205	15,514
		90	12,922	1,708	5	5	16,025	30,665
		88	4,063	2,231	0	5,350	36,050	47,694
100-44-7	Benzyl chloride	92	25,003	10,099	15	50	43	35,210
		91	18,184	8,934	15	20	0	27,153
		90	26,024	7,521	265	315	270	34,395
		88	30,689	12,640	640	0	500	44,469
7440-41-7	Beryllium	92	1	1,867	39	0	21,358	23,265
		91	6	1,372	101	0	29,023	30,502
		90	9	1,366	42	0	6,517	7,934
		88	550	2,213	74	0	37,000	39,837
	Beryllium compounds	92	0	511	5	0	48,000	48,516
		91	1	241	9	0	30,000	30,251
		90	1	211	88	0	40,000	40,300
		88	1	861	17	0	12,000	12,879
92-52-4	Biphenyl	92	676,939	145,397	9,483	49,127	4,622	885,568
		91	679,572	183,336	18,704	47,318	29,912	958,842
		90	771,965	369,686	21,398	63,214	35,552	1,261,815
		88	628,881	579,701	68,497	82,760	222,297	1,582,136
111-44-4	Bis(2-chloroethyl) ether	92	2,673	514	5	0	0	3,192
		91	2,950	594	0	0	0	3,544
		90	3,206	573	83	0	0	3,862
		88	4,322	600	1,351	0	0	6,273
542-88-1	Bis(chloromethyl) ether	92	3	306	0	0	0	309
		91	2	572	0	0	0	574
		90	3	360	0	0	0	363
		88	1	0	0	0	0	1
108-60-1	Bis(2-chloro-1-methylethyl)ether	92	8,000	1,430	1,900	0	0	11,330
		91	9,700	1,520	1,800	0	0	13,020
		90	3,800	2,430	12,000	0	0	18,230
		88	344	15	30,000	0	0	30,359

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling(37) Pounds	Transfers to Energy Recovery(37) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers(38) Pounds	Total Transfers(39) Pounds
Benzal chloride	92	0	34,000	4,343	0	0	0	38,343
	91	0	35,000	0	0	0	0	35,000
	90	NA	NA	37,000	5	0	0	*37,005*
	88	NA	NA	95,878	0	7,308	0	*103,186*
Benzamide	92	No Reports Received						
	91	No Reports Received						
	90	No Reports Received						
	88	NA	NA	0	0	750	0	*750*
Benzene	92	420,161	2,355,003	2,239,808	418,050	93,206	931,612	6,457,840
	91	353,207	3,675,231	1,654,824	615,849	141,160	385	6,440,656
	90	NA	NA	1,917,908	633,978	265,537	38,018	*2,855,441*
	88	NA	NA	1,891,649	1,135,172	396,880	7,430	*3,431,131*
Benzoic trichloride	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	5	90	0	*95*
	88	NA	NA	12,795	0	9,777	0	*22,572*
Benzoyl chloride	92	0	0	385,832	175	0	0	386,007
	91	0	18,421	493,270	230	0	0	511,921
	90	NA	NA	640,697	1,353	46	0	*642,096*
	88	NA	NA	358,570	180	2,399	0	*361,149*
Benzoyl peroxide	92	6,400	2,422	16,834	38,327	9,337	0	73,320
	91	11,000	911	62,192	17,192	5,860	0	97,155
	90	NA	NA	9,972	48,028	6,555	0	*64,555*
	88	NA	NA	38,600	69,946	23,954	0	*132,500*
Benzyl chloride	92	0	260,011	38,381	25,331	220	0	323,943
	91	0	200,005	73,051	28,749	205	0	302,010
	90	NA	NA	278,050	45,550	2,162	0	*325,762*
	88	NA	NA	89,160	41,553	9,687	0	*140,400*
Beryllium	92	7,282	0	743	0	14,094	0	22,119
	91	77,731	10	245	0	117,582	0	195,568
	90	NA	NA	0	0	1,371	0	*1,371*
	88	NA	NA	3	4	3,155	0	*3,162*
Beryllium compounds	92	18,485	0	438	250	4,050	0	23,223
	91	7,135	0	1,081	0	1,800	0	10,016
	90	NA	NA	801	1	320	0	*1,122*
	88	NA	NA	1,391	3	7,150	0	*8,544*
Biphenyl	92	353,966	389,944	212,022	994,151	32,822	0	1,982,905
	91	179,826	321,354	184,796	782,642	43,714	300	1,512,632
	90	NA	NA	175,078	1,076,096	45,042	193,089	*1,489,305*
	88	NA	NA	250,871	1,446,614	227,492	0	*1,924,977*
Bis(2-chloroethyl) ether	92	0	140	57,031	10,949	3	0	68,123
	91	0	350	447,600	15,841	0	0	463,791
	90	NA	NA	20,596	31,791	101	0	*52,488*
	88	NA	NA	27,265	9,621	0	0	*36,886*
Bis(chloromethyl) ether	92	0	0	0	0	1	0	1
	91	0	0	0	0	2	0	2
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Bis(2-chloro-1-methyl-ethyl)ether	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
103-23-1	Bis(2-ethylhexyl) adipate	92	75,921	154,947	1,628	0	95,291	327,787
		91	76,445	80,421	90	0	81,715	238,671
		90	48,528	99,236	6,919	0	19,798	174,481
		88	25,789	66,788	10,440	0	1,200	104,217
75-25-2	Bromoform	92	11,120	5	0	4,500	0	15,625
		91	150	0	0	1,900	0	2,050
		90	48,205	0	0	0	72,000	120,205
		88	0	0	8,600	0	0	8,600
74-83-9	Bromomethane	92	528,321	2,472,829	390	1,000	0	3,002,540
		91	448,440	2,589,843	0	1,000	0	3,039,283
		90	420,301	2,568,062	0	28,000	0	3,016,363
		88	416,777	2,356,018	0	1,546	0	2,774,341
106-99-0	1,3-Butadiene	92	2,229,847	1,613,853	1,364	1,000	372	3,846,436
		91	2,051,762	1,895,332	5,049	0	8,881	3,961,024
		90	3,094,370	2,068,264	111,234	1,605	6,428	5,281,901
		88	4,052,885	2,935,269	522,504	1,500	7,817	7,519,975
141-32-2	Butyl acrylate	92	184,349	158,966	2,261	0	834	346,410
		91	151,354	141,226	1,273	0	55	293,908
		90	138,636	167,254	29,072	0	68	335,030
		88	165,197	246,676	3,528	10	602	416,013
71-36-3	n-Butyl alcohol	92	7,134,970	22,588,357	35,369	2,324,731	57,220	32,140,647
		91	7,392,318	22,974,071	257,967	4,382,276	83,111	35,089,743
		90	7,300,822	26,397,485	324,240	3,529,441	97,838	37,649,826
		88	8,865,492	28,878,427	128,130	3,006,660	175,819	41,054,528
78-92-2	sec-Butyl alcohol	92	208,247	460,823	15,706	25,450	762	710,988
		91	233,287	409,563	4,486	170,000	14	817,350
		90	214,625	495,032	4,315	171,484	51	885,507
		88	399,726	697,037	122,291	0	2,600	1,221,654
75-65-0	tert-Butyl alcohol	92	1,245,810	426,219	147,629	640,123	14	2,459,795
		91	760,862	422,999	130,806	827,562	497	2,142,726
		90	1,264,494	341,300	271,274	995,382	24,962	2,897,412
		88	1,206,290	366,697	14,989	674,798	818	2,263,592
85-68-7	Butyl benzyl phthalate	92	151,715	186,523	957	0	6,109	345,304
		91	109,589	193,276	1,177	0	75,866	379,908
		90	42,475	185,209	925	260	9,774	238,643
		88	45,407	245,853	802	480	16,682	309,224
106-88-7	1,2-Butylene oxide	92	59,828	15,024	5,773	0	0	80,625
		91	48,928	10,836	3,490	0	5	63,259
		90	54,696	24,769	4,625	0	5	84,095
		88	34,973	64,958	3,500	0	250	103,681
123-72-8	Butyraldehyde	92	214,563	281,946	470	128,051	256	625,286
		91	165,671	267,829	575	144,427	28	578,530
		90	211,784	350,687	3,423	1,937	371	568,202
		88	691,404	1,511,388	3,812	1,997	31	2,208,632
569-64-2	C.I. Basic Green 4	92	5	5	40	0	0	50
		91	6	6	14	0	0	26
		90	9	7	250	0	0	266
		88	500	250	0	0	0	750
989-38-8	C.I. Basic Red 1	92	0	0	0	0	0	0
		91	0	0	0	0	375	375
		90	0	0	0	0	0	0
		88	No Reports Received					

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Bis(2-ethylhexyl) adipate	92	135,434	274,379	23,018	20,456	290,126	0	743,413
	91	16,709	107,088	97,926	22,465	211,468	0	455,656
	90	NA	NA	39,985	33,937	173,897	0	*247,819*
	88	NA	NA	97,289	49,659	79,800	29,617	*256,365*
Bromoform	92	0	0	6,400	0	195,005	0	201,405
	91	0	0	250	0	99,300	0	99,550
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Bromomethane	92	0	3,500	255	0	250	0	4,005
	91	121,000	420	320	0	15	0	121,755
	90	NA	NA	2,821	552,160	0	0	*554,981*
	88	NA	NA	0	0	0	0	*0*
1,3-Butadiene	92	18,386,640	177,839	194,778	20,583	7,666	0	18,787,506
	91	5,537,690	377,354	124,385	11,650	4,602	0	6,055,681
	90	NA	NA	106,024	14,383	21,901	33,919	*176,227*
	88	NA	NA	178,855	44,874	185,398	1,934	*411,061*
Butyl acrylate	92	12,572	34,905	59,628	190,144	23,350	0	320,599
	91	114,618	124,590	38,736	138,351	15,098	0	431,393
	90	NA	NA	101,842	127,589	28,233	250	*257,914*
	88	NA	NA	585,394	34,604	18,766	525	*639,289*
n-Butyl alcohol	92	2,524,614	8,096,439	2,942,954	2,070,978	500,583	48,427	16,183,995
	91	2,907,920	6,765,689	3,351,457	2,211,131	296,197	30,083	15,562,477
	90	NA	NA	4,113,834	4,241,417	1,867,750	107,197	*10,330,198*
	88	NA	NA	6,849,699	4,524,613	924,519	424,735	*12,723,566*
sec-Butyl alcohol	92	3,025	4,844,222	100,138	11,880	6,662	0	4,965,927
	91	25,317	3,904,139	27,216	14,464	1,723	0	3,972,859
	90	NA	NA	36,955	9,991	36,143	7	*83,096*
	88	NA	NA	74,574	41,108	21,351	134,802	*271,835*
tert-Butyl alcohol	92	3,058	28,475,525	353,220	2,104,895	63,908	0	31,000,606
	91	0	26,160,445	326,204	1,340,027	788,849	0	28,615,525
	90	NA	NA	394,499	1,803,787	78,015	0	*2,276,301*
	88	NA	NA	328,523	1,539,726	56,502	110,250	*2,035,001*
Butyl benzyl phthalate	92	58,054	124,622	243,487	27,227	403,286	0	856,676
	91	99,372	119,485	149,535	40,824	316,753	0	725,969
	90	NA	NA	209,425	87,605	686,823	2,817	*986,670*
	88	NA	NA	337,119	44,235	726,946	6,230	*1,114,530*
1,2-Butylene oxide	92	0	354,320	0	6,059	0	0	360,379
	91	10	326,019	907	5	0	0	326,941
	90	NA	NA	250	250	7,935	0	*8,435*
	88	NA	NA	250	0	898	0	*1,148*
Butyraldehyde	92	5,850	3,839	3,804	250,480	11	0	263,984
	91	0	911	2,083	260,475	388	0	263,857
	90	NA	NA	2,618	350,893	463	1,001	*354,975*
	88	NA	NA	6,197	371,633	117,741	0	*495,571*
C.I. Basic Green 4	92	0	0	499	3,006	3,025	0	6,530
	91	0	0	0	18,132	1,995	499	20,626
	90	NA	NA	0	1,006	250	250	*1,506*
	88	NA	NA	0	1,320	250	0	*1,570*
C.I. Basic Red 1	92	0	309	0	0	382	0	691
	91	0	271	0	0	375	0	646
	90	NA	NA	0	0	0	0	*0*
	88	No Reports Received						

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
2832-40-8	C.I. Disperse Yellow 3	92	428	0	23	0	780	1,231
		91	336	0	26	0	782	1,144
		90	369	250	36	0	848	1,503
		88	398	0	302	0	0	700
81-88-9	C.I. Food Red 15	92	0	2	0	0	0	2
		91	0	1	0	0	0	1
		90	0	2	0	0	0	2
		88	250	0	0	0	0	250
97-56-3	C.I. Solvent Yellow 3	92	No Reports Received					
		91	0	5	0	0	0	5
		90	0	0	5	0	0	5
		88	250	0	0	0	0	250
842-07-9	C.I. Solvent Yellow 14	92	0	0	0	0	0	0
		91	No Reports Received					
		90	0	0	0	0	0	0
		88	0	0	0	0	0	0
7440-43-9	Cadmium	92	2,295	6,461	638	0	7,036	16,430
		91	1,857	3,091	661	0	2,753	8,362
		90	5,166	8,159	1,380	10	84,892	99,607
		88	9,300	13,130	2,598	0	94,602	119,630
	Cadmium compounds	92	11,347	49,037	780	1,211	65,407	127,782
		91	16,066	51,478	3,580	1,540	248,354	321,018
		90	25,873	64,186	1,959	1,565	312,631	406,214
		88	23,099	77,163	1,799	2,409	295,127	399,597
156-62-7	Calcium cyanamide	92	8,000	405	0	0	30,005	38,410
		91	12,000	625	0	0	40,005	52,630
		90	12,000	620	0	0	40,000	52,620
		88	12,000	600	0	0	66,000	78,600
133-06-2	Captan	92	1,647	5,189	10	5,000	10	11,856
		91	1,883	5,233	260	4,500	260	12,136
		90	1,783	17,469	505	5,500	505	25,762
		88	4,066	10,803	750	5,100	1,000	21,719
63-25-2	Carbaryl	92	2,525	7,172	15	0	265	9,977
		91	2,022	4,825	260	0	1,170	8,277
		90	2,292	6,166	505	0	48,755	57,718
		88	2,515	5,408	877	0	500	9,300
75-15-0	Carbon disulfide	92	2,636,114	90,240,923	45,087	2,704	21	92,924,849
		91	2,626,842	86,861,615	58,634	2,835	260	89,550,186
		90	3,333,871	95,092,808	40,579	3,900	505	98,471,663
		88	3,139,255	120,974,449	39,501	13,400	43,436	124,210,041
56-23-5	Carbon tetrachloride	92	416,994	973,268	2,441	45,984	333	1,439,020
		91	528,622	1,019,252	2,844	42,470	2,152	1,595,340
		90	419,001	1,320,225	4,718	31,557	1,005	1,776,506
		88	1,081,552	2,695,101	15,627	98,054	14,759	3,905,093
463-58-1	Carbonyl sulfide	92	4,222	16,198,944	0	0	0	16,203,166
		91	5,627	16,719,541	0	0	0	16,725,168
		90	12,249	18,622,615	0	0	0	18,634,864
		88	7,643	20,175,429	750	0	0	20,183,822
120-80-9	Catechol	92	9,925	917	223,299	3,507	59,154	296,802
		91	4,026	1,841	252,434	0	86,602	344,903
		90	2,772	25,260	232,765	0	84,213	345,010
		88	2,388	1,201	400,760	0	84,283	488,632

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
C.I. Disperse Yellow 3	92	0	0	0	755	286	0	1,041
	91	0	0	0	0	125	0	125
	90	NA	NA	0	250	219	0	*469*
	88	NA	NA	0	0	899	0	*899*
C.I. Food Red 15	92	0	0	0	1,700	0	0	1,700
	91	0	5	0	1,400	0	0	1,405
	90	NA	NA	0	270	0	0	*270*
	88	NA	NA	0	0	0	0	*0*
C.I. Solvent Yellow 3	92	No Reports Received						
	91	0	0	10	0	0	0	10
	90	NA	NA	0	5	0	0	*5*
	88	NA	NA	0	0	0	0	*0*
C.I. Solvent Yellow 14	92	0	0	0	0	0	0	0
	91	No Reports Received						
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Cadmium	92	227,783	0	76,146	2,502	101,049	107	407,587
	91	120,281	813	68,200	3,090	667,572	4,804	864,760
	90	NA	NA	35,403	4,815	199,692	0	*239,910*
	88	NA	NA	83,296	7,894	131,879	2,441	*225,510*
Cadmium compounds	92	1,819,291	3,302	435,404	43,313	280,064	11,527	2,592,901
	91	2,136,760	6,647	293,424	5,460	355,101	36,801	2,834,193
	90	NA	NA	113,611	8,953	973,433	230	*1,096,227*
	88	NA	NA	86,534	13,719	982,418	500	*1,083,171*
Calcium cyanamide	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Captan	92	0	0	4,095	255	5,087	0	9,437
	91	0	0	3,755	255	12,748	0	16,758
	90	NA	NA	12,334	255	4,387	50	*17,026*
	88	NA	NA	511	250	12,434	750	*13,945*
Carbaryl	92	0	0	10,777	0	30,268	0	41,045
	91	0	0	9,937	0	6,032	0	15,969
	90	NA	NA	11,945	0	3,503	0	*15,448*
	88	NA	NA	27,582	171	6,198	0	*33,951*
Carbon disulfide	92	64,455	145,128	16,526	193,442	1,717	0	421,268
	91	33,804	174,690	331,628	193,658	3,746	0	737,526
	90	NA	NA	242,982	121,882	1,249	0	*366,113*
	88	NA	NA	154,315	159,369	58,473	0	*372,157*
Carbon tetrachloride	92	345,452	24,455	839,388	1,054	11,955	0	1,222,304
	91	390,625	11,061	939,479	621	39,111	1,684	1,382,581
	90	NA	NA	1,072,020	42,050	10,163	5	*1,124,238*
	88	NA	NA	1,300,058	5,014	49,703	250	*1,355,025*
Carbonyl sulfide	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Catechol	92	31	1,526	76,354	154,358	37,192	0	269,461
	91	50	35,305	39,630	237,081	74,672	0	386,738
	90	NA	NA	208,955	336,096	37,581	1	*582,633*
	88	NA	NA	15,364	245,399	89,474	250	*350,487*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
133-90-4	Chloramben	92	No Reports Received					
		91	No Reports Received					
		90	5	5	0	0	0	10
		88	250	1,168	250	0	0	1,668
57-74-9	Chlordane	92	1,713	0	1	0	0	1,714
		91	1,248	179	1	0	0	1,428
		90	4,244	178	1	0	0	4,423
		88	2,695	3	4	4,262	0	6,964
7782-50-5	Chlorine	92	1,634,189	68,278,693	1,217,091	48,252	46,171	71,224,396
		91	1,726,624	74,853,891	731,984	72,551	78,264	77,463,314
		90	2,064,348	103,382,021	1,280,596	73,889	250,571	107,051,425
		88	4,704,628	129,400,016	6,615,540	107,624	428,097	141,255,905
10049-04-4	Chlorine dioxide	92	60,490	3,035,936	761	0	6	3,097,193
		91	146,153	3,832,282	13,760	0	120	3,992,315
		90	134,215	5,136,299	785	15	20	5,271,334
		88	1,277,546	12,076,241	2,350	0	41,000	13,397,137
79-11-8	Chloroacetic acid	92	10,778	1,024	3,199	0	0	15,001
		91	60,745	446,920	1,696	0	123,675	633,036
		90	20,650	4,754	1,691	0	0	27,095
		88	21,660	5,159	850	10	0	27,679
532-27-4	2-Chloroacetophenone	92	No Reports Received					
		91	1	1	0	0	0	2
		90	No Reports Received					
		88	No Reports Received					
108-90-7	Chlorobenzene	92	1,026,324	1,201,951	20,799	72,000	817	2,321,891
		91	1,225,868	1,281,273	5,165	177,032	1,534	2,690,872
		90	1,845,339	2,205,033	72,893	49,406	4,267	4,176,938
		88	2,032,791	2,533,096	98,354	84,457	4,127	4,752,825
75-00-3	Chloroethane	92	1,533,378	1,224,260	1,957	210	0	2,759,805
		91	1,397,212	1,466,057	16,078	300	10	2,879,657
		90	1,896,919	2,146,014	35,997	110	93	4,079,133
		88	2,148,225	2,555,010	27,448	1,510	0	4,732,193
67-66-3	Chloroform	92	6,017,425	11,017,501	654,452	50,240	28,582	17,768,200
		91	7,720,653	11,529,517	764,484	65,089	22,150	20,101,893
		90	8,388,150	14,648,445	1,005,860	89,560	57,924	24,189,939
		88	7,595,976	18,265,090	1,132,684	36,002	68,544	27,098,296
74-87-3	Chloromethane	92	1,325,645	4,317,830	30,961	86,709	0	5,761,145
		91	1,431,983	4,266,748	101,838	192,600	0	5,993,169
		90	1,979,304	5,847,270	144,397	199,605	92,260	8,262,836
		88	3,431,108	8,315,962	115,985	165,250	0	12,028,305
107-30-2	Chloromethyl methyl ether	92	35	1,186	10	0	0	1,231
		91	30	3,305	0	0	0	3,335
		90	35	3,300	0	0	0	3,335
		88	33	3,000	0	0	0	3,033
	Chlorophenols	92	3,226	6,057	290	133,204	0	142,777
		91	3,368	968	782	229,798	56	234,972
		90	3,913	1,162	551	174,100	2	179,728
		88	2,154	419	272	71,554	0	74,399
126-99-8	Chloroprene	92	152,543	1,344,852	47	54,000	1,811	1,553,253
		91	103,489	1,367,033	124	71,000	137,011	1,678,657
		90	159,397	1,401,702	756	140,000	750	1,702,605
		88	234,228	1,713,780	287	68,792	0	2,017,087

Table 3-15, Cont.

	Transfers	Transfers to Energy	Transfers to	Transfers	Transfers	Other Off-site	Total

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
1897-45-6	Chlorothalonil	92	3,185	2,695	6	0	12,250	18,136
		91	1,921	1,330	13	0	0	3,264
		90	2,786	9,668	9	0	0	12,463
		88	19,455	9,021	250	0	0	28,726
7440-47-3	Chromium	92	411,832	112,207	19,104	333	961,167	1,504,643
		91	289,196	107,891	17,577	531	1,196,873	1,612,068
		90	254,586	167,717	40,398	90	2,737,167	3,199,958
		88	365,498	209,324	74,941	2,249	9,295,079	9,947,091
	Chromium compounds	92	128,783	334,902	269,667	32,137	23,165,988	23,931,477
		91	143,995	433,941	335,807	34,603	24,757,061	25,705,407
		90	317,050	407,048	407,831	83,137	23,300,683	24,515,749
		88	259,687	507,512	323,027	52,653	30,933,656	32,076,535
7440-48-4	Cobalt	92	16,478	13,084	2,156	500	6,931	39,149
		91	29,085	42,090	4,289	0	13,456	88,920
		90	17,328	21,373	8,858	0	35,008	82,567
		88	22,434	21,311	16,743	0	213,204	273,692
	Cobalt compounds	92	7,840	23,471	99,289	18,420	126,946	275,966
		91	7,886	26,261	78,593	19,949	92,860	225,549
		90	10,148	42,971	90,869	19,308	43,493	206,789
		88	11,081	45,329	63,662	18,500	39,210	177,782
7440-50-8	Copper	92	476,395	1,018,974	41,474	16,736	12,647,313	14,200,892
		91	355,269	872,519	55,945	14,011	15,432,960	16,730,704
		90	374,595	578,612	57,287	22,356	11,421,410	12,454,260
		88	315,125	1,200,583	115,631	15,651	10,467,985	12,114,975
	Copper compounds	92	3,563,732	2,766,265	72,413	201,431	34,489,362	41,093,203
		91	2,391,269	1,874,005	159,601	224,560	41,828,821	46,478,256
		90	859,620	1,020,353	72,256	192,434	39,367,310	41,511,973
		88	2,335,156	820,766	182,687	165,957	29,680,507	33,185,073
120-71-8	p-Cresidine	92	240	100	5	0	255	600
		91	160	68	5	0	250	483
		90	2,607	83	0	0	250	2,940
		88	5,400	1,680	250	0	750	8,080
1319-77-3	Cresol (mixed isomers)	92	193,663	298,657	2,747	614,578	1,097	1,110,742
		91	350,695	391,763	3,661	749,531	2,528	1,498,178
		90	388,923	354,301	2,390	1,724,529	3,946	2,474,089
		88	400,427	378,672	6,500	1,804,060	4,762	2,594,421
108-39-4	m-Cresol	92	51,679	5,100	220	450,000	0	506,999
		91	66,736	11,098	445	560,000	10	638,289
		90	4,193	3,915	480	0	0	8,588
		88	5,860	12,572	283	0	455	19,170
95-48-7	o-Cresol	92	20,426	3,061	14	490,000	3	513,504
		91	29,218	31,557	11	550,000	4,860	615,646
		90	20,824	18,322	36	0	255	39,437
		88	45,563	44,236	448	1	1,667	91,915
106-44-5	p-Cresol	92	36,611	3,777	943	232,900	1,513	275,744
		91	45,103	90,084	2,046	252,200	3,259	392,692
		90	8,262	230,743	1,955	1,997	2,873	245,830
		88	6,286	634,417	1,143	152,000	62,291	856,137
98-82-8	Cumene	92	1,245,131	2,479,290	2,250	15,100	783	3,742,554
		91	1,240,289	2,419,019	2,027	9,189	21,757	3,692,281
		90	1,537,439	2,698,045	1,886	13,402	19,167	4,269,939
		88	2,152,339	2,895,981	3,201	30,165	8,591	5,090,277

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling(37) Pounds	Transfers to Energy Recovery(37) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers(38) Pounds	Total Transfers(39) Pounds
Chlorothalonil	92	1,100	0	4,119	269	175,978	0	181,466
	91	0	653	6,412	293	204,538	0	211,896
	90	NA	NA	2,382	755	201,740	5	*204,882*
	88	NA	NA	3,660	541	396,274	0	*400,475*
Chromium	92	67,938,117	2,449	1,326,072	132,754	4,365,586	491,230	74,256,208
	91	43,425,918	6,956	1,012,666	138,883	5,554,770	172,893	50,312,086
	90	NA	NA	1,171,436	164,476	8,977,883	10,110,830	*20,424,625*
	88	NA	NA	1,199,528	414,128	10,216,527	6,163,292	*17,993,475*
Chromium compounds	92	28,139,690	88,398	2,479,235	809,513	9,880,041	68,353	41,465,230
	91	23,051,461	116,978	2,787,599	798,350	10,508,722	141,910	37,405,020
	90	NA	NA	2,445,467	951,893	13,054,331	150,203	*16,601,894*
	88	NA	NA	2,660,428	1,663,076	11,482,115	386,049	*16,191,668*
Cobalt	92	4,895,246	4,111	22,716	12,169	105,487	250	5,039,979
	91	5,355,271	4	29,542	9,878	522,818	12	5,917,525
	90	NA	NA	25,814	8,175	262,160	279	*296,428*
	88	NA	NA	27,673	8,843	218,776	0	*255,292*
Cobalt compounds	92	1,446,723	11,289	80,374	14,398	347,695	76	1,900,555
	91	1,565,833	2,812	120,110	15,724	234,931	25	1,939,435
	90	NA	NA	40,929	17,165	390,628	3,099	*451,821*
	88	NA	NA	88,079	28,369	253,828	263	*370,539*
Copper	92	346,800,370	2,100	1,751,412	142,939	13,139,578	2,272,446	364,108,845
	91	300,418,342	3,518	2,590,245	159,108	12,678,712	1,891,608	317,741,533
	90	NA	NA	3,942,918	158,061	11,607,359	1,635,406	*17,343,744*
	88	NA	NA	4,063,934	312,047	14,885,986	1,108,742	*20,370,709*
Copper compounds	92	106,264,546	119,463	3,087,861	245,515	6,427,267	106,594	116,251,246
	91	98,093,015	42,455	1,927,814	199,220	6,664,783	194,512	107,121,799
	90	NA	NA	1,795,303	201,942	43,558,675	67,715	*45,623,635*
	88	NA	NA	5,930,345	433,518	8,457,299	1,523,862	*16,345,024*
p-Cresidine	92	0	0	0	23,780	4,500	0	28,280
	91	0	0	1	18,368	2,680	0	21,049
	90	NA	NA	0	18,750	0	0	*18,750*
	88	NA	NA	0	37,750	4,700	0	*42,450*
Cresol (mixed isomers)	92	38,462	329,156	207,196	40,759	22,891	0	638,464
	91	107,081	256,262	252,876	25,056	6,563	0	647,838
	90	NA	NA	566,391	57,073	84,904	0	*708,368*
	88	NA	NA	847,303	358,242	483,738	8,738	*1,698,021*
m-Cresol	92	888	45,117	20,963	7,496	23,021	0	97,485
	91	490	9,622	39,458	11,918	23,451	0	84,939
	90	NA	NA	12,267	7,439	2,479	0	*22,185*
	88	NA	NA	125,737	7,165	13,503	0	*146,405*
o-Cresol	92	0	28,607	4,529	33,565	13,382	0	80,083
	91	258	4,342	18,922	55,341	12,004	0	90,867
	90	NA	NA	37,023	53,066	14,714	14,510	*119,313*
	88	NA	NA	75,565	40,703	12,458	2,500	*131,226*
p-Cresol	92	0	163,747	21,716	672,069	12,310	0	869,842
	91	0	28,829	24,251	1,062,305	16,349	0	1,131,734
	90	NA	NA	53,697	879,959	27,044	0	*960,700*
	88	NA	NA	26,377	744,568	643	250	*771,838*
Cumene	92	62,769	664,283	102,082	42,645	18,072	0	889,851
	91	80,857	716,755	56,032	163,552	16,392	0	1,033,588
	90	NA	NA	351,824	254,062	64,404	250	*670,540*
	88	NA	NA	126,382	203,279	80,075	0	*409,736*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
80-15-9	Cumene hydroperoxide	92	66,077	12,009	217	259,000	21	337,324
		91	111,935	17,922	242	422,600	240	552,939
		90	97,285	12,886	427	45,518	6,665	162,781
		88	178,787	13,736	1,784	371,000	250	565,557
135-20-6	Cupferron	92	0	10	0	0	0	10
		91	0	1,200	0	0	0	1,200
		90	5	480	34	0	0	519
		88	140	780	0	0	0	920
	Cyanide compounds	92	80,916	974,494	81,369	2,963,579	12,936	4,113,294
		91	61,844	808,287	111,660	3,781,837	22,163	4,785,791
		90	183,863	1,057,080	125,277	3,383,860	19,672	4,769,752
		88	525,618	721,775	194,662	3,707,326	107,208	5,256,589
110-82-7	Cyclohexane	92	5,004,598	8,596,357	21,039	230,985	107,748	13,960,727
		91	6,670,329	9,862,716	12,826	591,703	27,757	17,165,331
		90	6,356,947	11,501,634	26,428	327,259	33,376	18,245,644
		88	4,922,963	8,834,641	20,273	334,471	38,190	14,150,538
94-75-7	2,4-D (acetic acid)	92	3,292	3,493	262	1,200	15,302	23,549
		91	10,049	6,161	262	1,291	13,260	31,023
		90	4,030	4,212	259	2,100	10,662	21,263
		88	3,289	3,731	549	3,789	38,000	49,358
1163-19-5	Decabromodiphenyl oxide	92	11,940	25,027	3,878	285	531,040	572,170
		91	21,947	26,043	3,817	38	220,075	271,920
		90	15,608	48,495	2,577	43	24,844	91,567
		88	7,500	22,104	500	292	21,450	51,846
615-05-4	2,4-Diaminoanisole	92	No Reports Received					
		91	0	0	0	0	0	0
		90	21	5	0	0	0	26
		88	0	0	0	0	0	0
39156-41-7	2,4-Diaminoanisole sulfate	92	No Reports Received					
		91	0	0	0	0	0	0
		90	0	0	0	0	0	0
		88	0	0	0	0	0	0
101-80-4	4,4'-Diaminodiphenyl ether	92	5	264	312	0	0	581
		91	7	697	337	0	0	1,041
		90	5	900	413	0	0	1,318
		88	0	216	585	0	0	801
25376-45-8	Diaminotoluene (mixed isomers)	92	13,913	4,570	695	10,000	85	29,263
		91	17,963	2,620	1,110	24,000	10	45,703
		90	19,345	5,869	955	89,000	265	115,434
		88	15,202	5,895	3,288	174,000	295	198,680
95-80-7	2,4-Diaminotoluene	92	1,150	755	5	0	0	1,910
		91	3,800	10	250	0	0	4,060
		90	3,801	127	250	0	0	4,178
		88	2,900	88	250	0	0	3,238
132-64-9	Dibenzofuran	92	16,474	13,282	260	0	211	30,227
		91	18,434	21,608	505	0	1,720	42,267
		90	21,207	9,018	532	0	897	31,654
		88	46,687	24,406	1,510	0	9,929	82,532
96-12-8	1,2-Dibromo-3-chloropropane	92	294	0	0	0	0	294
		91	290	0	0	0	0	290
		90	No Reports Received					
		88	No Reports Received					

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling (37) Pounds	Transfers to Energy Recovery (37) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers (38) Pounds	Total Transfers (39) Pounds
Cumene hydroperoxide	92	0	255	1,790	260	42,686	0	44,991
	91	0	2,101	7,423	265	25,465	0	35,254
	90	NA	NA	5,165	3,755	184,921	0	*193,841*
	88	NA	NA	2,572	5,250	22,944	0	*30,766*
Cupferron	92	0	0	0	69	0	0	69
	91	0	0	0	1,200	0	0	1,200
	90	NA	NA	0	530	0	0	*530*
	88	NA	NA	4,275	780	0	0	*5,055*
Cyanide compounds	92	94,518	250	377,676	87,697	254,652	2,200	816,993
	91	82,410	250	445,968	121,227	419,541	12,390	1,081,786
	90	NA	NA	913,915	119,004	471,620	1,880	*1,506,419*
	88	NA	NA	1,964,458	1,152,491	581,430	150,909	*3,849,288*
Cyclohexane	92	437,349	2,985,895	1,025,483	17,458	31,527	0	4,497,712
	91	579,083	3,699,980	956,727	26,599	24,184	119,416	5,405,989
	90	NA	NA	1,259,730	33,146	71,382	270	*1,364,528*
	88	NA	NA	2,691,889	146,667	211,572	37,400	*3,087,528*
2,4-D (acetic acid)	92	0	0	28,201	300	51,900	5	80,406
	91	0	0	105,891	350	13,326	0	119,567
	90	NA	NA	51,657	5,581	6,512	1,045	*64,795*
	88	NA	NA	23,335	27,952	68,422	0	*119,709*
Decabromodiphenyl oxide	92	20,282	7,406	53,759	126,872	714,384	0	922,703
	91	49,163	8,551	43,567	43,788	747,186	0	892,255
	90	NA	NA	90,149	37,100	706,688	14,588	*848,525*
	88	NA	NA	76,150	19,090	551,633	1,284	*648,157*
2,4-Diaminoanisole	92	No Reports Received						
	91	0	0	0	85	0	0	85
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	250	0	0	*250*
2,4-Diaminoanisole sulfate	92	No Reports Received						
	91	0	0	0	250	0	0	250
	90	NA	NA	0	250	0	0	*250*
	88	NA	NA	0	250	0	0	*250*
4,4'-Diaminodiphenyl ether	92	0	0	4,226	5	1,193	0	5,424
	91	0	0	3,962	5	120	0	4,087
	90	NA	NA	5,607	250	250	0	*6,107*
	88	NA	NA	0	179	142	0	*321*
Diaminotoluene (mixed isomers)	92	0	367,800	428,171	33,575	2,793	0	832,339
	91	0	578,455	544,862	54,369	21,702	0	1,199,388
	90	NA	NA	1,068,412	80,350	94,664	4,989	*1,248,415*
	88	NA	NA	456,114	2,951	289,591	250	*748,906*
2,4-Diaminotoluene	92	0	0	10,388	0	0	0	10,388
	91	0	8,396	5,710	620	6,060	0	20,786
	90	NA	NA	0	1,501	0	0	*1,501*
	88	NA	NA	0	1,200	0	0	*1,200*
Dibenzofuran	92	0	800	3,701	255	68,390	250	73,396
	91	0	3,246	16,943	500	81,602	0	102,291
	90	NA	NA	14,583	40,052	75,542	0	*130,177*
	88	NA	NA	51,985	47,726	181,799	250	*281,760*
1,2-Dibromo-3-chloropropane	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	No Reports Received						
	88	No Reports Received						

