United States
Environmental Protection
Agency

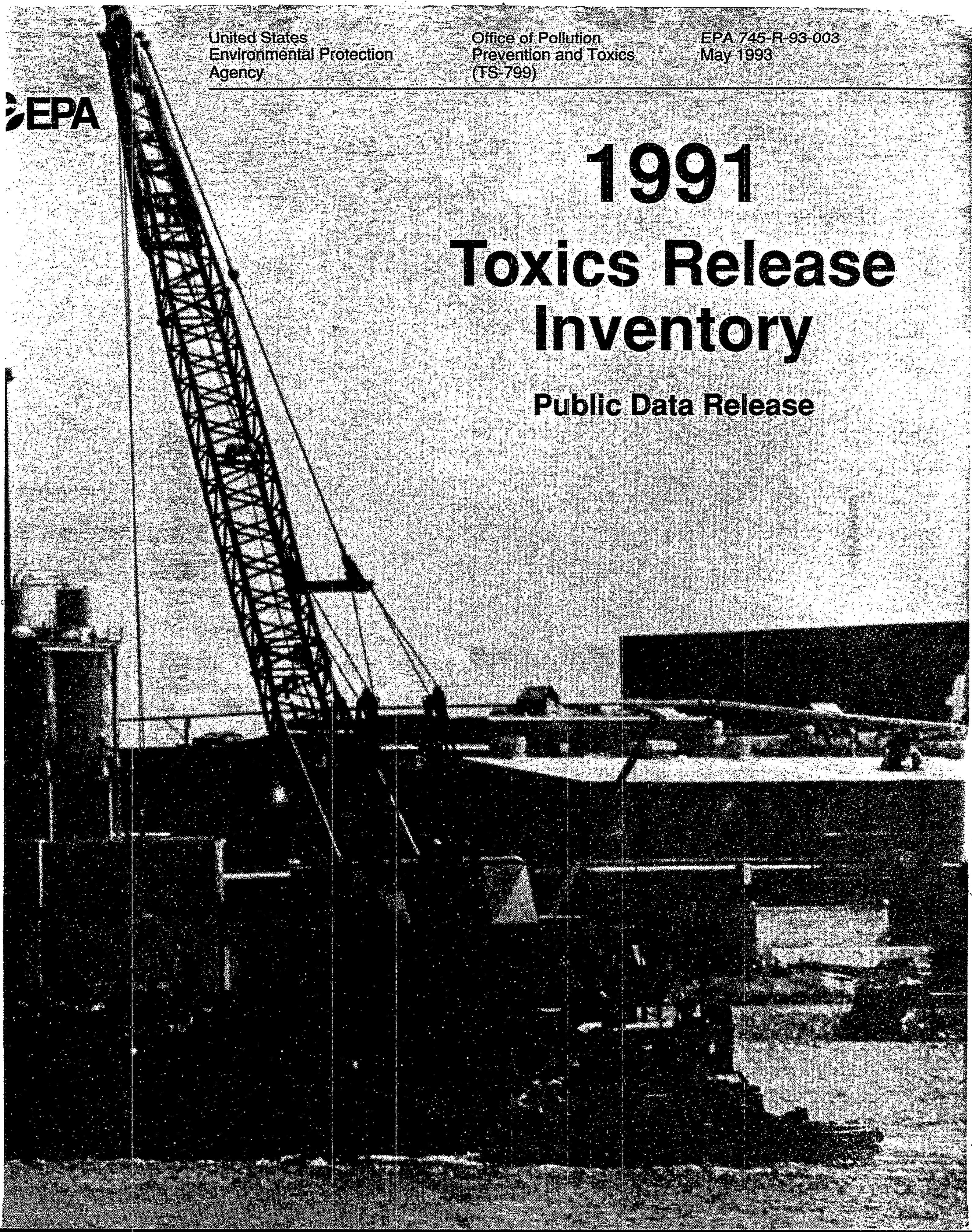
Office of Pollution
Prevention and Toxics
(TS-799)

EPA 745-R-93-003
May 1993

EPA

# 1991
# Toxics Release Inventory

## Public Data Release



#745R93003

# 1991
# Toxics Release Inventory

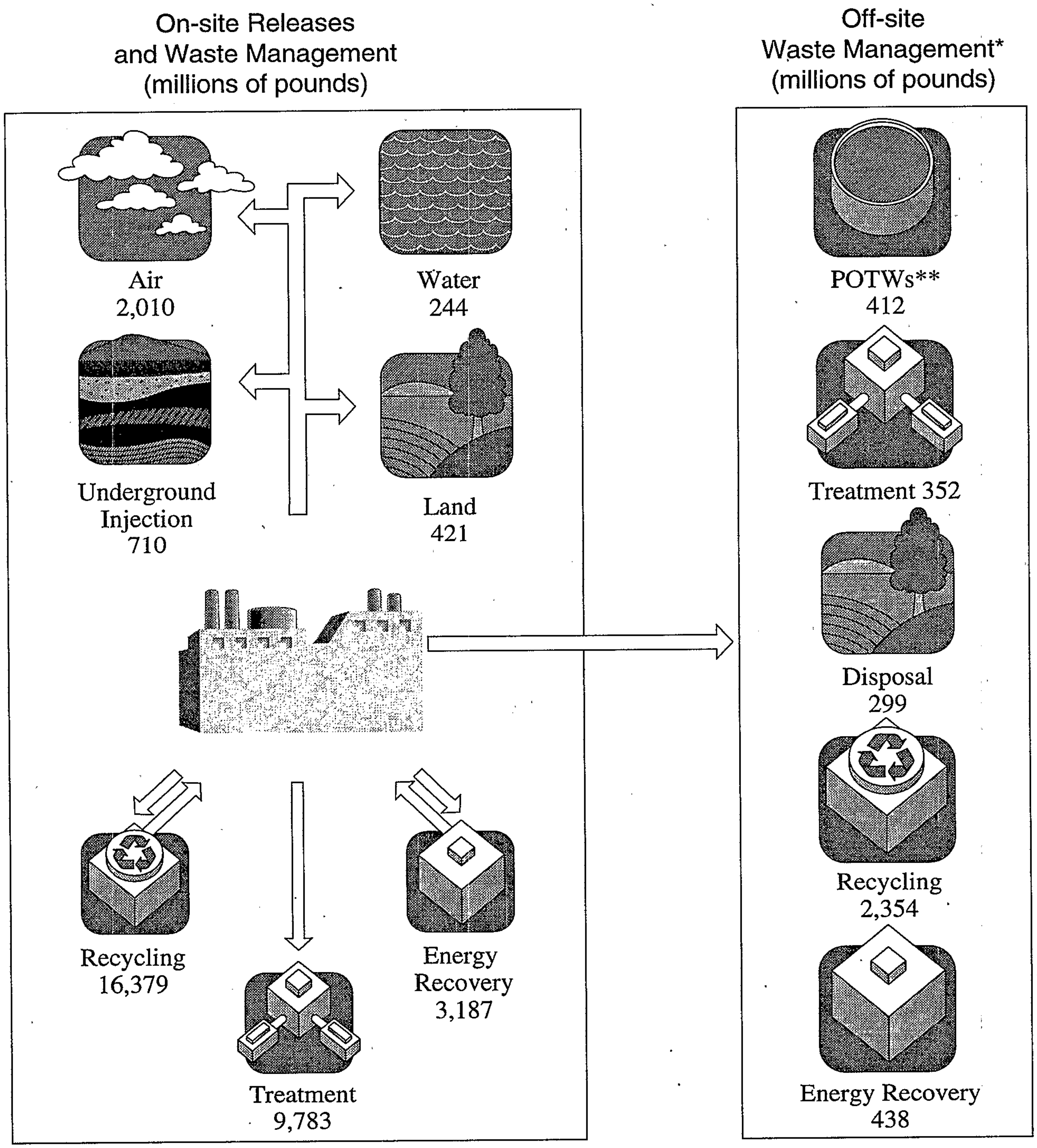
**Public Data Release**

U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxics (TS-779)
Washington, D.C. 20460

# Contents

## Contents

# 1991 Toxics Release Inventory Public Data Release Executive Summary




* 10 million pounds were reported with no off-site waste management code or an invalid code

** Publicly Owned Treatment Works

# 1991 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE EXECUTIVE SUMMARY

The 1991 reporting year marks the fifth year of the Toxics Release Inventory (TRI) program. According to the data, reported releases and transfers of listed toxic chemicals have declined for the fourth straight year.

Included in the 1991 data for the first time is extensive additional waste management and pollution prevention data required by the Pollution Prevention Act of 1990. The new data provide a much more complete picture of waste generation and management than has ever before been available in TRI, covering not just releases and off-site treatment and disposal, but also recycling, energy recovery, on-site treatment, and source reduction activities.

Because so many additional types of waste management activities are now reportable under TRI, the amount of toxic chemicals reported to TRI has increased greatly. The new TRI reports contain information about nearly 38 billion pounds of toxic chemicals managed or released by industry in 1991.

This additional data will be an exciting new tool for tracking facility progress in improving waste management and preventing pollution before it is ever generated.

## 1991 TRI DATA

| | |
|---|---|
| **1991 releases:** | 3,385 million pounds |
| Air releases: | 2,010 million |
| Water releases: | 244 million |
| Underground injection: | 710 million |
| Land releases: | 421 million |
| **1991 transfers:** | 3,865 million pounds |
| POTWs*: | 412 million |
| Treatment/disposal/other: | 661 million |
| Recycling: | 2,354 million |
| Energy recovery: | 438 million |
| Number of facilities reporting: | 23,719 |
| Number of forms filed: | 82,293 |

* Publicly Owned Treatment Works

**Top states for total release**
(air, water, land, and underground injection):

| | |
|---|---|
| Louisiana: | 459 million pounds |
| Texas: | 411 million pounds |
| Tennessee: | 215 million pounds |
| Ohio: | 171 million pounds |
| Indiana: | 136 million pounds |

**Top industries for total release:**

| | |
|---|---|
| Chemicals: | 1,550 million pounds |
| Primary metals: | 433 million pounds |
| Paper: | 242 million pounds |
| Plastics: | 152 million pounds |
| Transportation Equip.: | 149 million pounds |

**Top chemicals for total release:**

| | |
|---|---|
| Ammonia: | 485 million pounds |
| Hydrochloric acid: | 288 million pounds |
| Methanol: | 252 million pounds |
| Toluene: | 200 million pounds |
| Acetone: | 165 million pounds |

**Releases and transfers of metal compounds:**

| | |
|---|---|
| Land releases: | 315 million pounds |
| Transfers for disposal: | 159 million pounds |
| Transfers to recycling: | 1,012 million pounds |

**Releases of carcinogens:**

| | |
|---|---|
| Air releases: | 202 million pounds |
| Water releases: | 2 million pounds |
| Land releases: | 8 million pounds |

**Releases to air of ozone depleters:** 207 million pounds

**Releases of bioaccumulators**
(air, water, and land): 3 million pounds

## Pollution Prevention Act Data

The following are aggregate reported quantities of TRI chemicals in waste. This new reporting distinguishes between production-related quantities and those releases that are the result of one-time or catastrophic events (non-production related quantities). Separating these quantities gives a clearer picture of what amounts may be amenable to source reduction efforts.

| | | Percent of Total |
|---|---|---|
| **Total production-related quantities in waste:** | 37.8 billion pounds | |
| Recycled on-site: | 16.4 billion pounds | 43% |
| Recycled off-site: | 3.3 billion pounds | 9% |
| Energy Recovery on-site: | 3.2 billion pounds | 8% |
| Energy Recovery off-site: | 0.5 billion pounds | 1% |
| Treatment on-site: | 9.8 billion pounds | 26% |
| Treatment off-site: | 0.9 billion pounds | 2% |
| Quantity Released: | 3.8 billion pounds | 10% |
| **Top 5 chemicals for total production-related quantities in wastes:** | | |
| Sulfuric acid: | 7.4 billion pounds | |
| Hydrochloric acid: | 2.5 billion pounds | |
| Acetonitrile: | 2.5 billion pounds | |
| Methanol: | 2.5 billion pounds | |
| Toluene: | 1.8 billion pounds | |
| **Non-production related quantities in waste:** | 0.031 billion pounds | |

| | | Percent of Total |
|---|---|---|
| **Facilities reporting source reduction:** | 8,821 | 37% |
| **Forms indicating source reduction:** | 21,381 | 26% |
| **Most commonly reported source reduction activities:** | | |
| Good operating practices: | 9,966 forms | |
| Process modifications: | 8,030 forms | |
| Spill/leak prevention: | 6,071 forms | |
| Raw material modifications: | 4,094 forms | |
| Cleaning and degreasing: | 3,093 forms | |
| **Most commonly reported methods to identify source reduction activities:** | | |
| Participative team management: | 16,692 occurrences | |
| Internal pollution prevention opportunity audit: | 13,782 occurrences | |
| Informal employee recommendations: | 6,911 occurrences | |
| Vendor assistance: | 6,910 occurrences | |

The chemical for which source reduction was reported most frequently was 1,1,1-trichloroethane.

## 1988 - 1991 Comparison Data

Comparisons between 1990 and 1991 are made using a normalized data set of all chemicals reportable in both years. Comparisons between 1988 and 1991 are made using a normalized data set of only those chemicals reportable in all years 1988-1991. Although 1987 was the first year for TRI reporting, 1988 has been selected as the baseline year for comparisons because of concerns about data quality of industry's first-year submissions. Transfer comparisons do not include transfers for energy recovery and recycling, because these were first reportable for 1991.

| | Percent Change 1990-1991 | Percent Change 1988-1991 |
|---|---|---|
| **Total releases:** | - 9 | - 31 |
| Air releases: | - 13 | - 26 |
| Water releases: | + 24 | - 22 |
| Underground injection: | - 5 | - 47 |
| Land releases: | - 9 | - 20 |
| **Transfers for treatment/disposal:** | - 19 | - 34 |
| POTWs: | - 12 | - 28 |
| Treatment: | - 6 | - 28 |
| Disposal: | - 32 | - 39 |
| Number of facilities: | - 3 | + 6 |
| Number of forms: | - 5 | + 5 |

The net increase in water releases from 1990 to 1991 is largely attributable to increased runoff from four fertilizer facilities in Louisiana. Excluding those increases, reported water releases would have decreased about 7% from 1990 to 1991.