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
106-93-4	1,2-Dibromoethane	92	10,921	21,931	106	1,823	6	34,787
		91	8,642	29,560	73	240	2	38,517
		90	22,383	35,537	0	495	125	58,540
		88	34,119	29,208	1,011	6,882	259	71,479
84-74-2	Dibutyl phthalate	92	104,628	65,671	5,991	110,000	764	287,054
		91	58,461	88,556	8,907	160,000	5,069	320,993
		90	46,303	73,443	7,358	110,000	167	237,271
		88	169,836	33,972	14,339	350,000	6,395	574,542
25321-22-6	Dichlorobenzene (mixed isomers)	92	725	3,796	0	4	0	4,525
		91	4,441	73,649	2	0	9	78,101
		90	29,606	59,918	1	11	22	89,558
		88	20,169	143,515	40	0	0	163,724
95-50-1	1,2-Dichlorobenzene	92	182,216	166,843	2,395	3,700	6,469	361,623
		91	175,806	246,506	3,962	19,000	21,153	466,427
		90	160,017	256,013	12,395	15,313	32,588	476,326
		88	206,238	324,463	11,624	20,115	13,354	575,794
541-73-1	1,3-Dichlorobenzene	92	1,102	3,033	877	0	0	5,012
		91	878	3,941	779	0	0	5,598
		90	3,104	5,578	785	0	0	9,467
		88	5,782	9,500	1,281	0	0	16,563
106-46-7	1,4-Dichlorobenzene	92	74,313	263,633	2,021	2,000	622	342,589
		91	47,159	297,095	2,146	2,000	420	348,820
		90	96,238	721,895	3,912	255	38	822,338
		88	103,870	1,787,549	6,153	4,000	1,300	1,902,872
91-94-1	3,3'-Dichlorobenzidine	92	5	5	0	0	0	10
		91	5	5	0	0	0	10
		90	10	15	1	0	0	26
		88	250	5	752	0	0	1,007
75-27-4	Dichlorobromomethane	92	194	0	0	0	0	194
		91	200	0	0	0	0	200
		90	632	0	0	0	0	632
		88	No Reports Received					
107-06-2	1,2-Dichloroethane	92	650,901	2,514,306	12,296	6,927	1,858	3,186,288
		91	816,464	3,268,059	26,264	6,334	7,051	4,124,172
		90	1,167,609	4,436,475	49,513	826,672	7,351	6,487,620
		88	1,572,325	2,963,854	40,527	1,452,084	2,166	6,030,956
540-59-0	1,2-Dichloroethylene	92	15,623	7,604	5	24	1	23,257
		91	14,925	29,857	12	0	0	44,794
		90	81,311	46,588	54	360	118	128,431
		88	16,552	108,896	95	0	1	125,544
75-09-2	Dichloromethane	92	27,495,557	46,467,648	221,192	1,183,867	79,313	75,447,577
		91	31,896,963	48,227,792	98,924	1,317,706	118,560	81,659,945
		90	38,001,615	62,614,734	194,670	850,018	21,024	101,682,061
		88	49,344,483	79,395,371	348,560	1,478,833	157,156	130,724,403
120-83-2	2,4-Dichlorophenol	92	274	303	0	9,735	0	10,312
		91	885	547	1	42,800	1	44,234
		90	264	565	215	20,400	0	21,444
		88	535	868	107	17,700	2	19,212
78-87-5	1,2-Dichloropropane	92	205,467	414,450	6,089	0	1,206	627,212
		91	226,947	545,596	6,570	0	0	779,113
		90	199,002	839,612	10,453	0	300	1,049,367
		88	316,478	1,079,826	23,785	0	3,400	1,423,489

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
1,2-Dibromoethane	92	0	2,353	66,160	0	1,005	0	69,518
	91	0	842	838	2	750	0	2,432
	90	NA	NA	79,214	255	7,650	0	*87,119*
	88	NA	NA	5,937	253	27,924	0	*34,114*
Dibutyl phthalate	92	1,345	117,926	140,581	8,829	74,981	0	343,662
	91	4,660	166,958	110,547	14,535	70,751	10,063	377,514
	90	NA	NA	168,086	19,812	50,072	330	*238,300*
	88	NA	NA	157,156	36,523	112,818	1,618	*308,115*
Dichlorobenzene (mixed isomers)	92	0	92	212	250	11	0	565
	91	0	325,693	111,339	7,410	9	0	444,451
	90	NA	NA	195,644	26,769	17,056	0	*239,469*
	88	NA	NA	104,706	182,663	19,672	0	*307,041*
1,2-Dichlorobenzene	92	1,904,907	776,316	1,897,342	29,794	64,582	0	4,672,941
	91	1,490,896	1,079,191	2,413,025	84,218	427,032	0	5,494,362
	90	NA	NA	2,840,297	76,763	24,091	0	*2,941,151*
	88	NA	NA	1,947,856	64,118	38,266	53,683	*2,103,923*
1,3-Dichlorobenzene	92	950	0	4,626	480	18	0	6,074
	91	800	0	3,966	160	22	0	4,948
	90	NA	NA	1,463	30	1	0	*1,494*
	88	NA	NA	250	40	290	0	*580*
1,4-Dichlorobenzene	92	3	0	132,587	1,603	751	77	135,021
	91	4	36,530	111,019	11,068	770	0	159,391
	90	NA	NA	176,500	12,921	4,006	250	*193,677*
	88	NA	NA	138,132	37,997	750	0	*176,879*
3,3'-Dichlorobenzidine	92	0	250	16,600	260	5,850	0	22,960
	91	0	0	19,116	15	4,650	0	23,781
	90	NA	NA	11,133	505	5,618	0	*17,256*
	88	NA	NA	14,420	617	209,785	0	*224,822*
Dichlorobromomethane	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	No Reports Received						
1,2-Dichloroethane	92	18,429,536	77,386	2,135,859	20,044	25,329	0	20,688,154
	91	19,363,730	51,917	5,729,404	26,294	6,789	0	25,178,134
	90	NA	NA	3,528,945	81,514	33,279	0	*3,643,738*
	88	NA	NA	1,619,255	1,477,242	166,131	228,000	*3,490,628*
1,2-Dichloroethylene	92	2,330	0	312	0	3	0	2,645
	91	2,000	0	359	0	0	0	2,359
	90	NA	NA	4,000	0	1	0	*4,001*
	88	NA	NA	125,744	0	87,614	0	*213,358*
Dichloromethane	92	28,892,840	4,091,111	11,631,227	1,300,147	189,299	80,549	46,185,173
	91	28,453,488	3,728,253	11,988,448	1,302,759	495,784	164,918	46,133,650
	90	NA	NA	7,843,699	1,277,099	931,117	649,894	*10,701,809*
	88	NA	NA	11,192,106	1,830,904	10,152,702	1,089,604	*24,265,316*
2,4-Dichlorophenol	92	0	0	0	0	0	0	0
	91	0	750	0	0	0	0	750
	90	NA	NA	60,800	0	0	0	*60,800*
	88	NA	NA	12,559	6	350	0	*12,915*
1,2-Dichloropropane	92	0	0	53	1,389	1,952	0	3,394
	91	0	0	252	7,100	2,073	0	9,425
	90	NA	NA	4,570	8,596	1,639	0	*14,805*
	88	NA	NA	3,782	136,775	1,131	0	*141,688*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
542-75-6	1,3-Dichloropropylene	92	32,315	10,292	67	0	0	42,674
		91	11,895	8,510	0	0	0	20,405
		90	46,570	12,903	310	0	0	59,783
		88	39,790	14,800	250	0	0	54,840
62-73-7	Dichlorvos	92	541	558	5	0	0	1,104
		91	326	318	0	0	0	644
		90	800	510	0	0	0	1,310
		88	1,050	0	0	0	0	1,050
115-32-2	Dicofol	92	255	256	0	0	0	511
		91	5	1	0	0	0	6
		90	13	255	5	0	0	273
		88	593	750	0	0	0	1,343
1464-53-5	Diepoxybutane	92	No Reports Received					
		91	0	0	0	0	0	0
		90	No Reports Received					
		88	No Reports Received					
111-42-2	Diethanolamine	92	170,229	86,577	403,692	55,526	178,766	894,790
		91	192,674	83,577	434,065	60,000	132,835	903,151
		90	290,144	99,452	361,127	157,015	116,371	1,024,109
		88	439,907	198,081	438,213	238,317	133,456	1,447,974
117-81-7	Di-(2-ethylhexyl) phthalate	92	149,292	724,491	947	35	101,712	976,477
		91	105,832	1,053,803	3,842	370	161,625	1,325,472
		90	135,521	1,184,893	2,393	265	19,801	1,342,873
		88	181,742	959,875	2,776	3,091	20,748	1,168,232
84-66-2	Diethyl phthalate	92	10,824	82,934	470	0	505	94,733
		91	11,042	100,399	678	0	2,977	115,096
		90	12,839	83,578	2,697	0	37	99,151
		88	6,239	82,378	11,272	0	0	99,889
64-67-5	Diethyl sulfate	92	3,284	9,952	5	0	5	13,246
		91	3,610	408	5	0	10	4,033
		90	5,058	435	10	5	280	5,788
		88	8,436	2,191	0	0	250	10,877
119-90-4	3,3'-Dimethoxybenzidine	92	0	0	8	0	0	8
		91	0	0	4	0	0	4
		90	3	1	4	0	0	8
		88	No Reports Received					
119-93-7	3,3'-Dimethylbenzidine	92	No Reports Received					
		91	No Reports Received					
		90	0	0	0	0	0	0
		88	No Reports Received					
57-14-7	1,1-Dimethyl hydrazine	92	83	286	0	0	5	374
		91	111	378	0	0	0	489
		90	100	363	250	0	0	713
		88	2,206	2,117	10	0	0	4,333
105-67-9	2,4-Dimethylphenol	92	19,320	8,390	4	66,000	10	93,724
		91	18,008	15,686	8	101,000	26	134,728
		90	2,453	5,433	13	56,900	302	65,101
		88	1,661	9,927	484	24,703	649	37,424
131-11-3	Dimethyl phthalate	92	11,352	67,335	662	855	5	80,209
		91	14,152	63,014	1,198	865	811	80,040
		90	60,979	268,476	1,528	750	433	332,166
		88	113,841	420,965	4,335	390	504	540,035

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
1,3-Dichloropropylene	92	0	0	2,818	0	0	0	2,818
	91	0	0	920	0	0	0	920
	90	NA	NA	1,268	0	0	0	*1,268*
	88	NA	NA	2,738	0	0	0	*2,738*
Dichlorvos	92	0	250	2,350	1	1,251	0	3,852
	91	0	500	2,000	0	1,610	0	4,110
	90	NA	NA	792	5	3,199	0	*3,996*
	88	NA	NA	1,011	0	505	0	*1,516*
Dicofol	92	0	0	1,750	0	500	0	2,250
	91	0	0	7,899	0	10	0	7,909
	90	NA	NA	16	0	270	0	*286*
	88	NA	NA	9,380	0	15,786	0	*25,166*
Diepoxybutane	92	No Reports Received						
	91	0	0	0	0	0	0	0
	90	No Reports Received						
	88	No Reports Received						
Diethanolamine	92	229,669	114,258	331,933	983,606	164,481	0	1,823,947
	91	191,987	171,046	367,573	1,337,623	221,811	434	2,290,474
	90	NA	NA	346,857	3,496,367	240,845	37,612	*4,121,681*
	88	NA	NA	733,874	2,002,497	372,457	221,811	*3,330,639*
Di-(2-ethylhexyl) phthalate	92	3,318,190	388,743	194,931	30,306	1,204,709	0	5,136,879
	91	3,308,284	303,711	179,531	50,482	1,190,066	440	5,032,514
	90	NA	NA	429,374	93,541	1,373,978	86,615	*1,983,508*
	88	NA	NA	825,367	168,891	1,657,143	44,250	*2,695,651*
Diethyl phthalate	92	297,764	57,808	54,135	474,407	45,251	250	929,615
	91	183,064	12,927	77,732	315,218	48,747	281	637,969
	90	NA	NA	47,476	440,616	38,051	0	*526,143*
	88	NA	NA	97,952	37,600	6,572	1,400	*143,524*
Diethyl sulfate	92	4,942,698	33	815	547	172	0	4,944,265
	91	7,137,400	50	805	633	0	0	7,138,888
	90	NA	NA	2,725	1,170	1	100	*3,996*
	88	NA	NA	0	890	0	0	*890*
3,3'-Dimethoxybenzidine	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	37	0	0	*37*
	88	No Reports Received						
3,3'-Dimethylbenzidine	92	No Reports Received						
	91	No Reports Received						
	90	NA	NA	0	5	0	0	*5*
	88	No Reports Received						
1,1-Dimethyl hydrazine	92	22	0	7,005	0	0	0	7,027
	91	3	0	6,360	0	26	0	6,389
	90	NA	NA	8,474	0	33	0	*8,507*
	88	NA	NA	0	0	8,855	0	*8,855*
2,4-Dimethylphenol	92	304	72,669	10,351	5,445	1,503	0	90,272
	91	12,000	22,069	3,369	3,975	1,595	0	43,008
	90	NA	NA	1,891	4,030	13,201	0	*19,122*
	88	NA	NA	1,250	7,964	1,750	0	*10,964*
Dimethyl phthalate	92	500	47,843	38,402	108,765	3,497	0	199,007
	91	250	16,102	57,123	82,565	17,434	0	173,474
	90	NA	NA	43,292	88,719	13,854	0	*145,865*
	88	NA	NA	44,454	508,821	93,358	0	*646,633*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
77-78-1	Dimethyl sulfate	92	6,050	973	161	0	0	7,184
		91	9,675	432	293	0	0	10,400
		90	9,306	439	375	0	0	10,120
		88	9,176	1,630	610	0	50	11,466
534-52-1	4,6-Dinitro-o-cresol	92	2	31	20	0	0	53
		91	7	43	33	0	0	83
		90	8	39	131	0	0	178
		88	259	15	266	0	2	542
51-28-5	2,4-Dinitrophenol	92	14,680	5,632	128	18,925	6	39,371
		91	16,585	7,557	3,888	35,532	10	63,572
		90	17,111	7,586	89,074	111,500	3,307	228,578
		88	12,386	8,439	98,692	86,200	257	205,974
121-14-2	2,4-Dinitrotoluene	92	1,707	57	105	0	0	1,869
		91	5,104	313	2,682	0	1,424	9,523
		90	6,317	51,276	3,735	74,000	2,153	137,481
		88	15,533	77,724	12,055	106,400	14,961	226,673
606-20-2	2,6-Dinitrotoluene	92	422	3	126	0	0	551
		91	1,197	751	702	0	0	2,650
		90	1,486	16,251	416	19,000	0	37,153
		88	6,074	81,523	957	27,000	0	115,554
123-91-1	1,4-Dioxane	92	410,648	273,837	447,066	0	3,297	1,134,848
		91	365,544	365,038	318,133	0	15,952	1,064,667
		90	307,216	346,400	303,856	0	12,549	970,021
		88	361,259	251,374	203,320	0	11,702	827,655
106-89-8	Epichlorohydrin	92	402,097	120,556	3,165	0	1,655	527,473
		91	277,040	182,110	5,456	0	3,675	468,281
		90	254,946	171,714	11,029	79,220	7,648	524,557
		88	296,142	200,965	4,917	68,750	2,524	573,298
110-80-5	2-Ethoxyethanol	92	117,490	279,496	18	0	35	397,039
		91	207,045	466,743	5,022	0	5	678,815
		90	354,631	675,331	42,015	0	0	1,071,977
		88	281,053	2,150,257	120,164	0	52	2,551,526
140-88-5	Ethyl acrylate	92	107,913	97,399	734	3,200	1,114	210,360
		91	108,927	120,195	423	947	939	231,431
		90	122,136	95,675	1,161	10	498	219,480
		88	126,521	119,461	1,211	0	265	247,458
100-41-4	Ethylbenzene	92	3,236,753	6,766,461	15,778	193,882	289,108	10,501,982
		91	2,916,016	5,913,257	16,826	94,637	52,860	8,993,596
		90	3,164,597	6,274,181	13,228	213,657	61,308	9,726,971
		88	3,063,489	4,414,287	15,985	72,914	202,112	7,768,787
541-41-3	Ethyl chloroformate	92	2,231	1,138	26	0	5	3,400
		91	1,254	576	0	0	0	1,830
		90	1,307	525	0	0	0	1,832
		88	11,880	2,023	0	0	0	13,903
74-85-1	Ethylene	92	16,595,902	20,010,924	13,413	0	0	36,620,239
		91	16,416,939	22,083,020	17,015	0	0	38,516,974
		90	16,546,338	22,960,498	11,488	27,500	11,005	39,556,829
		88	22,409,675	26,599,970	15,214	17,203	13,250	49,055,312
107-21-1	Ethylene glycol	92	3,180,308	7,070,854	1,326,208	4,923,321	684,588	17,185,279
		91	4,566,093	6,237,409	2,313,490	3,654,273	908,417	17,679,682
		90	3,960,627	7,009,590	2,754,760	5,809,297	987,625	20,521,899
		88	4,021,202	9,125,337	3,727,220	7,927,570	736,344	25,537,673

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Dimethyl sulfate	92	48,266	0	0	10	0	0	48,276
	91	0	0	0	260	0	0	260
	90	NA	NA	33	30	0	0	*63*
	88	NA	NA	0	1,000	0	0	*1,000*
4,6-Dinitro-o-cresol	92	0	210	2,166	4,910	5,550	0	12,836
	91	0	100	5,915	26,255	11,455	0	43,725
	90	NA	NA	558	44,756	204,015	0	*249,329*
	88	NA	NA	259,448	19	46,648	0	*306,115*
2,4-Dinitrophenol	92	0	1	6,410	5	0	0	6,416
	91	0	2,600	5	255	1,200	0	4,060
	90	NA	NA	2,493	261	1,430	0	*4,184*
	88	NA	NA	567,365	1,000	110,285	0	*678,650*
2,4-Dinitrotoluene	92	0	0	0	0	0	0	0
	91	0	110,750	53,250	0	57	0	164,057
	90	NA	NA	36,921	12	99	0	*37,032*
	88	NA	NA	2,055	700,000	124,281	0	*826,336*
2,6-Dinitrotoluene	92	0	0	0	0	0	0	0
	91	0	250	250	0	0	0	500
	90	NA	NA	9,230	0	0	0	*9,230*
	88	NA	NA	703	170,000	30,882	0	*201,585*
1,4-Dioxane	92	37,825	589,723	388,376	269,319	47,275	0	1,332,518
	91	44,222	254,649	526,359	254,304	76,539	1	1,156,074
	90	NA	NA	90,982	210,938	13,598	0	*315,518*
	88	NA	NA	199,402	203,103	10,954	925	*414,384*
Epichlorohydrin	92	0	41,275	880,794	4,709	276	0	927,054
	91	4,669	7,800	919,235	12,703	594	0	945,001
	90	NA	NA	658,739	57,931	10,977	0	*727,647*
	88	NA	NA	690,257	73,385	307	0	*763,949*
2-Ethoxyethanol	92	13,335	206,073	73,093	404,046	250	2	696,799
	91	36,186	201,811	139,537	217,923	20,456	2	615,915
	90	NA	NA	168,265	111,872	6,031	23,915	*310,083*
	88	NA	NA	366,979	196,286	71,142	250	*634,657*
Ethyl acrylate	92	0	1,275,919	123,262	15,836	19,268	0	1,434,285
	91	200	783,299	167,145	19,855	24,621	440	995,560
	90	NA	NA	71,104	13,126	30,517	334	*115,081*
	88	NA	NA	101,345	27,656	7,110	250	*136,361*
Ethylbenzene	92	3,214,813	8,783,022	1,355,782	100,113	142,199	12,476	13,608,405
	91	2,819,677	8,864,209	1,343,280	103,264	197,160	11,677	13,339,267
	90	NA	NA	1,808,250	117,783	379,211	166,905	*2,472,149*
	88	NA	NA	2,317,452	511,285	415,533	269,164	*3,513,434*
Ethyl chloroformate	92	0	0	0	0	0	0	0
	91	0	1,200	390	0	0	0	1,590
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	69,600	0	0	0	*9,600*
Ethylene	92	0	14,007,417	92,714	5	329	0	14,100,465
	91	0	40,096	897,754	17	504	0	938,371
	90	NA	NA	16	11	396	0	*423*
	88	NA	NA	29,887	250	11,432	0	*41,569*
Ethylene glycol	92	102,373,295	7,466,108	6,994,349	19,775,302	920,298	33,744	137,563,096
	91	91,449,208	4,114,804	5,939,789	19,321,608	1,265,933	7,739	122,099,081
	90	NA	NA	8,980,570	15,958,825	2,218,181	85,900	*27,243,476*
	88	NA	NA	14,522,939	17,359,752	2,600,072	465,625	*34,948,388*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
151-56-4	Ethyleneimine	92	0	0	0	0	0	0
		91	No Reports Received					
		90	No Reports Received					
		88	250	250	0	0	0	500
75-21-8	Ethylene oxide	92	662,386	638,649	1,991	120,000	837	1,423,863
		91	816,194	994,758	2,260	25,416	50,336	1,888,964
		90	675,040	1,643,726	8,911	49,280	24,042	2,400,999
		88	923,531	3,708,003	44,851	11,125	54,700	4,742,210
96-45-7	Ethylene thiourea	92	5	280	0	0	0	285
		91	24	553	0	0	0	577
		90	255	30	0	0	0	285
		88	0	500	0	0	0	500
2164-17-2	Fluometuron	92	301	303	5	0	0	609
		91	104	113	10	0	5	232
		90	26	19	0	0	0	45
		88	250	250	0	0	0	500
50-00-0	Formaldehyde	92	1,847,451	9,055,776	441,244	4,916,248	174,429	16,435,148
		91	1,787,725	8,666,365	627,001	5,220,067	248,866	16,550,024
		90	2,288,127	10,323,441	763,633	8,025,876	188,552	21,589,629
		88	3,055,165	9,064,198	904,788	9,608,524	494,111	23,126,786
76-13-1	Freon 113	92	17,610,197	6,954,728	1,916	214	9,028	24,576,083
		91	24,499,949	11,873,161	3,259	558	81,583	36,458,510
		90	32,040,568	15,538,007	12,170	1,820	35,477	47,628,042
		88	46,879,742	23,306,813	32,894	5,965	27,799	70,253,213
	Glycol ethers	92	10,590,821	34,937,784	350,489	194,386	140,595	46,214,075
		91	10,289,909	34,268,764	510,500	176,033	696,202	45,941,408
		90	10,331,563	39,320,667	437,189	207,032	273,803	50,570,254
		88	10,414,144	38,358,119	293,936	362,198	105,185	49,533,582
76-44-8	Heptachlor	92	460	250	1	0	0	711
		91	5	0	0	0	0	5
		90	3,797	0	1	0	0	3,798
		88	54,292	3	2	0	0	54,297
118-74-1	Hexachlorobenzene	92	4,138	333	227	794	0	5,492
		91	549	292	111	60	1	1,013
		90	1,258	210	124	220	0	1,812
		88	3,602	443	4	410	0	4,459
87-68-3	Hexachloro-1,3-butadiene	92	1,916	2,218	1,911	738	0	6,783
		91	2,420	990	681	200	2	4,293
		90	3,364	1,542	715	330	0	5,951
		88	2,043	465	153	220	0	2,881
77-47-4	Hexachlorocyclo-pentadiene	92	7,112	1,268	0	5	0	8,385
		91	24,744	717	23	5	0	25,489
		90	83,812	773	10	5	0	84,600
		88	77,902	415	6	2,131	0	80,454
67-72-1	Hexachloroethane	92	1,738	19,284	3	1,670	0	22,695
		91	1,783	20,926	0	160	2	22,871
		90	1,885	6,156	1	1,500	334	9,876
		88	2,949	16,128	11	520	1	19,609
302-01-2	Hydrazine	92	13,033	6,238	842	0	10	20,123
		91	22,354	6,079	1,520	0	5	29,958
		90	22,457	4,726	1,414	423	5	29,025
		88	24,368	7,689	2,149	0	29	34,235

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Ethyleneimine	92	0	0	0	0	0	0	0
	91	No Reports Received						
	90	No Reports Received						
	88	NA	NA	0	0	0	0	*0*
Ethylene oxide	92	21,866	0	14,288	84,915	1,650	0	122,719
	91	28,631	0	15,039	113,994	1,604	0	159,268
	90	NA	NA	366	265,864	2,363	0	*268,593*
	88	NA	NA	1,250	362,521	20,663	0	*384,434*
Ethylene thiourea	92	0	1,682	6,042	12	7,060	0	14,796
	91	0	0	11,117	10	7,500	0	18,627
	90	NA	NA	750	255	15,859	0	*16,864*
	88	NA	NA	250	500	2,250	0	*3,000*
Fluometuron	92	0	0	7,205	11,851	3,037	0	22,093
	91	0	0	11,625	1,012	17,010	0	29,647
	90	NA	NA	1,851	81,085	1,542	0	*84,478*
	88	NA	NA	19,100	2,300	3,700	0	*25,100*
Formaldehyde	92	180,648	180,517	866,876	5,635,857	323,132	29,766	7,216,796
	91	206,290	102,312	913,722	5,482,188	488,176	8,433	7,201,121
	90	NA	NA	1,378,587	6,324,692	479,228	63,344	*8,245,851*
	88	NA	NA	1,310,663	4,382,254	1,410,749	3,580	*7,107,246*
Freon 113	92	5,637,865	385,048	777,851	22,961	94,831	5,116	6,923,672
	91	8,404,994	470,744	1,237,958	38,402	126,976	103,417	10,382,491
	90	NA	NA	1,939,380	50,515	654,773	124,706	*2,769,374*
	88	NA	NA	4,056,728	104,193	1,929,497	298,985	*6,389,403*
Glycol ethers	92	3,417,078	11,640,189	3,090,223	10,354,678	674,074	70,136	29,246,378
	91	4,039,106	11,941,735	3,368,415	9,506,172	811,214	38,730	29,705,372
	90	NA	NA	6,000,837	10,517,559	1,590,079	121,806	*18,230,281*
	88	NA	NA	5,836,838	9,037,704	1,545,590	539,894	*16,960,026*
Heptachlor	92	0	0	93,737	69	0	0	93,806
	91	0	0	5	0	0	0	5
	90	NA	NA	85,306	58	0	0	*85,364*
	88	NA	NA	51,935	37	0	0	*51,972*
Hexachlorobenzene	92	1	0	62,543	8	28,380	0	90,932
	91	1	0	127,143	5	1,064,793	0	1,191,942
	90	NA	NA	18,999	23	34,011	0	*53,033*
	88	NA	NA	521,558	160	443,541	0	*965,259*
Hexachloro-1,3-butadiene	92	0	0	14,441	7	5	0	14,453
	91	0	0	1,710,359	4	4,263	0	1,714,626
	90	NA	NA	84,300	958	45	0	*85,303*
	88	NA	NA	3,513,001	300	19,640	0	*3,532,941*
Hexachlorocyclo-pentadiene	92	0	1,000	33,818	653	2,740	0	38,211
	91	0	4,000	27,803	624	3,000	0	35,427
	90	NA	NA	39,109	904	5,000	0	*45,013*
	88	NA	NA	590,845	852	28,470	0	*620,167*
Hexachloroethane	92	0	21,000	10,187	0	206	0	31,393
	91	0	39,000	167,313	0	5,011	0	211,324
	90	NA	NA	93,428	0	34,813	0	*128,241*
	88	NA	NA	532,352	260	128,504	0	*661,116*
Hydrazine	92	22	455	131,085	1,308	2,559	0	135,429
	91	3	38,000	13,515	6,368	4,021	29	61,936
	90	NA	NA	23,629	11,367	1,845	0	*36,841*
	88	NA	NA	36,582	1,468	6,541	0	*44,591*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
10034-93-2	Hydrazine sulfate	92	0	2	0	120,000	0	120,002
		91	0	2	0	150,000	0	150,002
		90	5	252	0	138,941	0	139,198
		88	290	882	0	355,000	0	356,172
7647-01-0	Hydrochloric acid	92	4,393,471	72,715,559	1,927,193	207,817,749	432,770	287,286,742
		91	4,707,300	79,345,444	2,144,699	190,422,615	12,172,416	288,792,474
		90	5,700,949	81,181,802	2,770,495	167,217,396	13,071,078	269,941,720
		88	6,225,080	68,436,807	3,861,789	396,089,339	5,509,273	480,122,288
74-90-8	Hydrogen cyanide	92	65,822	2,275,468	3,947	801,646	17	3,146,900
		91	64,031	1,205,762	8,839	945,926	17	2,224,575
		90	56,825	663,250	3,824	1,597,552	48	2,321,499
		88	131,604	980,673	2,300	1,737,850	1,761	2,854,188
7664-39-3	Hydrogen fluoride	92	4,158,141	5,599,637	4,205	1	27,887	9,789,871
		91	3,603,048	6,211,840	5,464	1	25,259	9,845,612
		90	3,402,027	6,456,733	13,868	25	8,329	9,880,982
		88	3,784,342	9,705,080	189,928	250	13,002	13,692,602
123-31-9	Hydroquinone	92	4,533	8,985	3,967	250,750	0	268,235
		91	6,434	4,367	4,388	255,705	6	270,900
		90	6,261	5,736	4,735	284,020	295	301,047
		88	3,601	6,733	7,211	375,400	530	393,475
78-84-2	Isobutyraldehyde	92	114,601	289,005	351	3,840	1	407,798
		91	118,100	272,124	91	6,810	262	397,387
		90	148,031	337,247	80	864	1	486,223
		88	178,740	503,878	773	60	1	683,452
67-63-0	Isopropyl alcohol (manufacturing)	92	381,879	998,990	15	0	330	1,381,214
		91	435,394	903,445	35	0	77	1,338,951
		90	1,074,802	1,598,262	10,881	10	45	2,684,000
		88	790,232	1,196,100	1,900	0	14	1,988,246
80-05-7	4,4'-Isopropylidene-diphenol	92	109,282	76,427	7,463	41,000	287,138	521,310
		91	117,170	313,599	4,492	43,000	374,926	853,187
		90	94,031	93,110	2,412	23,000	555,917	768,470
		88	119,870	107,056	126,385	0	424,117	777,428
7439-92-1	Lead	92	167,966	244,838	11,641	1	2,045,059	2,469,505
		91	206,863	227,460	20,513	0	3,323,689	3,778,525
		90	501,991	366,922	25,401	35	4,823,003	5,717,352
		88	500,273	644,191	61,791	5	6,633,580	7,839,840
	Lead compounds	92	447,167	986,955	60,934	2,880	11,913,242	13,411,178
		91	349,275	1,081,616	119,268	928	13,701,989	15,253,076
		90	409,409	1,030,661	107,252	1,608	14,135,674	15,684,604
		88	357,432	1,176,104	180,113	2,755	20,384,120	22,100,524
58-89-9	Lindane	92	507	531	0	0	0	1,038
		91	271	291	0	0	5	567
		90	1,011	538	250	0	5	1,804
		88	251	7	0	0	0	258
108-31-6	Maleic anhydride	92	100,959	355,296	405	5	2,327	458,992
		91	77,432	382,057	465	255	1,405	461,614
		90	90,849	402,959	1,388	15	121,081	616,292
		88	111,640	550,604	12,580	240,000	250	915,074
12427-38-2	Maneb	92	510	535	0	0	250	1,295
		91	10	19	0	0	0	29
		90	265	271	5	0	0	541
		88	1,000	1,265	250	0	0	2,515

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Hydrazine sulfate	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	250	250	0	0	*500*
	88	NA	NA	0	0	0	0	*0*
Hydrochloric acid	92	59,448,806	5,109,001	42,563,284	29,390,927	12,981,133	255,991	149,749,142
	91	43,621,890	4,415,525	35,755,664	16,582,916	14,117,213	567,652	115,060,860
	90	NA	NA	17,334,981	39,081,660	23,762,722	546,709	*80,726,072*
	88	NA	NA	25,651,851	35,571,348	48,941,973	148,417	*110,313,589*
Hydrogen cyanide	92	0	168,250	470	330	874	0	169,924
	91	0	250	315	271	120	0	956
	90	NA	NA	1,972	290	2,155	0	*4,417*
	88	NA	NA	21,200	337	1,001	250	*22,788*
Hydrogen fluoride	92	289,178	0	2,537,160	290,544	1,267,924	10,030	4,394,836
	91	46,814	750	2,516,449	326,070	1,080,205	250	3,970,538
	90	NA	NA	2,377,063	70,961	1,658,769	18,420	*4,125,213*
	88	NA	NA	2,841,628	696,139	3,467,471	17,652	*7,022,890*
Hydroquinone	92	8,316	5,139	28,737	162,175	8,646	250	213,263
	91	10	4,132	22,736	168,069	214,630	440	410,017
	90	NA	NA	127,344	277,533	11,641	2,105	*418,623*
	88	NA	NA	303,106	512,180	6,835	0	*822,121*
Isobutyraldehyde	92	400	1,096,087	35,010	3,265	250	0	1,135,012
	91	0	553,000	47,587	37,444	0	0	638,031
	90	NA	NA	41,987	35,728	0	0	*77,715*
	88	NA	NA	30,260	713	0	0	*30,973*
Isopropyl alcohol (manufacturing)	92	225,917	238,756	99,184	68,302	1,318	8,099	641,576
	91	38,983	412,315	102,514	68,576	29,555	536	652,479
	90	NA	NA	256,155	92,336	403,241	107,753	*859,485*
	88	NA	NA	319,961	160,751	247,039	129,407	*857,158*
4,4'-Isopropylidene-diphenol	92	18,865	34,510	29,037	34,480	359,528	4	476,424
	91	4,707	67,980	21,524	32,776	264,513	754	392,254
	90	NA	NA	104,693	42,334	380,178	21,877	*549,082*
	88	NA	NA	995,810	31,135	444,560	1,000	*1,472,505*
Lead	92	30,611,062	20,205	778,572	31,169	3,002,220	109,071	34,552,299
	91	37,946,251	9,606	1,992,816	49,124	5,485,004	39,308	45,522,109
	90	NA	NA	1,523,299	33,518	8,330,271	2,866,789	*12,753,877*
	88	NA	NA	2,899,433	122,216	10,701,755	252,660	*13,976,064*
Lead compounds	92	372,021,825	39,856	20,082,019	326,787	13,200,051	412,721	406,083,259
	91	182,297,317	59,751	2,451,821	286,116	11,726,248	63,910	196,885,163
	90	NA	NA	3,273,233	159,002	40,567,060	66,422	*44,065,717*
	88	NA	NA	2,236,778	90,481	14,147,053	668,736	*17,143,048*
Lindane	92	0	0	51,355	5	73	0	51,433
	91	0	0	7,258	5	66	0	7,329
	90	NA	NA	2,738	5	314	0	*3,057*
	88	NA	NA	130	0	56	0	*186*
Maleic anhydride	92	0	62,503	686,945	1,400	34,654	577	786,079
	91	47	36,484	735,361	254,846	18,370	1	1,045,109
	90	NA	NA	880,659	653,137	55,428	20,950	*1,610,174*
	88	NA	NA	1,725,648	556,373	132,148	1,150	*2,415,319*
Maneb	92	0	0	3,070	5	14,092	0	17,167
	91	0	0	255	0	2,370	0	2,625
	90	NA	NA	0	0	5,100	0	*5,100*
	88	NA	NA	2,077	1,470	5,285	0	*8,832*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
7439-96-5	Manganese	92	570,920	299,310	234,925	304	6,521,605	7,627,064
		91	688,838	320,423	143,101	272	9,901,453	11,054,087
		90	511,263	641,556	138,678	869	9,030,537	10,322,903
		88	1,043,690	770,247	321,992	250	20,462,716	22,598,895
	Manganese compounds	92	501,113	1,297,031	733,225	22,569	61,485,334	64,039,272
		91	490,992	744,201	699,720	15,327	68,346,880	70,297,120
		90	1,356,214	912,339	721,787	2,842	83,563,911	86,557,093
		88	582,193	1,215,222	681,469	6,816,070	84,222,474	93,517,428
7439-97-6	Mercury	92	8,416	4,055	266	0	3,117	15,854
		91	10,557	6,355	624	0	5,287	22,823
		90	14,015	8,384	751	0	4,184	27,334
		88	16,036	7,359	1,397	0	13,279	38,071
	Mercury compounds	92	2,488	761	297	9	17	3,572
		91	1,355	1,725	47	9	2	3,138
		90	783	375	58	21	15	1,252
		88	1,006	1,370	259	27	250	2,912
67-56-1	Methanol	92	33,921,970	160,868,717	16,422,600	27,084,182	3,328,541	241,626,010
		91	36,999,841	167,915,875	20,057,614	28,877,462	3,602,540	257,453,332
		90	40,342,241	165,586,071	17,412,605	28,097,212	5,541,929	256,980,058
		88	46,708,235	183,124,724	16,804,634	26,555,436	11,674,236	284,867,265
72-43-5	Methoxychlor	92	261	557	5	0	5	828
		91	251	314	10	0	5	580
		90	756	846	505	0	255	2,362
		88	47,971	224,910	252	0	258	273,391
109-86-4	2-Methoxyethanol	92	891,829	527,586	165,535	0	4	1,584,954
		91	1,096,988	711,706	364,059	0	20	2,172,773
		90	1,298,299	1,357,067	57,340	4,540	3,233	2,720,479
		88	1,148,256	4,751,413	40,520	750	7	5,940,946
96-33-3	Methyl acrylate	92	129,009	136,816	1,279	77	705	267,886
		91	66,031	169,936	919	161	0	237,047
		90	79,905	171,353	470	99	4	251,831
		88	332,710	110,786	1,687	200	30,260	475,643
1634-04-4	Methyl tert-butyl ether	92	829,786	1,990,920	102,851	68,445	288	2,992,290
		91	793,332	2,206,926	30,901	81,690	2,903	3,115,752
		90	652,252	2,244,135	42,667	112,400	1,501	3,052,955
		88	620,740	1,918,697	21,499	14,400	370	2,575,706
101-14-4	4,4'-Methylenebis (2-chloroaniline)	92	12	5	0	0	2	19
		91	1,010	255	0	0	0	1,265
		90	257	1,005	0	0	0	1,262
		88	250	0	0	0	0	250
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	92	No Reports Received					
		91	No Reports Received					
		90	No Reports Received					
		88	250	0	0	0	7,000	7,250
101-68-8	Methylenebis (phenylisocyanate)	92	274,052	146,080	30	0	77,201	497,363
		91	286,544	236,274	10	0	112,387	635,215
		90	367,490	241,849	50	20	226,171	835,580
		88	155,161	90,897	1,022	0	87,415	334,495
74-95-3	Methylene bromide	92	23,361	14,790	0	250	0	38,401
		91	38,277	13,010	0	0	0	51,287
		90	51,164	13,630	0	0	0	64,794
		88	34,468	23,255	0	0	0	57,723