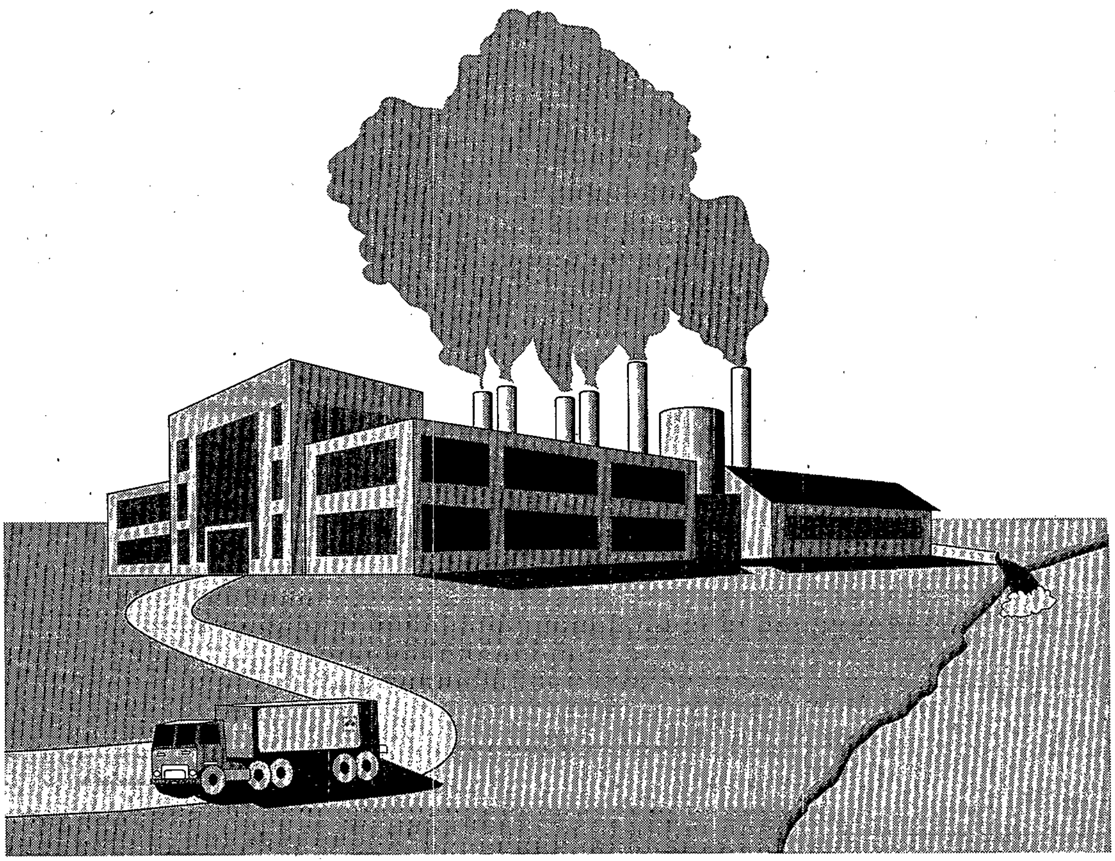
## 33/50 Program Information

The 33/50 Program is a voluntary Government/Industry/Community partnership program of toxics release reduction. The program targets 17 high-priority chemicals for reductions in releases and transfers of 33% by the 1992 TRI reporting year and 50% by the 1995 reporting year, using the 1988 TRI reports as a baseline. Many states, industry associations, and individual companies include 33/50 program chemicals within the scope of their own reduction programs.

Releases and transfers of the 17 targeted chemicals declined by 22% between 1990 and 1991, more than twice the rate of reduction for all other TRI chemicals.

1991 TRI data indicate that the 33/50 Program has reached its 1992 interim reduction goal of 33% a full year early. Releases and transfers of the targeted chemicals have declined 34% since 1988.

# 1991 Toxics Release Inventory Public Data Release Introduction



# 1991 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.

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 includes 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 data entry and data quality assurance activities are completed, 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 1991 and provides basic data from 1988-1990 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.

## 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, rubber and 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 are required to provide additional information about waste management and source reduction activities. New data elements include quantities of the listed chemical treated, recycled, and combusted for energy recovery on-site, quantities transferred off-site for recycling and energy recovery, source reduction activities, and methods used to identify those activities. Availability of these data will provide a more complete picture of total waste generation and management by facilities, and will increase the ability to track progress in moving towards less waste generation and safer management alternatives. Companies must also provide a production index that will help relate changes in reported quantities of toxic chemicals in waste to changes in production.

## WHAT ARE THE BENEFITS AND USES OF THE DATA?

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

Federal, state, and local governments can use the data to compare facilities or geographic areas, to identify hotspots, to evaluate existing environmental programs, to more effectively set regulatory priorities, and to track pollution control and waste reduction progress.

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?

Although the TRI includes over 82,000 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. Although non-manufacturing facilities currently are not required to report, EPA is working to add to the TRI requirement certain non-manufacturing industries, such as mining and electric utilities, that are sources of significant releases of toxic chemicals. Many toxic chemicals, including some chemicals regulated under other environmental statutes, currently are not listed under EPCRA section 313, but are being identified and evaluated for addition to the list.

Some facilities that are required to report their releases and transfers to TRI do not file any reports, and some facilities may file reports for some, but not all, of the chemicals for which they were required to report. Accuracy of release and transfer data may vary from facility to facility and from year to year. Facilities are not required to perform any monitoring to develop TRI estimates, and may use a variety of estimation techniques if actual measurements are not available. EPA's active enforcement efforts have focused to date on facilities that have failed to file. EPA also is initiating more data quality inspections each year.

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.

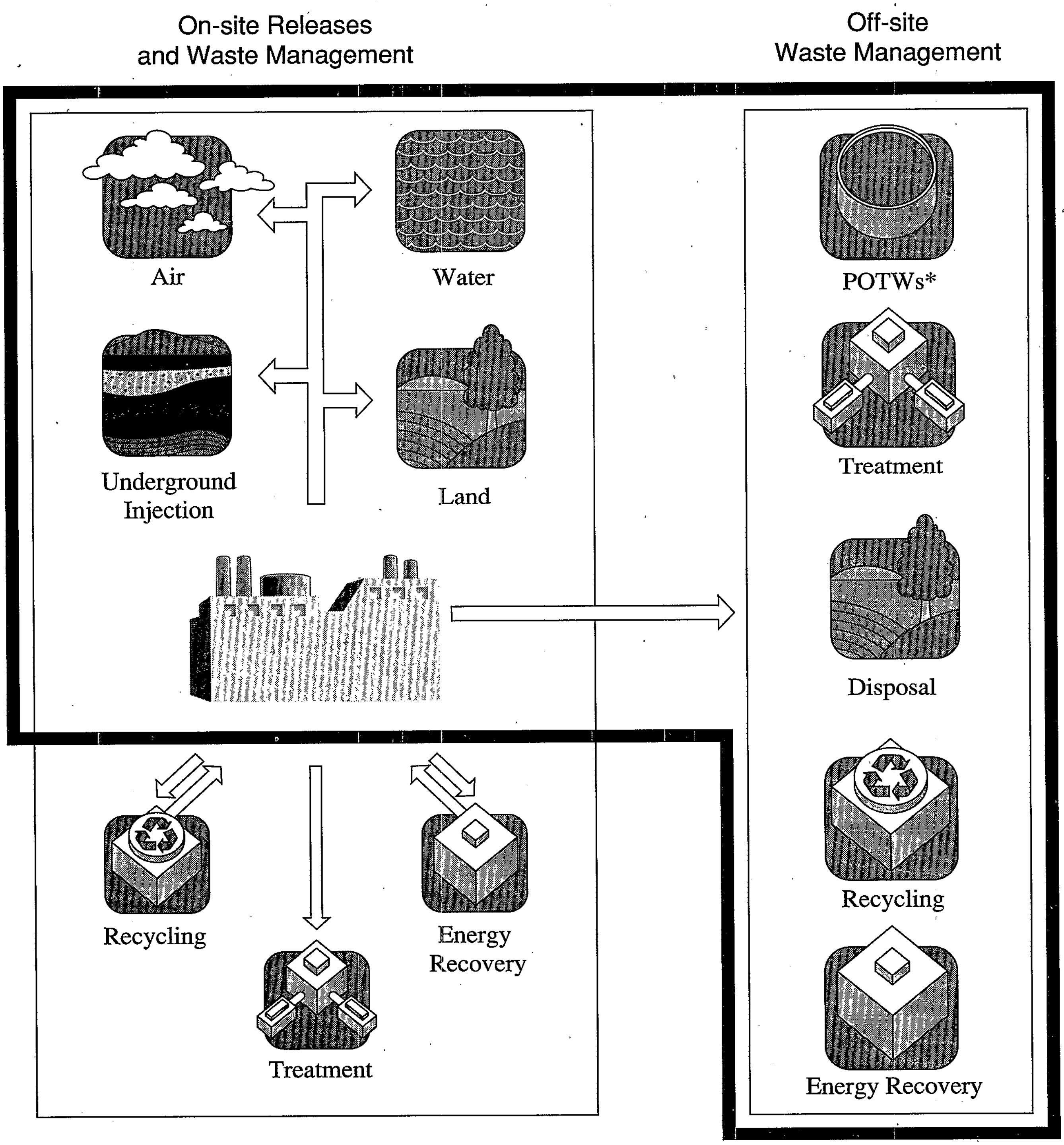
## How Can I Obtain Additional TRI Information?

This report contains 1991 TRI data and limited comparison data for 1988-1990. The TRI database is accessible to the public via on-line telecommunications through the National Library of Medicine's TOXNET system; 1991 data should be available through this system in early June. Information about accessing the TRI database through TOXNET is provided in the Appendix.

Copies of TRI data submitted by facilities can be obtained from the EPA's TRI Reporting Center. Other potential sources of TRI information include the EPA Regional office, the State Section 313 contact, the Local Emergency Planning Committee, the State Emergency Response Commission, or the facility itself. Details about contacting some of these sources are provided in the Appendix.

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.

# Chapter 1
# 1991 TRI Releases and Transfers




* Publicly Owned Treatment Works

# 1991 TRI RELEASES AND TRANSFERS

This chapter provides information reported by facilities for calendar year 1991 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, or recycling. These data are presented in three ways: by chemical; by state; and by industry. A separate section provides data on chemicals that may be of special interest to the public.

In 1991, there were 3.39 billion pounds of toxic chemicals released to the environment, including 2.01 billion pounds emitted to the air, 244 million pounds released to water, 421 million pounds released to land, and 710 million pounds injected underground.

Facilities also sent a total of 3.87 billion pounds of toxic chemicals to off-site facilities for treatment, disposal, energy recovery, and recycling. The bulk of these off-site transfers, 2.35 billion pounds, were sent off-site to be recycled. In addition, 438 million pounds of toxic chemicals were sent off-site for energy recovery, 352 million pounds of toxic chemicals were transferred off-site for treatment, 299 million pounds of toxic chemicals were transferred off-site for disposal, and 412 million pounds were sent to publicly-owned-treatment works.

Under TRI, facilities have been required to report off-site transfers of toxic chemicals for treatment or disposal. The 1991 reporting year was the first year in which facilities subject to TRI reporting were also required to report on the amounts of toxic chemicals that were sent off-site for the purposes of energy recovery or recycling. This new information, required by the Pollution Prevention Act, provides a more complete picture of toxic chemicals in wastes that are sent off-site by facilities subject to TRI. Although the total reported transfers in this chapter are significantly larger than total transfers reported in previous years, this does not represent an increase in the amounts of toxic chemicals in wastes sent off-site for treatment or disposal, but rather the inclusion of the new off-site transfer data.

In addition to the new information on off-site transfers, the Pollution Prevention Act also required information on the on-site management of toxic chemicals in wastes and efforts to prevent or reduce the amounts of toxic chemicals entering wastes. This new information is discussed in the next chapter.

## TRI Chemicals Newly Listed For 1991

This chapter contains release information on all chemicals currently listed on EPCRA section 313, including the following chemicals that were first reportable in the 1991 reporting year:

Bromochlorodifluoromethane (Halon 1211)
Bromotrifluoromethane (Halon 1301)
Dibromotetrafluoroethane (Halon 2402)
Dichlorodifluoromethane (CFC-12)
Dichlorotetrafluoroethane (CFC-114)
Monochloropentafluoroethane (CFC-115)
Trichlorofluoromethane (CFC-11)

Data on releases and transfers of these ozone depleters are highlighted in Tables 1-27 and 1-28.

## 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, and releases at the facility to land and underground injection wells.

*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.

*Releases to Land*

Releases to land occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals in wastes in a landfill (in which waste is buried), land treatment/ application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), and surface impoundment (which is an uncovered holding area used to volatilize and/or settle waste materials).

*Underground Injection*

Underground injection is the disposal of fluids by the subsurface placement of the fluids in a well. Wastes containing EPCRA section 313 chemicals are either injected into 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. Wastes containing EPCRA section 313 chemicals are not disposed of in other classes of wells (i.e., Class II-IV).

## Off-site Transfers

An off-site transfer is a transfer of the 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 represent entry of the chemical into the environment.

*Transfers to Publicly Owned Treatment Works (POTW)*

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 chemical and 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. Not all chemicals on EPCRA section 313 can be treated by a POTW. Those that are not removed by treatment are released by the POTW to surface waters.

*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, 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 injected underground.

*Transfers Off-site for Recycling [This is a new TRI data element]*

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 [This is a new TRI data element]*

Toxic chemicals in waste sent off-site for purposes of energy recovery are combusted off-site in industrial furnaces (including kilns) or boilers that generate energy for use at that location. Chemicals that are not combustible, such as metals, metal compounds, CFCs and halons, should not be reported as transferred off-site for energy recovery. Treatment of a chemical by incineration is not considered to be energy recovery.

*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 recycing) 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 can be used to determine the potential risks that may result from releases and transfers of toxic chemicals. The determination of potential risk depends upon many factors. 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 not-significantly 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.

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

  Sunlight, heat, or microorganisms may or may not decompose the chemical. Exposure to a chemical is also dependent upon how long the chemical remains unchanged in the environment.

  - 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; other chemicals, such as di-n-octyl phthalate, will disperse rather than bioconcentrate in higher organisms.

- **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 publicly owned treatment works (POTWs) may result in exposure if chemicals are not removed through treatment processes and are released by 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 permanent landfills and underground wells in which toxic chemicals in wastes are injected into rock below underground sources of drinking water may reduce the potential exposure from land disposal.

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

- **The location of the off-site facility receiving the chemical and the type and 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 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. 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.

Table 1-1. TRI Releases, 1991.

| 1991 Releases | Pounds |
|---|---|
| Total Releases | 3,385,873,118 |
| Air Emissions | 2,010,554,065 |
| Surface Water Discharges | 243,513,772 |
| Underground Injection | 710,377,137 |
| Releases to Land | 421,428,144 |

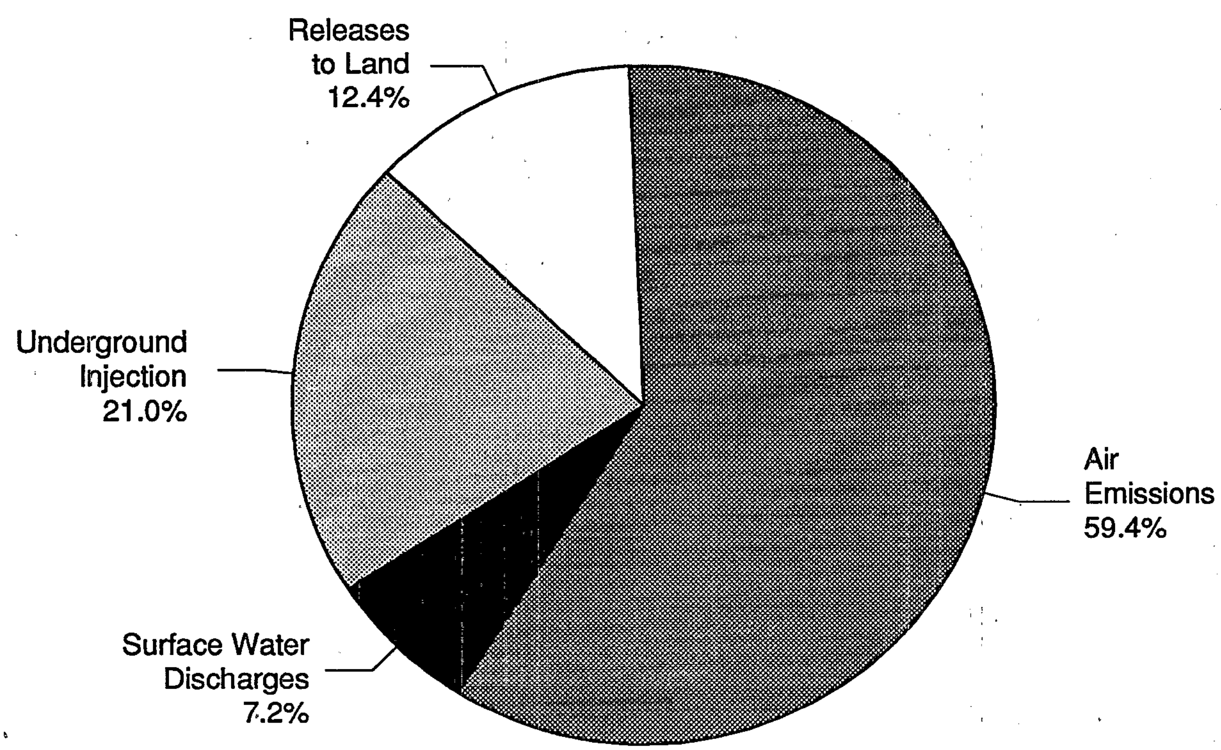



Figure 1-1. TRI Releases, 1991.

Table 1-2. TRI Transfers, 1991.

| 1991 Transfers | Pounds |
|---|---|
| Total Transfers | 3,865,281,524 |
| Transfers to POTWs | 411,907,098 |
| Transfers to Treatment | 352,433,168 |
| Transfers to Disposal | 299,042,451 |
| Transfers to Energy Recovery | 438,225,342 |
| Transfers to Recycling | 2,354,123,586 |
| Other Off-site Transfers | 9,549,879 |

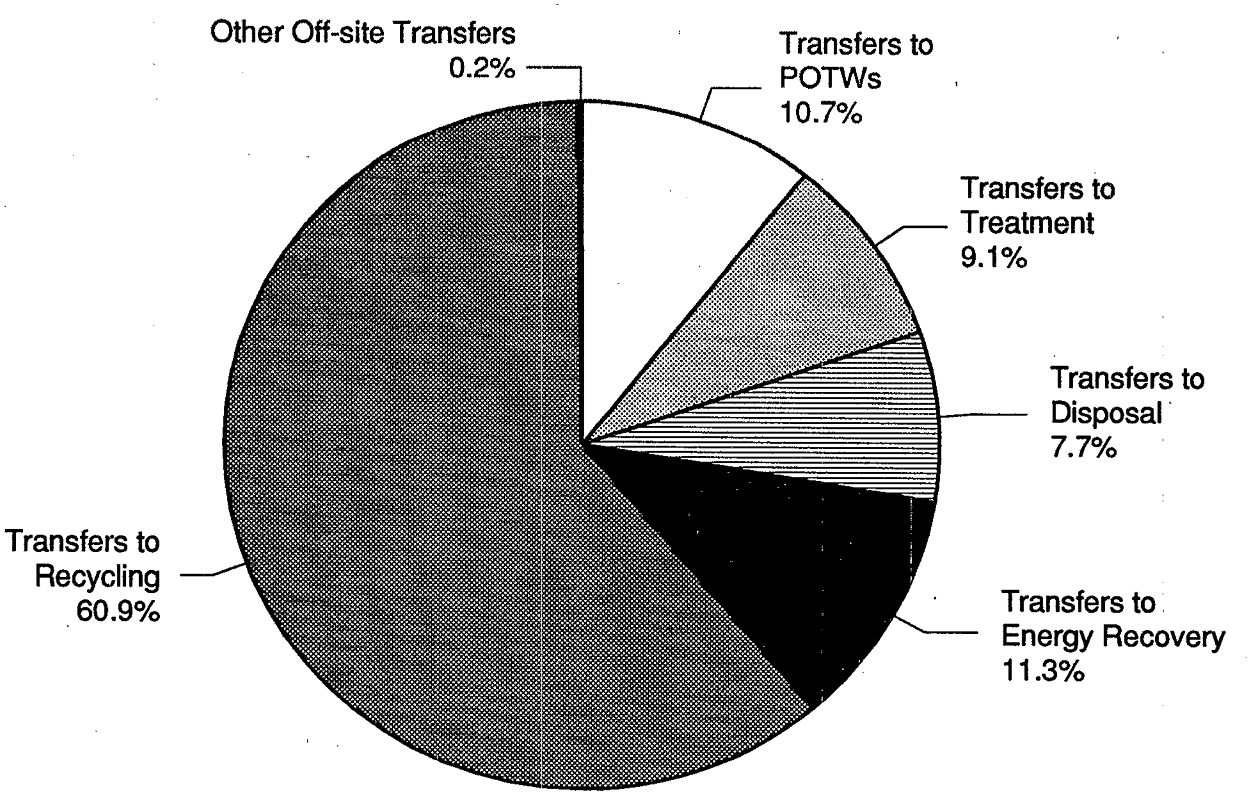



Figure 1-2. TRI Transfers, 1991.