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Manganese	92	30,026,743	323	492,916	39,376	10,673,549	520,206	41,753,113
	91	36,483,059	24,538	1,325,781	161,599	13,057,860	177,609	51,230,446
	90	NA	NA	1,214,365	66,184	9,748,369	6,878,975	*17,907,893*
	88	NA	NA	4,203,866	132,384	17,570,598	4,189,091	*26,095,939*
Manganese compounds	92	36,068,799	29,446	3,366,261	1,037,274	12,897,077	145,350	53,544,207
	91	28,334,762	3,644	3,458,716	3,342,672	20,750,738	195,061	56,085,593
	90	NA	NA	2,947,253	6,550,197	26,341,602	196,922	*36,035,974*
	88	NA	NA	1,376,268	1,843,159	18,010,251	423,308	*21,652,986*
Mercury	92	14,455	0	13,584	15	29,343	22	57,419
	91	21,674	0	43,401	42	69,550	0	134,667
	90	NA	NA	43,722	42	133,296	261	*177,321*
	88	NA	NA	38,548	1,613	218,830	0	*258,991*
Mercury compounds	92	37,000	1	60,394	7	135,641	0	233,043
	91	443,815	5	22,146	272	17,741	0	483,979
	90	NA	NA	15,113	274	20,913	0	*36,300*
	88	NA	NA	256	528	17,383	0	*18,167*
Methanol	92	15,958,965	69,270,848	39,898,705	113,917,241	2,900,199	17,152	241,963,110
	91	12,194,993	64,368,830	38,185,074	114,717,875	4,418,748	1,456,494	235,342,014
	90	NA	NA	40,380,448	130,114,057	7,459,937	1,100,540	*179,054,982*
	88	NA	NA	39,994,638	121,314,339	14,925,728	3,537,772	*179,772,477*
Methoxychlor	92	0	0	251	0	255	0	506
	91	0	0	159	0	5	0	164
	90	NA	NA	1,232	0	255	0	*1,487*
	88	NA	NA	24,751	0	8	0	*24,759*
2-Methoxyethanol	92	6,174	727,772	329,204	1,054,043	750	17,845	2,135,788
	91	26,025	542,690	592,598	403,041	702	0	1,565,056
	90	NA	NA	543,860	531,570	347,965	55	*1,423,450*
	88	NA	NA	826,153	622,102	57,362	715	*1,506,332*
Methyl acrylate	92	0	409,635	41,241	8,293	1,433	0	460,602
	91	5,000	221,846	38,476	5,311	1,275	0	271,908
	90	NA	NA	739,889	9,510	3,803	261	*753,463*
	88	NA	NA	14,040	14,886	4,765	0	*33,691*
Methyl tert-butyl ether	92	17,250	346,392	32,688	80,414	14,469	0	491,213
	91	6,618	522,457	20,321	129,131	6,060	0	684,587
	90	NA	NA	48,774	123,291	6,806	0	*178,871*
	88	NA	NA	93,575	7,713	4,602	0	*105,890*
4,4'-Methylenebis (2-chloroaniline)	92	0	2,559	2,390	5	0	0	4,954
	91	0	1,000	4,228	5	0	0	5,233
	90	NA	NA	1,350	0	755	0	*2,105*
	88	NA	NA	6,250	0	0	0	*6,250*
4,4'-Methylenebis(N,N-dimethyl) benzeneamine	92	No Reports Received						
	91	No Reports Received						
	90	No Reports Received						
	88	NA	NA	0	0	1,150	0	*1,150*
Methylenebis (phenylisocyanate)	92	326,884	86,687	551,353	2,305	937,334	47,000	1,951,563
	91	381,544	49,475	543,797	911	1,022,145	83,036	2,080,908
	90	NA	NA	508,576	5,421	1,177,625	20,087	*1,711,709*
	88	NA	NA	932,648	1,500	1,769,383	7,325	*2,710,856*
Methylene bromide	92	33	0	2,284	1,493	0	0	3,810
	91	0	0	0	5,417	0	0	5,417
	90	NA	NA	49,085	8,579	0	0	*57,664*
	88	NA	NA	0	6,097	0	0	*6,097*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
101-77-9	4,4'-Methyenedianiline	92	6,487	3,889	420	8,865	55	19,716
		91	9,013	4,155	1,486	22,062	3	36,719
		90	14,250	5,273	1,201	57,250	6	77,980
		88	36,804	93,347	2,599	460,250	1,140	594,140
78-93-3	Methyl ethyl ketone	92	31,107,484	59,397,157	153,249	365,395	241,794	91,265,079
		91	34,945,620	70,452,517	139,752	355,736	166,746	106,060,371
		90	44,852,450	87,382,385	88,289	146,204	50,526	132,519,854
		88	39,149,720	98,154,472	87,847	255,962	166,537	137,814,538
60-34-4	Methyl hydrazine	92	0	0	0	0	0	0
		91	0	0	0	0	0	0
		90	1	0	0	0	0	1
		88	2,774	153	1	0	0	2,928
74-88-4	Methyl iodide	92	21,980	3,405	11	9,500	0	34,896
		91	22,544	2,870	13	740	0	26,167
		90	29,443	373	1	5,085	0	34,902
		88	5,691	3,253	5	250	0	9,199
108-10-1	Methyl isobutyl ketone	92	7,814,570	18,079,207	96,387	129,100	194,986	26,314,250
		91	8,388,210	18,960,112	167,452	161,600	130,415	27,807,789
		90	9,850,864	18,284,937	55,598	52,221	24,733	28,268,353
		88	13,056,204	18,956,818	762,108	116,650	31,770	32,923,550
624-83-9	Methyl isocyanate	92	6,851	803	0	0	0	7,654
		91	6,742	798	0	0	0	7,540
		90	13,033	1,390	0	0	500	14,923
		88	9,649	586	0	0	64	10,299
80-62-6	Methyl methacrylate	92	734,794	1,820,951	34,595	220,000	4,003	2,814,343
		91	693,623	1,968,813	20,998	270,000	4,305	2,957,739
		90	710,902	1,963,785	27,181	210,015	593	2,912,476
		88	1,346,196	2,284,375	28,437	327,221	8,119	3,994,348
90-94-8	Michler's ketone	92	No Reports Received					
		91	0	0	0	0	0	0
		90	0	0	0	0	0	0
		88	450	650	0	0	0	1,100
1313-27-5	Molybdenum trioxide	92	50,338	59,606	59,441	162,705	14,651	346,741
		91	46,031	48,391	78,785	134,965	23,165	331,337
		90	22,677	43,671	102,840	170,650	49,120	388,958
		88	37,272	73,013	139,021	197,115	97,238	543,659
91-20-3	Naphthalene	92	1,368,999	1,233,810	28,936	78,227	1,667,141	4,377,113
		91	1,418,724	1,321,754	31,484	39,112	54,343	2,865,417
		90	2,108,391	1,762,062	36,819	28,130	143,186	4,078,588
		88	3,370,487	1,735,494	22,568	50,946	123,706	5,303,201
134-32-7	alpha-Naphthylamine	92	5	5	0	0	0	10
		91	5	5	0	0	0	10
		90	250	250	0	0	0	500
		88	336	254	101	0	0	691
7440-02-0	Nickel	92	516,037	198,687	44,910	5,309	2,395,966	3,160,909
		91	335,723	141,555	54,838	4,418	420,695	957,229
		90	243,826	212,785	58,214	9,136	3,007,983	3,531,944
		88	268,411	181,996	90,133	14,295	1,226,177	1,781,012
	Nickel compounds	92	59,632	89,950	66,305	292,453	1,305,284	1,813,624
		91	60,753	183,024	76,193	366,530	1,281,563	1,968,063
		90	146,123	104,932	90,080	259,827	2,047,535	2,648,497
		88	154,167	109,764	131,934	224,968	2,390,604	3,011,437

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
4,4'-Methyenedianiline	92	0	26,949	84,836	1,629	9,710	0	123,124
	91	0	28,000	44,218	1,759	16,913	0	90,890
	90	NA	NA	68,532	2,434	37,774	0	*108,740*
	88	NA	NA	139,349	7,399	141,538	0	*288,286*
Methyl ethyl ketone	92	25,348,083	39,200,900	6,226,190	652,667	620,881	288,689	72,337,410
	91	27,549,459	35,495,872	9,955,059	776,361	541,328	294,801	74,612,880
	90	NA	NA	17,116,898	873,341	2,870,832	533,201	*21,394,272*
	88	NA	NA	22,151,698	962,868	5,011,443	2,039,078	*30,165,087*
Methyl hydrazine	92	0	0	0	0	0	0	0
	91	0	0	0	1	0	2	3
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	1,250	0	1,450	0	*2,700*
Methyl iodide	92	0	0	250	0	0	0	250
	91	0	0	5	0	0	0	5
	90	NA	NA	0	0	228	0	*228*
	88	NA	NA	0	0	250	0	*250*
Methyl isobutyl ketone	92	20,065,393	17,343,529	1,449,180	776,557	107,897	205,272	39,947,828
	91	17,719,398	19,020,878	1,999,778	815,571	158,886	4,745	39,719,256
	90	NA	NA	3,810,262	1,258,294	732,795	44,615	*5,845,966*
	88	NA	NA	6,075,272	1,509,030	1,966,217	2,467,925	*12,018,444*
Methyl isocyanate	92	0	0	0	0	0	0	0
	91	0	0	0	0	15,067	0	15,067
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	314	0	8,400	0	*8,714*
Methyl methacrylate	92	359,902	1,047,331	658,495	252,175	96,623	40,862	2,455,388
	91	405,587	1,255,989	525,679	130,045	187,596	9	2,504,905
	90	NA	NA	1,029,928	166,245	109,461	250	*1,305,884*
	88	NA	NA	2,787,477	191,071	276,567	37,511	*3,292,626*
Michler's ketone	92	No Reports Received						
	91	0	703	0	3	0	0	706
	90	NA	NA	27,591	0	0	0	*27,591*
	88	NA	NA	33,519	0	0	0	*33,519*
Molybdenum trioxide	92	3,007,386	0	61,237	72,494	349,880	250	3,491,247
	91	2,533,168	0	48,998	80,682	534,959	86,736	3,284,543
	90	NA	NA	53,868	39,534	528,261	0	*621,663*
	88	NA	NA	7,336	34,044	573,624	20,000	*635,004*
Naphthalene	92	140,690	2,395,500	554,118	88,371	667,206	2,850	3,848,735
	91	212,455	1,354,681	492,211	63,546	979,586	16,406	3,118,885
	90	NA	NA	522,857	210,537	919,227	463,816	*2,116,437*
	88	NA	NA	536,139	800,227	1,359,184	31,000	*2,726,550*
alpha-Naphthylamine	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	534	0	0	0	*534*
	88	NA	NA	0	0	0	0	*0*
Nickel	92	52,455,389	13,073	1,151,268	128,402	4,218,406	397,856	58,364,394
	91	40,549,900	7,832	611,137	253,573	3,606,330	343,183	45,371,955
	90	NA	NA	918,096	115,962	4,314,702	3,000,284	*8,349,044*
	88	NA	NA	1,145,784	252,517	6,396,393	2,595,753	*10,390,447*
Nickel compounds	92	26,780,934	21,555	1,470,981	121,227	5,018,366	44,123	33,457,186
	91	24,449,191	12,196	1,730,070	133,418	2,974,638	29,354	29,328,867
	90	NA	NA	2,583,358	200,007	3,896,101	33,518	*6,712,984*
	88	NA	NA	1,884,144	650,732	3,903,085	193,635	*6,631,596*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
7697-37-2	Nitric acid	92	720,461	2,310,467	53,725	22,081,766	664,849	25,831,268
		91	671,987	2,689,363	88,773	21,128,099	576,633	25,154,855
		90	764,174	3,037,859	152,179	31,912,657	383,143	36,250,012
		88	1,150,693	7,139,525	1,380,565	25,485,680	1,330,695	36,487,158
139-13-9	Nitrilotriacetic acid	92	4	0	4,069	2,700	0	6,773
		91	5	0	4,100	7,800	0	11,905
		90	25	1,000	7,700	0	0	8,725
		88	1,000	1,500	5,100	0	5,100	12,700
99-59-2	5-Nitro-o-anisidine	92	5	10	0	0	0	15
		91	5	10	0	0	0	15
		90	5	5	0	0	0	10
		88	No Reports Received					
98-95-3	Nitrobenzene	92	38,744	12,909	442	864,949	0	917,044
		91	34,483	18,125	1,226	468,404	365	522,603
		90	51,251	15,009	1,419	608,000	755	676,434
		88	22,614	17,759	5,907	819,024	2,875	868,179
55-63-0	Nitroglycerin	92	2,059	27,073	12,906	0	16,150	58,188
		91	1,790	26,657	12,399	0	9,550	50,396
		90	1,053	29,550	11,580	0	17,150	59,333
		88	2,280	50,103	2,746	0	11,640	66,769
88-75-5	2-Nitrophenol	92	5	7	48	0	0	60
		91	0	2	40	0	0	42
		90	0	4	29	0	0	33
		88	32,152	1,537	1	0	2	33,692
100-02-7	4-Nitrophenol	92	715	105	1,700	0	0	2,520
		91	9,406	127	600	0	0	10,133
		90	7,570	83	31	1,200	0	8,884
		88	7,642	213	0	6,300	7	14,162
79-46-9	2-Nitropropane	92	36,262	9,380	900	65,581	0	112,123
		91	31,052	74,695	380	139,342	0	245,469
		90	62,836	21,422	1,100	87,000	0	172,358
		88	208,303	181,082	4,300	257,000	0	650,685
156-10-5	p-Nitrosodiphenylamine	92	24	0	0	4,900	0	4,924
		91	24	0	0	4,700	0	4,724
		90	24	0	0	0	0	24
		88	15	0	0	2,000	0	2,015
121-69-7	N,N-Dimethylaniline	92	19,366	24,012	2,039	0	0	45,417
		91	24,751	26,605	30,430	0	0	81,786
		90	17,802	33,500	16,920	0	0	68,222
		88	18,448	80,457	19,967	0	250	119,122
62-75-9	N-Nitrosodimethylamine	92	No Reports Received					
		91	No Reports Received					
		90	No Reports Received					
		88	0	0	0	0	0	0
86-30-6	N-Nitrosodiphenylamine	92	0	0	0	0	0	0
		91	0	0	0	0	0	0
		90	0	0	0	0	0	0
		88	0	0	27	34,000	0	34,027
56-38-2	Parathion	92	10	255	5	0	0	270
		91	267	280	255	0	255	1,057
		90	296	317	10	0	10	633
		88	2,258	1,007	750	0	250	4,265

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Nitric acid	92	3,259,058	539	10,617,898	3,739,898	3,986,437	15,194	21,619,024
	91	2,209,835	0	14,127,268	8,608,741	3,934,347	9,314	28,889,505
	90	NA	NA	14,325,231	13,065,274	6,777,602	50,284	*34,218,391*
	88	NA	NA	18,442,846	22,890,722	7,908,518	6,802	*49,248,888*
Nitrilotriacetic acid	92	0	0	8,556	0	0	0	8,556
	91	0	0	0	0	0	0	0
	90	NA	NA	0	3,300	0	0	*3,300*
	88	NA	NA	190,753	254,859	250	0	*445,862*
5-Nitro-o-anisidine	92	0	0	0	10	250	0	260
	91	0	0	0	255	250	0	505
	90	NA	NA	0	5	0	0	*5*
	88	No Reports Received						
Nitrobenzene	92	2,881	27,210	435,854	23	14,297	0	480,265
	91	35,606	243,550	326,969	100	8,403	4,048	618,676
	90	NA	NA	105,033	1,372	3,319	0	*109,724*
	88	NA	NA	1,301,075	5,671	69,570	750	*1,377,066*
Nitroglycerin	92	3,088	250	68,952	40	0	0	72,330
	91	2,683	8	87,122	86	0	0	89,899
	90	NA	NA	32,936	84	0	0	*33,020*
	88	NA	NA	3,581	53	2	0	*3,636*
2-Nitrophenol	92	0	0	429	0	0	0	429
	91	0	0	11,441	140	221	0	11,802
	90	NA	NA	7,854	4,600	28,040	0	*40,494*
	88	NA	NA	1,600	149,000	13,100	0	*163,700*
4-Nitrophenol	92	0	0	820,002	411	27	0	820,440
	91	0	0	561,290	21,067	0	0	582,357
	90	NA	NA	61,417	400,774	1,200	0	*463,391*
	88	NA	NA	0	560,428	70	0	*560,498*
2-Nitropropane	92	2,230	0	4,100	0	63,962	4,120	74,412
	91	39,204	0	2,837	0	33,650	0	75,691
	90	NA	NA	500	0	5,600	0	*6,100*
	88	NA	NA	8,910	3,000	4,785	0	*16,695*
p-Nitrosodiphenylamine	92	0	15,000	0	0	0	0	15,000
	91	0	2,200	0	0	0	0	2,200
	90	NA	NA	0	0	1,300	0	*1,300*
	88	NA	NA	0	0	180	0	*180*
N,N-Dimethylaniline	92	0	954,379	132,993	161,693	0	0	1,249,065
	91	0	489,869	84,654	206,399	0	0	780,922
	90	NA	NA	99,602	198,535	4,611	4,657	*307,405*
	88	NA	NA	465,397	287,483	772	0	*753,652*
N-Nitrosodimethylamine	92	No Reports Received						
	91	No Reports Received						
	90	No Reports Received						
	88	NA	NA	0	0	0	0	*0*
N-Nitrosodiphenylamine	92	0	0	498,400	0	0	0	498,400
	91	0	0	470,000	0	0	0	470,000
	90	NA	NA	1,853,445	0	0	0	*1,853,445*
	88	NA	NA	300	0	0	0	*300*
Parathion	92	0	0	6,502	0	0	0	6,502
	91	0	0	361	0	505	2,307	3,173
	90	NA	NA	26,367	0	199	0	*26,566*
	88	NA	NA	1,321	0	3,959	0	*5,280*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
87-86-5	Pentachlorophenol	92	7,470	6,224	3,127	0	270	17,091
		91	6,991	5,517	2,278	0	1,510	16,296
		90	15,512	7,699	2,577	0	1,946	27,734
		88	8,133	5,896	2,465	20,000	3,717	40,211
79-21-0	Peracetic acid	92	2,589	3,379	14	5	520	6,507
		91	1,110	3,982	10	5	3,220	8,327
		90	2,066	3,766	113	0	1,826	7,771
		88	766	4,687	55	0	0	5,508
108-95-2	Phenol	92	2,990,363	4,749,651	165,074	5,552,077	190,230	13,647,395
		91	2,536,840	4,170,522	164,786	3,192,210	311,965	10,376,323
		90	3,100,834	4,600,466	272,607	4,425,739	293,898	12,693,544
		88	4,526,342	6,005,381	258,950	4,661,319	1,882,255	17,334,247
106-50-3	p-Phenylenediamine	92	2,737	2,710	0	0	3	5,450
		91	1,054	2,497	0	0	2	3,553
		90	768	350	0	4,500	0	5,618
		88	2,210	111,680	826	4,716	0	119,432
90-43-7	2-Phenylphenol	92	6,957	17,865	97	0	5	24,924
		91	8,403	1,054	224	0	5	9,686
		90	8,925	985	135	10	530	10,585
		88	9,010	1,620	480	0	0	11,110
75-44-5	Phosgene	92	3,596	1,684	5	5	0	5,290
		91	2,279	2,109	5	5	0	4,398
		90	2,418	2,421	5	5	0	4,849
		88	3,839	17,764	500	250	0	22,353
7664-38-2	Phosphoric acid	92	326,636	868,973	158,674,836	35,230	46,725,635	206,631,310
		91	310,296	1,001,973	114,333,113	26,545	47,296,276	162,968,203
		90	424,165	1,213,711	74,718,555	1,500,399	61,067,391	138,924,221
		88	727,787	1,235,548	122,647,164	53,711	52,588,221	177,252,431
7723-14-0	Phosphorus (yellow or white)	92	25,507	2,397	2,861	5	327,970	358,740
		91	19,662	3,847	2,273	0	339,229	365,011
		90	19,433	4,913	2,345	0	2,196,153	2,222,844
		88	7,594	11,559	11,322	0	3,893,674	3,924,149
85-44-9	Phthalic anhydride	92	116,352	633,112	5,240	0	1,079	755,783
		91	112,654	520,170	13,169	0	1,194	647,187
		90	148,299	542,039	447	5	9,870	700,660
		88	126,906	422,823	1,040	0	1,265	552,034
88-89-1	Picric acid	92	2	1	2	1,068,674	2	1,068,681
		91	2	1	2	1,634,494	19	1,634,518
		90	1	1	2	1,249,930	2	1,249,936
		88	251	1	251	1,362,180	250	1,362,933
	Polybrominated biphenyls	92	0	250	0	0	5	255
		91	No Reports Received					
		90	No Reports Received					
		88	250	0	0	0	0	250
1336-36-3	Polychlorinated biphenyls (PCBs)	92	0	0	0	0	1	1
		91	0	0	0	0	0	0
		90	5	0	0	0	71,366	71,371
		88	6	0	10	0	752	768
1120-71-4	Propane sultone	92	250	0	0	0	0	250
		91	No Reports Received					
		90	No Reports Received					
		88	0	0	0	0	0	0

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Pentachlorophenol	92	1,250	2,406,652	23,221	900	99,640	0	2,531,663
	91	1,755	10,613	65,491	834	187,231	90	266,014
	90	NA	NA	69,307	4,349	5,847	5	*79,508*
	88	NA	NA	27,568	4,728	518,105	0	*550,401*
Peracetic acid	92	0	0	4,553	2,474	0	2,312	9,339
	91	0	0	0	1,672	0	0	1,672
	90	NA	NA	0	1,750	1,821	0	*3,571*
	88	NA	NA	0	0	0	0	*0*
Phenol	92	808,209	2,687,109	1,825,900	4,547,598	1,139,093	25,087	11,032,996
	91	919,296	1,996,347	2,376,455	5,371,293	940,133	25,892	11,629,416
	90	NA	NA	3,995,234	5,061,348	2,293,140	10,320	*11,360,042*
	88	NA	NA	3,668,466	6,046,640	2,518,438	107,900	*12,341,444*
p-Phenylenediamine	92	0	0	409	4,298	4,800	0	9,507
	91	0	0	1,200	3,239	13,000	0	17,439
	90	NA	NA	37,250	23,509	4,336	0	*65,095*
	88	NA	NA	53,471	6,277	64,452	0	*124,200*
2-Phenylphenol	92	0	505	1,500	2,667	515	0	5,187
	91	0	260	5	4,858	510	0	5,633
	90	NA	NA	0	5,442	1,000	0	*6,442*
	88	NA	NA	0	6,400	250	0	*6,650*
Phosgene	92	0	0	1,538	0	10	0	1,548
	91	0	0	2,425	0	5	0	2,430
	90	NA	NA	1,708	0	5	0	*1,713*
	88	NA	NA	1,040	0	480	0	*1,520*
Phosphoric acid	92	9,331,205	913	1,740,291	4,889,570	1,173,331	105,575	17,240,885
	91	8,331,550	16,603	3,042,527	5,545,206	1,680,753	586,025	19,202,664
	90	NA	NA	2,066,388	6,466,581	2,912,363	232,358	*11,677,690*
	88	NA	NA	3,270,219	13,983,732	4,515,332	743,381	*22,512,664*
Phosphorus (yellow or white)	92	151,644	0	36,229	255	759	0	188,887
	91	141,598	0	3,652	266	506	0	146,022
	90	NA	NA	9,698	1,302	4,831	0	*15,831*
	88	NA	NA	14,074	646	195,013	946	*210,679*
Phthalic anhydride	92	4,148	3,659,358	315,500	4,800	251,349	0	4,235,155
	91	0	4,684,778	512,644	252,054	279,776	1	5,729,253
	90	NA	NA	2,263,987	52,519	271,396	2,650	*2,590,552*
	88	NA	NA	2,877,574	53,441	3,976,682	21,803	*6,929,500*
Picric acid	92	0	0	34	0	0	0	34
	91	0	25,000	12,465	0	0	0	37,465
	90	NA	NA	0	1	1,044	0	*1,045*
	88	NA	NA	14,000	0	0	0	*14,000*
Polybrominated biphenyls	92	0	0	0	0	500	0	500
	91	No Reports Received						
	90	No Reports Received						
	88	NA	NA	0	0	0	0	*0*
Polychlorinated biphenyls (PCBs)	92	18,920	0	1,243,879	0	427,320	0	1,690,119
	91	14	0	774,559	0	112,850	0	887,423
	90	NA	NA	2,269,305	0	364,041	0	*2,633,346*
	88	NA	NA	5,282,525	250	518,732	23,550	*5,825,057*
Propane sultone	92	0	0	0	0	0	0	0
	91	No Reports Received						
	90	No Reports Received						
	88	NA	NA	0	0	0	0	*0*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
123-38-6	Propionaldehyde	92	396,321	293,319	9	63,940	0	753,589
		91	598,008	790,001	63	66,741	0	1,454,813
		90	340,631	648,355	491	34,394	0	1,023,871
		88	399,253	868,586	1,156	930	0	1,269,925
114-26-1	Propoxur	92	39	386	0	0	0	425
		91	10	5	0	0	0	15
		90	260	10	5	0	0	275
		88	250	0	0	0	0	250
115-07-1	Propylene	92	12,981,892	8,235,849	989	5	0	21,218,735
		91	13,672,667	9,449,265	4,685	0	0	23,126,617
		90	13,729,880	10,158,654	867	0	296	23,889,697
		88	18,217,808	11,854,225	10,003	0	0	30,082,036
75-55-8	Propyleneimine	92	17	386	0	0	0	403
		91	50	350	0	0	0	400
		90	293	318	0	0	0	611
		88	250	250	0	0	0	500
75-56-9	Propylene oxide	92	603,914	737,428	7,260	200	2,251	1,351,053
		91	806,309	666,690	10,181	20,710	2,450	1,506,340
		90	494,937	910,286	70,781	120,005	3,893	1,599,902
		88	540,841	2,733,342	112,503	1,113,780	11,630	4,512,096
110-86-1	Pyridine	92	55,984	78,252	10,218	508,615	9	653,078
		91	59,155	86,587	4,930	370,750	13	521,435
		90	67,277	91,163	7,866	514,955	25	681,286
		88	143,881	107,918	2,158	491,775	1,125	746,857
91-22-5	Quinoline	92	20,702	17,471	75	59,000	46	97,294
		91	20,133	24,958	2,660	23,000	286	71,037
		90	20,513	7,177	17	0	198	27,905
		88	31,633	17,717	502	0	896	50,748
106-51-4	Quinone	92	6,100	18,002	4	27	0	24,133
		91	2,205	1,807	0	5	0	4,017
		90	711	891	5	0	0	1,607
		88	4,600	6,700	140	0	0	11,440
82-68-8	Quintozene	92	766	774	0	0	0	1,540
		91	20	286	0	0	0	306
		90	260	21	0	0	0	281
		88	750	314	0	0	0	1,064
81-07-2	Saccharin (manufacturing)	92	63	260	0	0	0	323
		91	63	251	0	0	0	314
		90	68	258	0	0	0	326
		88	250	500	0	0	0	750
94-59-7	Safrole	92	No Reports Received					
		91	No Reports Received					
		90	5	0	0	0	0	5
		88	250	250	0	0	0	500
7782-49-2	Selenium	92	30	1,033	0	0	5	1,068
		91	525	835	188	0	260	1,808
		90	1,260	799	452	0	171,283	173,794
		88	2,251	14,031	1,168	0	127,508	144,958
	Selenium compounds	92	4,498	28,385	5,963	3,700	99,116	141,662
		91	2,380	34,674	722	4,100	80,295	122,171
		90	5,287	28,925	1,145	5,000	120,061	160,418
		88	2,251	12,255	250	3,400	46,000	64,156

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling(37) Pounds	Transfers to Energy Recovery(37) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers(38) Pounds	Total Transfers(39) Pounds
Propionaldehyde	92	0	14,339	0	12,906	4,961	0	32,206
	91	0	5,100	250	12,922	4,975	0	23,247
	90	NA	NA	0	69	1,457	0	*1,526*
	88	NA	NA	1,600	761	0	0	*2,361*
Propoxur	92	0	0	1,000	250	5	0	1,255
	91	0	0	455	255	5	0	715
	90	NA	NA	505	260	291	0	*1,056*
	88	NA	NA	0	0	250	0	*250*
Propylene	92	0	2,891,581	580,777	255	34	0	3,472,647
	91	0	2,640,000	724,173	5	6,039	0	3,370,217
	90	NA	NA	980,977	1,340	566	0	*982,883*
	88	NA	NA	1,521,069	500	3,320	0	*1,524,889*
Propyleneimine	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	250	0	0	*250*
	88	NA	NA	0	250	0	0	*250*
Propylene oxide	92	0	572,206	3,884	33,600	76,669	0	686,359
	91	5	1,361,220	12,187	52,154	40,392	0	1,465,958
	90	NA	NA	4,201	251,413	8,055	0	*263,669*
	88	NA	NA	1,091	386,355	16,626	35	*404,107*
Pyridine	92	0	506,091	331,554	199,015	4,541	0	1,041,201
	91	33,804	177,321	202,765	264,235	4,560	0	682,685
	90	NA	NA	170,428	264,948	5,051	0	*440,427*
	88	NA	NA	56,729	275,083	40,699	0	*372,511*
Quinoline	92	0	210	5,001	260	2,160	250	7,881
	91	0	0	4,248	255	3,702	0	8,205
	90	NA	NA	11,189	4,893	5,344	0	*21,426*
	88	NA	NA	4,945	6,406	6,242	0	*17,593*
Quinone	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	280	250	0	0	*530*
Quintozene	92	170,000	373	452,527	26	50	0	622,976
	91	0	105	61,470	11	1,480	0	63,066
	90	NA	NA	813	10	274	0	*1,097*
	88	NA	NA	0	250	12,625	0	*12,875*
Saccharin (manufacturing)	92	0	0	9,550	279	1,300	0	11,129
	91	0	0	350	260	1,400	0	2,010
	90	NA	NA	0	681	4,043	0	*4,724*
	88	NA	NA	0	7,900	750	0	*8,650*
Safrole	92	No Reports Received						
	91	No Reports Received						
	90	NA	NA	0	12	0	0	*12*
	88	NA	NA	0	250	0	0	*250*
Selenium	92	38,463	0	462	57	3,440	5	42,427
	91	43,378	5	6,975	270	22,407	0	73,035
	90	NA	NA	3,777	520	7,328	12,041	*23,666*
	88	NA	NA	3,145	1,250	2,617	500	*7,512*
Selenium compounds	92	271,351	1,270	26,982	210	41,894	0	341,707
	91	22,485	0	10,456	160	37,774	0	70,875
	90	NA	NA	2,088	508	52,119	253	*54,968*
	88	NA	NA	1,631	1,860	61,366	0	*64,857*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
7440-22-4	Silver	92	3,257	3,512	140	0	500	7,409
		91	5,555	7,599	119	28	250	13,551
		90	4,662	7,514	297	5	3,725	16,203
		88	11,482	36,519	1,654	0	39,510	89,165
	Silver compounds	92	6,924	22,673	9,639	24	20,318	59,578
		91	6,595	18,243	8,309	25	17,541	50,713
		90	7,584	13,537	11,343	265	21,786	54,515
		88	5,991	9,415	8,934	250	11,550	36,140
100-42-5	Styrene	92	13,149,414	19,185,202	23,502	83,170	304,179	32,745,467
		91	10,515,688	18,602,990	25,979	22,080	389,979	29,556,716
		90	12,755,754	18,504,225	37,438	29,035	160,283	31,486,735
		88	12,747,924	20,610,944	59,069	165	242,941	33,661,043
96-09-3	Styrene oxide	92	304	64	0	0	0	368
		91	1,628	47	0	0	0	1,675
		90	1,535	888	0	0	0	2,423
		88	511	1,803	0	0	0	2,314
7664-93-9	Sulfuric acid	92	1,570,940	22,150,513	32,719,526	98,631,395	1,737,032	156,809,406
		91	1,443,842	20,281,499	37,001,838	94,720,218	7,679,146	161,126,543
		90	1,651,635	22,670,646	25,805,185	112,116,432	2,213,265	164,457,163
		88	2,260,082	15,861,959	36,485,235	138,707,333	4,929,111	198,243,720
79-34-5	1,1,2,2-Tetra-chloroethane	92	28,117	20,782	564	0	0	49,463
		91	40,927	23,324	2,113	0	0	66,364
		90	38,513	6,283	3,529	80	495	48,900
		88	25,904	17,961	1,903	0	29	45,797
127-18-4	Tetrachloroethylene	92	5,198,796	7,112,439	10,207	12,780	9,354	12,343,576
		91	6,617,995	10,151,368	7,448	14,000	23,304	16,814,115
		90	9,312,227	13,328,073	21,510	11,012	1,255	22,674,077
		88	16,328,800	19,668,646	33,314	72,250	82,144	36,185,154
961-11-5	Tetrachlorvinphos	92	260	2,575	5	0	0	2,840
		91	251	379	2	0	0	632
		90	1,000	254	0	0	0	1,254
		88	250	1	0	0	0	251
7440-28-0	Thallium	92	No Reports Received					
		91	1	29	1	0	0	31
		90	250	500	5	0	0	755
		88	No Reports Received					
	Thallium compounds	92	255	500	0	0	505	1,260
		91	5	250	0	0	255	510
		90	5	250	0	0	255	510
		88	1	252	750	0	250	1,253
62-55-5	Thioacetamide	92	No Reports Received					
		91	0	0	0	0	0	0
		90	0	0	0	0	0	0
		88	250	250	0	0	0	500
62-56-6	Thiourea	92	650	302	727	5,300	256	7,235
		91	873	555	717	5,400	505	8,050
		90	2,300	565	572	4,800	265	8,502
		88	1,504	500	16,951	5,940	750	25,645
1314-20-1	Thorium dioxide	92	0	5	0	0	0	5
		91	0	250	0	0	0	250
		90	250	610	0	0	0	860
		88	230	1,350	0	0	0	1,580