# THE 1991 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE

## *1991 Releases and Transfers by State*

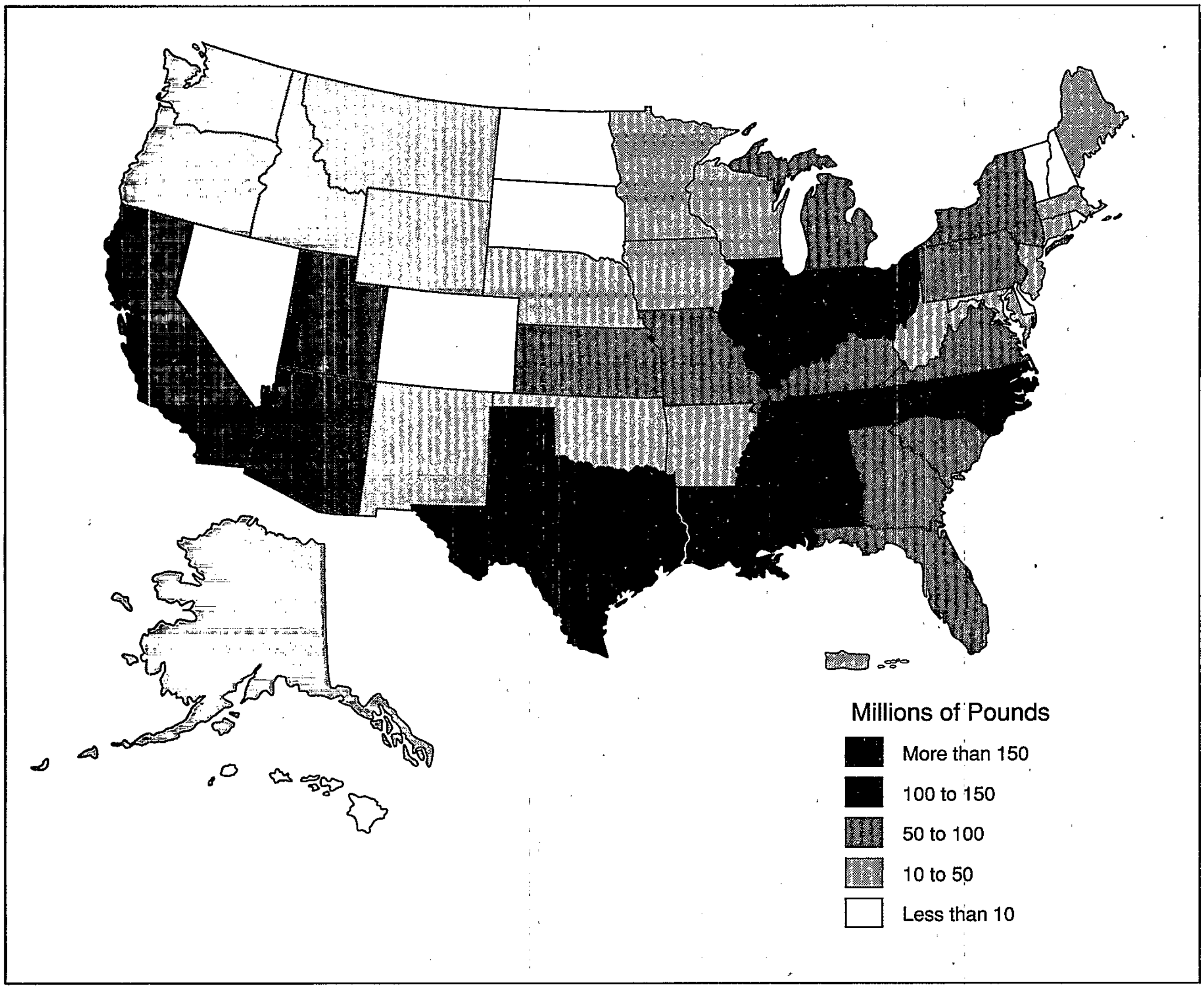



**Figure 1-3. TRI Releases by State, 1991.**

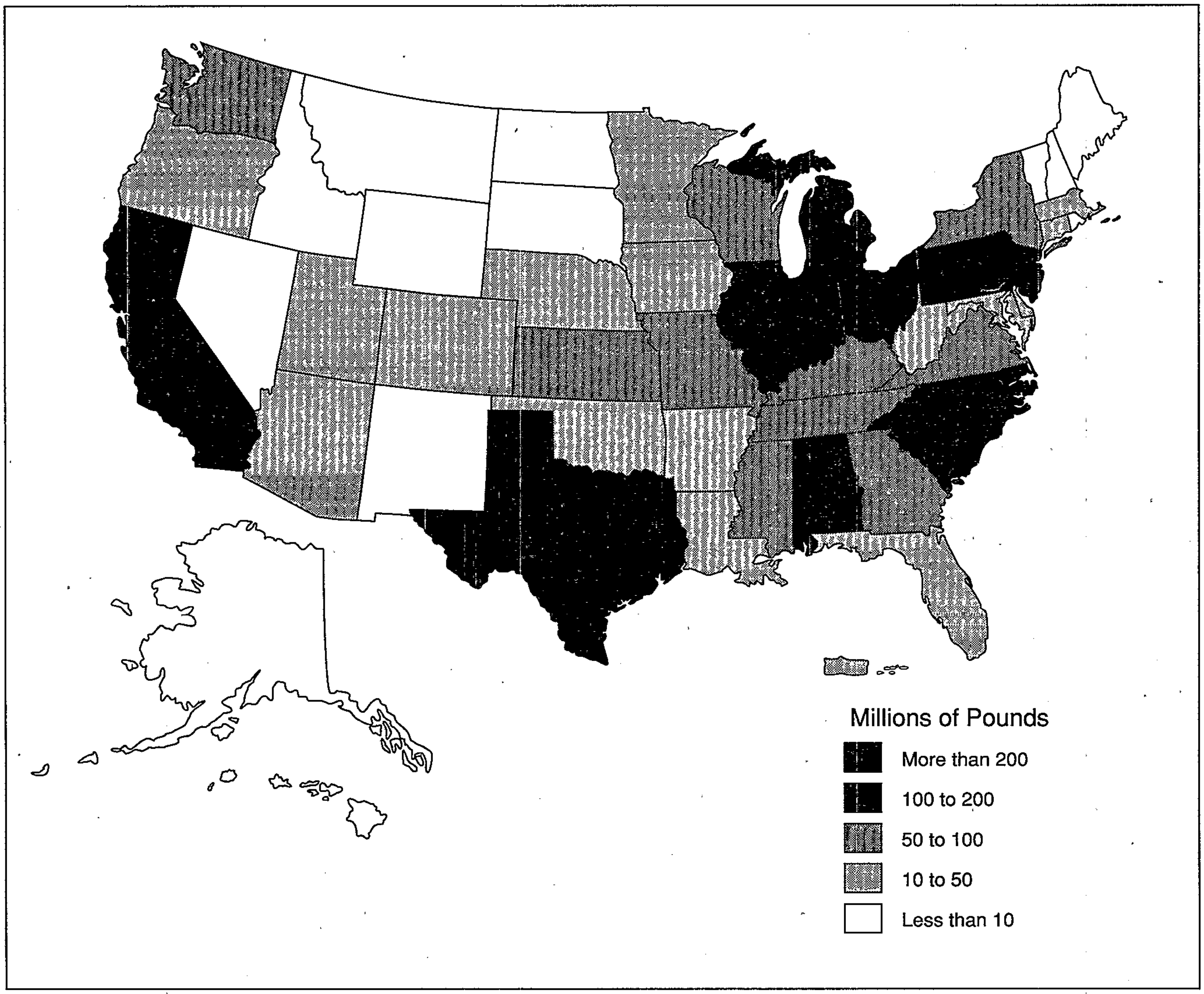



**Figure 1-4. TRI Transfers by State, 1991.**

**Table 1-3. TRI Releases by State, 1991 (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 | 16,580,199 | 82,578,637 | 4,264,358 | 7,988,920 | 6,662,537 | 118,074,651 |
| Alaska | 582,728 | 12,643,715 | 4,795,953 | 150 | 4,132 | 18,026,678 |
| American Samoa | 22,000 | 0 | 0 | 0 | 0 | 22,000 |
| Arizona | 4,487,344 | 5,022,927 | 32,960 | 0 | 53,310,818 | 62,854,049 |
| Arkansas | 9,072,344 | 22,347,516 | 2,424,306 | 14,031,499 | 1,692,933 | 49,568,598 |
| California | 31,444,873 | 35,856,384 | 10,232,335 | 1,944,661 | 8,722,943 | 88,201,196 |
| Colorado | 2,754,475 | 3,318,751 | 195,424 | 500 | 514,465 | 6,783,615 |
| Connecticut | 6,870,076 | 9,388,954 | 3,902,429 | 50 | 3,345 | 20,164,854 |
| Delaware | 1,496,345 | 4,380,793 | 349,040 | 0 | 155,180 | 6,381,358 |
| Florida | 14,797,254 | 23,444,346 | 3,147,409 | 13,728,636 | 32,737,051 | 87,854,696 |
| Georgia | 13,526,226 | 44,514,716 | 4,728,313 | 0 | 1,155,194 | 63,924,449 |
| Hawaii | 438,180 | 141,478 | 17,029 | 235,199 | 81,200 | 913,086 |
| Idaho | 974,270 | 5,151,603 | 119,934 | 0 | 3,880,780 | 10,126,587 |
| Illinois | 27,542,663 | 54,164,438 | 6,438,552 | 16,199,676 | 18,591,746 | 122,937,075 |
| Indiana | 38,159,600 | 58,165,907 | 1,723,434 | 2,360,830 | 36,009,003 | 136,418,774 |
| Iowa | 6,407,397 | 28,701,215 | 2,001,525 | 0 | 1,789,953 | 38,900,090 |
| Kansas | 8,485,733 | 19,372,658 | 921,578 | 44,938,711 | 1,235,203 | 74,953,883 |
| Kentucky | 11,385,737 | 27,200,204 | 682,699 | 22,000,000 | 1,645,414 | 62,914,054 |
| Louisiana | 21,845,216 | 76,977,192 | 161,287,666 | 196,607,237 | 1,850,432 | 458,567,743 |
| Maine | 2,451,528 | 11,541,829 | 813,197 | 0 | 876,354 | 15,682,908 |
| Maryland | 4,478,187 | 7,078,279 | 682,953 | 0 | 1,293,351 | 13,532,770 |
| Massachusetts | 6,412,932 | 10,020,869 | 396,842 | 0 | 167,019 | 16,997,662 |
| Michigan | 18,598,896 | 51,851,274 | 944,817 | 6,699,997 | 13,943,692 | 92,038,676 |
| Minnesota | 7,350,164 | 32,030,987 | 838,399 | 0 | 1,432,241 | 41,651,791 |
| Mississippi | 13,746,569 | 42,198,692 | 2,173,830 | 48,371,556 | 5,607,356 | 112,098,003 |
| Missouri | 10,605,454 | 24,431,418 | 1,230,337 | 0 | 23,823,821 | 60,091,030 |
| Montana | 1,552,443 | 808,406 | 147,484 | 0 | 38,533,803 | 41,042,136 |
| Nebraska | 3,769,064 | 11,008,508 | 385,629 | 0 | 395,026 | 15,558,227 |
| Nevada | 447,056 | 543,444 | 250 | 0 | 2,435,160 | 3,425,910 |
| New Hampshire | 1,861,622 | 3,442,431 | 44,361 | 0 | 38,328 | 5,386,742 |
| New Jersey | 8,239,096 | 13,822,245 | 493,623 | 1 | 547,802 | 23,102,767 |
| New Mexico | 601,965 | 1,697,575 | 9,992 | 750 | 37,670,985 | 39,981,267 |
| New York | 21,158,898 | 43,526,898 | 1,656,018 | 38 | 1,742,285 | 68,084,137 |
| North Carolina | 20,133,754 | 63,499,937 | 781,249 | 0 | 23,599,855 | 108,014,795 |
| North Dakota | 582,348 | 1,214,279 | 79,557 | 0 | 22,750 | 1,898,934 |
| Ohio | 33,214,660 | 66,996,655 | 6,055,535 | 29,417,995 | 35,462,806 | 171,147,651 |
| Oklahoma | 5,398,061 | 18,428,487 | 509,137 | 2,597,370 | 8,366,323 | 35,299,378 |
| Oregon | 4,937,250 | 12,557,412 | 386,156 | 0 | 1,331,309 | 19,212,127 |
| Pennsylvania | 28,452,750 | 38,363,869 | 1,225,774 | 0 | 7,832,148 | 75,874,541 |
| Puerto Rico | 8,690,832 | 7,981,641 | 119,408 | 250 | 130,650 | 16,922,781 |
| Rhode Island | 2,668,383 | 1,682,723 | 121,277 | 0 | 24,147 | 4,496,530 |
| South Carolina | 17,463,068 | 44,452,404 | 1,210,766 | 0 | 1,069,601 | 64,195,839 |
| South Dakota | 377,674 | 2,261,739 | 9,038 | 0 | 32,790 | 2,681,241 |
| Tennessee | 53,306,877 | 86,310,304 | 3,622,533 | 69,568,902 | 2,417,820 | 215,226,436 |
| Texas | 79,402,956 | 89,520,877 | 2,889,837 | 225,032,087 | 13,767,951 | 410,613,708 |
| Utah | 5,000,623 | 69,550,357 | 120,656 | 0 | 23,722,951 | 98,394,587 |
| Vermont | 298,726 | 611,615 | 44,250 | 0 | 57,189 | 1,011,780 |
| Virgin Islands | 794,692 | 315,396 | 394,318 | 0 | 15,610 | 1,520,016 |
| Virginia | 17,716,400 | 49,592,240 | 2,251,200 | 0 | 2,022,165 | 71,582,005 |
| Washington | 10,392,763 | 15,738,122 | 4,355,925 | 5 | 156,331 | 30,643,146 |
| West Virginia | 10,359,757 | 16,758,644 | 1,436,226 | 0 | 354,546 | 28,909,173 |
| Wisconsin | 8,114,196 | 29,012,764 | 712,079 | 25 | 2,324,940 | 40,164,004 |
| Wyoming | 927,092 | 1,950,915 | 106,175 | 8,652,092 | 166,710 | 11,802,984 |
| Total | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

**Table 1-4. TRI Transfers by State, 1991 (Alphabetically Ordered).**

| State | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|
| Alabama | 945,395 | 9,456,286 | 5,841,317 | 45,325,310 | 39,335,023 | 148,902 | 101,052,233 |
| Alaska | 0 | 1,036 | 20 | 0 | 0 | 0 | 1,056 |
| American Samoa | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Arizona | 475,907 | 1,138,509 | 80,969 | 815,522 | 23,873,872 | 42,191 | 26,426,970 |
| Arkansas | 576,892 | 2,246,527 | 2,292,016 | 3,520,143 | 30,854,407 | 4,124 | 39,494,109 |
| California | 28,349,693 | 6,329,931 | 8,906,422 | 13,625,824 | 131,519,474 | 312,378 | 189,043,722 |
| Colorado | 460,138 | 1,805,943 | 1,059,679 | 1,323,698 | 6,895,802 | 165,500 | 11,710,760 |
| Connecticut | 1,566,744 | 6,324,365 | 1,041,153 | 3,586,484 | 22,581,871 | 191,209 | 35,291,826 |
| Delaware | 2,344,905 | 806,462 | 28,741 | 1,186,088 | 7,045,571 | 0 | 11,411,767 |
| Florida | 13,860,357 | 7,112,699 | 2,590,989 | 4,855,937 | 15,097,568 | 18,154 | 43,535,704 |
| Georgia | 8,353,426 | 3,361,216 | 8,762,511 | 6,874,235 | 53,318,134 | 258,138 | 80,927,660 |
| Hawaii | 26,253 | 20 | 12,388 | 185 | 42,781 | 0 | 81,627 |
| Idaho | 1,246,330 | 61,501 | 5,065 | 283,187 | 475,283 | 0 | 2,071,366 |
| Illinois | 59,457,320 | 15,510,816 | 20,810,237 | 26,383,842 | 75,500,327 | 346,944 | 198,009,486 |
| Indiana | 5,761,241 | 35,159,725 | 10,435,579 | 19,408,585 | 294,438,283 | 1,378,073 | 366,581,486 |
| Iowa | 8,313,212 | 2,525,595 | 1,832,804 | 4,163,659 | 16,115,605 | 43,392 | 32,994,267 |
| Kansas | 1,951,405 | 3,017,996 | 43,694,705 | 1,548,678 | 32,746,921 | 1,660 | 82,961,365 |
| Kentucky | 1,942,905 | 6,698,250 | 7,184,087 | 5,351,092 | 59,278,568 | 807,733 | 81,262,635 |
| Louisiana | 112,305 | 9,381,126 | 4,317,925 | 5,127,982 | 28,730,868 | 9,627 | 47,679,833 |
| Maine | 794,917 | 474,453 | 1,081,428 | 298,665 | 2,589,437 | 9,600 | 5,248,500 |
| Maryland | 4,589,080 | 2,058,549 | 725,963 | 1,624,448 | 24,973,328 | 4,483 | 33,975,851 |
| Massachusetts | 5,708,676 | 4,993,072 | 2,358,484 | 6,707,841 | 15,797,249 | 199,355 | 35,764,677 |
| Michigan | 14,692,799 | 22,427,390 | 22,974,160 | 60,116,674 | 75,910,180 | 659,742 | 196,780,945 |
| Minnesota | 4,834,431 | 2,120,595 | 966,720 | 3,566,433 | 19,361,828 | 24,730 | 30,874,737 |
| Mississippi | 1,200,612 | 1,921,390 | 709,018 | 3,724,518 | 44,557,507 | 93,194 | 52,206,239 |
| Missouri | 26,111,983 | 6,317,491 | 2,110,458 | 9,753,464 | 31,805,124 | 134,441 | 76,232,961 |
| Montana | 10,650 | 156,360 | 78,681 | 184,211 | 2,874,853 | 0 | 3,304,755 |
| Nebraska | 1,295,342 | 3,875,356 | 4,098,986 | 1,004,157 | 13,640,100 | 6,866 | 23,920,807 |
| Nevada | 8,612 | 16,234 | 40,583 | 8,274 | 387,776 | 800 | 462,279 |
| New Hampshire | 451,079 | 1,601,771 | 391,659 | 329,446 | 3,633,242 | 38,650 | 6,445,847 |
| New Jersey | 44,204,143 | 17,653,135 | 2,458,127 | 22,512,174 | 93,159,759 | 176,797 | 180,164,135 |
| New Mexico | 90,891 | 60,776 | 31,920 | 147,996 | 198,644 | 25,444 | 555,671 |
| New York | 11,311,332 | 8,928,910 | 5,900,633 | 9,847,093 | 41,997,009 | 157,452 | 78,142,429 |
| North Carolina | 5,465,648 | 7,586,054 | 3,960,381 | 8,311,606 | 109,326,810 | 195,628 | 134,846,127 |
| North Dakota | 108,820 | 38,860 | 5,070 | 36,120 | 31,750 | 399 | 221,019 |
| Ohio | 45,038,807 | 44,941,803 | 22,650,421 | 26,439,909 | 319,626,185 | 189,512 | 458,886,637 |
| Oklahoma | 156,243 | 1,929,808 | 13,090,567 | 1,303,266 | 16,986,379 | 250 | 33,466,513 |
| Oregon | 4,133,808 | 949,589 | 4,059,878 | 457,922 | 8,109,370 | 56,016 | 17,766,583 |
| Pennsylvania | 15,505,272 | 33,660,701 | 17,192,967 | 16,703,984 | 210,783,647 | 231,317 | 294,077,888 |
| Puerto Rico | 6,206,477 | 7,977,747 | 461,490 | 6,400,370 | 11,914,110 | 250 | 32,960,444 |
| Rhode Island | 678,929 | 734,009 | 336,988 | 462,785 | 6,877,389 | 16,602 | 9,106,702 |
| South Carolina | 3,646,939 | 7,075,642 | 3,006,742 | 6,774,721 | 82,274,965 | 355,874 | 103,134,883 |
| South Dakota | 199,789 | 32,626 | 41,771 | 207,533 | 216,054 | 21,150 | 718,923 |
| Tennessee | 17,489,150 | 5,011,931 | 17,851,458 | 8,522,817 | 30,097,377 | 1,753,189 | 80,725,922 |
| Texas | 30,863,548 | 42,273,079 | 35,621,960 | 71,008,321 | 165,505,214 | 1,287,370 | 346,559,492 |
| Utah | 572,366 | 929,934 | 2,305,443 | 379,910 | 28,835,045 | 12,000 | 33,034,698 |
| Vermont | 35,707 | 673,321 | 29,477 | 73,460 | 2,158,192 | 4,400 | 2,974,557 |
| Virgin Islands | 0 | 173 | 0 | 0 | 376,488 | 0 | 376,661 |
| Virginia | 20,831,067 | 3,097,201 | 2,028,579 | 10,341,187 | 25,320,804 | 45,845 | 61,664,683 |
| Washington | 383,361 | 1,745,436 | 843,120 | 804,281 | 67,675,647 | 4,311 | 71,456,156 |
| West Virginia | 1,840,770 | 2,416,754 | 2,951,693 | 7,404,858 | 25,564,125 | 3,684 | 40,181,884 |
| Wisconsin | 7,528,307 | 7,813,947 | 9,778,535 | 9,382,150 | 33,707,641 | 112,503 | 68,323,083 |
| Wyoming | 173,115 | 1,068 | 2,484 | 4,297 | 0 | 0 | 180,964 |
| Total | 411,907,098 | 352,433,168 | 299,042,451 | 438,225,342 | 2,354,123,586 | 9,549,879 | 3,865,281,524 |

**Table 1-5. TRI Releases by State, 1991 (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 | 21,845,216 | 76,977,192 | 161,287,666 | 196,607,237 | 1,850,432 | 458,567,743 |
| Texas | 79,402,956 | 89,520,877 | 2,889,837 | 225,032,087 | 13,767,951 | 410,613,708 |
| Tennessee | 53,306,877 | 86,310,304 | 3,622,533 | 69,568,902 | 2,417,820 | 215,226,436 |
| Ohio | 33,214,660 | 66,996,655 | 6,055,535 | 29,417,995 | 35,462,806 | 171,147,651 |
| Indiana | 38,159,600 | 58,165,907 | 1,723,434 | 2,360,830 | 36,009,003 | 136,418,774 |
| Illinois | 27,542,663 | 54,164,438 | 6,438,552 | 16,199,676 | 18,591,746 | 122,937,075 |
| Alabama | 16,580,199 | 82,578,637 | 4,264,358 | 7,988,920 | 6,662,537 | 118,074,651 |
| Mississippi | 13,746,569 | 42,198,692 | 2,173,830 | 48,371,556 | 5,607,356 | 112,098,003 |
| North Carolina | 20,133,754 | 63,499,937 | 781,249 | 0 | 23,599,855 | 108,014,795 |
| Utah | 5,000,623 | 69,550,357 | 120,656 | 0 | 23,722,951 | 98,394,587 |
| Michigan | 18,598,896 | 51,851,274 | 944,817 | 6,699,997 | 13,943,692 | 92,038,676 |
| California | 31,444,873 | 35,856,384 | 10,232,335 | 1,944,661 | 8,722,943 | 88,201,196 |
| Florida | 14,797,254 | 23,444,346 | 3,147,409 | 13,728,636 | 32,737,051 | 87,854,696 |
| Pennsylvania | 28,452,750 | 38,363,869 | 1,225,774 | 0 | 7,832,148 | 75,874,541 |
| Kansas | 8,485,733 | 19,372,658 | 921,578 | 44,938,711 | 1,235,203 | 74,953,883 |
| Virginia | 17,716,400 | 49,592,240 | 2,251,200 | 0 | 2,022,165 | 71,582,005 |
| New York | 21,158,898 | 43,526,898 | 1,656,018 | 38 | 1,742,285 | 68,084,137 |
| South Carolina | 17,463,068 | 44,452,404 | 1,210,766 | 0 | 1,069,601 | 64,195,839 |
| Georgia | 13,526,226 | 44,514,716 | 4,728,313 | 0 | 1,155,194 | 63,924,449 |
| Kentucky | 11,385,737 | 27,200,204 | 682,699 | 22,000,000 | 1,645,414 | 62,914,054 |
| Arizona | 4,487,344 | 5,022,927 | 32,960 | 0 | 53,310,818 | 62,854,049 |
| Missouri | 10,605,454 | 24,431,418 | 1,230,337 | 0 | 23,823,821 | 60,091,030 |
| Arkansas | 9,072,344 | 22,347,516 | 2,424,306 | 14,031,499 | 1,692,933 | 49,568,598 |
| Minnesota | 7,350,164 | 32,030,987 | 838,399 | 0 | 1,432,241 | 41,651,791 |
| Montana | 1,552,443 | 808,406 | 147,484 | 0 | 38,533,803 | 41,042,136 |
| Wisconsin | 8,114,196 | 29,012,764 | 712,079 | 25 | 2,324,940 | 40,164,004 |
| New Mexico | 601,965 | 1,697,575 | 9,992 | 750 | 37,670,985 | 39,981,267 |
| Iowa | 6,407,397 | 28,701,215 | 2,001,525 | 0 | 1,789,953 | 38,900,090 |
| Oklahoma | 5,398,061 | 18,428,487 | 509,137 | 2,597,370 | 8,366,323 | 35,299,378 |
| Washington | 10,392,763 | 15,738,122 | 4,355,925 | 5 | 156,331 | 30,643,146 |
| West Virginia | 10,359,757 | 16,758,644 | 1,436,226 | 0 | 354,546 | 28,909,173 |
| New Jersey | 8,239,096 | 13,822,245 | 493,623 | 1 | 547,802 | 23,102,767 |
| Connecticut | 6,870,076 | 9,388,954 | 3,902,429 | 50 | 3,345 | 20,164,854 |
| Oregon | 4,937,250 | 12,557,412 | 386,156 | 0 | 1,331,309 | 19,212,127 |
| Alaska | 582,728 | 12,643,715 | 4,795,953 | 150 | 4,132 | 18,026,678 |
| Massachusetts | 6,412,932 | 10,020,869 | 396,842 | 0 | 167,019 | 16,997,662 |
| Puerto Rico | 8,690,832 | 7,981,641 | 119,408 | 250 | 130,650 | 16,922,781 |
| Maine | 2,451,528 | 11,541,829 | 813,197 | 0 | 876,354 | 15,682,908 |
| Nebraska | 3,769,064 | 11,008,508 | 385,629 | 0 | 395,026 | 15,558,227 |
| Maryland | 4,478,187 | 7,078,279 | 682,953 | 0 | 1,293,351 | 13,532,770 |
| Wyoming | 927,092 | 1,950,915 | 106,175 | 8,652,092 | 166,710 | 11,802,984 |
| Idaho | 974,270 | 5,151,603 | 119,934 | 0 | 3,880,780 | 10,126,587 |
| Colorado | 2,754,475 | 3,318,751 | 195,424 | 500 | 514,465 | 6,783,615 |
| Delaware | 1,496,345 | 4,380,793 | 349,040 | 0 | 155,180 | 6,381,358 |
| New Hampshire | 1,861,622 | 3,442,431 | 44,361 | 0 | 38,328 | 5,386,742 |
| Rhode Island | 2,668,383 | 1,682,723 | 121,277 | 0 | 24,147 | 4,496,530 |
| Nevada | 447,056 | 543,444 | 250 | 0 | 2,435,160 | 3,425,910 |
| South Dakota | 377,674 | 2,261,739 | 9,038 | 0 | 32,790 | 2,681,241 |
| North Dakota | 582,348 | 1,214,279 | 79,557 | 0 | 22,750 | 1,898,934 |
| Virgin Islands | 794,692 | 315,396 | 394,318 | 0 | 15,610 | 1,520,016 |
| Vermont | 298,726 | 611,615 | 44,250 | 0 | 57,189 | 1,011,780 |
| Hawaii | 438,180 | 141,478 | 17,029 | 235,199 | 81,200 | 913,086 |
| American Samoa | 22,000 | 0 | 0 | 0 | 0 | 22,000 |
| Total | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

**Table 1-6. TRI Releases to Air, Water, and Land by State, 1991 (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 | 98,822,408 | 161,287,666 | 1,850,432 | 261,960,506 |
| Texas | 168,923,833 | 2,889,837 | 13,767,951 | 185,581,621 |
| Tennessee | 139,617,181 | 3,622,533 | 2,417,820 | 145,657,534 |
| Ohio | 100,211,315 | 6,055,535 | 35,462,806 | 141,729,656 |
| Indiana | 96,325,507 | 1,723,434 | 36,009,003 | 134,057,944 |
| Alabama | 99,158,836 | 4,264,358 | 6,662,537 | 110,085,731 |
| North Carolina | 83,633,691 | 781,249 | 23,599,855 | 108,014,795 |
| Illinois | 81,707,101 | 6,438,552 | 18,591,746 | 106,737,399 |
| Utah | 74,550,980 | 120,656 | 23,722,951 | 98,394,587 |
| California | 67,301,257 | 10,232,335 | 8,722,943 | 86,256,535 |
| Michigan | 70,450,170 | 944,817 | 13,943,692 | 85,338,679 |
| Pennsylvania | 66,816,619 | 1,225,774 | 7,832,148 | 75,874,541 |
| Florida | 38,241,600 | 3,147,409 | 32,737,051 | 74,126,060 |
| Virginia | 67,308,640 | 2,251,200 | 2,022,165 | 71,582,005 |
| New York | 64,685,796 | 1,656,018 | 1,742,285 | 68,084,099 |
| South Carolina | 61,915,472 | 1,210,766 | 1,069,601 | 64,195,839 |
| Georgia | 58,040,942 | 4,728,313 | 1,155,194 | 63,924,449 |
| Mississippi | 55,945,261 | 2,173,830 | 5,607,356 | 63,726,447 |
| Arizona | 9,510,271 | 32,960 | 53,310,818 | 62,854,049 |
| Missouri | 35,036,872 | 1,230,337 | 23,823,821 | 60,091,030 |
| Minnesota | 39,381,151 | 838,399 | 1,432,241 | 41,651,791 |
| Montana | 2,360,849 | 147,484 | 38,533,803 | 41,042,136 |
| Kentucky | 38,585,941 | 682,699 | 1,645,414 | 40,914,054 |
| Wisconsin | 37,126,960 | 712,079 | 2,324,940 | 40,163,979 |
| New Mexico | 2,299,540 | 9,992 | 37,670,985 | 39,980,517 |
| Iowa | 35,108,612 | 2,001,525 | 1,789,953 | 38,900,090 |
| Arkansas | 31,419,860 | 2,424,306 | 1,692,933 | 35,537,099 |
| Oklahoma | 23,826,548 | 509,137 | 8,366,323 | 32,702,008 |
| Washington | 26,130,885 | 4,355,925 | 156,331 | 30,643,141 |
| Kansas | 27,858,391 | 921,578 | 1,235,203 | 30,015,172 |
| West Virginia | 27,118,401 | 1,436,226 | 354,546 | 28,909,173 |
| New Jersey | 22,061,341 | 493,623 | 547,802 | 23,102,766 |
| Connecticut | 16,259,030 | 3,902,429 | 3,345 | 20,164,804 |
| Oregon | 17,494,662 | 386,156 | 1,331,309 | 19,212,127 |
| Alaska | 13,226,443 | 4,795,953 | 4,132 | 18,026,528 |
| Massachusetts | 16,433,801 | 396,842 | 167,019 | 16,997,662 |
| Puerto Rico | 16,672,473 | 119,408 | 130,650 | 16,922,531 |
| Maine | 13,993,357 | 813,197 | 876,354 | 15,682,908 |
| Nebraska | 14,777,572 | 385,629 | 395,026 | 15,558,227 |
| Maryland | 11,556,466 | 682,953 | 1,293,351 | 13,532,770 |
| Idaho | 6,125,873 | 119,934 | 3,880,780 | 10,126,587 |
| Colorado | 6,073,226 | 195,424 | 514,465 | 6,783,115 |
| Delaware | 5,877,138 | 349,040 | 155,180 | 6,381,358 |
| New Hampshire | 5,304,053 | 44,361 | 38,328 | 5,386,742 |
| Rhode Island | 4,351,106 | 121,277 | 24,147 | 4,496,530 |
| Nevada | 990,500 | 250 | 2,435,160 | 3,425,910 |
| Wyoming | 2,878,007 | 106,175 | 166,710 | 3,150,892 |
| South Dakota | 2,639,413 | 9,038 | 32,790 | 2,681,241 |
| North Dakota | 1,796,627 | 79,557 | 22,750 | 1,898,934 |
| Virgin Islands | 1,110,088 | 394,318 | 15,610 | 1,520,016 |
| Vermont | 910,341 | 44,250 | 57,189 | 1,011,780 |
| Hawaii | 579,658 | 17,029 | 81,200 | 677,887 |
| American Samoa | 22,000 | 0 | 0 | 22,000 |
| Total | 2,010,554,065 | 243,513,772 | 421,428,144 | 2,675,495,981 |