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Silver	92	979,756	0	4,797	1,858	9,802	3,900	1,000,113
	91	985,071	0	9,105	2,134	116,254	337	1,112,901
	90	NA	NA	1,282	3,077	2,608	0	*6,967*
	88	NA	NA	23,875	3,624	3,263	0	*30,762*
Silver compounds	92	976,578	0	1,912	4,224	8,190	500	991,404
	91	676,072	0	1,358	3,308	2,901	500	684,139
	90	NA	NA	22,958	4,317	56,451	250	*83,976*
	88	NA	NA	8,986	8,078	3,139	2,830	*23,033*
Styrene	92	1,079,415	8,577,736	3,221,494	254,679	2,624,009	20,908	15,778,241
	91	112,577	8,493,350	2,855,711	242,630	2,018,301	8,385	13,730,954
	90	NA	NA	6,538,359	254,841	3,399,589	421,710	*10,614,499*
	88	NA	NA	5,696,394	478,773	2,237,215	1,260,446	*9,672,828*
Styrene oxide	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	250	750	0	*1,000*
Sulfuric acid	92	921,378,531	520,391	41,458,033	35,866,416	34,202,633	3,703,090	1,037,129,094
	91	718,934,821	94,156	43,570,440	33,289,571	31,389,905	128,357	827,407,250
	90	NA	NA	41,473,012	29,489,497	31,979,636	16,861,811	*119,803,956*
	88	NA	NA	63,763,194	54,266,585	41,816,564	3,501,906	*163,348,249*
1,1,2,2-Tetra-chloroethane	92	1,446,254	0	65,142	8,113	273	0	1,519,782
	91	992,070	17,800	214,173	2,005	262	1	1,226,311
	90	NA	NA	149,006	124	771	750	*150,651*
	88	NA	NA	74,982	400	128,750	0	*204,132*
Tetrachloroethylene	92	7,688,770	729,405	1,853,236	111,273	111,474	157,406	10,651,564
	91	10,760,043	1,263,488	3,587,201	234,642	115,933	138,019	16,099,326
	90	NA	NA	3,635,134	450,922	796,446	56,717	*4,939,219*
	88	NA	NA	4,059,045	586,398	1,385,378	119,665	*6,150,486*
Tetrachlorvinphos	92	0	0	135,100	29	104,680	0	239,809
	91	0	0	5,550	9	27,969	0	33,528
	90	NA	NA	91,530	28	6,598	0	*98,156*
	88	NA	NA	40,210	2	9,270	0	*49,482*
Thallium	92	No Reports Received						
	91	0	0	1	0	953	0	954
	90	NA	NA	0	0	916	0	*916*
	88	No Reports Received						
Thallium compounds	92	75,905	0	3,900	5	250	0	80,060
	91	1,500	0	0	5	0	0	1,505
	90	NA	NA	0	5	0	0	*5*
	88	NA	NA	250	6	1,000	0	*1,256*
Thioacetamide	92	No Reports Received						
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	250	0	0	0	*250*
Thiourea	92	0	0	2,698	25,175	16,962	0	4,835
	91	335	750	4,107	15,906	1,661	0	22,759
	90	NA	NA	1,950	11,045	2,005	0	*15,000*
	88	NA	NA	2,511	26,634	2,303	0	*31,448*
Thorium dioxide	92	0	0	0	5	64,000	0	64,005
	91	0	0	0	250	102,249	0	102,499
	90	NA	NA	0	660	533,147	0	*533,807*
	88	NA	NA	0	250	677,549	0	*677,799*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
7550-45-0	Titanium tetrachloride	92	23,889	4,094	0	0	0	27,983
		91	27,370	6,236	0	0	0	33,606
		90	42,397	11,963	0	0	0	54,360
		88	38,614	40,054	0	0	1,400	80,068
108-88-3	Toluene	92	64,986,449	126,010,712	84,024	1,573,901	708,278	193,363,364
		91	75,638,113	130,598,817	105,120	1,373,957	179,941	207,895,948
		90	85,965,861	159,946,495	201,796	1,432,918	371,222	247,918,292
		88	103,150,123	190,959,865	197,233	1,473,666	731,199	296,512,086
584-84-9	Toluene-2,4-diiso-cyanate	92	4,995	9,037	0	0	250	14,282
		91	12,148	1,309,866	0	0	250	1,322,264
		90	18,862	38,529	0	0	5	57,396
		88	46,634	118,428	0	0	1,040	166,102
91-08-7	Toluene-2,6-diiso-cyanate	92	2,151	3,168	0	0	250	5,569
		91	303,581	28,114	0	0	250	331,945
		90	6,023	19,438	5	0	5	25,471
		88	153,253	338,939	0	0	510	492,702
95-53-4	o-Toluidine	92	5,255	2,237	310	31,800	6,823	46,425
		91	8,904	1,925	260	21,100	8,111	40,300
		90	5,367	2,075	252	250	8,486	16,430
		88	19,196	27,726	1,902	250	5,024	54,098
8001-35-2	Toxaphene	92	No Reports Received					
		91	No Reports Received					
		90	0	0	0	0	0	0
		88	No Reports Received					
52-68-6	Trichlorfon	92	5	253	9	0	0	267
		91	5	254	9	0	0	268
		90	250	254	6	0	0	510
		88	250	3	0	0	0	253
120-82-1	1,2,4-Trichlorobenzene	92	219,941	195,356	995	1,200	2,680	420,172
		91	127,598	283,851	1,669	3,134	4,573	420,825
		90	106,656	270,210	7,417	3,479	725	388,487
		88	438,009	1,094,904	31,628	7,408	3,073	1,575,022
71-55-6	1,1,1-Trichloroethane	92	56,479,078	58,465,308	13,132	561	76,381	115,034,460
		91	70,669,445	70,284,531	22,058	2,805	174,480	141,153,319
		90	84,171,441	82,033,915	16,727	1,581	62,176	166,285,840
		88	91,654,550	86,658,242	95,624	1,000	187,786	178,597,202
79-00-5	1,1,2-Trichloroethane	92	85,953	476,232	1,033	0	7	563,225
		91	94,329	433,537	1,382	2	256	529,506
		90	91,027	497,437	2,231	1,091	265	592,051
		88	618,608	1,122,734	5,303	0	89	1,746,734
79-01-6	Trichloroethylene	92	15,269,203	14,305,372	8,153	466	20,726	29,603,920
		91	16,833,623	18,603,398	12,784	800	62,991	35,513,596
		90	18,794,419	20,633,998	14,285	805	12,554	39,456,061
		88	26,076,180	29,712,439	13,801	390	21,186	55,823,996
95-95-4	2,4,5-Trichlorophenol	92	0	0	0	0	0	0
		91	0	0	0	28,000	0	28,000
		90	No Reports Received					
		88	1	90	0	0	0	91
88-06-2	2,4,6-Trichlorophenol	92	7	79	1	0	0	87
		91	1	79	1	0	1	82
		90	0	78	79	0	0	157
		88	0	250	50	12,000	0	12,300

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling(37) Pounds	Transfers to Energy Recovery(37) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers(38) Pounds	Total Transfers(39) Pounds
Titanium tetrachloride	92	0	0	3,276,833	0	39,000	0	3,315,833
	91	0	2,688	2,367,140	5	958	0	2,370,791
	90	NA	NA	1,854,087	5	121,806	0	*1,975,898*
	88	NA	NA	1,667,045	0	0	0	*1,667,045*
Toluene	92	29,949,225	78,876,427	19,777,172	984,843	936,544	129,989	130,654,200
	91	26,155,482	80,504,551	20,383,839	1,294,467	1,693,546	174,107	130,205,992
	90	NA	NA	34,405,273	1,724,282	4,916,783	881,328	*41,927,666*
	88	NA	NA	47,679,311	3,549,521	9,559,099	4,629,806	*65,417,737*
Toluene-2,4-diiso-cyanate	92	7,400	1,020	45,644	0	1,499	0	55,563
	91	10,900	12,911	35,711	0	14,098	0	73,620
	90	NA	NA	82,082	0	8,863	0	*90,945*
	88	NA	NA	193,439	500	36,178	3	*230,120*
Toluene-2,6-diiso-cyanate	92	1,770	48	15,433	0	475	0	17,726
	91	1,950	10	14,428	0	0	0	16,388
	90	NA	NA	16,474	2,005	2,031	0	*20,510*
	88	NA	NA	45,287	250	9,444	0	*54,981*
o-Toluidine	92	0	232,901	11,182	2,412	188	0	246,683
	91	0	62,900	101,931	8,250	85	1,300	174,466
	90	NA	NA	11,336	28,312	1,055	0	*40,703*
	88	NA	NA	31,500	15,172	670	0	*47,342*
Toxaphene	92	No Reports Received						
	91	No Reports Received						
	90	NA	NA	2,200	0	0	0	*2,200*
	88	No Reports Received						
Trichlorfon	92	0	0	3,109	0	274	0	3,383
	91	0	0	1,145	0	297	0	1,442
	90	NA	NA	542	125	715	0	*1,382*
	88	NA	NA	1,079	215	487	0	*1,781*
1,2,4-Trichlorobenzene	92	48,070	72,654	1,548,055	183,015	42,748	0	1,894,542
	91	85,165	68,617	315,761	136,769	59,051	0	665,363
	90	NA	NA	597,300	229,363	85,872	0	*912,535*
	88	NA	NA	734,243	262,676	164,144	0	*1,161,063*
1,1,1-Trichloroethane	92	23,082,207	3,639,456	4,247,899	118,253	611,054	173,815	31,872,684
	91	27,607,678	3,265,506	6,845,536	252,057	979,627	291,538	39,241,942
	90	NA	NA	8,519,503	169,276	3,810,144	409,232	*12,908,155*
	88	NA	NA	12,086,575	304,603	5,940,759	1,219,348	*19,551,285*
1,1,2-Trichloroethane	92	8,905,509	1,000	3,221,849	1,200	219	0	12,129,777
	91	8,179,318	0	4,997,737	819	8,580	0	13,186,454
	90	NA	NA	1,994,294	855	25,498	0	*2,020,647*
	88	NA	NA	239,032	750	19,810	1,000	*260,592*
Trichloroethylene	92	6,610,826	969,233	1,728,770	69,639	248,714	49,621	9,676,803
	91	6,885,795	848,696	2,586,647	72,595	115,973	94,386	10,604,092
	90	NA	NA	2,894,302	11,348	724,724	146,333	*3,776,707*
	88	NA	NA	4,691,284	85,652	1,398,876	342,580	*6,518,392*
2,4,5-Trichlorophenol	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	No Reports Received						
	88	NA	NA	0	0	20	0	*20*
2,4,6-Trichlorophenol	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	10	0	*10*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
1582-09-8	Trifluralin	92	10,637	2,672	290	0	10	13,609
		91	8,449	2,711	80	0	31,835	43,075
		90	12,997	2,621	17	0	10	15,645
		88	2,020	1,257	601	0	0	3,878
95-63-6	1,2,4-Trimethylbenzene	92	2,229,766	3,028,445	8,481	14,409	511,202	5,792,303
		91	2,837,622	2,678,156	15,822	16,898	17,732	5,566,230
		90	3,313,189	2,318,841	6,115	28,574	12,862	5,679,581
		88	1,965,468	2,309,701	10,103	7,964	61,583	4,354,819
51-79-6	Urethane	92	3,200	0	0	0	0	3,200
		91	0	1,800	0	0	0	1,800
		90	510	3,310	0	5	20	3,845
		88	140,500	4,623	0	0	0	145,123
7440-62-2	Vanadium (fume or dust)	92	2,015	11,930	4,250	0	83,250	101,445
		91	2,869	14,664	685	0	74,730	92,948
		90	2,623	12,683	670	0	63,952	79,928
		88	3,135	14,029	4,704	0	87,296	109,164
108-05-4	Vinyl acetate	92	1,079,209	3,073,769	7,208	1,616,385	5,249	5,781,820
		91	1,102,854	4,382,994	9,900	3,088,362	7,237	8,591,347
		90	1,212,020	4,357,449	5,558	1,360,901	14,151	6,950,079
		88	1,470,627	4,450,994	10,021	2,109,859	18,889	8,060,390
593-60-2	Vinyl bromide	92	28,300	4,600	0	0	0	32,900
		91	260	3,300	0	0	0	3,560
		90	9,190	915	270	0	0	10,375
		88	4,000	950	400	0	0	5,350
75-01-4	Vinyl chloride	92	370,412	730,744	902	1	3,106	1,105,165
		91	390,319	657,366	4,625	4	250	1,052,564
		90	313,596	821,994	7,291	593	2,535	1,146,009
		88	421,882	1,016,687	2,051	53	4,409	1,445,082
75-35-4	Vinylidene chloride	92	52,657	188,781	1,296	0	14	242,748
		91	71,731	213,416	794	0	15	285,956
		90	69,583	234,130	251	155	483	304,602
		88	104,552	191,801	3,462	170	429	300,414
1330-20-7	Xylene (mixed isomers)	92	26,080,470	83,631,841	41,504	219,270	1,434,430	111,407,515
		91	28,720,815	91,009,542	52,181	139,948	283,182	120,205,668
		90	32,558,954	105,954,310	44,355	105,394	418,716	139,081,729
		88	34,184,627	121,475,381	204,256	144,728	558,007	156,566,999
108-38-3	m-Xylene	92	874,061	386,780	1,387	5	6,189	1,268,422
		91	888,807	509,426	2,260	5	3,186	1,403,684
		90	888,639	680,158	1,526	0	1,130	1,571,453
		88	1,410,104	1,012,939	2,566	0	18,045	2,443,654
95-47-6	o-Xylene	92	1,441,352	636,477	1,868	5	5,967	2,085,669
		91	1,146,683	576,448	6,507	5	1,618	1,731,261
		90	1,554,145	584,222	2,761	0	1,842	2,142,970
		88	1,553,292	642,522	2,786	250	22,461	2,221,311
106-42-3	p-Xylene	92	1,035,834	2,985,051	1,868	5	4,101	4,026,859
		91	1,307,444	4,034,927	1,076	5	3,635	5,347,087
		90	1,333,708	3,517,838	896	0	1,510	4,853,952
		88	1,687,827	4,352,922	3,200	0	49,226	6,093,175
87-62-7	2,6-Xylidine	92	33	26	0	0	0	59
		91	5	16	0	0	0	21
		90	0	17	1,906	0	0	1,923
		88	0	337	1,537	0	0	1,874

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling (37) Pounds	Transfers to Energy Recovery (37) Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers (38) Pounds	Total Transfers (39) Pounds
Trifluralin	92	250	5	44,573	32	25,332	0	70,192
	91	250	0	26,604	141	50,013	0	77,008
	90	NA	NA	43,743	93	38,458	0	*82,294*
	88	NA	NA	149,989	371	40,557	0	*190,917*
1,2,4-Trimethylbenzene	92	448,846	2,234,938	231,171	180,428	52,706	4,415	3,152,504
	91	488,269	1,530,262	216,685	269,685	145,170	14,361	2,664,432
	90	NA	NA	217,583	140,850	340,205	500	*699,138*
	88	NA	NA	330,046	501,717	200,616	38,117	*1,070,496*
Urethane	92	0	0	4,700	6,400	3,200	0	14,300
	91	0	0	15,300	0	3,750	0	19,050
	90	NA	NA	2,528	750	0	0	*3,278*
	88	NA	NA	3,558	260	1,350	0	*5,168*
Vanadium (fume or dust)	92	92	0	849	5	9,769	0	10,715
	91	154,749	61	1,646	270	426,571	0	583,297
	90	NA	NA	0	260	41,132	0	*41,392*
	88	NA	NA	1,858	0	91,559	0	*93,417*
Vinyl acetate	92	1,139,485	5,897,704	838,232	190,754	395,519	5,600	8,467,294
	91	1,136	3,648,193	124,913	153,451	49,834	0	3,977,527
	90	NA	NA	1,992,642	221,787	45,767	49,410	*2,309,606*
	88	NA	NA	354,698	2,319,733	21,811	20,015	*2,716,257*
Vinyl bromide	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*
Vinyl chloride	92	158,159	2,731	23,909	474	11,694	0	196,967
	91	236,549	59	69,619	252	6,549	0	313,028
	90	NA	NA	105,858	1,897	25,001	0	*132,756*
	88	NA	NA	669,044	17,104	4,555	2,188	*692,891*
Vinylidene chloride	92	0	0	104,102	260	0	0	104,362
	91	0	0	74,520	94	7	0	74,621
	90	NA	NA	134,511	1,000	262	0	*135,773*
	88	NA	NA	360,958	3,303	44,281	0	*408,542*
Xylene (mixed isomers)	92	39,088,457	64,252,052	6,414,100	860,674	1,240,922	119,128	111,975,333
	91	40,078,110	66,725,729	19,297,772	1,438,909	953,757	195,932	128,690,209
	90	NA	NA	19,501,344	1,898,835	4,333,891	485,077	*26,219,147*
	88	NA	NA	27,138,180	4,159,730	6,459,759	3,800,783	*41,558,452*
m-Xylene	92	10,331	93,296	132,919	156,993	72,851	0	466,390
	91	15,968	47,829	106,345	19,178	49,329	0	238,649
	90	NA	NA	124,577	1,013	49,443	0	*175,033*
	88	NA	NA	113,311	19,708	107,746	115	*240,880*
o-Xylene	92	135,247	2,327,216	48,805	53,212	11,067	0	2,575,547
	91	10,249	2,614,447	101,894	117,628	23,242	61,354	2,928,814
	90	NA	NA	332,300	55,154	121,367	0	*508,821*
	88	NA	NA	95,764	44,023	52,881	12,864	*205,532*
p-Xylene	92	215	46,909	8,020	70,927	10,681	0	136,752
	91	1,365	10,020	48,171	18,748	14,076	296	92,676
	90	NA	NA	34,827	256	20,619	0	*55,702*
	88	NA	NA	48,320	752	31,108	0	*80,180*
2,6-Xylidine	92	0	0	0	0	0	0	0
	91	0	0	0	0	0	0	0
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	0	0	0	0	*0*

Table 3-15. Releases and Transfers of TRI Chemicals Reported, 1988, 1990-1992 (Alphabetically Ordered), Continued.

CAS Number	Chemical	Year	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
7440-66-6	Zinc (fume or dust)	92	634,722	905,990	46,975	120,000	13,041,123	14,748,810
		91	768,219	1,205,415	27,924	115	9,215,354	11,217,027
		90	849,513	1,348,263	40,889	280	11,333,161	13,572,106
		88	1,943,918	1,511,370	849,544	140,010	25,617,365	30,062,207
	Zinc compounds	92	1,506,116	2,678,676	1,009,739	126,947	76,540,392	81,861,870
		91	1,526,293	2,792,289	1,324,009	228,007	108,663,500	114,534,098
		90	1,917,115	2,859,311	1,139,644	312,151	101,170,166	107,398,387
		88	3,267,346	3,996,657	1,186,679	109,555	114,051,378	122,611,615
12122-67-7	Zineb	92	No Reports Received					
		91	5	0	0	0	0	5
		90	5	0	0	0	0	5
		88	250	1,000	0	0	0	1,250
	Mixtures and other trade name products	92	13,770	44,316	0	0	32,950	91,036
		91	207,940	680,154	6,063	1,540	4,852	900,549
		90	200,254	953,317	61,856	1,350,015	22,280	2,587,722
		88	713,667	2,744,385	69,810	0	25,149	3,553,011
	Trade secret chemicals	92	3,650	485	0	0	20,000	24,135
		91	51	143	1,400	0	0	1,594
		90	0	0	530	0	0	530
		88	0	0	19,700	0	0	19,700
	Total	92	536,680,299	1,284,284,917	272,905,180	725,820,874	337,590,822	3,157,282,092
		91	616,663,149	1,388,425,487	243,331,324	710,237,637	414,576,639	3,373,234,236
		90	713,869,291	1,590,610,816	198,131,625	754,523,494	436,018,244	3,693,153,470
		88	829,601,355	1,853,850,246	311,236,419	1,343,657,667	514,592,116	4,852,937,803

Table 3-15, Cont.

Chemical	Year	Transfers to Recycling[37] Pounds	Transfers to Energy Recovery[37] Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Transfers to Disposal Pounds	Other Off-site Transfers[38] Pounds	Total Transfers[39] Pounds
Zinc (fume or dust)	92	62,584,129	102,007	1,367,703	159,837	5,399,683	105,120	69,718,479
	91	69,014,541	50,022	3,511,627	39,783	4,150,652	146,827	76,913,452
	90	NA	NA	5,315,287	44,503	6,911,035	3,835,896	*16,106,721*
	88	NA	NA	7,643,114	834,711	29,642,266	4,776,287	*42,896,378*
Zinc compounds	92	227,148,192	348,371	36,892,532	564,123	42,506,449	3,284,350	310,744,017
	91	181,160,524	475,814	7,291,761	628,253	41,871,921	1,750,175	233,178,448
	90	NA	NA	15,466,241	1,168,091	63,405,154	1,177,101	*81,216,587*
	88	NA	NA	17,793,661	1,520,756	65,817,189	1,011,161	*86,142,767*
Zineb	92	No Reports Received						
	91	0	0	5	0	0	0	5
	90	NA	NA	0	0	0	0	*0*
	88	NA	NA	250	0	2,600	0	*2,850*
Mixtures and other trade name products	92	349,327	39,342	638,294	1,872	1,552,607	0	2,581,442
	91	1,440,133	174,329	187,479	64,463	272,504	5,700	2,144,608
	90	NA	NA	144,601	196,253	1,385,463	36,919	*1,763,236*
	88	NA	NA	741,982	188,738	10,663,677	190,046	*11,784,443*
Trade secret chemicals	92	68,000	23,000	14,000	5	0	0	105,005
	91	30,000	2,000	329,200	0	8,499	0	369,699
	90	NA	NA	9,500	0	0	0	*9,500*
	88	NA	NA	20,650	0	0	0	*20,650*
Total	92	2,838,465,419	477,307,370	389,675,327	380,708,363	256,005,214	16,876,490	4,359,038,183
	91	2,264,903,256	442,199,308	351,112,534	394,421,377	262,810,417	10,288,734	3,725,735,626
	90	NA	NA	374,810,144	469,486,355	433,105,439	55,963,051	*1,333,364,989*
	88	NA	NA	492,538,569	581,038,548	484,882,422	56,911,929	*1,615,371,468*

[36] Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991 or delisted chemicals.

[37] NA: Transfers for recycling or energy recovery were not required to be reported for 1988 and 1990.

[38] For 1991 and 1992, 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.

[39] Because transfers for recycling or energy recovery were not required to be reported in 1990, total transfers in those years are not comparable to total transfers reported for 1991 and 1992. (Total transfers for 1988 and 1990 appear in italics.)

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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 prevention 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 by 1995 in releases and transfers of 17 high-priority toxic chemicals (see Box 4-1), using 1988 TRI reporting as a baseline. During 1988, 1.48 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 is to reduce this amount by at least 50%—743 million pounds—by 1995, with an interim reduction target of more than 490 million pounds by 1992.

The 33/50 Program represents an innovative experiment aimed at demonstrating whether voluntary reduction programs can augment the Agency's traditional command-and-control approach by achieving targeted reductions more quickly than would regulations alone. The 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 emissions. More than 16,000 TRI facilities have reported 33/50 Program chemicals to TRI since 1988. By contacting the chief executives of the parent companies of TRI facilities that report 33/50 Program chemicals, the Program seeks to instill a pollution prevention ethic throughout the highest echelons of American businesses.

At the time the 33/50 Program was formulated, 1988 was the most recent year for which 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

17 Priority Chemicals Targeted by the 33/50 Program

Benzene
Cadmium and compounds
Carbon tetrachloride
Chloroform
Chromium and compounds
Cyanide compounds
Dichloromethane
Lead and compounds
Mercury and compounds
Methyl ethyl ketone
Methyl isobutyl ketone
Nickel and compounds
Tetrachloroethylene
Toluene
1,1,1-Trichloroethane
Trichloroethylene
Xylenes

Box 4-1. 33/50 Program Chemicals.

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 of 1991.

Many states, a number of industry associations, and numerous individual companies include 33/50 Program chemicals within the scope of their own reduction programs. 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 emissions of 33/50 Program chemicals reflects the efforts of all these partners.

Analyses of 33/50 Program progress consider only those data elements facilities were required to report in 1988: environmental releases and transfers off-site for treatment and disposal (including transfers to POTWs and transfers with missing or invalid transfer codes). Transfers off-site for energy recovery and for recycling are not included in 33/50 Program goals.

SUMMARY OF FINDINGS

Findings revealed in the 1992 TRI reporting data are summarized below. The data themselves are presented in subsequent sections. As with all TRI reporting, data represent facility estimates, and some reported reductions may not be reflected in real declines in releases or transfers.

33/50 Program Chemicals Continue Trend Toward Early Achievement of 1995 Reduction Goal

Releases and transfers of 33/50 Program chemicals were reduced significantly between 1991 and 1992, continuing to approach the Program's ultimate reduction goal of 50% by 1995.

- Aggregate reductions of the 17 target chemicals from 1988 through 1992 stand at 596 million pounds (40.1%), exceeding by more than 100 million pounds the 33/50 Program's 1992 interim 33% reduction goal of 490 million pounds (see Figure 4-1).

- Releases and transfers of the 17 target chemicals declined at four times the rate reported for all other TRI chemicals between 1991 and 1992 (10.4% vs. 2.6%), and accounted for more than half of the total reduction in releases and transfers of all TRI chemicals during that period.

- Facilities' projections for 33/50 Program chemicals suggest the Program's 1995 50% reduction goal of 743 million pounds may be achieved substantially ahead of schedule. Projections for 1993 suggest the potential for an additional 100 million pounds of reductions; facilities anticipate a total of nearly 200 million pounds of additional reductions by 1994.

Facilities owned by companies participating in the 33/50 Program reported the highest reduction levels and accounted for most of the pounds of 33/50 Program chemical reductions.

- Between 1991 and 1992, facilities owned by Program participants reduced releases and transfers of the 17 Program chemicals by 15%, nearly twice the rate of reduction achieved by facilities owned by non-participating companies.

- Participating companies accounted for 80% of the reduction in 33/50 Program chemical releases and transfers in the last year.

- Since 1988, participating companies have almost halved their releases and transfers of 33/50 Program chemicals (48%).

Total 33/50 Program Chemical Production-Related Wastes Projected to Decline

- Total production-related wastes associated with 33/50 Program chemicals increased slightly between 1991 and 1992, but are projected to decline significantly in 1993 and 1994.

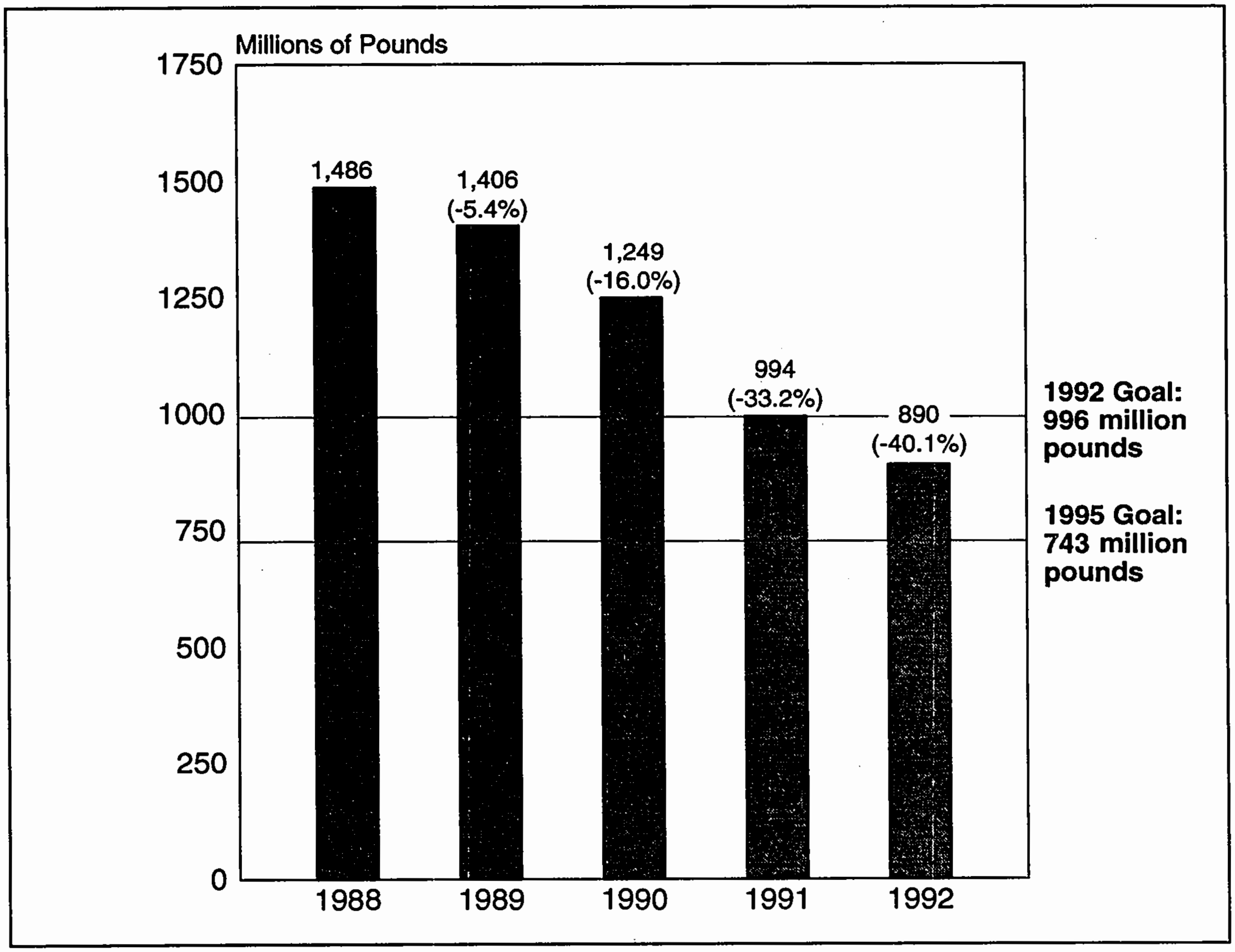


Figure 4-1. TRI Releases and Transfers of 33/50 Program Chemicals, 1988-1992.❶

❶ The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.

- Facilities owned by 33/50 Program participating companies reported an increase in production-related waste for the Program's 17 target chemicals in the last year, but are projecting substantial waste reductions in 1993 and 1994.

Source Reduction Activity Highlights

- 33/50 Program chemicals again in 1992 evidenced higher rates and levels of source reduction activity reporting than other TRI chemicals.

- Individual 33/50 Program chemicals had some of the highest rates of source reduction activity reporting in 1992.

COMPANY PARTICIPATION IN THE 33/50 PROGRAM

While the 33/50 Program does not have a fixed goal for the number of companies electing to participate, the Program nonetheless has placed considerable emphasis on outreach to prospective 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 are directed to the chief executive officers of the parent companies of the more than 16,000 industrial facilities that have reported to TRI any of the Program's 17 target chemicals since 1988. At the close of the Program's third year in February of 1994, nearly 7,500 companies had been contacted by EPA with invitations to participate. Of these, 1,216 companies have elected to enroll, pledging to reduce voluntarily more than 355 million pounds of pollution (see Figure 4-2).

The "Top 600" companies with the greatest amounts of releases and transfers were the first to be contacted and have been the focus of greater outreach follow-up from the Program's headquarters and Regional Office staffs. This concentration on larger companies has proven quite effective, with more than 60% of these companies electing to participate. However, only a little over 11% of the nearly 7,000 smaller companies contacted by EPA since 1991 have chosen to enroll (although the number of participants from this diverse group of companies continues to approach 1,000).

Reductions Pledged by Participating Companies

More than 700 of the participating companies have provided release/transfer reduction targets for 33/50 Program chemicals totalling 355 million pounds by 1995. For these companies, whose base year amounts accounted for 78% of the releases and transfers reported by all Program participants, this reduction commitment represents slightly less than 50% per company.

Most of the remaining Program participants have also developed reduction targets, but have structured them in ways that are difficult to assess against the 1988 release/transfer baseline. For example, many 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 can not 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 355 million pounds of release/transfer reductions represents a lower bound on the reductions that companies are attempting under the 33/50 Program.

Actual Reductions Out-Pacing Pledges

As evidenced in both the 1991 and 1992 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 596 million pounds of 33/50 Program chemical releases and transfers reduced between 1988 and 1992 is more than two-thirds greater than the 355 million pounds pledged by participating companies to be reduced by 1995.

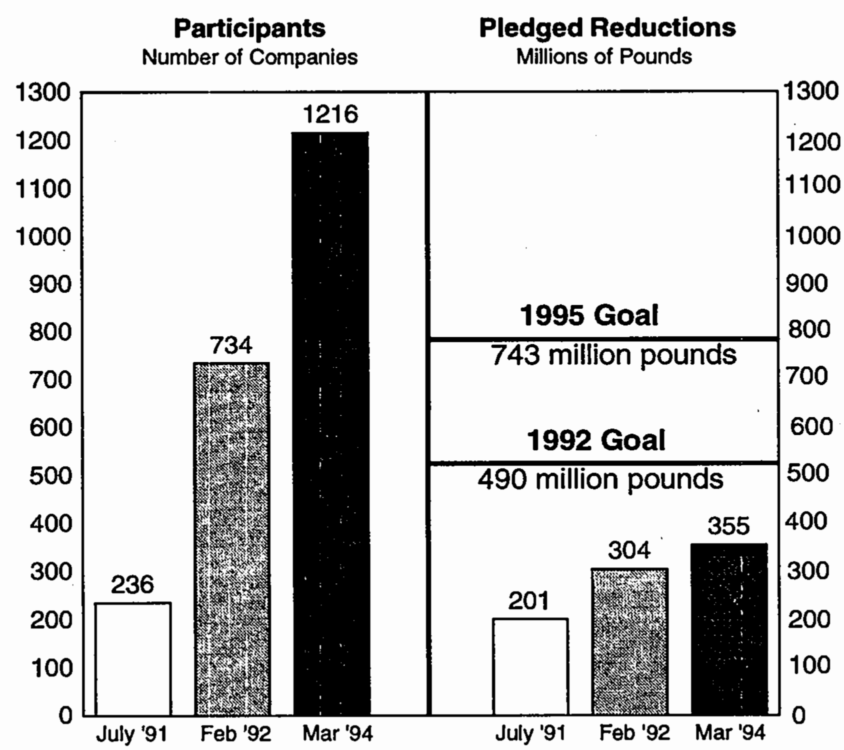


Figure 4-2. 33/50 Program Participant Status, March 1994.

Some of these additional reductions are a result of decreases being achieved by companies that are not participating in the Program (about 170 million pounds through 1992). Some is due to the efforts of participating companies whose reduction pledges could not be not factored into the national total. Significantly, however, companies that have made reduction pledges are achieving greater results than even they anticipated.

33/50 PROGRAM RELEASES AND TRANSFERS

Table 4-1 presents facilities' reports of on-site releases and off-site transfers to treatment and disposal for 1988, the 33/50 Program's base year, and for the latest three years: 1990, 1991, and 1992. Therefore, with few exceptions, TRI data for 1989 will not be presented. In order to control for changes to the chemical list over time, year-to-year comparisons are based on a consistent list of chemicals that have been reportable for all years 1988-1992. In addition, 33/50 Program chemicals are broken out in aggregate for comparison to all other TRI chemicals. The trends in reductions for each grouping of chemicals are depicted in Figure 4-3.

33/50 Program Chemical Reductions versus Reductions for Other TRI Chemicals

Figure 4-4 highlights the dramatic change in the reduction trends for 33/50 Program chemicals versus other TRI chemicals that began in 1991, the year that the 33/50 Program was announced, and that continues to be observed through 1992, the Program's second year. Facilities' 1992 TRI reports show that in the first two years after formal announcement of the 33/50 Program, the 17 target chemicals were reduced at over twice the rate observed for all other TRI chemicals: a 28.7% reduction between 1990 and 1992 for 33/50 Program chemicals versus a 12.4% reduction for the remaining TRI chemicals. In the last year alone, Program chemicals out-paced reductions in other TRI chemicals by four to one (10.4% vs. 2.6%).

This reduction pattern represents a significant change from that observed in years prior to the initiation of the 33/50 Program. Prior to 1991, reductions in the releases and off-site transfers of the 17 33/50 Program chemicals lagged significantly behind reductions in other TRI chemicals. When the 17 33/50 Program chemicals are subtracted, remaining TRI releases and transfers declined by 24% from 1988 through 1990. During that same period, emissions of the 17 targeted 33/50 Program chemicals were reduced by only 16%.

Between 1991 and 1992, reductions in releases and transfers of the 17 33/50 Program chemicals were also greater in absolute amounts than those reported for all other chemicals subject to TRI reporting requirements: a 103 million pound reduction for Program chemicals compared to an 88 million pound decline for the other TRI chemicals. This despite the fact that the 17 33/50 Program chemicals represented only 23% of TRI total releases and transfers in 1991 (reduced to 21% in 1992).

Reductions of the 17 33/50 Program chemicals are accounting for increasing proportions of the aggregate TRI release/transfer reductions. Prior to the Program's initiation in 1991, the 17 target chemicals accounted for 16.5% of the reductions in the releases and transfers of TRI chemicals (238 million of the 1.4 billion pounds of TRI releases and transfers reduced between 1988 and

Table 4-1. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988, 1990-1992❷.