**Table 1-7. Receipt of TRI Chemicals in Wastes from Out of State, 1991 (by Total Received).**

| Receiving State | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Received Pounds |
|---|---|---|---|---|---|---|
| Delaware | 136,308 | 52,475 | 0 | 144,700,126 | 0 | 144,888,909 |
| Ohio | 18,212,652 | 11,077,225 | 30,324,252 | 80,322,005 | 319,057 | 140,255,191 |
| Louisiana | 18,551,952 | 4,348,207 | 16,198,492 | 85,987,787 | 5,750 | 125,092,188 |
| Pennsylvania | 7,026,647 | 1,390,015 | 2,426,874 | 103,013,666 | 1,741,435 | 115,598,637 |
| Indiana | 10,788,130 | 6,961,100 | 26,782,074 | 55,294,128 | 146,870 | 99,972,302 |
| Illinois | 6,310,519 | 5,940,239 | 13,331,114 | 68,361,036 | 260,114 | 94,203,022 |
| Alabama | 5,758,037 | 3,061,969 | 13,776,623 | 59,081,523 | 118,640 | 81,796,792 |
| Michigan | 14,137,069 | 2,884,016 | 9,047,802 | 43,541,431 | 106,109 | 69,716,427 |
| Texas | 7,645,417 | 12,125,205 | 3,817,202 | 45,597,068 | 106,961 | 69,291,853 |
| South Carolina | 10,046,851 | 3,203,325 | 27,988,928 | 27,196,259 | 19,086 | 68,454,449 |
| California | 599,344 | 135,157 | 663,850 | 66,124,215 | 47,079 | 67,569,645 |
| New Jersey | 12,855,002 | 426,260 | 15,187,333 | 24,626,194 | 101,096 | 53,195,885 |
| Tennessee | 3,256,719 | 777,089 | 5,931,493 | 34,710,440 | 377,788 | 45,053,529 |
| New York | 2,523,667 | 1,014,780 | 2,144,196 | 37,173,914 | 74,262 | 42,930,819 |
| Wisconsin | 1,298,581 | 208,119 | 7,626,672 | 25,531,873 | 61,362 | 34,726,607 |
| Missouri | 2,188,812 | 35,492 | 7,526,378 | 22,246,373 | 89,295 | 32,086,350 |
| Kentucky | 3,354,596 | 475,873 | 17,807,968 | 7,365,143 | 40,369 | 29,043,949 |
| Georgia | 515,506 | 156,654 | 2,493,049 | 24,370,324 | 182,895 | 27,718,428 |
| West Virginia | 360,579 | 174,687 | 0 | 25,187,037 | 0 | 25,722,303 |
| Virginia | 957,760 | 16,630 | 8,002,980 | 11,656,015 | 484,750 | 21,118,135 |
| Florida | 1,980,074 | 14,602 | 3,472,303 | 13,549,944 | 54,000 | 19,070,923 |
| North Carolina | 593,646 | 155,766 | 7,343,038 | 9,970,432 | 2,684 | 18,065,566 |
| Connecticut | 595,000 | 377,283 | 264,372 | 14,089,614 | 48,385 | 15,374,654 |
| Minnesota | 1,888,797 | 256 | 3,493,367 | 9,497,256 | 164 | 14,879,840 |
| Arkansas | 6,011,719 | 362,364 | 4,795,290 | 1,147,920 | 57,995 | 12,375,288 |
| Montana | 0 | 0 | 0 | 9,863,953 | 0 | 9,863,953 |
| District of Columbia | 0 | 360 | 0 | 9,790,000 | 0 | 9,790,360 |
| Kansas | 194,639 | 116,681 | 4,493,366 | 4,520,945 | 2,420 | 9,328,051 |
| Massachusetts | 1,467,399 | 723,770 | 626,333 | 5,981,232 | 162,533 | 8,961,267 |
| Oklahoma | 1,059,434 | 2,832,426 | 1,359,079 | 3,423,582 | 25,948 | 8,700,469 |
| Washington | 295,000 | 3,099,640 | 85,710 | 2,176,604 | 0 | 5,656,954 |
| Wyoming | 0 | 0 | 0 | 5,000,000 | 0 | 5,000,000 |
| Arizona | 171,999 | 30,228 | 23,022 | 4,682,579 | 12 | 4,907,840 |
| Utah | 336,301 | 2,952,025 | 46,690 | 136,318 | 25,518 | 3,496,852 |
| Rhode Island | 125,166 | 99,533 | 17,046 | 2,946,712 | 1,495 | 3,189,952 |
| Colorado | 214,527 | 2,484 | 542,956 | 2,026,526 | 0 | 2,786,493 |
| Maryland | 201,596 | 192,729 | 57,118 | 1,907,225 | 30,000 | 2,388,668 |
| Iowa | 36,229 | 347,947 | 0 | 1,608,152 | 0 | 1,992,328 |
| Idaho | 233,735 | 150,714 | 0 | 1,105,057 | 0 | 1,489,506 |
| Oregon | 78,490 | 501,434 | 3,784 | 857,288 | 32,290 | 1,473,286 |
| Nevada | 162,321 | 871,507 | 0 | 184,859 | 14 | 1,218,701 |
| Nebraska | 4,524 | 6,250 | 16,348 | 622,428 | 0 | 649,550 |
| New Mexico | 509,890 | 24,250 | 0 | 0 | 0 | 534,140 |
| Mississippi | 727 | 26,407 | 195,379 | 238,579 | 8,055 | 469,147 |
| New Hampshire | 29 | 78,495 | 500 | 25,279 | 0 | 104,303 |
| Alaska | 24,797 | 8 | 16,930 | 0 | 0 | 41,735 |
| Vermont | 9,694 | 600 | 25,800 | 2,915 | 250 | 39,259 |
| South Dakota | 17,761 | 0 | 0 | 3,319 | 0 | 21,080 |
| North Dakota | 0 | 18,322 | 0 | 0 | 0 | 18,322 |
| American Samoa | 0 | 0 | 0 | 7,600 | 0 | 7,600 |
| Maine | 0 | 3,199 | 6 | 1,103 | 0 | 4,308 |
| Hawaii | 0 | 0 | 0 | 0 | 0 | 0 |
| Virgin Islands | 0 | 0 | 0 | 0 | 0 | 0 |
| Puerto Rico | 0 | 0 | 0 | 0 | 0 | 0 |
| Other (a) | 3,878,863 | 871,487 | 1,337,117 | 72,529,170 | 23,835 | 78,640,472 |
| Total | 146,616,505 | 68,325,284 | 239,292,834 | 1,169,983,148 | 4,758,516 | 1,628,976,287 |

**Table 1-8. Transfers of TRI Chemicals in Wastes Out of State, 1991 (by Total Transferred).**

| Transferring State | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Out of State Pounds |
|---|---|---|---|---|---|---|
| Pennsylvania | 15,083,909 | 8,815,922 | 15,499,379 | 145,227,957 | 141,170 | 184,768,337 |
| Texas | 5,018,345 | 5,699,381 | 7,992,233 | 106,751,612 | 228,475 | 125,690,046 |
| Ohio | 22,361,832 | 2,531,743 | 8,494,441 | 80,027,445 | 53,707 | 113,469,168 |
| New Jersey | 6,110,616 | 1,333,140 | 8,091,283 | 75,512,127 | 108,268 | 91,155,434 |
| North Carolina | 4,901,436 | 932,904 | 6,004,698 | 75,301,627 | 71,985 | 87,212,650 |
| Alabama | 6,248,643 | 170,845 | 39,540,821 | 32,715,255 | 53,125 | 78,728,689 |
| Illinois | 6,584,699 | 2,450,363 | 21,116,584 | 47,710,345 | 44,637 | 77,906,628 |
| Michigan | 8,924,133 | 3,100,658 | 30,936,158 | 29,203,512 | 126,960 | 72,291,421 |
| Kentucky | 3,733,319 | 573,673 | 3,839,844 | 50,429,486 | 805,488 | 59,381,810 |
| Indiana | 2,522,535 | 1,931,476 | 6,258,453 | 44,302,565 | 377,515 | 55,392,544 |
| Georgia | 2,811,539 | 1,691,824 | 6,335,695 | 36,520,236 | 8,309 | 47,367,603 |
| Mississippi | 1,874,504 | 291,927 | 3,528,672 | 40,888,462 | 93,194 | 46,676,759 |
| New York | 7,280,133 | 1,483,643 | 7,862,772 | 28,410,772 | 29,388 | 45,066,708 |
| South Carolina | 3,322,896 | 621,998 | 3,398,000 | 37,712,774 | 138 | 45,055,806 |
| Missouri | 4,773,241 | 687,280 | 7,422,005 | 22,283,775 | 117,949 | 35,284,250 |
| Virginia | 2,806,246 | 856,530 | 6,687,569 | 22,970,144 | 38,839 | 33,359,328 |
| Arkansas | 1,955,689 | 1,729,521 | 3,310,570 | 25,339,805 | 750 | 32,336,335 |
| Utah | 467,863 | 47,693 | 374,233 | 28,310,265 | 0 | 29,200,054 |
| Tennessee | 2,102,345 | 5,501,793 | 5,604,416 | 13,130,218 | 1,751,180 | 28,089,952 |
| Maryland | 1,992,627 | 396,759 | 1,604,898 | 19,981,553 | 4,442 | 23,980,279 |
| Florida | 6,757,075 | 1,070,070 | 4,249,126 | 11,546,256 | 1,550 | 23,624,077 |
| Wisconsin | 1,284,137 | 1,557,786 | 7,999,293 | 12,347,948 | 934 | 23,190,098 |
| Connecticut | 5,074,121 | 455,495 | 3,410,852 | 13,682,230 | 191,209 | 22,813,907 |
| California | 1,839,241 | 4,119,162 | 1,676,336 | 13,732,638 | 48,090 | 21,415,467 |
| Kansas | 1,118,355 | 337,252 | 709,260 | 19,147,526 | 255 | 21,312,648 |
| Oklahoma | 1,332,887 | 7,194,028 | 893,498 | 11,610,185 | 0 | 21,030,598 |
| Iowa | 933,334 | 472,525 | 4,142,412 | 15,171,545 | 23,660 | 20,743,476 |
| Louisiana | 4,529,408 | 2,742,184 | 1,874,369 | 11,431,874 | 9,322 | 20,587,157 |
| Arizona | 389,497 | 34,433 | 342,454 | 17,141,535 | 42,176 | 17,950,095 |
| West Virginia | 2,416,647 | 681,252 | 7,210,118 | 7,144,513 | 3,684 | 17,456,214 |
| Minnesota | 911,727 | 518,101 | 3,093,945 | 12,198,984 | 23,730 | 16,746,487 |
| Massachusetts | 2,425,978 | 807,953 | 4,578,033 | 8,338,365 | 77,714 | 16,228,043 |
| Nebraska | 565,735 | 2,029,859 | 958,598 | 11,756,929 | 0 | 15,311,121 |
| Oregon | 374,110 | 3,098,728 | 422,094 | 6,109,389 | 0 | 10,004,321 |
| Rhode Island | 664,712 | 200,077 | 455,105 | 6,500,811 | 16,602 | 7,837,307 |
| Colorado | 1,146,443 | 687,303 | 106,853 | 5,599,662 | 159,800 | 7,700,061 |
| Washington | 131,598 | 586,944 | 509,487 | 6,351,657 | 3,828 | 7,583,514 |
| Delaware | 709,519 | 23,350 | 1,186,088 | 5,402,473 | 0 | 7,321,430 |
| New Hampshire | 1,561,351 | 294,886 | 329,446 | 3,077,238 | 38,650 | 5,301,571 |
| Montana | 156,360 | 69,300 | 184,211 | 2,811,853 | 0 | 3,221,724 |
| Vermont | 669,217 | 28,019 | 73,460 | 2,141,892 | 4,400 | 2,916,988 |
| Maine | 457,053 | 72,514 | 297,915 | 1,460,711 | 9,600 | 2,297,793 |
| Puerto Rico | 155,607 | 377,332 | 0 | 1,026,339 | 0 | 1,559,278 |
| Idaho | 21,666 | 13 | 282,937 | 475,283 | 0 | 779,899 |
| South Dakota | 32,626 | 0 | 207,533 | 216,049 | 21,150 | 477,358 |
| New Mexico | 26,006 | 9,300 | 147,996 | 197,144 | 25,444 | 405,890 |
| Virgin Islands | 173 | 0 | 0 | 376,488 | 0 | 376,661 |
| Nevada | 14,388 | 5 | 8,274 | 181,165 | 800 | 204,632 |
| North Dakota | 38,860 | 4,037 | 36,120 | 31,750 | 399 | 111,166 |
| Hawaii | 20 | 2,250 | 0 | 42,781 | 0 | 45,051 |
| Wyoming | 1,068 | 2,033 | 4,297 | 0 | 0 | 7,398 |
| Alaska | 1,036 | 20 | 0 | 0 | 0 | 1,056 |
| American Samoa | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 146,616,505 | 68,325,284 | 239,292,834 | 1,169,983,148 | 4,758,516 | 1,628,976,287 |