	All TRI Chemicals (Excluding Additions/ Deletions)	TRI Chemicals Less 33/50 Chemicals	33/50 Program Chemicals Only
	Pounds	Pounds	Pounds
1988	6,468,309,271	4,981,845,141	1,486,464,130
1990	5,026,518,459	3,777,948,282	1,248,570,177
1991	4,391,867,298	3,398,277,613	993,589,685
1992	4,200,547,486	3,310,219,739	890,327,747
	Percent Change	Percent Change	Percent Change
1988-1992	-35.1%	-33.6%	-40.1%
1988-1990	-22.3%	-24.2%	-16.0%
1990-1992	-16.4%	-12.4%	-28.7%
1991-1992	-4.4%	-2.6%	-10.4%

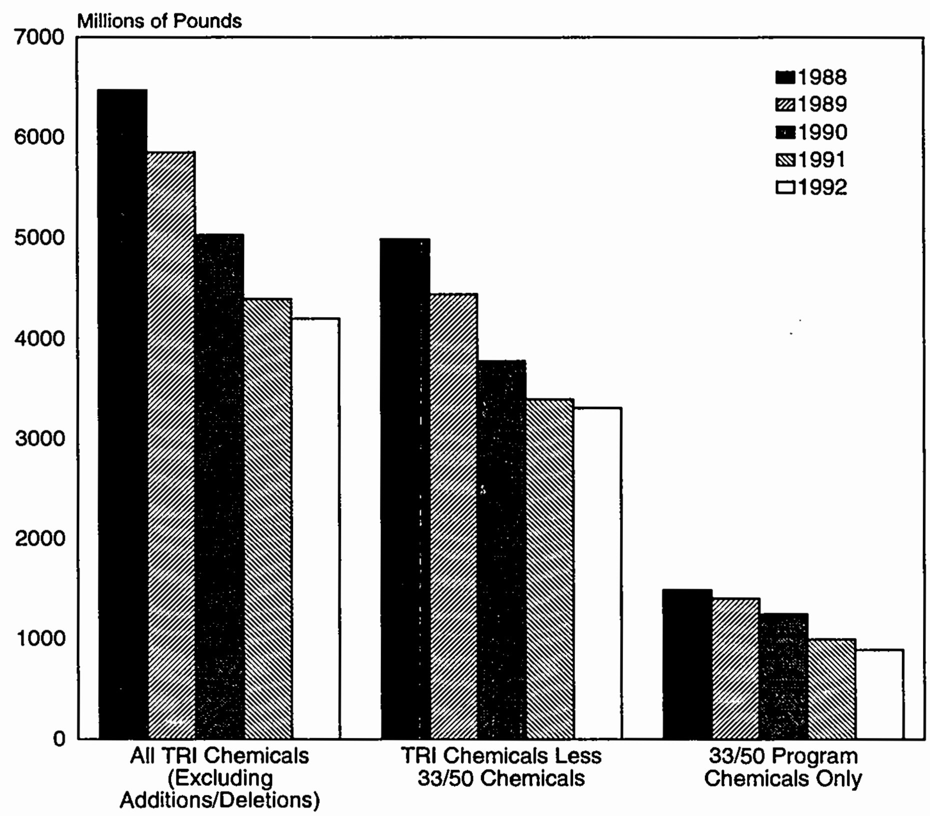


Figure 4-3. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988-1992.❷

❷ The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.

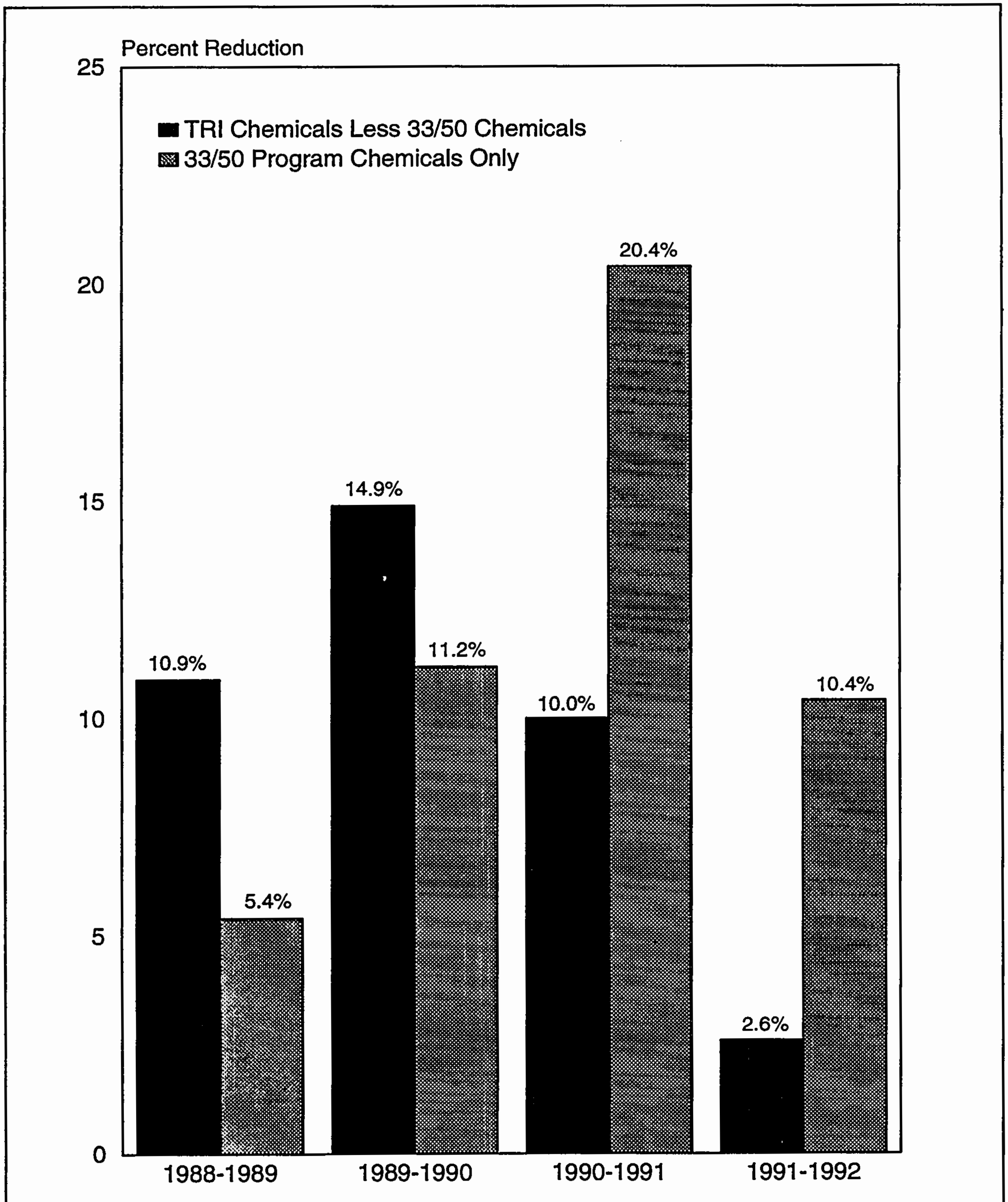


Figure 4-4. Year-to-Year Reduction Comparisons: Releases and Transfers of 33/50 Program Chemicals versus Other TRI Chemicals, 1988-1992.[3]

[3] The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.

1990). In the Program's first year, the portion of total reductions attributable to 33/50 Program chemicals jumped to 40%; between 1991 and 1992, the share of reductions associated with Program chemicals increased again to more than half (54%) of the TRI total.

The "leaders-in-reductions" role being played by 33/50 Program chemicals is also reflected in the reductions performance of the individual TRI facilities that use these chemicals. Nine out of the top ten facilities reporting the greatest absolute reductions in direct environmental releases (excluding underground injection) of all TRI chemicals between 1991 and 1992 are owned by companies that are participating in the 33/50 Program. 33/50 Program companies also own 18 of the top 20 and 41 of the top 50 total non-injection release reduction facilities.

33/50 Program Chemical Releases and Transfers, by Medium/Management Method and by Chemical

Releases and off-site transfers of 33/50 Program chemicals are summarized by chemical and release medium/transfer management method in Table 4-2. The "Subtotal" column in the transfers portion of this table represents those transfer types (POTWs, treatment, and disposal) that are included in the 33/50 Program goals. Figures 4-5 and 4-6 illustrate the reduction trends for 33/50 Program chemicals aggregated by on-site release medium/off-site transfer type, and by chemical, respectively.

Off-site transfers of 33/50 Program chemicals have declined at a higher rate (-52.8% since 1988) than have on-site environmental releases (-36.9%). However, between 1991 and 1992 release reductions occurred at almost twice the rate of that for off-site transfers for treatment and disposal (11.2% vs. 6.1%). Releases of other TRI chemicals declined at less than half the rate for 33/50 Program chemicals in 1992 (4.8%), and transfers actually increased by nearly 4% (33.9 million pounds).

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 6.2 of Form R in addition to the previously reported transfers to POTW's and other treatment and disposal facilities. Off-site transfers to energy recovery and recycling facilities are also reported in Section 8 of Form R, which was made mandatory under the PPA commencing with the 1991 reporting period.

Transfers to energy recovery (215.1 million pounds) and transfers to recycling (763.2 million pounds) in 1992 again substantially exceeded the total for all previously reported off-site transfers of 33/50 Program chemicals (142.1 million pounds). While on-site releases of Program chemicals declined by 11.2% and off-site transfers for treatment and disposal decreased by 6.1% between 1991 and 1992, transfers of the 17 target chemicals to recycling increased by more than 40%. Transfers to energy recovery, on the other hand, declined slightly (1.2%).

Table 4-2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1990-1992.

CAS Number	Chemical	Year	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	92	7,640,101	4,744,478	24,918	355,683	340,636	13,105,816
		91	9,730,501	7,594,244	26,966	824,342	111,928	18,287,981
		90	14,509,387	10,759,685	25,286	689,066	717,007	26,700,431
		88	20,384,441	11,404,198	46,998	825,035	127,920	32,788,592
56-23-5	Carbon tetrachloride	92	416,994	973,268	2,441	45,984	333	1,439,020
		91	528,622	1,019,252	2,844	42,470	2,152	1,595,340
		90	419,001	1,320,225	4,718	31,557	1,005	1,776,506
		88	1,081,552	2,695,101	15,627	98,054	14,759	3,905,093
67-66-3	Chloroform	92	6,017,425	11,017,501	654,452	50,240	28,582	17,768,200
		91	7,720,653	11,529,517	764,484	65,089	22,150	20,101,893
		90	8,388,150	14,648,445	1,005,860	89,560	57,924	24,189,939
		88	7,595,976	18,265,090	1,132,684	36,002	68,544	27,098,296
75-09-2	Dichloromethane	92	27,495,557	46,467,648	221,192	1,183,867	79,313	75,447,577
		91	31,896,963	48,227,792	98,924	1,317,706	118,560	81,659,945
		90	38,001,615	62,614,734	194,670	850,018	21,024	101,682,061
		88	49,344,483	79,395,371	348,560	1,478,833	157,156	130,724,403
78-93-3	Methyl ethyl ketone	92	31,107,484	59,397,157	153,249	365,395	241,794	91,265,079
		91	34,945,620	70,452,517	139,752	355,736	166,746	106,060,371
		90	44,852,450	87,382,385	88,289	146,204	50,526	132,519,854
		88	39,149,720	98,154,472	87,847	255,962	166,537	137,814,538
108-10-1	Methyl isobutyl ketone	92	7,814,570	18,079,207	96,387	129,100	194,986	26,314,250
		91	8,388,210	18,960,112	167,452	161,600	130,415	27,807,789
		90	9,850,864	18,284,937	55,598	52,221	24,733	28,268,353
		88	13,056,204	18,956,818	762,108	116,650	31,770	32,923,550
127-18-4	Tetrachloroethylene	92	5,198,796	7,112,439	10,207	12,780	9,354	12,343,576
		91	6,617,995	10,151,368	7,448	14,000	23,304	16,814,115
		90	9,312,227	13,328,073	21,510	11,012	1,255	22,674,077
		88	16,328,800	19,668,646	33,314	72,250	82,144	36,185,154
108-88-3	Toluene	92	64,986,449	126,010,712	84,024	1,573,901	708,278	193,363,364
		91	75,638,113	130,598,817	105,120	1,373,957	179,941	207,895,948
		90	85,965,861	159,946,495	201,796	1,432,918	371,222	247,918,292
		88	103,150,123	190,959,865	197,233	1,473,666	731,199	296,512,086
71-55-6	1,1,1-Trichloroethane	92	56,479,078	58,465,308	13,132	561	76,381	115,034,460
		91	70,669,445	70,284,531	22,058	2,805	174,480	141,153,319
		90	84,171,441	82,033,915	16,727	1,581	62,176	166,285,840
		88	91,654,550	86,658,242	95,624	1,000	187,786	178,597,202
79-01-6	Trichloroethylene	92	15,269,203	14,305,372	8,153	466	20,726	29,603,920
		91	16,833,623	18,603,398	12,784	800	62,991	35,513,596
		90	18,794,419	20,633,998	14,285	805	12,554	39,456,061
		88	26,076,180	29,712,439	13,801	390	21,186	55,823,996
	Xylenes	92	29,431,717	87,640,149	46,627	219,285	1,450,687	118,788,465
		91	32,063,749	96,130,343	62,024	139,963	291,621	128,687,700
		90	36,335,446	110,736,528	49,538	105,394	423,198	147,650,104
		88	38,835,850	127,483,764	212,808	144,978	647,739	167,325,139
	Cadmium and cadmium compounds	92	13,642	55,498	1,418	1,211	72,443	144,212
		91	17,923	54,569	4,241	1,540	251,107	329,380
		90	31,039	72,345	3,339	1,575	397,523	505,821
		88	32,399	90,293	4,397	2,409	389,729	519,227

Table 4-2.

CAS Number	Chemical	Year	Transfers to POTWs Pounds	Transfers Off-site for Treatment/ Disposal/Other❹ Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers Pounds
71-43-2	Benzene	92	418,050	3,264,626	3,682,676	420,161	2,355,003	6,457,840
		91	615,849	1,796,369	2,412,218	353,207	3,675,231	6,440,656
		90	633,978	2,221,463	2,855,441	NA	NA	2,855,441
		88	1,135,172	2,295,959	3,431,131	NA	NA	3,431,131
56-23-5	Carbon tetrachloride	92	1,054	851,343	852,397	345,452	24,455	1,222,304
		91	621	980,274	980,895	390,625	11,061	1,382,581
		90	42,050	1,082,188	1,124,238	NA	NA	1,124,238
		88	5,014	1,350,011	1,355,025	NA	NA	1,355,025
67-66-3	Chloroform	92	553,650	1,052,533	1,606,183	1,417,848	765,345	3,789,376
		91	803,997	1,890,042	2,694,039	2,077,870	255,288	5,027,197
		90	802,260	1,321,726	2,123,986	NA	NA	2,123,986
		88	1,226,573	1,369,922	2,596,495	NA	NA	2,596,495
75-09-2	Dichloromethane	92	1,300,147	11,901,075	13,201,222	28,892,840	4,091,111	46,185,173
		91	1,302,759	12,649,150	13,951,909	28,453,488	3,728,253	46,133,650
		90	1,277,099	9,424,710	10,701,809	NA	NA	10,701,809
		88	1,830,904	22,434,412	24,265,316	NA	NA	24,265,316
78-93-3	Methyl ethyl ketone	92	652,667	7,135,760	7,788,427	25,348,083	39,200,900	72,337,410
		91	776,361	10,791,188	11,567,549	27,549,459	35,495,872	74,612,880
		90	873,341	20,520,931	21,394,272	NA	NA	21,394,272
		88	962,868	29,202,219	30,165,087	NA	NA	30,165,087
108-10-1	Methyl isobutyl ketone	92	776,557	1,762,349	2,538,906	20,065,393	17,343,529	39,947,828
		91	815,571	2,163,409	2,978,980	17,719,398	19,020,878	39,719,256
		90	1,258,294	4,587,672	5,845,966	NA	NA	5,845,966
		88	1,509,030	10,509,414	12,018,444	NA	NA	12,018,444
127-18-4	Tetrachloroethylene	92	111,273	2,122,116	2,233,389	7,688,770	729,405	10,651,564
		91	234,642	3,841,153	4,075,795	10,760,043	1,263,488	16,099,326
		90	450,922	4,488,297	4,939,219	NA	NA	4,939,219
		88	586,398	5,564,088	6,150,486	NA	NA	6,150,486
108-88-3	Toluene	92	984,843	20,843,705	21,828,548	29,949,225	78,876,427	130,654,200
		91	1,294,467	22,251,492	23,545,959	26,155,482	80,504,551	130,205,992
		90	1,724,282	40,203,384	41,927,666	NA	NA	41,927,666
		88	3,549,521	61,868,216	65,417,737	NA	NA	65,417,737
71-55-6	1,1,1-Trichloroethane	92	118,253	5,032,768	5,151,021	23,082,207	3,639,456	31,872,684
		91	252,057	8,116,701	8,368,758	27,607,678	3,265,506	39,241,942
		90	169,276	12,738,879	12,908,155	NA	NA	12,908,155
		88	304,603	19,246,682	19,551,285	NA	NA	19,551,285
79-01-6	Trichloroethylene	92	69,639	2,027,105	2,096,744	6,610,826	969,233	9,676,803
		91	72,595	2,797,006	2,869,601	6,885,795	848,696	10,604,092
		90	11,348	3,765,359	3,776,707	NA	NA	3,776,707
		88	85,652	6,432,740	6,518,392	NA	NA	6,518,392
	Xylenes	92	1,141,806	8,058,493	9,200,299	39,234,250	66,719,473	115,154,022
		91	1,594,463	20,852,168	22,446,631	40,105,692	69,398,025	131,950,348
		90	1,955,258	25,003,445	26,958,703	NA	NA	26,958,703
		88	4,224,213	37,860,831	42,085,044	NA	NA	42,085,044
	Cadmium and cadmium compounds	92	45,815	904,297	950,112	2,047,074	3,302	3,000,488
		91	8,550	1,425,902	1,434,452	2,257,041	7,460	3,698,953
		90	13,768	1,322,369	1,336,137	NA	NA	1,336,137
		88	21,613	1,287,068	1,308,681	NA	NA	1,308,681

Table 4-2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1990-1992, Continued.

CAS Number	Chemical	Year	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	92	540,615	447,109	288,771	32,470	24,127,155	25,436,120
		91	433,191	541,832	353,384	35,134	25,953,934	27,317,475
		90	571,636	574,765	448,229	83,227	26,037,850	27,715,707
		88	625,185	716,836	397,968	54,902	40,228,735	42,023,626
	Cyanide compounds	92	146,738	3,249,962	85,316	3,765,225	12,953	7,260,194
		91	125,875	2,014,049	120,499	4,727,763	22,180	7,010,366
		90	240,688	1,720,330	129,101	4,981,412	19,720	7,091,251
		88	657,222	1,702,448	196,962	5,445,176	108,969	8,110,777
	Lead and lead compounds	92	615,133	1,231,793	72,575	2,881	13,958,301	15,880,683
		91	556,138	1,309,076	139,781	928	17,025,678	19,031,601
		90	911,400	1,397,583	132,653	1,643	18,958,677	21,401,956
		88	857,705	1,820,295	241,904	2,760	27,017,700	29,940,364
	Mercury and mercury compounds	92	10,904	4,816	563	9	3,134	19,426
		91	11,912	8,080	671	9	5,289	25,961
		90	14,798	8,759	809	21	4,199	28,586
		88	17,042	8,729	1,656	27	13,529	40,983
	Nickel and nickel compounds	92	575,669	288,637	111,215	297,762	3,701,250	4,974,533
		91	396,476	324,579	131,031	370,948	1,702,258	2,925,292
		90	389,949	317,717	148,294	268,963	5,055,518	6,180,441
		88	422,578	291,760	222,067	239,263	3,616,781	4,792,449
	Total for 33/50 Chemicals	92	253,760,075	439,491,054	1,874,640	8,036,820	45,026,306	748,188,895
		91	296,575,009	487,804,076	2,159,463	9,434,790	46,244,734	842,218,072
		90	352,760,371	585,780,919	2,540,702	8,747,177	52,216,111	1,002,045,280
		88	409,270,010	687,984,367	4,011,558	10,247,357	73,612,183	1,185,125,475
	Total for All Other TRI Chemicals	92	282,920,224	844,793,863	271,030,540	717,784,054	292,564,516	2,409,093,197
		91	320,088,140	900,621,411	241,171,861	700,802,847	368,331,905	2,531,016,164
		90	361,108,920	1,004,829,897	195,590,923	745,776,317	383,802,133	2,691,108,190
		88	420,331,345	1,165,865,879	307,224,861	1,333,410,310	440,979,933	3,667,812,328
	Total for All TRI Chemicals	92	536,680,299	1,284,284,917	272,905,180	725,820,874	337,590,822	3,157,282,092
		91	616,663,149	1,388,425,487	243,331,324	710,237,637	414,576,639	3,373,234,236
		90	713,869,291	1,590,610,816	198,131,625	754,523,494	436,018,244	3,693,153,470
		88	829,601,355	1,853,850,246	311,236,419	1,343,657,667	514,592,116	4,852,937,803

Table 4-2, Cont.

CAS Number	Chemical	Year	Transfers to POTWs Pounds	Transfers Off-site for Treatment/ Disposal/Other❹ Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers Pounds
	Chromium and chromium compounds	92	942,267	18,610,517	19,552,784	96,077,807	90,847	115,721,438
		91	937,233	20,178,560	21,115,793	66,477,379	123,934	87,717,106
		90	1,116,369	35,910,150	37,026,519	NA	NA	37,026,519
		88	2,077,204	32,107,939	34,185,143	NA	NA	34,185,143
	Cyanide compounds	92	88,027	635,872	723,899	94,518	168,500	986,917
		91	121,498	878,334	999,832	82,410	500	1,082,742
		90	119,294	1,391,542	1,510,836	NA	NA	1,510,836
		88	1,152,828	2,719,248	3,872,076	NA	NA	3,872,076
	Lead and lead compounds	92	357,956	37,584,654	37,942,610	402,632,887	60,061	440,635,558
		91	335,240	21,759,107	22,094,347	220,243,568	69,357	242,407,272
		90	192,520	56,627,074	56,819,594	NA	NA	56,819,594
		88	212,697	30,906,415	31,119,112	NA	NA	31,119,112
	Mercury and mercury compounds	92	22	238,984	239,006	51,455	1	290,462
		91	314	152,838	153,152	465,489	5	618,646
		90	316	213,305	213,621	NA	NA	213,621
		88	2,141	275,017	277,158	NA	NA	277,158
	Nickel and nickel compounds	92	249,629	12,301,000	12,550,629	79,236,323	34,628	91,821,580
		91	386,991	9,294,712	9,681,703	64,999,091	20,028	74,700,822
		90	315,969	14,746,059	15,062,028	NA	NA	15,062,028
		88	903,249	16,118,794	17,022,043	NA	NA	17,022,043
	Total for 33/50 Chemicals	92	7,811,655	134,327,197	142,138,852	763,195,119	215,071,676	1,120,405,647
		91	9,553,208	141,818,405	151,371,613	542,583,715	217,688,133	911,643,461
		90	10,956,344	235,568,553	246,524,897	NA	NA	246,524,897
		88	19,789,680	281,548,975	301,338,655	NA	NA	301,338,655
	Total for All Other TRI Chemicals	92	372,896,708	528,229,834	901,126,542	2,075,270,300	262,235,694	3,238,632,536
		91	384,868,169	482,393,280	867,261,449	1,722,319,541	224,511,175	2,814,092,165
		90	458,530,011	628,310,081	1,086,840,092	NA	NA	1,086,840,092
		88	561,248,868	752,783,945	1,314,032,813	NA	NA	1,314,032,813
	Total for All TRI Chemicals	92	380,708,363	662,557,031	1,043,265,394	2,838,465,419	477,307,370	4,359,038,183
		91	394,421,377	624,211,685	1,018,633,062	2,264,903,256	442,199,308	3,725,735,626
		90	469,486,355	863,878,634	1,333,364,989	NA	NA	1,333,364,989
		88	581,038,548	1,034,332,920	1,615,371,468	NA	NA	1,615,371,468

❹ "Other" indicates: For 1991 and 1992, 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.

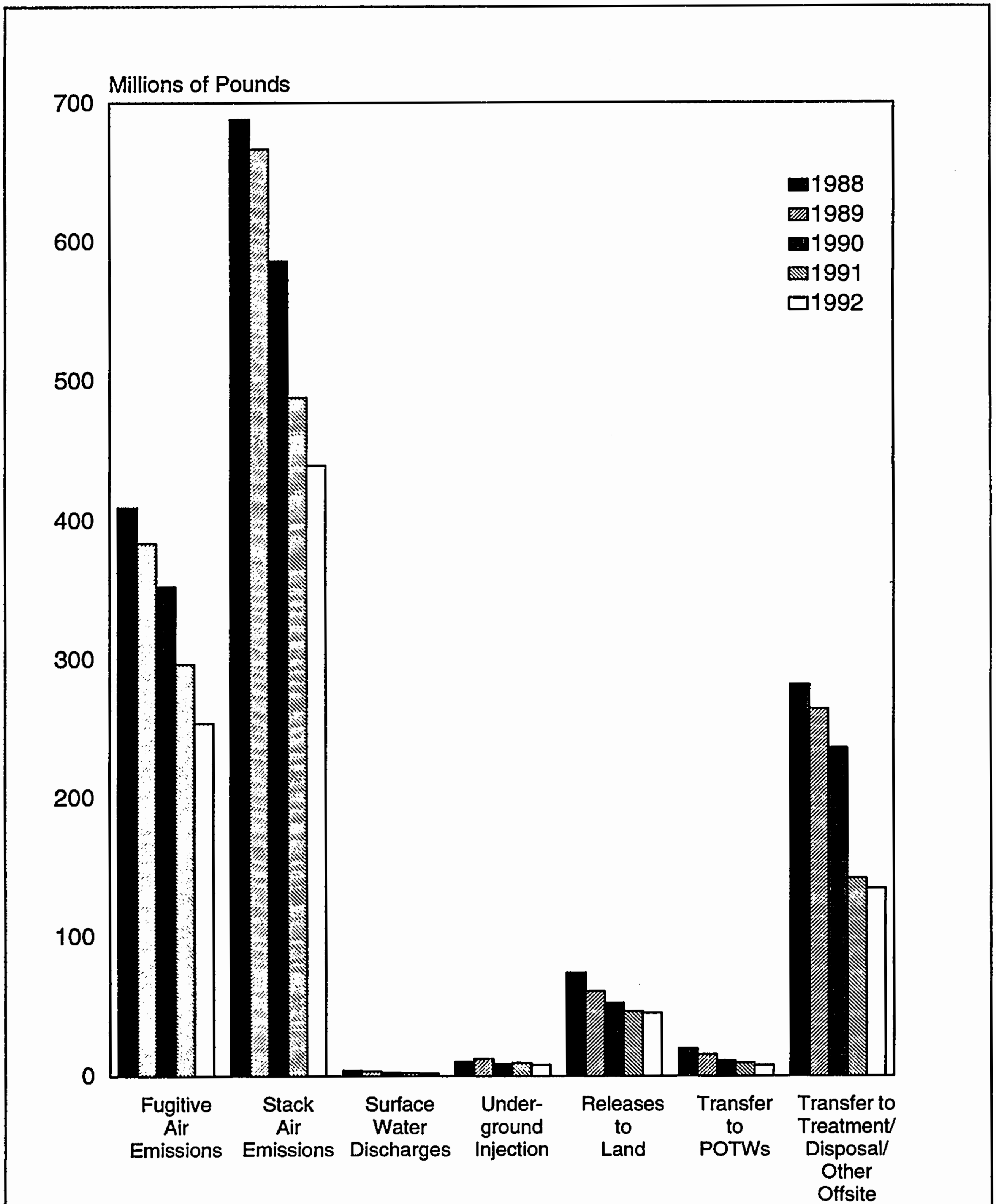


Figure 4-5. TRI Releases and Transfers of 33/50 Program Chemicals, by On-site Release Medium or Transfer Management Type, 1988-1992.[5]

[5] The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.

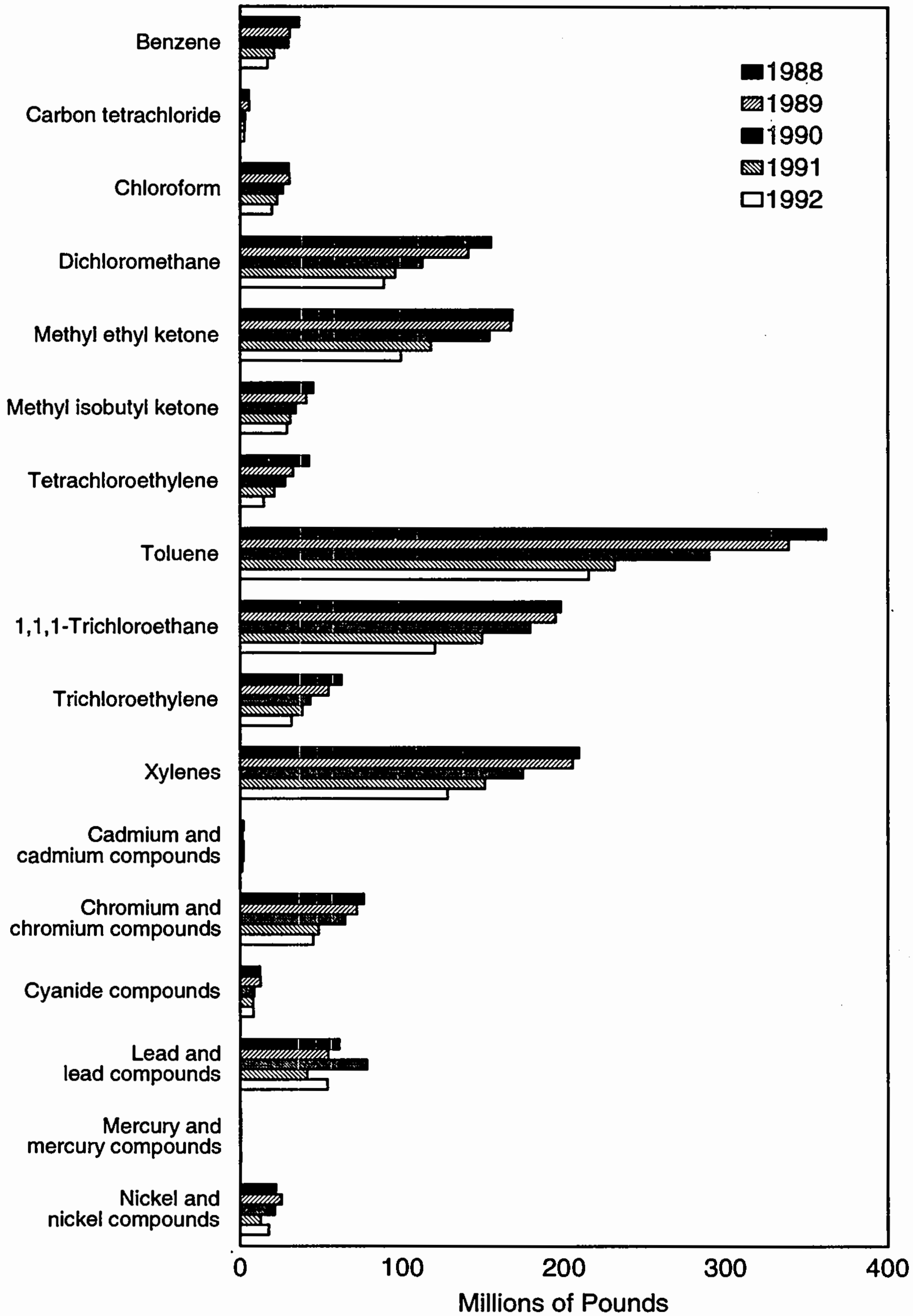


Figure 4-6. TRI Releases and Transfers of 33/50 Program Chemicals, by Chemical, 1988-1992.[6]

[6] The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.

TRI POLLUTION PREVENTION ACT DATA FOR 33/50 PROGRAM CHEMICALS

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 and off-site processes;
- combusted in on-site and off-site energy recovery systems;
- destroyed in on-site treatment systems and amounts 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 wastes that are the result of regular production-related activities. Toxic chemical quantities contained in wastes that are 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 wastes in Section 8 is reported in aggregate, by chemical, for the reporting year (1992), the prior year (1991), and forecasted by facilities for the two successive years (1993 and 1994).

Analysts will note significant discrepancies between reported off-site transfers to recycling in Sections 6 and 8 of Form R. Less significant discrepancies can also be observed in the reporting of off-site shipments to energy recovery and treatment. The causes and meaning of these discrepancies are discussed in Chapter 2.

Furthermore, those who compare 1992 TRI production waste data with the figures presented in the 1991 TRI Public Data Release published report will observe a substantial decline (20%) in the amounts reported for 33/50 Program chemical production wastes and one of its components, on-site recycling. Most of this change, however, is the result of an erroneous report submitted for 1991 by one facility for on-site recycling of methyl ethyl ketone and toluene. The facility corrected the error after the 1991 data release. Accordingly, year-to-year comparisons of 33/50 Program chemical on-site recycling and total production waste amounts should be conducted using only the 1992 edition of the reporting data, which includes the corrected reporting for 1991.

Management of 33/50 Program Chemicals in Wastes

Tables 4-3 through 4-7 present the four years of Section 8 data reported for each 33/50 Program chemical in 1992, by waste management activity (non-production-related wastes are reported only for 1992). Figures 4-7 and 4-8 illustrate the trends in these data, aggregated by management method and chemical, respectively.

Table 4-3. Quantity of 33/50 Chemicals Recycled On-site and Off-site, 1991-1994.

CAS Number	Chemical	1991 On-site Pounds	1992 On-site Pounds	Projected Data 1993 On-site Pounds	Projected Data 1994 On-site Pounds
71-43-2	Benzene	170,352,697	59,012,822	58,786,237	59,341,922
56-23-5	Carbon tetrachloride	10,540,016	16,629,476	16,889,014	14,614,106
67-66-3	Chloroform	5,924,900	6,353,787	6,311,241	6,221,101
75-09-2	Dichloromethane	124,080,595	121,863,677	119,030,230	112,841,738
78-93-3	Methyl ethyl ketone	152,234,046	169,763,949	173,010,685	175,139,976
108-10-1	Methyl isobutyl ketone	224,788,108	223,939,338	224,999,630	224,338,224
127-18-4	Tetrachloroethylene	95,046,671	81,782,280	74,303,431	72,380,009
108-88-3	Toluene	600,469,708	627,080,929	636,496,137	635,112,924
71-55-6	1,1,1-Trichloroethane	189,367,728	171,223,961	153,257,583	121,591,215
79-01-6	Trichloroethylene	219,725,356	225,757,972	217,821,421	208,863,392
	Xylenes	118,594,411	119,008,434	120,496,728	119,049,200
	Cadmium and cadmium compounds	3,610,253	11,810,622	4,947,572	5,297,481
	Chromium and chromium compounds	65,261,002	63,405,578	60,784,565	57,509,521
	Cyanide compounds	3,523,828	773,581	706,134	679,761
	Lead and lead compounds	918,250,111	839,102,385	883,559,075	807,828,777
	Mercury and mercury compounds	1,073,668	1,684,398	1,612,095	1,632,295
	Nickel and nickel compounds	47,282,050	45,430,519	50,304,683	48,821,770
Subtotal On-site for 33/50 Chemicals		2,950,125,148	2,784,623,708	2,803,316,461	2,671,263,412
Subtotal On-site for All Other TRI Chemicals		12,902,557,239	12,997,571,180	13,872,343,524	14,138,586,599
Subtotal On-site for All TRI Chemicals		15,852,682,387	15,782,194,888	16,675,659,985	16,809,850,011

CAS Number	Chemical	1991 Off-site Pounds	1992 Off-site Pounds	Projected Data 1993 Off-site Pounds	Projected Data 1994 Off-site Pounds
71-43-2	Benzene	1,418,334	487,209	461,747	463,574
56-23-5	Carbon tetrachloride	390,924	344,453	296,821	286,821
67-66-3	Chloroform	2,094,019	1,417,917	1,327,711	1,323,146
75-09-2	Dichloromethane	26,539,452	26,109,091	23,818,596	19,737,318
78-93-3	Methyl ethyl ketone	24,414,975	26,505,126	24,905,724	24,635,612
108-10-1	Methyl isobutyl ketone	16,663,629	19,724,864	21,476,647	21,962,040
127-18-4	Tetrachloroethylene	11,992,876	10,259,945	8,725,950	7,948,157
108-88-3	Toluene	25,308,785	27,395,427	23,418,661	18,336,201
71-55-6	1,1,1-Trichloroethane	26,408,474	23,721,150	14,437,157	7,073,900
79-01-6	Trichloroethylene	7,212,151	8,109,967	6,782,011	5,797,334
	Xylenes	33,622,912	36,505,254	32,905,968	34,641,047
	Cadmium and cadmium compounds	1,860,251	2,013,976	1,823,702	1,753,478
	Chromium and chromium compounds	97,854,574	110,664,314	110,148,305	116,031,611
	Cyanide compounds	46,631	73,104	72,510	70,958
	Lead and lead compounds	294,606,470	451,653,860	294,265,107	291,022,932
	Mercury and mercury compounds	60,547	71,411	116,688	107,563
	Nickel and nickel compounds	80,461,579	89,574,344	89,792,017	89,435,685
Subtotal Off-site for 33/50 Chemicals		650,956,583	834,631,412	654,775,322	640,627,377
Subtotal Off-site for All Other TRI Chemicals		2,325,855,746	2,639,263,097	2,518,052,255	2,814,027,599
Subtotal Off-site for All TRI Chemicals		2,976,812,329	3,473,894,509	3,172,827,577	3,454,654,976
Total for 33/50 Chemicals		3,601,081,731	3,619,255,120	3,458,091,783	3,311,890,789
Total for All Other TRI Chemicals		15,228,412,985	15,636,834,277	16,390,395,779	16,952,614,198
Total for All TRI Chemicals		18,829,494,716	19,256,089,397	19,848,487,562	20,264,504,987

Table 4-4. Quantity of 33/50 Chemicals Used for Energy Recovery On-site and Off-site, 1991-1994.

CAS Number	Chemical	1991 On-site Pounds	1992 On-site Pounds	Projected Data 1993 On-site Pounds	Projected Data 1994 On-site Pounds
71-43-2	Benzene	33,015,755	36,703,579	22,297,708	23,051,244
56-23-5	Carbon tetrachloride	4,421,868	4,889,374	4,587,378	4,810,854
67-66-3	Chloroform	5,495,474	6,471,447	6,912,839	6,891,840
75-09-2	Dichloromethane	10,662,551	11,832,816	12,539,968	13,146,768
78-93-3	Methyl ethyl ketone	87,985,435	84,226,588	93,355,448	105,537,394
108-10-1	Methyl isobutyl ketone	39,271,740	51,018,601	46,475,389	53,896,285
127-18-4	Tetrachloroethylene	5,507,721	9,655,330	9,142,000	10,086,346
108-88-3	Toluene	254,531,730	255,986,447	285,761,516	335,528,420
71-55-6	1,1,1-Trichloroethane	5,422,186	6,457,400	6,575,250	7,690,000
79-01-6	Trichloroethylene	2,248,000	1,421,546	2,457,611	2,622,311
	Xylenes	218,121,061	222,759,973	253,852,372	304,877,880
	Cadmium and cadmium compounds	0	0	0	0
	Chromium and chromium compounds	8,331	9,410	10,000	10,000
	Cyanide compounds	22,457,509	23,649,069	22,798,386	22,981,579
	Lead and lead compounds	3,500	4,250	4,650	5,250
	Mercury and mercury compounds	0	0	0	0
	Nickel and nickel compounds	0	0	0	0
	Subtotal On-site for 33/50 Chemicals	689,152,861	715,085,830	766,770,515	891,136,171
	Subtotal On-site for All Other TRI Chemicals	2,153,305,078	2,226,136,283	2,142,536,121	2,200,548,200
	Subtotal On-site for All TRI Chemicals	2,842,457,939	2,941,222,113	2,909,306,636	3,091,684,371

CAS Number	Chemical	1991 Off-site Pounds	1992 Off-site Pounds	Projected Data 1993 Off-site Pounds	Projected Data 1994 Off-site Pounds
71-43-2	Benzene	4,621,312	4,347,690	4,301,407	4,150,444
56-23-5	Carbon tetrachloride	9,955	6,451	4,048	3,048
67-66-3	Chloroform	713,071	565,883	510,411	445,146
75-09-2	Dichloromethane	3,619,866	3,247,710	2,781,527	2,909,892
78-93-3	Methyl ethyl ketone	32,888,025	39,688,668	38,293,592	36,374,762
108-10-1	Methyl isobutyl ketone	13,510,417	17,643,369	17,636,861	18,251,623
127-18-4	Tetrachloroethylene	565,416	560,816	577,256	559,848
108-88-3	Toluene	75,285,746	82,041,437	72,241,814	69,322,212
71-55-6	1,1,1-Trichloroethane	3,107,273	3,060,231	1,843,474	1,023,000
79-01-6	Trichloroethylene	929,245	884,498	921,898	928,313
	Xylenes	61,739,897	66,458,815	61,338,567	57,761,072
	Cadmium and cadmium compounds	6,525	3,193	2,154	1,104
	Chromium and chromium compounds	170,499	102,216	78,388	76,803
	Cyanide compounds	24	168,614	169,815	169,815
	Lead and lead compounds	2,535,181	3,050,765	49,456	49,390
	Mercury and mercury compounds	0	0	0	0
	Nickel and nickel compounds	19,084	20,226	22,411	24,774
	Subtotal Off-site for 33/50 Chemicals	199,721,536	221,850,582	200,773,079	192,051,246
	Subtotal Off-site for All Other TRI Chemicals	380,988,735	508,104,018	498,698,829	499,782,921
	Subtotal Off-site for All TRI Chemicals	580,710,271	729,954,600	699,471,908	691,834,167
	Total for 33/50 Chemicals	888,874,397	936,936,412	967,543,594	1,083,187,417
	Total for All Other TRI Chemicals	2,534,293,813	2,734,240,301	2,641,234,950	2,700,331,121
	Total for All TRI Chemicals	3,423,168,210	3,671,176,713	3,608,778,544	3,783,518,538

Table 4-5. Quantity of 33/50 Chemicals Treated On-site and Off-site, 1991-1994.

CAS Number	Chemical	1991 On-site Pounds	1992 On-site Pounds	Projected Data 1993 On-site Pounds	Projected Data 1994 On-site Pounds
71-43-2	Benzene	33,264,317	29,725,777	28,315,408	29,610,573
56-23-5	Carbon tetrachloride	15,315,779	15,007,086	15,551,212	14,727,641
67-66-3	Chloroform	23,239,932	21,854,747	21,819,606	21,438,887
75-09-2	Dichloromethane	32,784,253	35,365,596	33,322,409	27,797,042
78-93-3	Methyl ethyl ketone	45,628,868	50,463,297	49,836,026	55,945,338
108-10-1	Methyl isobutyl ketone	10,455,419	10,747,535	11,336,684	10,612,472
127-18-4	Tetrachloroethylene	14,093,320	15,421,358	14,722,794	15,509,522
108-88-3	Toluene	116,150,620	125,358,145	135,541,841	133,049,992
71-55-6	1,1,1-Trichloroethane	1,513,388	1,653,692	1,748,516	2,186,676
79-01-6	Trichloroethylene	3,553,915	5,675,129	9,364,672	10,345,592
	Xylenes	41,461,510	44,637,186	44,365,735	45,676,574
	Cadmium and cadmium compounds	523,743	645,925	468,881	436,158
	Chromium and chromium compounds	34,881,945	55,866,063	60,942,244	60,860,651
	Cyanide compounds	18,943,383	19,989,134	20,173,491	20,641,658
	Lead and lead compounds	36,854,777	36,241,003	37,333,322	39,046,357
	Mercury and mercury compounds	35,303	31,042	31,210	31,300
	Nickel and nickel compounds	1,847,413	2,969,189	2,456,848	2,370,361
Subtotal On-site for 33/50 Chemicals		430,547,885	471,651,904	487,330,899	490,286,794
Subtotal On-site for All Other TRI Chemicals		9,437,599,018	9,855,097,590	9,696,849,334	9,607,372,010
Subtotal On-site for All TRI Chemicals		9,868,146,903	10,326,749,494	10,184,180,233	10,097,658,804

CAS Number	Chemical	1991 Off-site Pounds	1992 Off-site Pounds	Projected Data 1993 Off-site Pounds	Projected Data 1994 Off-site Pounds
71-43-2	Benzene	2,198,932	1,434,236	1,227,132	1,224,595
56-23-5	Carbon tetrachloride	820,033	833,039	901,559	1,205,208
67-66-3	Chloroform	2,082,474	1,612,837	1,746,847	1,597,194
75-09-2	Dichloromethane	9,205,487	12,445,135	13,368,381	13,393,559
78-93-3	Methyl ethyl ketone	6,685,883	6,274,738	5,817,366	5,371,211
108-10-1	Methyl isobutyl ketone	2,184,621	2,049,489	1,793,918	1,704,922
127-18-4	Tetrachloroethylene	3,097,783	1,963,634	1,689,040	1,769,285
108-88-3	Toluene	14,025,994	18,618,495	17,750,157	14,243,401
71-55-6	1,1,1-Trichloroethane	4,875,376	4,310,414	3,164,624	1,938,091
79-01-6	Trichloroethylene	1,564,117	1,881,112	1,516,461	1,313,148
	Xylenes	11,028,479	9,600,124	8,802,461	7,941,810
	Cadmium and cadmium compounds	313,879	486,314	438,721	448,567
	Chromium and chromium compounds	4,183,628	4,716,909	4,266,774	3,582,183
	Cyanide compounds	463,621	464,810	328,019	303,461
	Lead and lead compounds	5,071,645	5,206,963	5,124,571	6,085,877
	Mercury and mercury compounds	55,362	23,165	19,802	17,702
	Nickel and nickel compounds	1,908,749	2,616,341	2,195,918	2,043,479
Subtotal Off-site for 33/50 Chemicals		69,766,063	74,537,755	70,151,751	64,183,693
Subtotal Off-site for All Other TRI Chemicals		610,602,035	603,836,095	557,113,522	534,432,147
Subtotal Off-site for All TRI Chemicals		680,368,098	678,373,850	627,265,273	598,615,840
Total for 33/50 Chemicals		500,313,948	546,189,659	557,482,650	554,470,487
Total for All Other TRI Chemicals		10,048,201,053	10,458,933,685	10,253,962,856	10,141,804,157
Total for All TRI Chemicals		10,548,515,001	11,005,123,344	10,811,445,506	10,696,274,644

Table 4-6. Quantity of 33/50 Chemicals Released, 1991-1994.❼

CAS Number	Chemical	1991 Quantity Released Pounds	1992 Quantity Released Pounds	Projected Data 1993 Quantity Released Pounds	Projected Data 1994 Quantity Released Pounds
71-43-2	Benzene	17,951,313	13,390,673	11,766,248	10,814,320
56-23-5	Carbon tetrachloride	1,492,508	1,426,570	1,221,711	944,923
67-66-3	Chloroform	20,484,275	17,802,805	15,711,525	13,663,473
75-09-2	Dichloromethane	79,759,180	75,729,079	64,886,747	53,606,274
78-93-3	Methyl ethyl ketone	100,294,177	88,491,478	78,652,309	71,944,001
108-10-1	Methyl isobutyl ketone	25,953,178	25,840,592	23,957,680	21,673,572
127-18-4	Tetrachloroethylene	15,321,406	12,552,614	9,613,732	7,375,482
108-88-3	Toluene	193,808,129	186,681,857	158,230,484	147,254,594
71-55-6	1,1,1-Trichloroethane	125,928,847	112,587,880	71,383,366	40,271,208
79-01-6	Trichloroethylene	31,623,552	28,162,324	24,232,164	18,955,105
	Xylenes	119,925,131	116,193,398	112,585,040	106,475,141
	Cadmium and cadmium compounds	1,066,297	621,839	1,368,535	1,145,824
	Chromium and chromium compounds	40,430,313	41,140,750	40,874,361	42,344,836
	Cyanide compounds	6,989,038	7,365,187	7,157,795	7,160,461
	Lead and lead compounds	34,425,360	32,880,181	31,992,682	30,609,120
	Mercury and mercury compounds	81,599	234,050	95,850	87,421
	Nickel and nickel compounds	11,191,734	10,345,041	11,490,456	11,293,953
Total Released On-site/Disposed of Off-site for 33/50 Chemicals		826,726,037	771,446,318	665,220,685	585,619,708
Total Released On-site/Disposed of Off-site for All Other TRI Chemicals		2,689,059,113	2,629,939,852	2,511,974,098	2,130,493,655
Total Released On-site/Disposed of Off-site for All TRI Chemicals		3,515,785,150	3,401,386,170	3,177,194,783	2,716,113,363

❼ "Quantity Released" in Section 8 of Form R includes amounts released to the environment on-site and amounts sent off-site for disposal.

Table 4-7. Total Quantity of 33/50 Chemicals in Wastes, 1991-1994.8

CAS Number	Chemical	1991 Total Production Related Wastes Pounds	1992 Total Production Related Wastes Pounds	Projected Data 1993 Total Production Related Wastes Pounds	Projected Data 1994 Total Production Related Wastes Pounds	1992 Non-Production Related Wastes Pounds
71-43-2	Benzene	262,822,660	145,101,986	127,155,887	128,656,672	122,584
56-23-5	Carbon tetrachloride	32,991,083	39,136,449	39,451,743	36,592,601	83,930
67-66-3	Chloroform	60,034,145	56,079,423	54,340,180	51,580,787	46,723
75-09-2	Dichloromethane	286,651,384	286,593,104	269,747,858	243,432,591	56,850
78-93-3	Methyl ethyl ketone	450,131,409	465,413,844	463,871,150	474,948,294	121,088
108-10-1	Methyl isobutyl ketone	332,827,112	350,963,788	347,676,809	352,439,138	27,958
127-18-4	Tetrachloroethylene	145,625,193	132,195,977	118,774,203	115,628,649	237,639
108-88-3	Toluene	1,279,580,712	1,323,162,737	1,329,440,610	1,352,847,744	479,129
71-55-6	1,1,1-Trichloroethane	356,623,272	323,014,728	252,409,970	181,774,090	103,973
79-01-6	Trichloroethylene	266,856,336	271,892,548	263,096,238	248,825,195	71,831
	Xylenes	604,493,401	615,163,184	634,346,871	676,422,724	688,403
	Cadmium and cadmium compounds	7,380,948	15,581,869	9,049,565	9,082,612	2,435
	Chromium and chromium compounds	242,790,292	275,905,240	277,104,637	280,415,605	1,460,995
	Cyanide compounds	52,424,034	52,483,499	51,406,150	52,007,693	1,518
	Lead and lead compounds	1,291,747,044	1,368,139,407	1,252,328,863	1,174,647,703	1,348,824
	Mercury and mercury compounds	1,306,479	2,044,066	1,875,645	1,876,281	344
	Nickel and nickel compounds	142,710,609	150,955,660	156,262,333	153,990,022	2,180,068
Total for 33/50 Chemicals		5,816,996,113	5,873,827,509	5,648,338,712	5,535,168,401	7,034,292
Total for All Other TRI Chemicals		30,499,966,964	31,459,948,115	31,797,567,683	31,925,243,131	26,935,531
Total for All TRI Chemicals		36,316,963,077	37,333,775,624	37,445,906,395	37,460,411,532	33,969,823

8 "Total Production Related Wastes" refers to wastes associated with routine production processes and is the sum of the amounts recycled on- and off-site, used for energy recovery on- and off-site, treated on- and off-site, and released. "Non-Production Related Wastes" refers to the quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes.

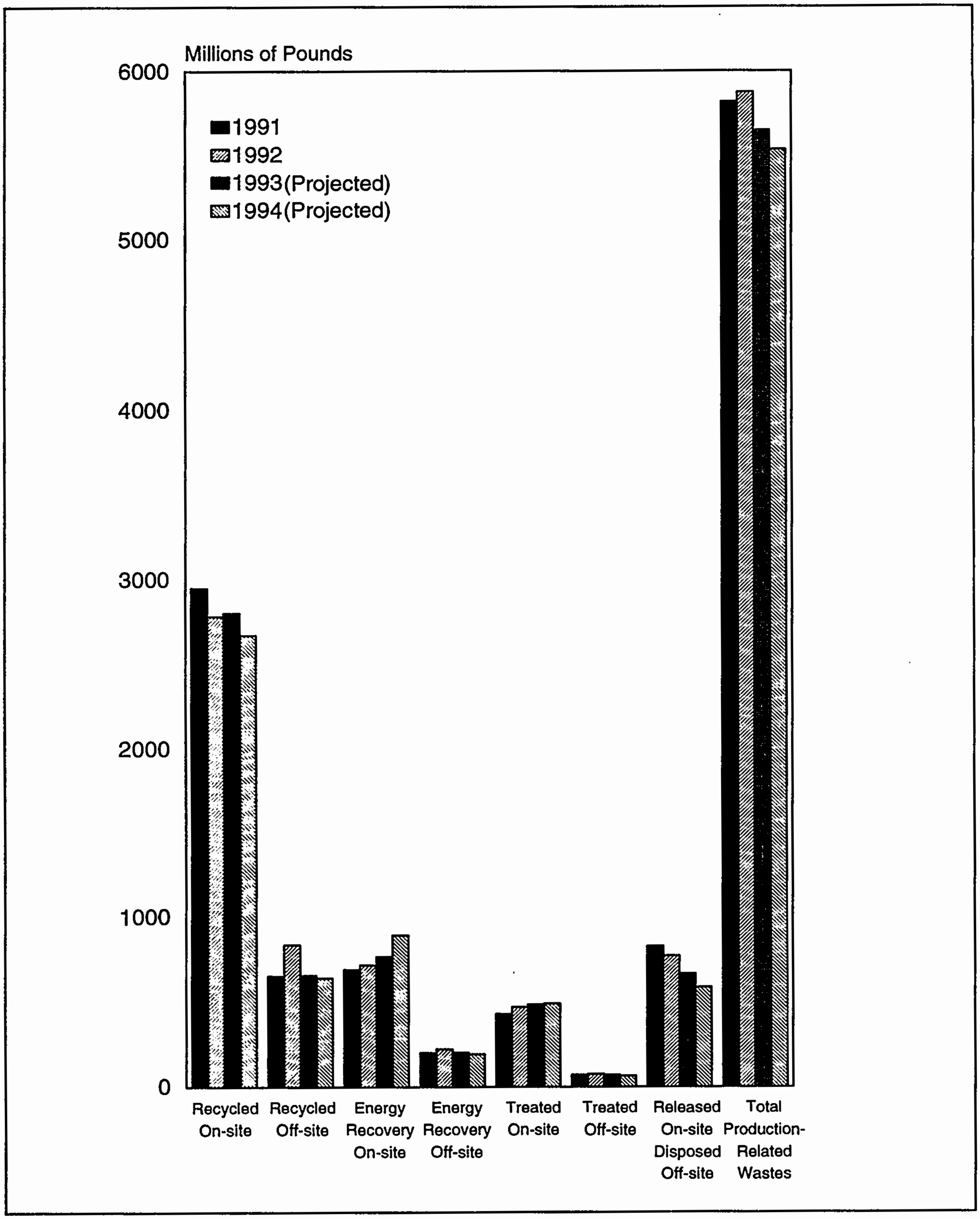


Figure 4-7. TRI Data Collected under the Pollution Prevention Act for 33/50 Program Chemicals, by Management Type, 1991-1994.

33/50 Program chemical production-related wastes increased slightly (1%) between 1991 and 1992, less than the increase observed for other TRI chemicals (3.2%). However, facilities are projecting decreases in production waste for 33/50 Program chemicals in 1993 (-3.8%) and again between 1993 and 1994 (-2%). Production wastes for other TRI chemicals are projected to continue to increase through 1994, though only slightly (1.5%).

Facilities owned by 33/50 Program participating companies reported a 3% increase in production-related waste for the Program's 17 target chemicals in the last year. Interestingly, production wastes for Program chemicals generated by non-participants actually declined by a similar amount. Participating companies, however, are projecting nearly a 12% reduction in 33/50 Program chemical production waste over the next two years, while non-participating companies are projecting a 3% increase.

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 4-8 summarizes facilities' reporting of source reduction activities for each of the 17 33/50 Program chemicals. As a group and individually, 33/50 Program chemicals evidenced higher rates and levels of source reduction activity reporting than for other TRI chemicals. Of the more than 20,000 Form Rs reporting that a source reduction activity was implemented during 1992, nearly 40% (8,049) were for the 17 33/50 Program chemicals, even though Program chemicals account for only 30% of total TRI Form Rs. One third of the Form Rs for 33/50 Program chemicals reported the occurrence of source reduction, compared to slightly more than one-fifth of the forms for other TRI chemicals.

Individual 33/50 Program chemicals had some of the highest rates of reporting on source reduction. The three TRI chemicals with the greatest number of Form Rs reporting source reduction are 33/50 Program chemicals (1,1,1-trichloroethane, toluene, and xylenes (mixed isomers)). The high ranking for 33/50 Program chemicals is partially due to the fact that they rank among the highest TRI chemicals in total number of Form Rs submitted, but they also evidenced some of the highest percentages of Form R submissions indicating source reduction.

Fourteen 33/50 Program chemicals are among the top 35 TRI chemicals for numbers of forms reporting source reduction. Of these, organic chemicals generally evidenced higher percentages of Form Rs reporting source reduction than did the metals, ranging from 30% to 47% for the nine organic chemicals with the largest number of source reduction reports.

Facilities described the type of source reduction activity which they implemented for each chemical (see Table 4-8). 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.

Methods Used to Identify Source Reduction Opportunities

Table 4-9 summarizes facilities' reporting of source reduction activity identification methods for each of the 17 33/50 Program chemicals. 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 federal programs, industry associations, and vendors in the case of 33/50 Program chemicals compared to other TRI chemicals.

Facilities continue to report little reliance on state and Federal programs for assistance in their source reduction endeavors. Interestingly, however, the number of pollution prevention audits conducted by external parties increased while facilities' reliance on state and federal programs decreased significantly for 33/50 Program chemicals between 1991 and 1992. Facilities' heavy reliance on internal resources suggests that familiarity with facility-specific conditions is critical to successful identification of source reduction opportunities. This may also explain the 10% increase in facilities' use of employee's recommendations between 1991 and 1992.

LOOKING TO THE FUTURE: AN AGENDA FOR ACTION

The 33/50 Program faces an ambitious agenda in the coming years:

- Efforts to expand company participation will continue with initial invitations to be offered to more than 1,000 new companies.

- Industry trade associations are being asked to assist EPA in convincing smaller companies to participate.

- Case studies of companies' pollution reduction initiatives under the 33/50 Program are being prepared and will be made available to the public.

- The 33/50 Program will co-sponsor a national conference showcasing the accomplishments of voluntary pollution prevention programs and their company and community partners. The conference, Promoting Pollution Prevention by Voluntary Initiatives, will be held June 1-3, 1994, in Colonial Williamsburg, Virginia.

- A formal 33/50 Program evaluation has been initiated to assess the Program's success. The evaluation is being conducted under a cooperative agreement with INFORM, a citizen environmental advocacy organization. Preliminary results will be made public at the conference described above. Follow-up reports will be issued at least annually.

Table 4-8. Number of TRI Forms Reporting Source Reduction, by Source Reduction Category, by Chemical, 1992.

CAS Number	Chemical	Number of TRI Forms	Forms Reporting Source Reduction Activities: Number	Forms Reporting Source Reduction Activities: Percent of All Forms
71-43-2	Benzene	472	154	32.6
56-23-5	Carbon tetrachloride	90	27	30.0
67-66-3	Chloroform	181	62	34.3
75-09-2	Dichloromethane	1,114	419	37.6
78-93-3	Methyl ethyl ketone	2,447	907	37.1
108-10-1	Methyl isobutyl ketone	1,014	360	35.5
127-18-4	Tetrachloroethylene	504	189	37.5
108-88-3	Toluene	3,689	1,430	38.8
71-55-6	1,1,1-Trichloroethane	3,131	1,477	47.2
79-01-6	Trichloroethylene	663	248	37.4
	Xylenes	3,573	1,305	36.5
	Cadmium and cadmium compounds	185	64	34.6
	Chromium and chromium compounds	2,956	560	18.9
	Cyanide compounds	294	86	29.3
	Lead and lead compounds	1,651	443	26.8
	Mercury and mercury compounds	37	8	21.6
	Nickel and nickel compounds	2,309	348	15.1
	Total for 33/50 Chemicals	24,310	8,087	33.3
	Total for All Other TRI Chemicals	56,706	12,421	21.9
	Total for All TRI Chemicals	81,016	20,508	25.3

Table 4-9. Methods Used to Identify Source Reduction Activities, by Chemical, 1992.

CAS Number	Chemical	Number of Forms Reporting Source Reduction Activities	Pollution Prevention Opportunity Audit: Internal	Pollution Prevention Opportunity Audit: External	Materials Balance Audit	Participative Team Management	Employee Recommendation: Informal	Employee Recommendation: Formal Program
71-43-2	Benzene	154	72	11	13	52	16	22
56-23-5	Carbon tetrachloride	27	15	0	5	10	5	4
67-66-3	Chloroform	62	22	0	7	30	7	5
75-09-2	Dichloromethane	419	145	16	66	181	84	39
78-93-3	Methyl ethyl ketone	907	341	38	144	422	183	106
108-10-1	Methyl isobutyl ketone	360	150	14	53	178	72	46
127-18-4	Tetrachloroethylene	189	89	6	28	87	32	17
108-88-3	Toluene	1,430	527	64	187	633	250	152
71-55-6	1,1,1-Trichloroethane	1,477	606	79	173	681	223	200
79-01-6	Trichloroethylene	248	114	12	37	108	51	26
	Xylenes	1,305	492	51	159	556	258	134
	Cadmium and cadmium compounds	64	25	5	8	29	12	8
	Chromium and chromium compounds	560	220	24	81	268	117	58
	Cyanide compounds	86	43	2	10	34	15	9
	Lead and lead compounds	443	173	27	50	217	96	41
	Mercury and mercury compounds	8	3	2	0	4	1	4
	Nickel and nickel compounds	348	132	12	54	191	75	36
	Total for 33/50 Chemicals	8,087	3,169	363	1,075	3,681	1,497	907
	Total for All Other TRI Chemicals	12,421	4,891	465	1,554	5,761	2,336	1,310
	Total for All TRI Chemicals	20,508	8,060	828	2,629	9,442	3,833	2,217

Table 4-8.

Chemical	Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
	Category of Source Reduction Activity (number of forms reporting)							
Benzene	52	6	126	8	88	2	3	7
Carbon tetrachloride	15	0	10	3	14	0	0	0
Chloroform	11	2	8	24	41	0	0	1
Dichloromethane	167	28	103	118	126	110	15	49
Methyl ethyl ketone	424	177	159	226	274	128	303	95
Methyl isobutyl ketone	170	61	72	78	139	39	135	41
Tetrachloroethylene	113	14	51	27	44	71	5	14
Toluene	590	210	320	397	446	148	429	176
1,1,1-Trichloroethane	554	100	139	363	240	777	130	149
Trichloroethylene	118	13	38	16	45	146	7	16
Xylenes	538	194	336	298	409	114	430	156
Cadmium and cadmium compounds	26	4	13	23	25	5	5	17
Chromium and chromium compounds	280	83	128	120	217	40	30	71
Cyanide compounds	29	6	17	13	58	13	2	2
Lead and lead compounds	188	63	118	135	184	8	10	70
Mercury and mercury compounds	2	0	0	1	10	0	0	0
Nickel and nickel compounds	188	57	81	31	163	33	10	36
Total for 33/50 Chemicals	3,465	1,018	1,719	1,881	2,523	1,634	1,514	900
Total for All Other TRI Chemicals	5,892	1,455	4,238	1,979	5,047	1,181	794	953
Total for All TRI Chemicals	9,357	2,473	5,957	3,860	7,570	2,815	2,308	1,853

Table 4-9.

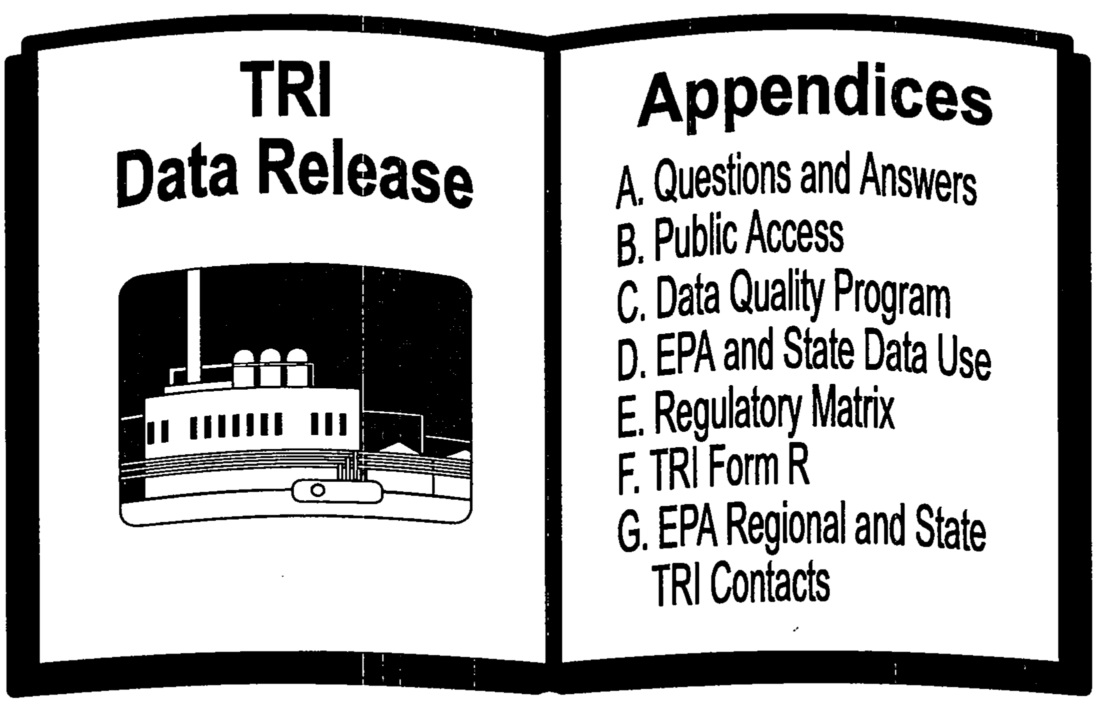
Chemical	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other	Number of Forms	Percent of Total Forms
Benzene	0	1	9	21	57	274	0.7
Carbon tetrachloride	0	0	0	2	4	45	0.1
Chloroform	0	0	10	5	15	101	0.3
Dichloromethane	4	2	14	98	101	750	2.0
Methyl ethyl ketone	14	1	50	289	156	1,744	4.7
Methyl isobutyl ketone	6	2	25	104	59	709	1.9
Tetrachloroethylene	4	0	20	48	34	365	1.0
Toluene	18	3	89	479	287	2,689	7.2
1,1,1-Trichloroethane	24	15	109	495	219	2,824	7.6
Trichloroethylene	8	0	12	54	40	462	1.2
Xylenes	15	2	77	455	263	2,462	6.6
Cadmium and cadmium compounds	0	0	3	15	17	122	0.3
Chromium and chromium compounds	4	0	33	124	99	1,028	2.8
Cyanide compounds	0	0	9	22	14	158	0.4
Lead and lead compounds	2	0	30	77	113	826	2.2
Mercury and mercury compounds	0	0	0	1	1	16	0.0
Nickel and nickel compounds	2	0	22	55	68	647	1.7
Total for 33/50 Chemicals	101	26	512	2,344	1,547	15,222	40.8
Total for All Other TRI Chemicals	127	28	630	2,452	2,503	22,057	59.2
Total for All TRI Chemicals	228	54	1,142	4,796	4,050	37,279	100.0

FOR MORE INFORMATION

Anyone interested in obtaining additional information from 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 us 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. Written communications from companies are maintained in a publicly available 33/50 Program Administrative Record. Copies of company communications and computer-generated lists of participating companies are available upon request.

Information about the 33/50 Program can also be obtained from 33/50 Program Coordinators in EPA's ten Regional Offices.

Appendices


TRI
Data Release
Appendices
A. Questions and Answers
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APPENDIX A

QUESTIONS AND ANSWERS

Page

I. GENERAL QUESTIONS

For more information:
Linda Wunderlich, Environmental Assistance Division (202) 260-4075

Q1 Why are these data collected?

A The Toxics Release Inventory is mandated by the Emergency Planning and Community Right-to-Know Act (EPCRA), signed by the President in October 1986. The law is based on the premise that citizens have a right to know about chemicals in their communities. It has two main purposes: to encourage planning for response to chemical accidents; and to provide the public and the government information about possible chemical hazards in their communities. The law also requires the establishment of State Emergency Response Commissions and Local Emergency Planning Committees to collect detailed information from local facilities.

Section 313 of EPCRA requires certain manufacturers to report to EPA and to the states the amounts of over 300 toxic chemicals and 20 chemical categories that they release directly to air, water, or land; or inject underground; or transfer to off-site facilities. In addition, the law specifies that the EPA must compile these reports into an annual inventory of releases and transfers--the TRI --and make the inventory available to the public by computer telecommunication and other means on a cost-reimbursable basis.

In October of 1990, the Pollution Prevention Act (PPA) was passed by Congress. Section 6607 of the PPA requires, beginning with the 1991 reporting year, that TRI facilities include information about their pollution prevention and waste management practices on their Toxic Chemical Release Inventory Reporting Form R submitted to EPA and the states. The collection of these data will help track facilities' progress in reducing not only releases of toxic chemicals to the environment, but also the quantities of the chemicals in other waste streams.

Q2 Who must report now?

A Manufacturing facilities (those in Standard Industrial Classification codes 20-39) with ten or more employees are required to file toxic chemical release reports if they manufacture or process more than 25,000 pounds of any of the reportable chemicals or otherwise use more than 10,000 pounds of any reportable chemicals.

Q3 What is the compliance rate with this reporting requirement?

A EPA does not have any specific data on 1992 compliance with the law. However, a confidential survey of facilities conducted in the summer of 1989 estimated compliance for 1987 to be approximately 66% of facilities. That is, for every 100 facilities that should have filed a Form R, approximately 66 did file at least one report. However, it is estimated by EPA staff that the 66% of facilities that reported in 1987 represented substantially more than 66% of total emissions and transfers. Furthermore, compliance activities appear to indicate a higher compliance percent at this time.

The survey estimated that there were approximately 148,000 facilities in SIC codes 20-39 with 10 or more employees in 1987. Of those facilities, an estimated 29,800 met the chemical thresholds and therefore were required to file at least one report in 1987. Of the 29,800 facilities that needed to report, only about 19,600 did file a report, leaving approximately 10,000 facilities out of compliance in 1987. This survey only identified facilities that failed to file any reports at all. Additional facilities may have been out of compliance because they filed for some but not all chemicals they needed to file for, or because their estimates were inaccurate.

Q4 In the future, does EPA plan to widen the scope of sources required to report under EPCRA section 313?

A EPA is in the process of identifying non-manufacturing industries associated with significant chemical releases to determine their suitability for TRI reporting. A proposed rule adding additional facilities is expected to be issued in late 1994.

Q5 Can releases of these chemicals be prevented?

A Much can be done to prevent the TRI chemicals from entering wastes and, thus, to reduce the amount ultimately released to the environment. One effect of the national availability of data on releases of toxic chemicals has been increased scrutiny by facilities, local communities, and state and federal governments with an eye to reducing releases. The new TRI data will help in tracking year-to-year trends in releases, waste management, and pollution prevention. All reporting facilities must provide EPA with information on what, if any, source reduction activities they implemented. Also, many states have established Pollution Prevention and Toxics Use Reduction programs.

Currently, over 1,200 parent companies have signed on to the 33/50 Program, a voluntary program with a national goal of a 33% reduction in releases and transfers of 17 TRI chemicals by 1992 and a 50% reduction by 1995, using the 1988 data as a baseline. These facilities have already either committed to plans to reduce releases of toxic chemicals over the next few years or have implemented changes which will reduce their releases in future years.

EPA's Office of Pollution Prevention and Toxics is leading an Agency-wide effort to promote reduction in the quantity of wastes generated, not just by manufacturing industries, but by other sectors of the economy as well.

For more information on EPA's pollution prevention initiatives, see Chapter 2, "Prevention and Management of TRI Chemicals in Waste," and Chapter 4, "TRI Reporting Profiles for 33/50 Program Chemicals," in this document.

Q6 What caused the big decrease in ammonium sulfate (solution) releases to water and discharges to POTWs between 1989 and 1990?

A Facilities that manufacture, process, or otherwise use ammonium sulfate (solution) were given the option of reporting their releases and transfers either as ammonium sulfate (solution) or as ammonia. Therefore many facilities filed reports for ammonia instead of ammonium sulfate in 1990. Every pound of ammonium sulfate decrease from these facilities is partially offset by an increase of 0.27 pounds of ammonia, since ammonium sulfate is 27% ammonia and 73% sulfate, by weight.

EPA believes that reporting releases of aqueous solutions of ammonium salts, such as ammonium sulfate, as ammonia more properly represents the substance of concern. Ammonium sulfate (solution) primarily affects water quality by the introduction of ammonia to a water body. EPA has low concern for sulfate as evidenced by its deletion of sodium sulfate (solution) from EPCRA section 313.

Q7 It has been said that making direct comparisons of the TRI releases and transfers across years is difficult to do. Why?