**Table 1-9. Transfers of TRI Chemicals in Wastes Within a State, 1991 (by Total Transferred).**

| State | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Within State Pounds |
|---|---|---|---|---|---|---|
| Indiana | 32,637,190 | 8,504,103 | 13,150,132 | 250,135,718 | 1,000,558 | 305,427,701 |
| Ohio | 22,579,971 | 20,118,678 | 17,945,468 | 239,598,740 | 135,805 | 300,378,662 |
| Texas | 37,254,734 | 29,922,579 | 63,016,088 | 58,753,602 | 1,058,895 | 190,005,898 |
| California | 4,490,690 | 4,787,260 | 11,949,488 | 117,786,836 | 264,288 | 139,278,562 |
| Michigan | 13,503,257 | 19,873,502 | 29,180,516 | 46,706,668 | 532,782 | 109,796,725 |
| Pennsylvania | 18,576,792 | 8,377,045 | 1,204,605 | 65,555,690 | 90,147 | 93,804,279 |
| Washington | 1,613,838 | 256,176 | 294,794 | 61,323,990 | 483 | 63,489,281 |
| Illinois | 8,926,117 | 18,359,874 | 5,267,258 | 27,789,982 | 302,307 | 60,645,538 |
| Kansas | 1,899,641 | 43,357,453 | 839,418 | 13,599,395 | 1,405 | 59,697,312 |
| South Carolina | 3,752,746 | 2,384,744 | 3,376,721 | 44,562,191 | 355,736 | 54,432,138 |
| New Jersey | 11,542,519 | 1,124,987 | 14,420,891 | 17,647,632 | 68,529 | 44,804,558 |
| North Carolina | 2,684,618 | 3,027,477 | 2,306,908 | 34,025,183 | 123,643 | 42,167,829 |
| Wisconsin | 6,529,810 | 8,220,749 | 1,382,857 | 21,359,693 | 111,569 | 37,604,678 |
| Tennessee | 2,909,586 | 12,349,665 | 2,918,401 | 16,967,159 | 2,009 | 35,146,820 |
| Louisiana | 4,851,718 | 1,575,741 | 3,253,613 | 17,298,994 | 305 | 26,980,371 |
| Georgia | 549,677 | 7,070,687 | 538,540 | 16,797,898 | 249,829 | 25,206,631 |
| Puerto Rico | 7,822,140 | 84,158 | 6,400,370 | 10,887,771 | 250 | 25,194,689 |
| New York | 1,648,777 | 4,416,990 | 1,984,321 | 13,586,237 | 128,064 | 21,764,389 |
| Alabama | 3,207,643 | 5,670,472 | 5,784,489 | 6,619,768 | 95,777 | 21,378,149 |
| West Virginia | 107 | 2,270,441 | 194,740 | 18,419,612 | 0 | 20,884,900 |
| Kentucky | 2,964,931 | 6,610,414 | 1,511,248 | 8,849,082 | 2,245 | 19,937,920 |
| Missouri | 1,544,250 | 1,423,178 | 2,331,459 | 9,521,349 | 16,492 | 14,836,728 |
| Massachusetts | 2,567,094 | 1,550,531 | 2,129,808 | 7,458,884 | 121,641 | 13,827,958 |
| Oklahoma | 596,921 | 5,896,539 | 409,768 | 5,376,194 | 250 | 12,279,672 |
| Connecticut | 1,250,244 | 585,658 | 175,632 | 8,899,641 | 0 | 10,911,175 |
| Minnesota | 1,208,868 | 448,619 | 472,488 | 7,162,844 | 1,000 | 9,293,819 |
| Arizona | 749,012 | 46,536 | 473,068 | 6,732,337 | 15 | 8,000,968 |
| Virginia | 290,955 | 1,172,049 | 3,653,618 | 2,350,660 | 7,006 | 7,474,288 |
| Nebraska | 3,309,621 | 2,069,127 | 45,559 | 1,883,171 | 6,866 | 7,314,344 |
| Arkansas | 290,838 | 562,495 | 209,573 | 5,514,602 | 3,374 | 6,580,882 |
| Florida | 355,624 | 1,520,919 | 606,811 | 3,551,312 | 16,604 | 6,051,270 |
| Maryland | 65,922 | 329,204 | 19,550 | 4,991,775 | 41 | 5,406,492 |
| Mississippi | 46,886 | 417,091 | 195,846 | 3,669,045 | 0 | 4,328,868 |
| Iowa | 1,592,261 | 1,360,279 | 21,247 | 944,060 | 19,732 | 3,937,579 |
| Oregon | 575,479 | 961,150 | 35,828 | 1,999,981 | 56,016 | 3,628,454 |
| Colorado | 659,500 | 372,376 | 1,216,845 | 1,296,140 | 5,700 | 3,550,561 |
| Utah | 462,071 | 2,257,750 | 5,677 | 524,780 | 12,000 | 3,262,278 |
| Maine | 17,400 | 1,008,914 | 750 | 1,128,726 | 0 | 2,155,790 |
| Delaware | 96,943 | 5,391 | 0 | 1,643,098 | 0 | 1,745,432 |
| New Hampshire | 40,420 | 96,773 | 0 | 556,004 | 0 | 693,197 |
| Rhode Island | 69,297 | 136,911 | 7,680 | 376,578 | 0 | 590,466 |
| Nevada | 1,846 | 40,578 | 0 | 206,611 | 0 | 249,035 |
| Montana | 0 | 9,381 | 0 | 63,000 | 0 | 72,381 |
| New Mexico | 34,770 | 22,620 | 0 | 1,500 | 0 | 58,890 |
| Idaho | 39,835 | 5,052 | 250 | 0 | 0 | 45,137 |
| South Dakota | 0 | 41,771 | 0 | 5 | 0 | 41,776 |
| Vermont | 4,104 | 1,458 | 0 | 16,300 | 0 | 21,862 |
| Hawaii | 0 | 10,138 | 185 | 0 | 0 | 10,323 |
| North Dakota | 0 | 1,033 | 0 | 0 | 0 | 1,033 |
| Wyoming | 0 | 451 | 0 | 0 | 0 | 451 |
| Virgin Islands | 0 | 0 | 0 | 0 | 0 | 0 |
| American Samoa | 0 | 0 | 0 | 0 | 0 | 0 |
| Alaska | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 205,816,663 | 230,717,167 | 198,932,508 | 1,184,140,438 | 4,791,363 | 1,824,398,139 |

# THE 1991 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE

***1991 Releases and Transfers by Chemical***

**Table 1-10. Top 50 Chemicals for Largest Releases, 1991.**

| 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 | 46,929,186 | 141,696,062 | 41,137,132 | 240,682,883 | 14,763,305 | 485,208,568 |
| 7647-01-0 | Hydrochloric acid | 4,634,850 | 78,286,624 | 2,143,954 | 190,422,615 | 12,193,916 | 287,681,959 |
| 67-56-1 | Methanol | 35,913,043 | 163,769,926 | 20,064,023 | 28,877,462 | 3,634,255 | 252,258,709 |
| 108-88-3 | Toluene | 73,620,294 | 124,944,414 | 104,645 | 1,373,207 | 185,012 | 200,227,572 |
| 67-64-1 | Acetone | 84,674,684 | 75,522,340 | 1,206,217 | 3,463,348 | 466,862 | 165,333,451 |
| 7664-38-2 | Phosphoric acid | 314,776 | 1,002,123 | 114,363,613 | 26,545 | 47,311,554 | 163,018,611 |
| 7664-93-9 | Sulfuric acid | 1,577,640 | 20,099,089 | 37,243,237 | 94,720,218 | 7,678,646 | 161,318,830 |
| 71-55-6 | 1,1,1-Trichloroethane | 69,230,762 | 68,274,801 | 21,803 | 2,805 | 171,807 | 137,701,978 |
| | Zinc compounds | 1,517,384 | 2,710,343 | 1,325,812 | 228,007 | 114,062,672 | 119,844,218 |
| 1330-20-7 | Xylene (mixed isomers) | 27,683,616 | 87,869,367 | 50,801 | 139,948 | 335,613 | 116,079,345 |
| 78-93-3 | Methyl ethyl ketone | 33,149,766 | 70,271,889 | 141,354 | 355,736 | 180,492 | 104,099,237 |
| 75-15-0 | Carbon disulfide | 2,626,842 | 86,712,281 | 58,634 | 2,835 | 260 | 89,400,852 |
| 75-09-2 | Dichloromethane | 31,726,830 | 47,611,641 | 98,877 | 1,317,706 | 117,788 | 80,872,842 |
| 7782-50-5 | Chlorine | 1,715,251 | 75,894,219 | 696,282 | 72,552 | 119,630 | 78,497,934 |
| | Manganese compounds | 490,885 | 755,529 | 698,968 | 15,327 | 68,528,067 | 70,488,776 |
| 6484-52-2 | Ammonium nitrate (solution) | 55,453 | 1,978,009 | 7,808,136 | 32,736,428 | 8,426,270 | 51,004,296 |
| | Copper compounds | 2,378,725 | 1,870,707 | 158,621 | 225,310 | 42,424,235 | 47,057,598 |
| | Glycol ethers | 10,235,089 | 33,678,910 | 507,487 | 176,033 | 711,313 | 45,308,832 |
| 74-85-1 | Ethylene | 16,137,889 | 22,133,970 | 17,015 | 0 | 0 | 38,288,874 |
| 76-13-1 | Freon 113 | 23,983,423 | 11,874,228 | 3,264 | 558 | 89,780 | 35,951,253 |
| 79-01-6 | Trichloroethylene | 16,642,065 | 18,416,403 | 12,750 | 800 | 62,991 | 35,135,009 |
| 71-36-3 | n-Butyl alcohol | 6,977,261 | 22,741,844 | 257,497 | 4,382,276 | 107,321 | 34,466,199 |
| 100-42-5 | Styrene | 10,161,049 | 18,315,297 | 25,609 | 22,080 | 389,929 | 28,913,964 |
| 108-10-1 | Methyl isobutyl ketone | 8,411,877 | 18,786,642 | 167,405 | 161,600 | 177,939 | 27,705,463 |
| | Chromium compounds | 134,838 | 427,257 | 335,233 | 34,619 | 24,761,345 | 25,693,292 |
| 7697-37-2 | Nitric acid | 685,940 | 2,594,202 | 167,773 | 21,128,099 | 585,053 | 25,161,067 |
| 115-07-1 | Propylene | 13,422,010 | 9,418,860 | 4,685 | 0 | 114,000 | 22,959,555 |
| 75-05-8 | Acetonitrile | 743,749 | 623,983 | 20,396 | 19,090,831 | 5,620 | 20,484,579 |
| 67-66-3 | Chloroform | 7,660,997 | 11,421,891 | 769,569 | 65,089 | 22,150 | 19,939,696 |
| 79-10-7 | Acrylic acid | 232,485 | 178,113 | 712 | 18,923,000 | 94 | 19,334,404 |
| 71-43-2 | Benzene | 9,971,308 | 7,503,182 | 26,896 | 834,242 | 111,928 | 18,447,556 |
| 110-82-7 | Cyclohexane | 6,605,946 | 10,577,659 | 12,606 | 591,703 | 27,757 | 17,815,671 |
| 107-21-1 | Ethylene glycol | 4,467,944 | 6,192,193 | 2,299,613 | 3,654,273 | 908,167 | 17,522,190 |
| 7783-20-2 | Ammonium sulfate (solution) | 19,639 | 265,457 | 7,592,647 | 7,523,816 | 2,106,747 | 17,508,306 |
| 7440-50-8 | Copper | 408,618 | 864,627 | 56,040 | 14,011 | 15,439,598 | 16,782,894 |
| 127-18-4 | Tetrachloroethylene | 6,482,575 | 10,204,876 | 7,448 | 14,000 | 23,302 | 16,732,201 |
| 463-58-1 | Carbonyl sulfide | 5,627 | 16,719,541 | 0 | 0 | 0 | 16,725,168 |
| 50-00-0 | Formaldehyde | 1,780,780 | 8,437,687 | 616,001 | 5,220,067 | 242,466 | 16,297,001 |
| | Lead compounds | 348,258 | 1,059,351 | 117,976 | 928 | 13,699,094 | 15,225,607 |
| 75-71-8 | Dichlorodifluoromethane (CFC-12) | 8,506,516 | 6,545,211 | 89 | 16,008 | 32,805 | 15,100,629 |
| 75-69-4 | Trichlorofluoromethane (CFC-11) | 5,339,896 | 6,382,210 | 5,156 | 1,428 | 10,203 | 11,738,893 |
| 7440-66-6 | Zinc (fume or dust) | 765,614 | 1,168,410 | 28,080 | 115 | 9,216,574 | 11,178,793 |
| 7439-96-5 | Manganese | 687,932 | 409,038 | 144,676 | 522 | 9,848,116 | 11,090,284 |
| 108-95-2 | Phenol | 2,498,507 | 3,832,788 | 163,915 | 3,192,210 | 324,921 | 10,012,341 |
| 75-07-0 | Acetaldehyde | 2,323,247 | 4,757,670 | 75,314 | 2,328,187 | 37,904 | 9,522,322 |
| 7664-39-3 | Hydrogen fluoride | 3,565,926 | 5,615,266 | 5,464 | 1 | 25,259 | 9,211,916 |
| 100-41-4 | Ethylbenzene | 2,876,381 | 5,764,613 | 16,608 | 94,637 | 53,124 | 8,805,363 |
| 108-05-4 | Vinyl acetate | 1,102,871 | 4,383,624 | 9,900 | 3,088,362 | 7,237 | 8,591,994 |
| 107-13-1 | Acrylonitrile | 520,853 | 1,668,036 | 1,959 | 4,732,983 | 13,293 | 6,937,124 |
| 7429-90-5 | Aluminum (fume or dust) | 523,990 | 4,210,547 | 56,841 | 0 | 1,420,310 | 6,211,688 |
| | Subtotal | 592,471,087 | 1,326,442,950 | 240,848,733 | 689,955,410 | 401,176,724 | 3,250,894,904 |
| | Total for All TRI Chemicals | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

**Table 1-11. The 15 Chemicals with the Largest Emissions to Air, 1991.**

| CAS Number | Chemical | Total Air Emissions Pounds |
|---|---|---|
| 67-56-1 | Methanol | 199,682,969 |
| 108-88-3 | Toluene | 198,564,708 |
| 7664-41-7 | Ammonia | 188,625,248 |
| 67-64-1 | Acetone | 160,197,024 |
| 71-55-6 | 1,1,1-Trichloroethane | 137,505,563 |
| 1330-20-7 | Xylene (mixed isomers) | 115,552,983 |
| 78-93-3 | Methyl ethyl ketone | 103,421,655 |
| 75-15-0 | Carbon disulfide | 89,339,123 |
| 7647-01-0 | Hydrochloric acid | 82,921,474 |
| 75-09-2 | Dichloromethane | 79,338,471 |
| 7782-50-5 | Chlorine | 77,609,470 |
| | Glycol ethers | 43,913,999 |
| 74-85-1 | Ethylene | 38,271,859 |
| 76-13-1 | Freon 113 | 35,857,651 |
| 79-01-6 | Trichloroethylene | 35,058,468 |
| | Subtotal | 1,585,860,665 |
| | Total for All TRI Chemicals | 2,010,554,065 |

**Table 1-12. The 15 Chemicals with the Largest Discharges to Surface Water, 1991.**

| CAS Number | Chemical | Surface Water Discharges Pounds |
|---|---|---|
| 7664-38-2 | Phosphoric acid | 114,363,613 |
| 7664-41-7 | Ammonia | 41,137,132 |
| 7664-93-9 | Sulfuric acid | 37,243,237 |
| 67-56-1 | Methanol | 20,064,023 |
| 6484-52-2 | Ammonium nitrate (solution) | 7,808,136 |
| 7783-20-2 | Ammonium sulfate (solution) | 7,592,647 |
| 107-21-1 | Ethylene glycol | 2,299,613 |
| 7647-01-0 | Hydrochloric acid | 2,143,954 |
| | Zinc compounds | 1,325,812 |
| 67-64-1 | Acetone | 1,206,217 |
| 67-66-3 | Chloroform | 769,569 |
| | Manganese compounds | 698,968 |
| 7782-50-5 | Chlorine | 696,282 |
| 50-00-0 | Formaldehyde | 616,001 |
| | Glycol ethers | 507,487 |
| | Subtotal | 238,472,691 |
| | Total for All TRI Chemicals | 243,513,772 |

Table 1-13. The 15 Chemicals with the Largest Underground Injection, 1991.

| CAS Number | Chemical | Underground Injection Pounds |
|---|---|---|
| 7664-41-7 | Ammonia | 240,682,883 |
| 7647-01-0 | Hydrochloric acid | 190,422,615 |
| 7664-93-9 | Sulfuric acid | 94,720,218 |
| 6484-52-2 | Ammonium nitrate (solution) | 32,736,428 |
| 67-56-1 | Methanol | 28,877,462 |
| 7697-37-2 | Nitric acid | 21,128,099 |
| 75-05-8 | Acetonitrile | 19,090,831 |
| 79-10-7 | Acrylic acid | 18,923,000 |
| 7783-20-2 | Ammonium sulfate (solution) | 7,523,816 |
| 50-00-0 | Formaldehyde | 5,220,067 |
| 107-13-1 | Acrylonitrile | 4,732,983 |
| 79-06-1 | Acrylamide | 4,594,900 |
| 71-36-3 | n-Butyl alcohol | 4,382,276 |
| | Cyanide compounds | 3,781,837 |
| 107-21-1 | Ethylene glycol | 3,654,273 |
| | Subtotal | 680,471,688 |
| | Total for All TRI Chemicals | 710,377,137 |