A There are many factors that may affect cross-year comparisons of releases and transfers at the state, local, chemical, or even facility-specific level. For example, the list of chemicals subject to reporting has changed. Thresholds for reporting for manufacturers and processors have been lowered from 75,000 pounds in 1987 to 50,000 pounds in 1988 to 25,000 pounds for 1989 and beyond. These changes alter the number of facilities that are required to report as well as the number of forms submitted to TRI. In addition, many other facility-dependent factors make assessing releases and transfers across years difficult. Facilities may change their methods of making estimates of their releases and transfers of toxic chemicals (hopefully, towards more accurate estimates). Chemicals not subject to TRI reporting may be substituted for covered chemicals. The amount of a chemical manufactured, processed, or used at a facility may be drastically different from year to year. Facilities may change products or processes that may affect which chemicals and how much of these chemicals are manufactured, processed, or otherwise used. Production of a covered chemical may be up or down for a given year. These factors and more make yearly comparisons difficult. This subject is discussed further in Chapter 3 of this document.

Q8 Are the 1992 release data compared to the current 1991 release data or to the 1991 data presented last spring?

A For purposes of comparison, EPA uses the current data for the 1991 reporting year, which differ from the data presented last spring because of late submissions, revisions, and withdrawals. Over time, the 1992 data will also change somewhat for the same reasons.

Q9 How much do changes in estimation techniques used by facilities affect facilities' release and transfer estimates?

A EPA conducted a study of a statistical sample of 1,200 facilities to assess the reasons for changes in estimates from 1989 to 1990. Fifteen percent of the reports evaluated had estimation method changes that accounted for at least part of the release estimate change. The study found that 7% of the total increased quantity and 5% of the total decreased quantity, and about 3% of net change in quantities were due to changes in measurement or estimation techniques.

Q10 Why is there such variability in release and transfer quantities? Facilities in the same business reported different numbers; are these differences real?

A There are many reasons for variability. For example, facilities in the same business may use very different processes (e.g. 5 or 6 major pulping/papermaking processes exist in the U.S.) and may have very different production levels or capacities (50 to 1,500 tons of paper per day).

One facility may treat waste on site, while a similar facility may transfer the same waste off-site for treatment. Some facilities simply have more efficient production processes, resulting in fewer releases and reduced waste. Even if two facilities generated the same quantity of waste, their reported releases and transfers could be quite different. For example, differences in type of pollution treatment controls and recycling practices utilized by facilities can lead to differences in reported releases and transfers.

A large difference may come from the ability of individual facilities to accurately estimate releases and transfers, which depends on the data and expertise available.

Q11 What can I do to reduce TRI releases in my community?

A A first step in encouraging release reductions is developing a full picture of releases to your community from the reporting facilities. Contact the facility or facilities and ask them for more information on their TRI releases, pollution prevention, and worker safety programs. Because of the new PPA data collected for the 1991 and 1992 years, Form R submissions can be used to see if facilities in your community are implementing source reduction programs and to determine what effect the programs are having. Establishing and continuing a positive dialogue with facilities on potential release reduction activities can promote risk reductions.

Discuss your concerns with local, state, and EPA officials, and encourage them to pursue pollution prevention initiatives with these facilities. These officials have more information that they can make available to you so you can develop a better understanding of environmental situations where you live. Organize a neighborhood citizen organization, contact existing public interest groups, and work together as a coalition to seek pollution prevention and risk reduction.

These are just a few examples of some of the hundreds of ways the TRI could serve and has served as a pollution prevention and release reduction tool. For more information on how TRI has been used, see Appendix D.

Q12 Has EPA looked at TRI facilities and releases on Indian tribal lands?

A Yes. EPA cross-referenced tribal land boundaries with the 1989 TRI reports and found that there were 303 facilities who reported being on or within three kilometers of tribal lands. The total reported releases and transfers were 34.6 million pounds (0.6% of the total TRI releases and transfers reported for 1989).

Q13 What is EPA's ability to actually measure the TRI chemicals in the environment?

A EPA has official methods for 146 of the 316 individually listed chemicals under EPCRA section 313.

Q14 Who should we see to get the analytical methods that EPA considers most appropriate? Who in EPA is responsible for developing these analytical methods?

A Three offices have responsibilities for developing analytical methods--the Office of Science and Technology, the Office of Solid Waste, and the Office of Research and Development. These analytical methods are available from:

Office of Science and Technology
Bill Telliard/Ben Honaker (202-260-2272)

Office of Solid Waste
Alec McBride (202-260-4761)

Office of Research and Development
Gary McGee (513-569-7325)

II. QUESTIONS ON THE FEDERAL FACILITIES EXECUTIVE ORDER

For more information:
Eileen Fesco, Environmental Assistance Division (202) 260-7232

Q15 Are Federal facilities required to report under section 313 of EPCRA?

A Government-owned and contractor-operated facilities (known as GOCOs) are currently covered and do report to TRI. Government-owned and government-operated facilities (GOGOs) have not been required to report by law, but some have reported voluntarily, and others plan to report for the 1993 reporting year. For example, the Department of Energy will voluntarily submit reports for the 1993 reporting year to EPA and the States for all their facilities by July 1, 1994.

On August 3, 1993, the President signed Executive Order #12856, "Federal Facility Compliance with Right-to-Know and Pollution Prevention Laws", requiring federal facilities (GOGOs) to comply with the federal Right-to-Know laws. All federal facilities must report to TRI beginning with reporting year 1994. The Executive Order also asks all federal facilities to set a voluntary goal of 50% reduction of their releases and transfers for treatment and disposal of toxic pollutants by 1999.

Q16 Does the reduction apply only to TRI toxic chemicals or all toxic chemicals?

A The toxic pollutant reduction program applies to the TRI chemicals used by the Federal agency, but the agency may go beyond the TRI list and set a voluntary reduction goal for other chemicals that they use.

Q17 Are all Federal agencies required to develop a pollution prevention strategy?

A The head of each Federal agency that has one or more facilities meeting EPCRA reporting requirements is responsible for the development of a written pollution prevention strategy. The strategy is due to EPA by August 3, 1994. Once submitted these strategies will be available to the public from EPA and from each individual agency.

Q18 How many Federal facilities are predicted to report in 1995?

A At this date, it is hard to predict how many federal facilities will file Form Rs in 1995. The Executive Order required that Federal agencies send a list to EPA, by January 31, 1994, of the facilities they believe will be covered under all sections of the Order. Operating from this list, EPA will soon be able to estimate the number of reports to expect. This list is available to the public via EPA's Pollution Prevention Information Clearinghouse at (202) 260-1023.

Q19 Will EPA report to the public on the Federal agencies' progress toward meeting their voluntary 50% reduction goals?

A EPA is to report annually to the President on the Federal agencies' progress toward reducing their releases and transfers of toxic pollutants.

III. QUESTIONS ON THE TRI LIST OF CHEMICALS

For more information:
Maria Doa, Environmental Assistance Division (202) 260-9592

Q20 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. EPA has also added chemicals that have met 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.

Q21 What are the criteria for listing a chemical under section 313 of EPCRA?

A For a chemical or chemical category to be kept on or added to the TRI list, it must be known to cause or can 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.
- because of its toxicity, its toxicity and persistence in the environment, or its toxicity and tendency to bioaccumulate in the environment, a significant adverse effect on the environment of sufficient seriousness to warrant release reporting under EPCRA section 313.

Q22 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 and 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 which appear on the Resource Conservation and Recovery Act (RCRA) list of hazardous wastes were added to the TRI list. Reporting for these chemicals will be 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 bisdithiocarbanic 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

Q23 What chemicals have been deleted from the TRI list?

A The following chemicals have been deleted from the TRI list:

Color Index (C.I.) Acid Blue 9 diammonium salt
C.I. Acid Blue 9 disodium salt
C.I. Pigment Blue 15 (a copper compound)
C.I. Pigment Green 7 (a copper compound)
C.I. Pigment Green 36 (a copper compound)

Di-n-Octyl phthalate (n-dioctyl phthalate)
Melamine
Sodium hydroxide (solution)
Sodium sulfate (solution)
Terephthalic acid
Titanium dioxide

EPA modified the listing for aluminum oxide to cover only fibrous forms of the chemical.

Q24 Is EPA planning to expand the number of chemicals covered by EPCRA section 313?

A On January 12, 1994 EPA proposed rulemaking to add 313 chemicals to the TRI list, including about 160 pesticides.

Q25 How were these proposed additional chemicals 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 candidates underwent a further hazard assessment, including a detailed review of the toxicity of each to determine whether the chemical meets the statutory criteria for listing.

Q26 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 decisions to date.

EPCRA Section 313 Petitions

Chemical	Action Requested	Status
Acetone	Delist	Pending
Aluminum oxide (non-fibrous)	Delist	Granted
Alloys	Delist	Denied (1)
Ammonium sulfate (solution) (2)	Delist	Proposed
Antimony tris(iso-octyl)-mercaptoacetate	Delist	Denied
Barium sulfate	Delist	Proposed
Butyl benzyl phthalate	Delist	Proposed

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 (4) disodium and diammonium salts	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 mono-chlorophthalocyanine	Delist	Proposed
Cyclohexane	Delist	Denied
Chromium antimony titanium buff rutile	Delist	Denied
Decabromodiphenyl ether	Delist	Denied
Di-n-Octyl phthalate	Delist	Granted
Diethyl phthalate	Delist	Withdrawn
Ethylene	Delist	Denied
Halon 1211	List	Granted
Halon 1301	List	Granted
Halon 2402	List	Granted
Hydrochlorofluorocarbons (5)	List	Partially Granted
Hydrochloric acid	Modify	Pending
Inorganic Fluorides	List	Denied
Iron Chromite	Delist	Withdrawn
Manganese and compounds	Delist	Denied
Manganese and compounds in Slags	Delist	Pending
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
Propylene	Delist	Denied
Sodium hydroxide (solution)	Delist	Granted
Sodium sulfate (solution)	Delist	Granted
Sulfuric acid	Delist	Denied
Sulfuric acid	Modify	Proposed
Terephthalic acid	Delist	Granted
Titanium dioxide	Delist	Granted
Trifluralin	Delist	Withdrawn
Zinc borate hydrate	Delist	Denied
Zinc sulfide	Delist	Denied
82 RCRA Chemicals (5)	List	Partially Granted

(1) EPA is reviewing whether certain constituent metals of alloys should be reportable.
(2) The ammonium sulfate (solution) proposed deletion will not result in a loss of reporting, but rather in more focused reporting. The ammonium moiety will be reportable as (aqueous) ammonia, which is listed on EPCRA section 313.
(3) CFC = Chlorofluorocarbon
(4) C.I. = Color Index
(5) Refer to Question 22 for a complete list of the HCFCs and RCRA chemicals which were added to the list.

IV. POLLUTION PREVENTION QUESTIONS

For more information:
Anning Smith, Environmental Assistance Division (202) 260-1576

Q27 When will EPA publish the final Form R including the new PPA data elements?

A The information required by the Pollution Prevention Act of 1990 (PPA) and the guidance for reporting that information have been discussed by the Toxics Data Reporting Subcommittee of the National Advisory Council for Environmental Policy and Technology (NACEPT). NACEPT is an independent advisory council that provides advice and recommendations to EPA on environmental issues. EPA is considering their ideas as it develops final guidance for the requirements of the PPA. EPA anticipates publishing the guidance in late 1994 or early 1995. Industry will continue to use the Form R that was approved May 14, 1992 until a new form is issued.

Q28 The Form R expiration date says 11/92. Is the Form R valid or will it be changed for reporting year 1993?

A November, 1992, was the expiration date given by the Office of Management and Budget (OMB) when they approved the form on May 19, 1992. However, the passage of the Pollution Prevention Act Implementation provisions of the 1993 Appropriations Act allows the Agency to continue to use this Form R until revisions are promulgated by law. Therefore, this Form R is still valid and should be used for all submissions until a final Form R is promulgated, even though the expiration date shown on the Form R has passed.

Q29 Why don't the totals reported for off-site transfers for energy recovery, recycling, and treatment for one part of the Form R equal the quantities of chemicals reported for energy recovery off-site, recycling off-site, and treatment off-site in another part? Do these represent different quantities? Why are the data reported in two places on the Form R?

A Differences in the data are often due to different interpretations by reporting facilities for the quantities reported in different parts of Form R. In some cases, these different interpretations are caused by unfamiliarity with the new data elements. One part of the Form R (section 8) contains the aggregate quantities undergoing each type of on-site or off-site waste management practice, as required by the PPA. Another part of Form R, Section 6.2, contains the same off-site quantity, but is reported by off-site location and listed by specific type of each waste management practice. The quantities are different if the facility has reported accidental or one-time releases not related to production. Quantities reported in Section 8 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. EPA will build on the experience gained from the 1991 and 1992 reports to develop final guidance for reporting facilities.

Q30 How does the quantity released as reported in the "Source Reduction and Recycling Activities" section (Section 8) of the Form R differ from the quantities reported in the "Releases of the Toxic Chemical to the Environment On-Site" section (Section 5)?

A The quantity reported as released in Section 8 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, which are not reported in Section 5. Second, the quantity reported in Section 8 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.

Q31 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 their control. The facility is not likely to know the amount recovered through a similar activity occurring off-site which is not under their 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 only know the amounts sent off-site for the purpose of energy recovery and treatment.

Q32 Why are the quantities reported in the "Source Reduction and Recycling Activities" section (Section 8) mutually exclusive of one another?

A These quantities are designed to add up to the total amount of the TRI chemical in wastes (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. Any double or multiple counting of an amount of the reported TRI chemical in waste will inflate the actual total. This also gives a more accurate picture of how the toxic chemical in wastes is managed within the waste management hierarchy.

Q33 Why are catastrophic releases reported separately?

A The amounts reported as recycled, used for energy recovery, treated, and released in Section 8 identify the quantities of the toxic chemical in waste that should be subject to pollution prevention efforts. The catastrophic releases are reported separately because they cannot be predicted and are generally not amenable to pollution prevention efforts.

Q34 Why are the recycling numbers so large?

A The recycling numbers are especially large in comparison with amounts of the toxic chemical reported as being released to the environment. These new amounts are not unexpected, however. Quantities recycled are likely to be much larger than release quantities because the purpose of recycling is to recover the chemical for further use. Unlike the quantities released, which leave the process, the recycled amounts return to the process again and again, and can be estimated based on the total number of times an amount is recovered from wastes and returned for further use.

Q35 How will EPA use the future years' estimates? What if actual estimates differ from the projected estimates?

A EPA will use the future estimates data as indicators of 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.

Q36 What is the purpose of the production index?

A The production index is a ratio of production during the reporting year and production during the prior year and is intended provide a potential indicator of progress in source reduction. It also allows data users to assess the impact of business changes on changes in total waste generated. By multiplying the sum of the waste quantities reported for the prior year by the production index, a data user can estimate the amount of the toxic chemical that would have been expected to enter wastes in the reporting year, given the change in production. Comparing this expected quantity for the current reporting year to the sum of the actual quantities for the current reporting year can yield an indication of whether source reduction is occurring. (See analysis in Chapter 2 of this document.)

Q37 How is a chemical that is treated on-site and then disposed of reported in the "Source Reduction and Recycling Activities" section (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).

Q38 Does EPA plan to review the quality of the new data reported on the Form R?

A EPA plans to institute computerized review of the new data, primarily to check potential data discrepancies between different sections of the form.

Q39 Millions of 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 wastestream.

Q40 A large quantity of toluene was reported as burned off-site for energy recovery in 1992. 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 un-combusted material or as fugitive releases from the handling of the toluene-containing material prior to combustion.

Q41 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 occurring in a boiler, kiln, or industrial furnace in which the heat from the combustion is used to generate steam or heat other materials in a manufacturing process. Incineration is combustion with the primary purpose being the destruction of the toxic chemical.

Q42 How are the 1991 and 1992 data elements collected by EPA different from those stated in the PPA?

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, not discussed in the PPA, has aspects of both recycling and waste treatment, and is reported separately rather than included as part of the quantities reported as treated or recycled. Instead of reporting the percent changes of quantities 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.

Q43 Will 1993 TRI reporting be different from 1992 TRI reporting?

A The 1993 TRI reporting will use essentially the same Form R and instructions as was used for the 1992 reporting.

Q44 What is the Office of Pollution Prevention and Toxics (OPPT) doing to reduce TRI releases?

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 incorporate prevention into what they do. 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 that provides information on pollution prevention for industry, government and public interest groups to use in encouraging and implementing prevention.

Q45 The quantity of certain chemicals released (at a particular facility or nationwide) is decreasing. What does this mean?

A The TRI database does not include specific explanations of the reasons for changes in quantities reported by facilities. The new TRI data can give some indication of whether changes are due to shifting of chemicals off-site for energy recovery or recycling, decrease in economic activity or production levels, or source reduction. However, other factors may also cause changes, such as substitution of one chemical (that may or may not be in TRI) for another, changes in accounting or estimation techniques, and other reasons. 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 source reduction was a significant factor in explaining some of the changes. However, fluctuations in production were more frequently cited than changes due to source reduction 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 new 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 a more comprehensive view of waste management practices. They shift the focus from releases to movement up the waste management hierarchy.

V. EXPOSURE AND HEALTH EFFECTS QUESTIONS

For more information:

Linda Rusak, Chemical Screening and Risk Assessment Division (202) 260-5273

Q46 How much of these 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. water to air); or concentrate it (e.g. bioaccumulation of the chemical in fish). Concentration in the environment can depend on 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 the 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, source and treatment of your drinking water supply, etc.

Q47 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 someone is exposed and the amount of chemical to which they are exposed, as well as the "inherent" toxicity of the chemical. The risk is increased as the amount of exposure increases.

Q48 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, spills, 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 risk of exposure.

Q49 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 as well as to 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.

Q50 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.

Q51 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.

Q52 Don't all chemicals cause cancer?

A No. Most chemicals tested by scientists do not cause cancer.

Q53 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.

Q54 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 damage can occur in humans.

Q55 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.

Q56 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.

Q57 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.

Q58 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 air toxics sources, 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.

Q59 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.

Q60 Can my drinking water be contaminated by these toxic chemicals?

A Again, this depends on the amount and concentration released, characteristics at the site, including the relationship of the release to the water supply, both surface and below ground, the distance to where the drinking water intake/well is located, and treatment, if any, the water receives before it is piped to your house.

Q61 Are the plants with the largest 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.

VI. COMPLIANCE AND ENFORCEMENT QUESTIONS

For more information:

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Rhonda Norton, Office of Compliance Monitoring	(202) 260-3724

Q62 How many inspections have EPA's Regional offices conducted in support of the Office of Compliance Monitoring's (OCM) EPCRA section 313 program?

A Since October 1988, our field offices have conducted approximately 4,064 inspections of facilities subject to EPCRA section 313 reporting requirements. Of these, 784 were in the 1992 calendar year and 798 were in the 1993 calendar year.

Q63 How many civil complaints have been issued?

A EPA has issued approximately 832 civil complaints (almost all of which are against non-reporters) since October 1988.

Q64 What is the total amount of proposed penalties levied against EPCRA section 313 violators?

A EPA's Office of Compliance Monitoring has levied proposed penalties in excess of 40 million dollars in the EPCRA section 313 program since October 1988.

Q65 What is EPA doing about Supplemental Environmental Projects (SEPs)?

A Supplemental Environmental Projects are projects that facilities may undertake, as part of the settlement process, to protect or restore the environment through pollution prevention, waste minimization, and/or decrease in the amount of natural resources used. Since Fiscal Year 1991 (when EPA began to track cases with SEPs), EPA has closed 152 civil complaint cases containing one or more SEPs.

Q66 What is the EPCRA section 313 compliance and enforcement program doing about data quality?

A Data quality is emerging 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, we are 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.

Q67 Without a final regulation in place, how is EPA enforcing the Pollution Prevention Act reporting requirements?

A Submission of the data to EPA and the states is required by the Pollution Prevention Act as mandated by Congress. EPA has issued 65 Notices of Noncompliance (NON) to facilities who did not use the revised Form R to submit their data for the 1992 reporting year. These facilities had previously been notified several times by EPA of the requirement to submit their information on the revised Form R. Each of the EPA regional offices will receive a complete listing of those facilities that have received a NON for not reporting on the revised Form R. In accordance with the EPCRA Enforcement Response Policy, EPA may issue civil penalties against those facilities that do not comply with the terms of the Notice of Noncompliance.

VII. 33/50 PROGRAM QUESTIONS

For more information:
Mike Burns, Environmental Assistance Division (202) 260-6394

Q68 How is the 33/50 Program related to the TRI program?

A In February 1991, the EPA Administrator announced the establishment of the 33/50 Program. It is a voluntary TRI release reduction program that asks industries to work with EPA, the environmental community, and the states to initiate or expand pollution prevention activities at individual facilities. EPA is seeking a 33% reduction in TRI releases and off-site transfers for treatment and disposal of 17 selected toxic chemicals and chemical categories by 1992, and a 50% or greater reduction by 1995. These reductions will be measured using the 1988 TRI data as a baseline. EPA expects the public accountability fostered by TRI and the Pollution Prevention Act to continue to play a vital role in persuading companies to take voluntary actions to prevent pollution from toxic chemicals.

The 17 chemicals and chemical categories targeted for reductions are: 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. For further information, see Chapter 4, "TRI Reporting for 33/50 Program Chemicals," of this document.

VIII. AIR QUESTIONS

For more information:

Vasu Kilaru, Office of Air Quality Planning and Standards (919) 541-5332
Al Rush, Office of Air and Radiation (202) 260-6002

Q69 What legal tools are available to the Agency to reduce toxic air emissions?

A Title III of the amended Clean Air Act (CAA) is the primary regulatory tool by which EPA will control emissions of air toxics. Under section 112(d), EPA must issue regulations requiring the maximum degree of reduction in emissions that is achievable. After the application of the maximum achievable control technology (MACT) standards, section 112(f) states that EPA must issue additional standards within 8 years if necessary to further protect the public.

Also, EPA has authority to abate "imminent and substantial endangerment" to public health under several statutes. In particular, section 303 of the CAA and section 106 of Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) provide that EPA can issue administrative orders or seek injunctive relief in court to address such hazards. Any facility-specific enforcement action would typically be preceded by a detailed facility-specific analysis of emissions and risk. EPA would consider use of these authorities to reduce emissions from facilities that pose high risks due to toxic air pollutants.

Q70 How much of the 1.8 billion pounds of toxic chemicals emitted to the air is addressed by the air toxics section of the 1990 Clean Air Act Amendments?

A The 1990 Clean Air Act Amendments (CAAA) address over 1.3 billion pounds of the 1.8 billion pounds of toxic chemicals reported to the TRI for 1992. The remaining 500 million pounds of toxic chemicals are subject to control under Title I of the CAA as volatile organic compounds under the ambient air standard for ozone, or are subject to the particulate matter ambient air standard.

Q71 When will the EPA promulgate regulations to reduce these emissions?

A In accordance with the CAA, EPA published on July 16, 1992 the final list of categories of sources to be regulated (57 FR 31576). The proposed schedule for regulation was published by EPA on September 24, 1992 in the Federal Register (57 FR 44147). A final regulation for Hazardous Organic National Emission Standards for Hazardous Air Pollutants (HON) for the synthetic organic chemical manufacturing industry was published on February 28, 1994. The HON will have far-reaching effects because it requires reductions of up to 110 hazardous air pollutants. The requirement will result in substantial reductions in emissions from the affected facilities.

Q72 Why are some of the 189 hazardous air pollutants listed in the amendments to the Clean Air Act not included in the TRI?

A There are currently 14 chemicals listed as hazardous air pollutants in the new CAA that are not listed on EPCRA section 313. Nine of the 14 were proposed for addition on January 12, 1994 as part of the Agency's proposed expansion of the TRI chemical list. A list of the 14 chemicals follows. The chemicals marked with a "*" were not included in the proposal.

Caprolactam
* Coke Oven Emissions
* p,p'-Dichlorodiphenyldichloroethylene (DDE)
Dimethyl formamide
Hexamethylene-1,6-diisocyanate
Hexane
Isophorone
Mineral fibers
Phosphine
Polycyclic Organic Matter (polycyclic aromatic compounds)
* Radionuclides (including radon)
* 2,3,7,8-Tetrachlorodibenzo-p-dioxin
Triethylamine
* 2,2,4-Trimethylpentane

There are various reasons why the remaining hazardous air pollutants were not 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 Toxic 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.

Q73 How will EPA regulate TRI chemicals with large quantities of air emissions?

A Listed below are the 10 chemicals with the greatest total reported air emissions in TRI for 1992 (see Table 1-23), and the authority by which they will be regulated under the Clean Air Act Amendments.

Chemical	Regulated under Clean Air Act Amendment
Acetone	Title I
Ammonia	Title III, section 112(r)
Carbon disulfide	Title I and Title III, section 112(b)
Dichloromethane	Title III, section 112(b)
Hydrochloric acid	Title III, section 112(b)
Methanol	Title I and Title III, section 112(b)
Methyl ethyl ketone	Title I and Title III, section 112(b)
Toluene	Title I and Title III, section 112(b)
1,1,1-Trichloroethane	Title VI and Title III, section 112(b)
Xylene	Title I and Title III, section 112(b)

Title I of the CAAA covers emission reduction programs for volatile organic compounds (VOCs) to meet ambient air quality standards. These programs are controlled to some extent by state and/or local governments. Six of the 10 TRI chemicals listed above are considered VOCs that participate in atmospheric photochemical reactions to produce ozone, a regulated ambient air pollutant.

Title III, section 112(b) of the CAAA, lists hazardous air pollutants (HAPs) that EPA is required to regulate by source categories. Eight of the 10 TRI chemicals listed above are considered CAAA HAPs. EPA's approach will lead to the early regulation of source categories that emit one or more of the HAPS. Therefore, significant reductions of all of the HAPS emitted by an industrial plant will be achieved rather than reduction of just one specific pollutant. For example, the HAPS (also referred to as air toxics) will be regulated under one of the first emission standards to be promulgated under the CAAA. The Hazardous Organic National Emissions Standards for Hazardous Air Pollutants will affect many sources of toxic emissions, such as process vents, equipment leaks, and storage tanks at chemical manufacturing plants, and will address the emissions of over 110 of the pollutants listed in section 112 of Title III. Hydrochloric acid emissions will be regulated by Maximum Available Control Technology (MACT) standards covering other source categories.

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. EPA published a proposed RMP rule in October 1993.

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 and 1,1,1-trichloroethane (methyl chloroform), by January 1, 1996, due to their ozone-depleting potential. The effective date of this rule is January 1, 1994.

IX. WATER QUESTIONS

For more information:
Arnold Kuzmak, Office of Water (202) 260-5821

Q74 Why did water releases increase so much since 1991?

A Total releases of the TRI chemicals to water in 1992 increased by almost 30 million pounds, approximately 12.2%, compared to the 1991 releases. Almost all of the increase is attributable to phosphoric acid release increases totaling 44.3 million pounds from four fertilizer plants (three in Louisiana and one in Texas). These releases were due to gypsum stack storm water runoff that could not be recycled by the facilities, and one accidental release which is a one time occurrence. If phosphoric acid releases from these facilities are factored out of the national totals, other TRI water releases actually decreased by 11.5%, or almost 15 million pounds, from 1991 to 1992.

Q75 How do the water releases compare from 1991 to 1992 for specific chemicals?

A The top 15 chemicals released to water account for over 98% of the total water releases. Four of these chemicals, phosphoric acid, chlorine, manganese compounds, and 1,4-dioxane, showed increases of 39%, 66%, 40%, and 64%, respectively. Increases of phosphoric acid are discussed in Q74 above. Increases of chemicals other than phosphoric acid could be due to a number of factors, including a change in business activity (change in production) or more accurate discharge estimates by the reporting facilities.

Of the top 15 chemicals released to water, the following chemicals showed a decrease: sulfuric acid (-12%), methanol (-18%), ammonium sulfate (solution) (-42%), ammonium nitrate (solution) (-13%), ethylene glycol (-43%), ammonia (-1%), zinc compounds (-24%), hydrochloric acid (-10%), acetone (-16%), formaldehyde (-30%), and chloroform (-14%). Chromium compounds, listed as the chemical with the 15th largest total releases to water in 1990, decreased 20% between 1991 and 1992. Chloroform and chromium compounds are both chemicals targeted for release reduction by EPA's 33/50 program.

Q76 What are the water quality impacts and toxicity concerns for the TRI chemicals with the largest surface water releases?

A TRI reports 216 chemicals discharged directly into the water environment. Over 95% (by weight) of these discharges consist of eight chemicals.

Three of these chemicals (phosphoric acid, sulfuric acid, and hydrochloric acid) affect water quality primarily by altering the pH of the water body, a chemical parameter EPA already regulates for industrial and municipal discharges to water.

Three other chemicals (ammonium sulfate, ammonia, and ammonium nitrate) primarily affect water quality by the introduction of ammonia to the water body. EPA has issued water quality criteria for ammonia. For several years, EPA has required states to pay special attention to them when developing water quality standards and regulatory control strategies. 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 only toxic at moderately high levels.

Ethylene glycol is essentially antifreeze. Ethylene glycol is not a priority pollutant, and we do not have water quality criteria for this chemical. It is moderately toxic to aquatic organisms at high levels.

EPA will examine the remaining 208 chemicals to see if their toxicity or if 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.

Q77 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 provision of the Act. This provision is 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 a subset of toxic pollutants of greatest concern. There are 126 such toxic chemicals; they are known as "priority pollutants." This list includes 94 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 guidelines, to set enforceable permit limits on the amounts of these and other toxic pollutants that cities and industries are allowed to discharge to waters of the United States.

While many of 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.

Q78 Which of the TRI chemicals are covered by water quality criteria? What are your plans to develop water quality criteria for chemicals that are on the EPCRA section 313 list, but for which criteria have not been developed?

A EPA has published aquatic life and/or human health protective ambient water quality criteria for 80 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 us 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 we begin 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, EPA meets with other affected offices 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.

Q79 Are the TRI chemicals covered by the state water quality standards? If not, why not?

A A number of the TRI chemicals are covered by state water quality standards. Recently, under the CWA, our emphasis on adoption and revision of chemicals in state water quality standards has been on the subset of TRI chemicals appearing on the CWA section 307(a)(1) list. This is a list of 126 pollutants that Congress has identified for priority attention in EPA's water program. The emphasis on this list for state standards stems from the mandate in the 1987 CWA amendments that EPA ensure that these chemicals, in particular, are covered in state water quality standards.

The Agency is very concerned with any pollution sources causing problems with human health or with aquatic life. EPA will review the TRI data, particularly in the context of the pollutant ranking described above, and intends to move aggressively in the water quality standards area for unregulated pollutants.

Q80 EPA has completed its review of the state assessments under Section 304(l) of the CWA, which reported the names and locations of water bodies in the United States that are not in attainment with water quality standards. Separate lists have been prepared for waters impacted by any pollutants and for waters and point sources where water quality is entirely or substantially impacted due to priority pollutants from point sources. Were the TRI data used in these assessments?

A States may have used similar types of information in generating their lists, but the actual TRI data submitted to EPA were not available to them at the time they did their assessments.

Q81 Were the TRI data used in EPA's review of the states' lists developed under Section 304(l)?

A Yes, to some degree. Under the statute, EPA had until June 4, 1990, to approve or disapprove the state lists. At a minimum, the list of facilities submitted by states and planned EPA additions to these lists were reviewed against the list of facilities identified in the TRI as discharging significant amounts of priority pollutants.

Q82 Will future state assessments of waters under Section 304(l) use TRI data?

A Yes. EPA will continue to review updates to state lists against the current and subsequent TRI submittals.

Q83 What are the difficulties in resolving any differences between the 304(l) lists submitted by the states and the TRI data?

A Each facility reporting to TRI shows that a significant release of toxics will need a separate review to determine if its receiving water should be included on future state lists of waters not meeting water quality standards. Although EPA expects the state lists to be generally consistent with the TRI data, in some cases, the TRI data include loadings from spills and other releases not regulated by permits. There are also some cases where states did not list waters on the section 304(1) lists due to a lack of discharge or ambient data for some toxics. In such cases, EPA and the states will, over time, fill any data gaps by collecting (and/or having dischargers collect) additional effluent and ambient data. In some cases, this may also require permitting of previously unpermitted discharges.

Q84 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. 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 and 1992. The choice of industries to be regulated is based on a number of factors, including TRI data. 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.

Q85 How will the 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 for identifying 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.

Q86 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 states using TRI data to determine whether permits issued to some or all of these facilities control contaminants listed as releases in TRI reports.

The Office of Wastewater Enforcement and Compliance (OWEC) used TRI data to begin to identify new undetected significant industrial users discharging to POTWs, and to identify illegal unpermitted discharges.

OWEC used data to identify discharges by industrial users to POTWs to determine whether additional NPDES permit limits are needed.

OWEC, EPA regional offices, and states will 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 QUESTIONS

For more information:
Robert Smith, Office of Water (202) 260-5559

Q87 How are the TRI data used in the Underground Injection Control (UIC) program of the Safe Drinking Water Act?

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.

Q88 What does a TRI injection discharge listing mean to an area's ground water resources?

A A listing for any particular facility may, depending on well classification and operating status, pose a threat to underground sources of drinking water. For that reason, each underground injection listing in the TRI database is checked against authorized facilities. If not properly authorized, the operation would be subject to state or EPA enforcement action. If authorized, the operation would be subject to a compliance review on prescribed schedule.

Q89 What do the TRI data show as underground injection operations?

A Generally, the largest number of facilities are injecting waste into Class I wells, which are industrial or municipal disposal wells injecting waste below the lowermost underground sources of drinking water. When constructed and operated in compliance with program requirements, these wells are expressly designed to prevent the movement of formation and disposed fluids into protected aquifers. Other facilities may be injecting waste into Class V wells which are important because they may be directly discharging into aquifers protected by the program and are a high priority for inspection and enforcement follow-up. EPA bans injection of hazardous waste at or above underground sources of drinking water.

Q90 Does EPA have any estimation of what percentage of the TRI releases to underground injection wells are going to Class I (deep underground injection or industrial or municipal wastes) wells?

A The current TRI Form R does not differentiate between underground injection releases by well type. Other UIC volume data reported by the states and the Regions indicate that the major percentage of TRI releases are from Class I industrial (non-hazardous) and Class I hazardous injection wells.

Q91 How are Class I injection wells monitored to ensure against any toxic releases to the environment?

A All Class I wells are rigorously monitored to prevent any loss of injected fluids emplaced 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.

Q92 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 wastes 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.

XI. SOLID AND HAZARDOUS WASTE QUESTIONS

For more information:

Chris Prins, Office of Solid Waste and Emergency Response (202) 260-4608

Q93 How can a Local Emergency Planning Committee (LEPC) and the community use the TRI data?

A First, LEPCs can use the TRI data for emergency planning for response to chemical accidents. Specifically, they can use TRI data, along with reports on chemical accidents, as a risk screening tool around manufacturing facilities. 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. More broadly, reviewing this information along with chemical inventory information submitted by facilities under sections 311 and 312 of EPCRA can enable communities and LEPCs to obtain a "chemical profile" of their community for use in planning for response to chemical accidents.

Second, the chemical profile now possible with information from EPCRA can be used to examine community-wide risks and be used in a variety of strategies to reduce those risks.

Additionally, the LEPCs can use the TRI data in conjunction with the Material Safety Data Sheets available under EPCRA and other information to respond to community requests for information under the right-to-know provisions under EPCRA.

Q94 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.

Q95 Are the TRI chemicals regulated under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)?

A Approximately 236 of the 316 individually listed TRI chemicals are also CERCLA hazardous substances. TRI chemicals that are also CERCLA hazardous substances are subject to all of the requirements of CERCLA, as amended, such as reporting, liability, financial responsibility, clean-up, and penalties.

Q96 How are the EPCRA section 313 reporting requirements similar 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 the 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.

In addition, EPCRA section 304 requires reporting of these releases to state and local authorities.

Q97 How many TRI chemicals are regulated under the Resource Conservation and Recovery Act (RCRA)?

A Approximately two-thirds of the 316 individually listed TRI chemicals are regulated under RCRA. An additional 21 chemicals and 2 chemical categories subject to RCRA were recently added to the TRI list (see Q22). More detailed information is contained in the TRI Chemical Regulatory Matrix in Appendix E of this document.

Forty of the individually listed TRI chemicals are currently used to identify a waste as a characteristic hazardous waste. 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 commercial chemical products.

Q98 Are all land releases reported under TRI regulated under RCRA?

A Some land releases may be accidental releases or 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, only those facilities that generate more than 100 kilograms (220 pounds) of hazardous waste per month must report.

Q99 Can you make direct comparisons between TRI data and data in the RCRA program for amounts of hazardous 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 wastestream. A RCRA hazardous waste stream may or may not contain TRI chemicals.

TRI reports toxic chemicals released to air, land, water; data collected in the RCRA program report hazardous waste generation and management in regulated land disposal, incineration, storage, or treatment units.

RCRA also 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 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 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.

The biennial report does request the CAS number of TRI chemicals that are contained in RCRA wastestreams, to facilitate a link between the two data sources.

Q100 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 4,850 Treatment, Storage, Incineration, and Land Disposal facilities, including: 1500 land disposal facilities; 350 incinerators; 3000 storage/ treatment facilities. RCRA also regulates more than 200,000 large and small quantity generators and about 18,000 transporters. 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.

Of the 200,000 large and small quantity generators that are regulated under Subtitle C of RCRA, approximately 17,000 of the large quantity generators (LQGs) report to RCRA's biennial reporting system. Approximately 10,000 of these LQGs fall within SIC codes 20 to 39, and, of these, approximately 7,000 sites report for TRI.

Q101 How are TRI releases of hazardous wastes regulated?

A Hazardous wastes must be stored, treated, or disposed 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 ground water 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.

APPENDIX B

PUBLIC ACCESS TO TRI

EPA continues to add new avenues of public access to the Toxics Release Inventory (TRI). Every year, EPA expands its outreach activities to new potential users of the data. Through its outreach activities, EPA identifies and engages the assistance of new organizations to help promote TRI awareness, provide access, and increase usage of the data. Since the TRI is only as valuable as the number of people who use the information, EPA hopes that these organizations will acquaint new users with TRI, help people who already know about TRI to better utilize or understand the data and, when possible, provide information on how to improve TRI products and services. Organizations such as libraries, journalists, national public interest and environmental groups and states remain key outreach participants.

Accessing TRI is easy. EPA offers the data in a variety of common computer and hard copy formats to ensure that everyone can easily use the information. Over 4,000 libraries have TRI in their collection. TRI is available on diskette, CD-ROM, magnetic tape and computer bulletin boards. It is available on an online national computer database. TRI reports are available from the states and from EPA. Many states make their data available before EPA completes 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.) The many other routes for accessing TRI are provided below.

TRI has proven to be a rich source of data for a broad-based 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 of TRI data. These individuals, on their own and through organized groups, are using TRI to raise and answer questions about chemical releases in their communities.

Looking forward, avenues of public access to TRI will continue to grow and the TRI will continue to be an important first step for discovering which chemicals are being manufactured, released, or transferred into communities across the country. The diversity of the groups across the country who use TRI will also 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

(For detailed ordering information, see page B-6)

Online Access

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-art, user-friendly online searching. The system features a variety of online user assistance features, a flexible command language, and "free text" search capability. Users can print entire or specific portions of the records either online or off-line and there are a wide variety of customized text options built into the system. The menu driven search package allows individuals with limited computer skills to use the TRI online database efficiently and effectively. Hazardous substance fact sheets, **TRI-FACTS**, can also be accessed via the TOXNET system (see TRI-FACTS under "Databases & Bulletin Boards," below). Online costs range from $18 - $20 per hour. The system contains the complete national TRI for all reporting years. Contact/Availability: NLM/1992 data will be available Spring 1994.

The **Integrated Risk Information System (IRIS)** contains health risk assessment and adverse health effects information summaries agreed on by various EPA programs. It is available online via the NLM TOXNET system. The system is intended to be used to assist in the risk assessment process. IRIS is also available on diskette from NLM. Contact/Availability: National Technical Information Service (NTIS), NLM.

TRI is available on the **Right-to-Know Network (RTK NET)**. RTK NET is an online network concerned with environmental issues, especially matters arising from passage of the Right-to-Know provisions embodied in the EPCRA legislation. The network contains other data sets that can be linked to facilitate integrated analysis. RTK NET provides access to the complete national TRI for all reporting years. There is no charge for accessing this network. (Additional information on RTK NET is provided on page B-9.) Contact/Availability: RTK NET/1992 data will be available Spring 1994.

Electronic Media

Compact Disk — Read Only Memory (CD-ROM)

The **TRI CD-ROM** contains the complete national TRI for all reporting years. Hazardous Substance Fact Sheets (TRI-FACTS) containing reference material on the health and ecological effects of the regulated substances are also available on CD-ROM. (Compact Disk Read Only Memory is a medium for retrieving data on a specially equipped microcomputer.) Contact/Availability: NTIS, Government Printing Office (GPO), Federal Depository Libraries, EPA Regional Offices/Disk containing 1987-1992 data will be available Summer 1994.

The **NESE-DB (National Economic, Social and Environmental Data Bank) CD-ROM** includes the TRI state data and the national public data release file on CD-ROM. The disk is produced quarterly by the Department of Commerce and provides access to socio-economic as well as environmental statistics and information. The data are gathered from over 15 federal agencies. Contact/Availability: Department of Commerce, NTIS, selected federal depository libraries/1992 data will be available Summer 1994.

Diskettes

The TRI is available on high density diskette, compatible with the IBM PC microcomputer in dBASE III PLUS, Lotus 1-2-3 (version 2.0). Requesters can select either 5.25 or 3.5 inch diskettes by state or for the country. Diskettes are accompanied by documentation. Contact/Availability: NTIS, GPO/1992 data will be available Summer 1994.

Magnetic Tapes

Each annual TRI is available on 9-track tapes and includes tape documentation. The magnetic tapes contain the complete national data and are periodically updated. Tapes can be ordered in ASCII or EBCDIC format in a 1600 or 6250 bpi density. The reporting facilities' names and addresses are also available on tape in the same formats and densities with tape documentation. Contact/Availability: NTIS, GPO/1992 data will be available Spring 1994.

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. Order No. EPA 749-93-002. Contact: National Center for Environmental Publications and Information (NCEPI).

TRI Reports

Several detailed annual reports on the TRI are available, 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 wastes and other kinds of analyses. Contact: EPCRA Information Hotline, TRI-US.

Microfiche

The microfiche for TRI contain the complete TRI for each reporting year 1987 through 1990, only. The fiche have a users' guide and indices to help locate specific facility reports. Fiche can be obtained for a specific state or the whole country. Although EPA no longer provides TRI on microfiche, fiche for 1987-1990 are still available. Availability: Over 3,000 public libraries, Federal Depository Libraries and GPO.

Form R Facsimile

Computer-generated facsimiles of TRI reports will be provided upon request. Contact/ Availability: TRI Information Management Branch/1992 data will be available Spring 1994.

Databases and Bulletin Boards

TRI-FACTS complements the environmental release data on TRI chemicals by providing information related to health, ecological effects, and safety and handling of these chemicals. TRI-FACTS is available on the NLM TOXNET system, the TRI CD-ROM and in printed format. Contact/Availability: NLM, GPO, NTIS, NCEPI.

The **313 Roadmaps Database** was developed to assist TRI users to perform preliminary, site-specific exposure and risk assessments. Roadmaps is a PC-based system that contains a number of reference sources, federal regulatory standards recommendations, and federal regulatory levels for TRI chemicals. Information includes chemical substances' synonyms, state contacts and general sources of information such as health effects and carcinogenicity sources. Access: NTIS

The Government Printing Office (GPO) provides an **electronic bulletin board** with TRI state specific data. Contact/Availability: GPO/1992 data will be available Summer 1994.

Assistance Services

TRI User Support Service (TRI-US)

The **TRI-US Service** provides general information about the Toxics Release Inventory and 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 a comprehensive search assistance for the TRI online and CD-ROM applications. TRI-US provides both NLM/TOXNET and CD-ROM training through individual 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 other TRI resource centers in local areas are also available. There is no cost for this service. Hours: 8:00 am - 4:30 pm (Eastern Time). Contact: EPA/TRI-US.

EPCRA Hotline

The **Emergency Planning and Community Right-Know Act (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 proves information on the availability of documents related to EPCRA and provides copies of selected documents on a limited basis. Contact: EPCRA Hotline.

Guidance Documents

"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. Contact: NTIS.

"Chemicals, the Press and the Public" — A journalists' guide to reporting on chemicals in the community. Contact: National Safety Council.

"Public Access to the Toxics Release Inventory"— Comprehensive listing and ordering information for TRI products, services, and documents. EPA Document No.: 749-B-03-002. Contact: TRI-US, EPCRA Hotline.

ORDERING INFORMATION

National Library of Medicine (NLM)
Specialized Information Services
8600 Rockville Pike
Bethesda, MD 20894
For information call: 301-496-6531
Hours: 7 days/week; 24 hours/day

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Rd.
Springfield, VA 22161
Call: 703-487-4650
Fax: 703-321-8547
Rush order: 1-800-553-NTIS
Hours: 8:30 am -5:00 pm (Eastern Time)

U.S. Government Printing Office (GPO)
Superintendent of Documents
P.O. Box 371954
Pittsburgh, PA 15250-7954
Call: 202-783-3238
Fax: 202-512-2250
Hours: 8:30 am - 4:00 pm (Eastern Time)
(To order CD-ROM, microfiche, and printed reports)

U.S. Government Printing Office (GPO)
Superintendent of Documents
Attn: Electronic Products Sales Coordinator
P.O. Box 37082
Washington, D.C. 20013-7082
Call: 202-512-1530
Fax: 202-512-1262
Hours: 8:30 am - 4:00 pm (Eastern Time)
(To order diskettes, magnetic tapes & to access the electronic bulletin board)

Public and Depository Libraries
Contact the EPCRA Information Hotline at 1-800-535-0202 or TRI-US at 202-260-1531.

TRI Information Branch
Call: 202-260-1609
Fax: 202-260-4655

Emergency Planning and Community Right-to-Know Act Information (EPCRA) Hotline
Call: 1-800-535-0202
Fax: 703-412-3333 (To request documents, only.)
Hours: 8:30 AM - 7:30 PM (Eastern Time)

U.S. Department of Commerce
NESE-DB CD-ROM
Office of Business Analysis
Room 4885
Washington, D.C. 20277 - 2787
Call: 202-377-1986

Toxics Release Inventory User Support Service (TRI-US)
U.S. EPA
401 M Street, SW. (7407)
Washington, D.C. 20460
Call: 202-260-1531
Fax: 202-260-4659
Hours: 8:00 am - 4:30 pm (Eastern Time)

National Center for Environmental Publications and Information (NCEPI)
Labat Anderson, Inc.
11029 Kenwood Rd.
Cincinnati, OH 45242
Call: 513-891-6561
Fax: 513-891-6685

Right-to-Know Network (RTK NET)
1731 Connecticut Ave., NW.
Washington, D.C. 20009-1146
Call: 202-797-7200
Fax: 202-234-8584
Modem: 202-234-8570
(Parameters 8,n,1. Login as "public.")

National Safety Council (NSC)
Environmental Health Center
1050 17th Street, NW. Suite 770
Washington, D.C. 20036
Call: 202-293-2270

NATIONAL LIBRARY OF MEDICINE (NLM): ONLINE ACCESS

TRI is a component file of NLM's TOXNET system. Utilizing a "free text" search capability, Boolean logic, a powerful and flexible command language, and a variety of online user assistance features, TOXNET offers state-of-the-art, user-friendly searching. Online and off-line printing of entire or specific portions of records is available, as is a variety of customized print options. Special TRI features allow sorting and numerical manipulation of data. A menu-driven search package also allows novice users or individuals with limited computer skills to search TRI efficiently.

The TOXNET systems also contains TRI-FACTS. TRI-FACTS contains information on health effects, ecological effects, safety, and handling of TRI chemicals.

Cost: $18 - 20 per hour
Hours: 7 days/week; 24 hours/day

To apply for access, contact:

TRI Representative
National Library of Medicine
Specialized Information Services
8600 Rockville Pike
Bethesda, MD 20894
Phone: 301-496-6531

Access to TRI Online Searches

Many EPA, Federal Depository, county public, university, and medical libraries across the nation have online access to NLM. Contact a library directly to inquire about its policy of providing online search service to the public. The EPCRA or TRI-US Hotlines can refer you to your nearest library. The EPCRA Hotline number is 1-800-535-0202 (in Washington DC 703-920-9877) and 1-202-260-1531 for TRI-US.

TOXIC RELEASE INVENTORY USER SUPPORT SERVICE (TRI-US)

TRI-US provides general information about the Toxics Release Inventory and access to any of the data formats. Specialists can help determine the data product best suited for the individual user's needs. The service provides a limited amount of online searches and comprehensive search assistance for the TRI online and CD-ROM applications. TRI-US provides both NLM/TOXNET and CD-ROM training through individual sessions and workshops. Documentation for all TRI products is available from TRI-US. TRI-US provides referrals to EPA regional or state TRI contacts, libraries where TRI is available, or other TRI resource centers in local areas.

Cost: No Charge
Hours: 8:00 am - 4:30 pm (Eastern Time)

Contact:

US EPA
TRI-US
401 M Street, SW (7407)
Washington, DC 20460
Phone: 202-260-1531
FAX: 202-260-4659

RTK NET (RIGHT-TO-KNOW NETWORK)

RTK NET is an online computer telecommunications link to environmental databases. This service promotes pollution prevention strategies. It provides communication among individuals concerned about toxic use reduction, and seeks to increase use and analysis of TRI and related data. RTK NET links TRI with other environmental data, all civil cases brought by the U.S. EPA, and a portion of the 1990 Census.

TRI data for 1987-1991 are available on RTK NET, along with health facts for each TRI chemical. Data for reporting year 1992 will be available during the summer of 1994. The TRI data can be accessed by modem from any computer. (Set computer parameters to 2400, 8,N,1. Dial-in using the modem number listed below, and type "public" (lower case) at the prompt for user id.) Participants can communicate with one another through computer-generated mail, in addition to exchanging and reviewing documents electronically.

In addition to the TRI data, RTK NET has the following databases:

CENSUS - U.S. Census Bureau 1990 extracted demographic data for states, counties, and "places" with TRI and FINDS Links
CERCLIS - CERCLA "Superfund" Information System
DOCKET - EPA Civil Litigation cases filed by Dept. of Justice
ERNS - EPA Emergency Response Notification System, 1991 data
FINDS - Location of all facilities regulated by EPA
NPL - EPA Superfund National Priority List of Sites
PCS - EPA Water Permit Compliance System data files on facilities, pipes, and pollutant limits
ROADMAPS- Regulatory levels and health effects of TRI chemicals

Training is available from the computer service on using telecommunications, using RTK NET, and searching the database.

For access, contact:

RTK NET
1731 Connecticut Ave., NW
Washington, DC 20009-1146
Phone: Unison Institute 202-797-7200
Fax: 202-234-8584
Modem: 202-234-8570

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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 16 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%. 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 35% of the 1992 submissions from facilities reporting on magnetic media, which ensures against data entry errors. This compares to 12% magnetic media submissions for 1991. 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 as requested (e.g., if asked for "Los Angeles," the computer will not be able to 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 (to ensure, for example, that all filings for a particular company can readily be identified), 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 1993, EPA provided all states with a facility listing to verify that both the state and Federal government received the same data. States which 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.

Every year EPA issues Notices of Noncompliance (NONs) to facilities who use invalid forms, 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 the reporting years 1988 through 1990, EPA also issued Notices of Technical Error (NOTEs) for missing required data or providing 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 1992 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 reporting year. EPA expects to issue NOTEs for the 1992 reporting year in April 1994. NOTEs for the 1993 reporting year will be issued in late 1994. Based on limited evaluation of the 1991 Form Rs, a list of common errors to avoid involving the required pollution prevention data has been developed and is available from the EPCRA Information Hotline at 1-800-535-0202.

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 waste waters 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 248 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

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 to be conducted include 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.

APPENDIX D

SUMMARY OF EPA PROGRAM OFFICE, REGIONAL OFFICE, AND STATE USES OF TRI DATA

EPA PROGRAM OFFICE USE

Office of Enforcement (OE) and Office of Compliance Monitoring (OCM)

TRI data will continue to be heavily used by the new Office of Enforcement and Compliance Assurance (OECA), which is the consolidated office that is replacing both the Office of Enforcement and the Office of Compliance Monitoring. OECA is composed of several smaller offices, including the Office of Regulatory Enforcement and the Office of Compliance.

TRI data will, as in the past, be used as a tool in facility inspection targeting, both in the Regions and at Headquarters. TRI reporting data are used in the EPCRA Targeting System (ETS), which provides local access to TRI reporting-status data and additional facility information contained in EPA's Facility Index System (FINDS), as well as to Dun & Bradstreet, for facilities potentially subject to EPCRA Section 313 reporting requirements. TRI data will also continue to be cross-checked with data collected under the Toxic Substances Control Act (TSCA) to identify those facilities or types of businesses that reported under some but not all of the reporting rules.

The TRI database is among the approximately twelve Agency databases that are linked in the Agency's Integrated Data for Enforcement Analysis (IDEA) system. IDEA provides enforcement planners with complete compliance profiles of industry sectors (as well as individual corporations) across the different statutes administered and enforced by EPA. IDEA will be used by all of the offices comprising the Office of Enforcement and Compliance Assurance for enforcement screening, targeting and planning, as well as development of enforcement policy.

Enforcement planners will continue to use TRI data to distinguish between industrial sectors based on risk, in terms of types of chemicals reported, total pounds of toxic chemicals released, types of releases, and average pounds released per facility (or industrial sector). Until new techniques for assessing risk can be developed, TRI data give the Agency a sound "surrogate" for the risks posed to the public by toxic chemical releases.

TRI data, already an important tool in achieving pollution prevention, will continue to play a key role in the Office of Enforcement and Compliance Assurance. Because it gives Agency enforcement staff a picture of what chemicals are being released (or transferred) to air, land and/or water, TRI is an excellent starting point for identifying opportunities for both toxics use reduction and source reduction among a broad spectrum of facilities, from small, single-facility business to multi-facility corporations. It will only grow in importance as more chemicals are added to the list of those covered by EPCRA Section 313.

Finally, because EPCRA is a right-to-know statute that places into the hands of the public data on toxic releases, it is a good mechanism for EPA to begin implementing the environmental justice program. That program calls upon both the government and industry to be more sensitive to the issues of both the environmental and human health conditions in minority and low-income communities.

Office of Air and Radiation (OAR)

OAR has used the Toxics Release Inventory data for a variety of tasks related to the implementation of the Clean Air Act Amendments of 1990 (CAAA), including the following:

- TRI data on the number of facilities emitting a chemical and amount emitted are used in setting research priorities for the 189 Hazardous Air Pollutants (HAPs) identified in the CAAA.

- TRI data were used to estimate the number of major sources of HAPs that might be affected by regulations under section 112(g), the modifications provision of the CAAA.

- TRI estimates of emissions from publicly owned treatment works (POTWs) were used in establishing maximum achievable control technology (MACT) standards required by Title III of the CAAA.

- TRI data are used to target potential sources for inclusion in the Early Reductions Program, which is a means of getting enforceable reductions of toxic emissions before a regulation is in place.

- TRI data are used in inventories of air toxics emissions, and in air toxics "Locating and Estimating" documents, which help state and local air agencies identify potential source categories of air toxics in their communities.

- TRI data are used to verify the quality and completeness of point source emission inventories in state implementation plans.

- TRI data are used to aid in identifying potential or actual violations of the National Ambient Air Quality Standards (NAAQS) for lead.

- TRI data were used to identify which of the 189 HAPs might be emitted as particulates and thus might be captured by control equipment used in response to the NAAQS for particulate matter.

- TRI data will be used as a measure of the progress of the CAAA in reducing air toxics.

Office of Pollution Prevention and Toxics (OPPT)

OPPT is using TRI data in a variety of ways to support EPA's Source Reduction Review Project (SRRP). The SRRP is an EPA-wide effort to promote source reduction in the regulatory development process. For example, data on the types of source reduction practices already adopted by some facilities are helpful for identifying candidate facilities for site visits, as well as technologies that could serve as the basis for prevention-oriented standards under the Agency's traditional environmental control programs (e.g., effluent guidelines under the Clean Water Act).

TRI data form the backbone of EPA's innovative 33/50 Program, which seeks to achieve voluntary national reductions of 33% by 1992 and 50% by 1995 in the releases and off-site transfers of 17 high priority TRI chemicals, using 1988 TRI reporting as a baseline. EPA has used TRI reporting data to identify more than 7,500 parent companies of the more than 16,400 facilities that have reported one or more of the target chemicals since 1988 (see Chapter 4). Each company has been contacted by EPA to solicit their participation in the Program. Participation in the 33/50 Program is easy, since companies' environmental releases and off-site transfers are already reported to TRI. Accordingly, no additional environmental data are required to be reported; companies merely inform us of their interest in participating and voluntary commitment to specific reduction targets.

Assessments of the 33/50 Program's progress in meeting its ambitious national goals, as well as the progress individual companies are making in achieving their own reduction targets, are made directly from environmental data already being reported annually to TRI. The Pollution Prevention Act's expansion of TRI reporting data for 1991 and beyond will greatly assist the Agency in determining the extent to which companies' pollution prevention initiatives contributed to observed reductions in releases and transfers. The new two-year forecasting data will also help by providing advance notice of any potential shortfalls in meeting the national goals, enabling EPA to attempt to determine if there are barriers inhibiting companies' reduction efforts. Finally, the Agency hopes that the requirement for companies to project future emissions will provide additional incentives to investigate source reduction opportunities and participate in the 33/50 Program.

The OPPT Existing Chemicals Program continues to use the TRI data for risk screening, testing, and pollution prevention activities in the Risk Management assessment processes. TRI data serve as a major input to exposure and risk assessments in OPPT. TRI data have also been useful in identifying target audiences for risk notification efforts following Risk Management assessment.

The TRI is especially important to the Existing Chemical Program's new initiatives on pollution prevention. TRI data are used for targeting chemicals/uses/facilities for pollution prevention assessment and for evaluating pollution prevention actions. TRI data are also used by the Chemical Assessment Desk and other OPPT outreach efforts to respond to inquiries from a variety of sources.

OPPT has developed software that contains health and ecotoxicity information on most of the section 313 chemicals. This software is called PC-TRIFACTS and enables the TRI data user to better understand the potential health and ecological effects of chemical releases identified in the TRI.

Office of Solid Waste and Emergency Response (OSWER)

TRI data, in combination with other information on waste minimization, are useful in analyzing long-term trends and identifying particular industry practices that warrant attention by the program.

With respect to enforcement, TRI data supplement other existing data sources and can be called on to assist in the development of OSWER enforcement priorities. TRI data also are valuable as a means of establishing liability under both the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Resource Conservation Recovery Act of 1976 (RCRA).

Another site-specific function of the TRI database relates to its role in providing emission information that can be used when developing emission inventories for the Superfund site discovery program and when undertaking Superfund preliminary assessments of sites. In the reportable quantity (RQ) program, TRI data could be used to support future rulemaking under CERCLA (e.g., designation of additional hazardous substances). In addition, states use the TRI data in conjunction with other data obtained under EPCRA for accident prevention planning.

Office of Water (OW)

TRI is being used as a source of data regarding discharge/release of contaminants to groundwater and surface water. The TRI data are used with other pertinent exposure and toxicity-related factors (e.g., quantity produced, occurrence in water, human health effects) in identifying and prioritizing drinking water contaminants. The prioritized list will be used to identify candidates for regulatory consideration.

TRI data were used as a screening mechanism for possible sources of wellhead contamination. Using TRI and other relevant data in a Geographic Information System (GIS), potential contamination sources have been identified. These sources may affect community groundwater systems in the development and implementation of wellhead protection programs. EPA Regional offices continue to coordinate groundwater programs, using GIS as a cross-program tool.

The OW document *Guidance for Water Quality-based Decisions: The TMDL Process* identifies the TRI as an important information source. In particular, TRI data can be used when developing section 303(d) lists. Section 303(d) lists, which must be submitted biennially by states, are composed of impaired waters which need additional controls in order to meet or maintain water quality standards.

OW's Gulf of Mexico Program uses the TRI data and other information to identify and quantify inputs of toxic chemicals to the Gulf. This information is then used to calculate a toxicity index for various Gulf estuaries.

The Office of Water Enforcement and Compliance (OWEC) has used TRI data to identify industrial users with the greatest combination of toxic pollutants to city sewer systems. Certain facilities are referred to EPA Regional offices for further evaluation.

OWEC also used TRI data to identify industrial users (IUs) that are subject to pretreatment standards, but that are located in cities that are not required to have pretreatment programs. Comparing location of users to cities without approved pretreatment programs may be a way of identifying IUs for which EPA is responsible. OW is also matching permitted facilities with facilities that reported TRI discharges to surface water. This will help identify unpermitted dischargers.

The TRI data were also used in compiling a report to Congress on the National Pretreatment Program, and in identifying the types and sources of pollutants discharged to publicly owned treatment works (POTWs).

OW is evaluating the types and volumes of TRI discharges reported by "minor" and "major" National Pollutant Discharge Elimination System (NPDES) facilities to assess the relative risk presented by minor as compared to major facilities.

In developing effluent guidelines, OW needs to understand which pollutants are released from pesticide manufacturing facilities and the patterns of those releases. Some TRI data are useful for screening purposes; however, the OW effluent guidelines program also screens for a number of pollutants not reported under TRI.

TRI data, in conjunction with the Permit Compliance System (PCS) database, were used in the development of a national database of point source discharges that may result in sediment contamination. The data generated from this inventory will be combined with data on conditions at specific locations. This will provide a valuable tool for identifying the potential magnitude of contamination problems in the nation's freshwater and estuarine bottom deposits, selecting facilities and industries that may require additional regulation, determining where permitting efforts should be focused, and identifying locations for further sediment testing.

REGION AND STATE USE OF TRI DATA

EPA's ten Regional Offices continue to use and promote the use of TRI data both internally and externally. On-going uses include using TRI to:

- Target facilities for compliance and enforcement inspections. In 1993, 798 inspections were conducted. To date, proposed fines totaling $40 million have been assessed by EPA Regional Offices against facilities who either did not report, reported late, or sent in poor quality data. Ohio, the state with the most aggressive EPCRA section 313 enforcement program, conducted over 100 inspections in 1993.

- Develop approaches for integrating the TRI with other databases to identify industries or geographic areas of concern. The TRI has been used by Regions III, IV and IX to identify sites for environmental justice projects. Seventeen states are conducting GIS studies using TRI and seven states have used or are using the TRI for environmental justice studies.

- Identify and report on pollution prevention practices by reporting facilities. These analyses have led to the development of technical assistance and peer information exchange programs in a number of Regions. A majority of the states have toxics use reduction or pollution prevention legislation that uses TRI data to track progress.

- Generate interest in and awareness of EPA's Right-to-Know program in order to foster a better informed public. TRI demonstrations and presentations have been given at a variety of educational institutions which have led to the development of course offerings that include the TRI as tool.

Below are some more detailed descriptions of how some of the EPA Regional Offices and states are using the TRI data.

REGIONS' USE OF TRI

Targeting Project

U.S. EPA Region IX is leading an effort to develop a partnership between industry and regulatory agencies to reduce the level of emissions in southwest Los Angeles County by fostering and implementing pollution prevention projects. This area was selected due to the high concentration of industrial facilities. Data from the TRI have shown that the area's toxic releases are the highest in the State and Region IX. The central theme of the partnership will be industry-driven, agency-supported, voluntary pollution prevention projects. All projects submitted by industry to the partnership will be evaluated with respect to the pollution prevention hierarchy of media reductions and must go "beyond compliance" (below allowable limits, ahead of schedule, and a voluntary action). Projects must make good business sense with a suitable return on investment, particularly in an area such as Los Angeles County which has experienced a severe business downturn. The partnership is named "Mutual Efforts to Reduce Industrial Toxics" (MERIT).

Region IX has drafted a set of guidelines for the partnership that will help companies to voluntarily assess their emissions to all media, and work with other companies and agencies to develop pollution prevention projects. Also, a community advisory board is being established to provide input into the program.

Companies that participate will be eligible for expedited processing of their permit applications, and will be able to receive compliance assistance from other partnership companies. Participating companies will also have an opportunity to provide meaningful input to regulators on how to encourage additional pollution prevention projects.

Examples of MERIT partnership projects include:

The Oil Refinery Roundtable and the Metal Finishers Waste Minimization Audit Workshop are designed to identify pollution prevention options that are available, transferable, and free of legal, regulatory, and proprietary barriers.

A project associated with electric car development involves the principles of "design for the environment" engineering to design batteries for disassembly and recycling/reuse, while avoiding hazardous waste disposal problems.

TRIPQUIC

The Air and Toxics Division in U.S. EPA Region VI has used the TRI data to analyze releases and transfers in areas of interest to the states, in particular the Louisiana industrial corridor, the Houston metropolitan area, the U.S./Mexico border, and the Gulf of Mexico. TRIPQUIC, a TRI data manipulation and mapping tool, is being used to produce numerical tables, bar graphs, pie charts, and maps that help federal and state officials better understand and analyze the data. Some of these TRIPQUIC analyses assisted the Region VI staff in negotiations with industrial groups to arrange for 33/50 Program and pollution prevention workshops. TRI data were used to aid the EPA staff in the development of environmental justice calculation software.

STATES' USE OF TRI

Healthy People 2000

The Arizona Department of Health Services (ADHS), in support of the objectives of the Public Health Services (PHS) of the U.S. Department of Health and Human Services (DHHS) "Healthy People 2000," has established goals to reduce human exposure to toxic agents by reducing the total pounds of those agents released into the air, water, and soil each year. The baseline for Arizona will come from two sources : the 1988 TRI and the Arizona Department of Environmental Quality 1991 Toxic Data Reports (state filers not otherwise subject to TRI).

ADHS will monitor the number of pounds reported which are DHHS-listed carcinogens and toxic agents listed by the Agency of Toxic Substances and Disease Registry.

TRI Used to Identify Customers

South Carolina has created TRI software that allows users to customize searches and reports on one year's entire database. The program gives public, private, and governmental interests the chance to work with the data much more efficiently. Michael Juras, South Carolina's EPCRA 313 Coordinator, has advertised the availability of this software program in state trade publications, noting, "My thought was to at least make it easier to market pollution prevention technology for those firms who need detailed information on waste streams. Enabling the free enterprise resolution of toxic pollution is an important goal." South Carolina's new Air Toxics Program and new Storm Water Program are using the TRI package to identify their own customers.

Waste Reduction Assistance Program

The Florida Department of Environmental Regulation sponsors a voluntary, cooperative, non-regulatory waste reduction program known as the Waste Reduction Assistance Program (WRAP). Retired engineers are sent out at the request of the facility to provide expertise in reducing the use of hazardous substances, the generation of hazardous wastes, and releases of air toxics. The program covers facilities handling TRI chemicals. The initial focus of the visit is on housekeeping issues, but inventory management, preventive maintenance, and potential process modifications are also examined. Upon completion of the visit, the engineer provides the facility with a list of suggestions to reduce waste generation and save related expenses. Typical suggestions include materials substitution, such as replacing 1,1,1-trichloroethane with less hazardous materials or non-toxic cleaners, or recycling used water in electroplating operations.

Over the past four years, more than 184 facilities have participated in the program, including a number of Department of Defense facilities. More than $3.7 million in economic savings have been achieved by Florida businesses and government facilities as a result of these source reduction efforts.

Multi-Media Waste Reduction Targeting

North Carolina's Department of Environment, Health, and Natural Resources has developed a database that contains emissions and waste reduction data from a variety of sources to facilitate waste reduction assessment by the North Carolina Pollution Prevention Program. The objective of this project is to integrate multi-media environmental release data into other statewide waste reduction efforts, including technical assistance, training, grants, research, and demonstration efforts of hazardous waste reduction.

Currently, this database is used by North Carolina's Office of Waste Reduction to determine various multi-media waste releases by industries in preparation for site visits and technical assistance. Ongoing projects utilizing these data include: using the data to assist industries in waste reduction plans; and evaluating the toxicological factors versus the risk factors of various chemicals in the database and directing technical assistance efforts towards the reduction of those chemicals. The database will also be used as a basis for targeting problem sectors (e.g., SIC codes, geographic regions, company sizes), and allocating funding, resources, and technical assistance.

Environmental Justice Projects

The National Conference of State Legislatures' 1994 State TRI Assessment study identified six states that use TRI data for environmental justice projects. They are:

- Arizona — analysis of a south Phoenix neighborhood
- California — state comparative risk project
- Connecticut — used to detect toxic release trends in minority communities
- Georgia — analysis of the TRI data in response to specific questions
- Louisiana — conducted a study of East Baton Rouge Parish, comparing facilities and releases to the location of low-income communities
- South Carolina — provided the state Black Caucus with data as part of an effort to develop an environmental equity bill in the South Carolina legislature.

In that same study, Texas and Washington indicated that they plan to initiate environmental justice projects using TRI data in the future.

For more detailed information on the status of state TRI programs, see the document that accompanies this report, titled *1992 Toxics Release Inventory Public Data Release: State Fact Sheets.*

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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, 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 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." EPA has developed water quality criteria for all the priority pollutants.

7. **RCRA (P/U)**: Under the Resource Conservation and Recovery Act (RCRA), hazardous wastes are 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 wastes. For more information, contact the RCRA/ Superfund Hotline: 1-800-424-9346.

CAS Number[1]	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
75-07-0	Acetaldehyde		X	X					X
60-35-5	Acetamide		X	X					
67-64-1	Acetone			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								
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		
—	Antimony compounds		X	X					
7440-38-2	Arsenic			X			X		
—	Arsenic compounds		X	X		X			
1332-21-4	Asbestos (friable)		X	X		X	X		
7440-39-3	Barium								
—	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		
—	Beryllium compounds		X	X					
92-52-4	Biphenyl		X	X	X				
111-44-4	Bis(2-chloroethyl) ether	X	X	X			X		X
542-88-1	Bis(chloromethyl) ether	X	X	X				X	
108-60-1	Bis(2-chloro-1-methylethyl) ether			X			X		X
103-23-1	Bis(2-ethylhexyl) adipate					X			

CAS Number❶	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
353-59-3	Bromochlorodifluoromethane (Halon 1211)			X					
75-25-2	Bromoform		X	X			X		X
74-83-9	Bromomethane	X	X	X	X		X		X
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								
85-68-7	Butyl benzyl phthalate			X			X		
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		
—	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
75-00-3	Chloroethane		X	X			X		
67-66-3	Chloroform	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					

CAS Number[1]	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
126-99-8	Chloroprene		X	X					
1897-45-6	Chlorothalonil				X				
7440-47-3	Chromium			X			X		
—	Chromium compounds		X	X		X			
7440-48-4	Cobalt								
—	Cobalt compounds		X	X					
7440-50-8	Copper			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					
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					
95-50-1	1,2-Dichlorobenzene			X	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		
75-71-8	Dichlorodifluoromethane (CFC-12)			X	X				X
107-06-2	1,2-Dichloroethane		X	X	X	X	X		X
540-59-0	1,2-Dichloroethylene								
75-09-2	Dichloromethane		X	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

CAS Number❶	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
76-14-2	Dichlorotetrafluoroethane (CFC-114)			X					
62-73-7	Dichlorvos	X	X	X	X				
115-32-2	Dicofol			X	X				
1464-53-5	Diepoxybutane	X		X					X
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					
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					
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
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				
107-21-1	Ethylene glycol		X	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
2164-17-2	Fluometuron				X				
50-00-0	Formaldehyde	X	X	X	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								
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				

CAS Number❶	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
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								
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		
—	Lead compounds		X	X		X			
58-89-9	Lindane	X	X	X	X	X	X		X
108-31-6	Maleic anhydride		X	X					X
12427-38-2	Maneb				X				
7439-96-5	Manganese								
—	Manganese compounds		X	X					
7439-97-6	Mercury			X			X		
—	Mercury compounds		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				
96-33-3	Methyl acrylate								
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)								
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		
—	Nickel compounds		X	X					
7697-37-2	Nitric acid	X		X					
139-13-9	Nitrilotriacetic acid								
99-59-2	5-Nitro-o-anisidine								
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							

CAS Number❶	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
55-63-0	Nitroglycerin			X				X	
88-75-5	2-Nitrophenol			X			X		
100-02-7	4-Nitrophenol		X	X	X		X		X
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	
56-38-2	Parathion	X	X	X	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			
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		
—	Selenium compounds		X	X		X			
7440-22-4	Silver			X	X		X		
—	Silver compounds			X	X				
7757-82-6	Sodium sulfate (solution)	X	X	X					X

CAS Number❶	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
100-42-5	Styrene		X	X		X			
96-09-3	Styrene oxide		X	X					
7664-93-9	Sulfuric acid	X		X	X				
79-34-5	1,1,2,2-Tetrachloroethane		X	X			X		X
127-18-4	Tetrachloroethylene		X	X	X	X	X		X
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
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
7440-28-0	Thallium			X		X	X		
—	Thallium compounds			X					
62-55-5	Thioacetamide			X					X
139-65-1	4,4'-Thiodianiline								
62-56-6	Thiourea			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
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				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
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
1330-20-7	Xylene (mixed isomers)		X	X	X	X			X
108-38-3	m-Xylene		X	X					X

CAS Number❶	Chemical	EPCRA 302	CAA 112	CERCLA	FIFRA	NPDWR	PPL	RCRA P	RCRA U
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								

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

APPENDIX F

TRI FORM R FOR 1992

The 1992 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 are referred to the EPCRA Information Hotline at 1-800-535-0202.

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

EPA
United States
Environmental Protection
Agency

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

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

For EPA use only

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

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

EPA
United States Environmental Protection Agency

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 only one)	a. ☐ An entire facility			b. ☐ Part of a 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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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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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 pounds.

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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;

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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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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 1991 (pounds/year)	Column B 1992 (pounds/year)	Column C 1993 (pounds/year)	Column D 1994 (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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