Table 1-14. The 15 Chemicals with the Largest Releases to Land, 1991.

| CAS Number | Chemical | Releases to Land Pounds |
|---|---|---|
| | Zinc compounds | 114,062,672 |
| | Manganese compounds | 68,528,067 |
| 7664-38-2 | Phosphoric acid | 47,311,554 |
| | Copper compounds | 42,424,235 |
| | Chromium compounds | 24,761,345 |
| 7440-50-8 | Copper | 15,439,598 |
| 7664-41-7 | Ammonia | 14,763,305 |
| | Lead compounds | 13,699,094 |
| 7647-01-0 | Hydrochloric acid | 12,193,916 |
| 7439-96-5 | Manganese | 9,848,116 |
| 7440-66-6 | Zinc (fume or dust) | 9,216,574 |
| 6484-52-2 | Ammonium nitrate (solution) | 8,426,270 |
| 7664-93-9 | Sulfuric acid | 7,678,646 |
| | Barium compounds | 4,005,169 |
| 67-56-1 | Methanol | 3,634,255 |
| | Subtotal | 395,992,816 |
| | Total for All TRI Chemicals | 421,428,144 |

**Table 1-15. The 15 Chemicals with the Largest Transfers to Publicly Owned Treatment Works, 1991.**

| CAS Number | Chemical | Transfers to POTWs Pounds |
|---|---|---|
| 67-56-1 | Methanol | 113,854,683 |
| 7664-41-7 | Ammonia | 96,492,357 |
| 7783-20-2 | Ammonium sulfate (solution) | 42,154,207 |
| 7664-93-9 | Sulfuric acid | 34,175,276 |
| 107-21-1 | Ethylene glycol | 18,602,841 |
| 7647-01-0 | Hydrochloric acid | 16,566,697 |
| 67-64-1 | Acetone | 14,475,090 |
| | Glycol ethers | 9,286,863 |
| 7697-37-2 | Nitric acid | 8,648,779 |
| 6484-52-2 | Ammonium nitrate (solution) | 5,984,399 |
| 7664-38-2 | Phosphoric acid | 5,498,173 |
| 50-00-0 | Formaldehyde | 5,482,598 |
| 108-95-2 | Phenol | 5,401,118 |
| | Manganese compounds | 3,341,541 |
| 71-36-3 | n-Butyl alcohol | 2,208,281 |
| | Subtotal | 382,172,903 |
| | Total for All TRI Chemicals | 411,907,098 |

**Table 1-16. The 15 Chemicals with the Largest Off-site Transfers for Treatment, 1991.**

| CAS Number | Chemical | Transfers to Treatment Pounds |
|---|---|---|
| 7664-93-9 | Sulfuric acid | 44,343,292 |
| 67-56-1 | Methanol | 37,951,338 |
| 7647-01-0 | Hydrochloric acid | 35,103,614 |
| 108-88-3 | Toluene | 20,171,434 |
| 1330-20-7 | Xylene (mixed isomers) | 19,031,424 |
| 7697-37-2 | Nitric acid | 14,022,809 |
| 67-64-1 | Acetone | 13,328,807 |
| 75-09-2 | Dichloromethane | 11,956,118 |
| 78-93-3 | Methyl ethyl ketone | 9,365,077 |
| | Zinc compounds | 9,336,028 |
| 7664-41-7 | Ammonia | 6,964,023 |
| 71-55-6 | 1,1,1-Trichloroethane | 6,743,974 |
| 7783-20-2 | Ammonium sulfate (solution) | 6,588,517 |
| 107-21-1 | Ethylene glycol | 5,948,273 |
| 107-06-2 | 1,2-Dichloroethane | 5,722,194 |
| | Subtotal | 246,576,922 |
| | Total for All TRI Chemicals | 352,433,168 |

Table 1-17. The 15 Chemicals with the Largest Off-site Transfers for Disposal, 1991.

| CAS Number | Chemical | Transfers to Disposal Pounds |
|---|---|---|
| | Zinc compounds | 40,753,446 |
| 6484-52-2 | Ammonium nitrate (solution) | 39,237,767 |
| 7664-93-9 | Sulfuric acid | 31,353,990 |
| | Manganese compounds | 20,715,032 |
| | Barium compounds | 16,639,604 |
| 7439-96-5 | Manganese | 12,738,621 |
| 7647-01-0 | Hydrochloric acid | 12,733,345 |
| 7440-50-8 | Copper | 12,273,545 |
| | Chromium compounds | 10,472,628 |
| | Lead compounds | 9,981,379 |
| | Copper compounds | 6,693,964 |
| 7429-90-5 | Aluminum (fume or dust) | 5,836,393 |
| 1332-21-4 | Asbestos (friable) | 5,534,023 |
| 7439-92-1 | Lead | 5,512,965 |
| 7440-47-3 | Chromium | 5,500,165 |
| | Subtotal | 235,976,867 |
| | Total for All TRI Chemicals | 299,042,451 |

Table 1-18. The 15 Chemicals with the Largest Off-site Transfers for Energy Recovery, 1991.

| CAS Number | Chemical | Transfers to Energy Recovery Pounds |
|---|---|---|
| 108-88-3 | Toluene | 80,207,715 |
| 1330-20-7 | Xylene (mixed isomers) | 66,547,878 |
| 67-56-1 | Methanol | 63,132,911 |
| 67-64-1 | Acetone | 40,265,509 |
| 78-93-3 | Methyl ethyl ketone | 35,111,556 |
| 75-65-0 | tert-Butyl alcohol | 26,160,445 |
| 108-10-1 | Methyl isobutyl ketone | 18,801,198 |
| | Glycol ethers | 11,663,373 |
| 100-41-4 | Ethylbenzene | 8,664,046 |
| 100-42-5 | Styrene | 8,502,579 |
| 71-36-3 | n-Butyl alcohol | 6,750,269 |
| 79-10-7 | Acrylic acid | 5,010,030 |
| 85-44-9 | Phthalic anhydride | 4,684,778 |
| 7647-01-0 | Hydrochloric acid | 4,415,525 |
| 110-82-7 | Cyclohexane | 4,114,655 |
| | Subtotal | 384,032,467 |
| | Total for All TRI Chemicals | 438,225,342 |

**Table 1-19. The 15 Chemicals with the Largest Off-site Transfers for Recycling, 1991.**

| CAS Number | Chemical | Transfers to Recycling Pounds |
|---|---|---|
| 7664-93-9 | Sulfuric acid | 883,134,485 |
| 7440-50-8 | Copper | 289,976,983 |
| | Lead compounds | 166,608,749 |
| | Zinc compounds | 141,091,759 |
| | Copper compounds | 93,403,884 |
| 107-21-1 | Ethylene glycol | 91,411,758 |
| 7440-66-6 | Zinc (fume or dust) | 67,787,514 |
| 7440-47-3 | Chromium | 50,766,527 |
| 7647-01-0 | Hydrochloric acid | 42,004,594 |
| 7439-96-5 | Manganese | 41,442,691 |
| 1330-20-7 | Xylene (mixed isomers) | 38,885,924 |
| 7440-02-0 | Nickel | 38,882,197 |
| 7439-92-1 | Lead | 38,232,373 |
| 75-09-2 | Dichloromethane | 29,163,629 |
| | Manganese compounds | 28,667,700 |
| | Subtotal | 2,041,460,767 |
| | Total for All TRI Chemicals | 2,354,123,586 |

**Table 1-20. Releases and Transfers of All TRI Chemicals, 1991 (Alphabetically Ordered).**

| 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 |
|---|---|---|---|---|---|---|---|---|
| 75-07-0 | Acetaldehyde | 45 | 2,323,247 | 4,757,670 | 75,314 | 2,328,187 | 37,904 | 9,522,322 |
| 60-35-5 | Acetamide | 259 | 10 | 25 | 5 | 0 | 0 | 40 |
| 67-64-1 | Acetone | 5 | 84,674,684 | 75,522,340 | 1,206,217 | 3,463,348 | 466,862 | 165,333,451 |
| 75-05-8 | Acetonitrile | 28 | 743,749 | 623,983 | 20,396 | 19,090,831 | 5,620 | 20,484,579 |
| 107-02-8 | Acrolein | 137 | 8,179 | 20,321 | 7 | 205,898 | 0 | 234,405 |
| 79-06-1 | Acrylamide | 56 | 60,668 | 3,496 | 4,635 | 4,594,900 | 1,500 | 4,665,199 |
| 79-10-7 | Acrylic acid | 30 | 232,485 | 178,113 | 712 | 18,923,000 | 94 | 19,334,404 |
| 107-13-1 | Acrylonitrile | 49 | 520,853 | 1,668,036 | 1,959 | 4,732,983 | 13,293 | 6,937,124 |
| 107-18-6 | Allyl alcohol | 144 | 27,628 | 47,624 | 5,555 | 44,560 | 100 | 125,467 |
| 107-05-1 | Allyl chloride | 140 | 155,176 | 24,977 | 5 | 145 | 0 | 180,303 |
| 7429-90-5 | Aluminum (fume or dust) | 50 | 523,990 | 4,210,547 | 56,841 | 0 | 1,420,310 | 6,211,688 |
| 1344-28-1 | Aluminum oxide (fibrous forms) | 130 | 23,646 | 41,268 | 1,571 | 0 | 213,286 | 279,771 |
| 60-09-3 | 4-Aminoazobenzene | 244 | 0 | 1 | 0 | 440 | 0 | 441 |
| 92-67-1 | 4-Aminobiphenyl | 276 | 0 | 0 | 0 | 4 | 0 | 4 |
| 7664-41-7 | Ammonia | 1 | 46,929,186 | 141,696,062 | 41,137,132 | 240,682,883 | 14,763,305 | 485,208,568 |
| 6484-52-2 | Ammonium nitrate (solution) | 16 | 55,453 | 1,978,009 | 7,808,136 | 32,736,428 | 8,426,270 | 51,004,296 |
| 7783-20-2 | Ammonium sulfate (solution) | 34 | 19,639 | 265,457 | 7,592,647 | 7,523,816 | 2,106,747 | 17,508,306 |
| 62-53-3 | Aniline | 69 | 130,452 | 496,579 | 26,801 | 1,603,259 | 1,068 | 2,258,159 |
| 90-04-0 | o-Anisidine | 206 | 765 | 260 | 187 | 0 | 3,800 | 5,012 |
| 104-94-9 | p-Anisidine | 264 | 5 | 8 | 5 | 0 | 0 | 18 |
| 120-12-7 | Anthracene | 157 | 25,778 | 29,716 | 1,158 | 0 | 2,433 | 59,085 |
| 7440-36-0 | Antimony | 177 | 3,964 | 17,300 | 1,223 | 120 | 5,745 | 28,352 |
| 7440-38-2 | Arsenic | 77 | 3,836 | 3,734 | 940 | 0 | 1,734,513 | 1,743,023 |
| 1332-21-4 | Asbestos (friable) | 106 | 5,610 | 6,952 | 252 | 0 | 585,676 | 598,490 |
| 7440-39-3 | Barium | 118 | 94,605 | 21,806 | 5,093 | 0 | 261,262 | 382,766 |
| 98-87-3 | Benzal chloride | 226 | 1,550 | 11 | 0 | 0 | 0 | 1,561 |
| 71-43-2 | Benzene | 31 | 9,971,308 | 7,503,182 | 26,896 | 834,242 | 111,928 | 18,447,556 |
| 98-07-7 | Benzoic trichloride | 201 | 7,686 | 261 | 0 | 0 | 0 | 7,947 |
| 98-88-4 | Benzoyl chloride | 180 | 23,446 | 3,420 | 5 | 0 | 250 | 27,121 |
| 94-36-0 | Benzoyl peroxide | 187 | 648 | 1,656 | 5 | 0 | 13,205 | 15,514 |
| 100-44-7 | Benzyl chloride | 179 | 18,189 | 8,934 | 15 | 20 | 0 | 27,158 |
| 7440-41-7 | Beryllium | 174 | 6 | 1,372 | 101 | 0 | 29,023 | 30,502 |
| 92-52-4 | Biphenyl | 94 | 677,182 | 183,323 | 18,700 | 47,318 | 30,162 | 956,685 |
| 111-44-4 | Bis(2-chloroethyl) ether | 215 | 2,950 | 594 | 0 | 0 | 0 | 3,544 |
| 542-88-1 | Bis(chloromethyl) ether | 239 | 2 | 572 | 0 | 0 | 0 | 574 |
| 108-60-1 | Bis(2-chloro-1-methyl-ethyl)ether | 205 | 2,090 | 1,520 | 1,800 | 0 | 0 | 5,410 |
| 103-23-1 | Bis(2-ethylhexyl) adipate | 139 | 69,541 | 73,183 | 50 | 0 | 81,715 | 224,489 |
| 353-59-3 | Bromochlorodifluoromethane (Halon 1211) | 191 | 8,388 | 3,570 | 0 | 0 | 0 | 11,958 |
| 75-25-2 | Bromoform | 222 | 150 | 0 | 0 | 1,900 | 0 | 2,050 |
| 74-83-9 | Bromomethane | 68 | 404,146 | 2,041,449 | 0 | 1,000 | 0 | 2,446,595 |
| 75-63-8 | Bromotrifluoromethane (Halon 1301) | 141 | 171,287 | 8,820 | 0 | 0 | 0 | 180,107 |
| 106-99-0 | 1,3-Butadiene | 59 | 2,050,374 | 1,900,003 | 5,049 | 0 | 8,881 | 3,964,307 |
| 141-32-2 | Butyl acrylate | 128 | 151,355 | 141,386 | 1,273 | 0 | 55 | 294,069 |
| 71-36-3 | n-Butyl alcohol | 22 | 6,977,261 | 22,741,844 | 257,497 | 4,382,276 | 107,321 | 34,466,199 |
| 78-92-2 | sec-Butyl alcohol | 97 | 228,025 | 409,563 | 4,486 | 170,000 | 14 | 812,088 |
| 75-65-0 | tert-Butyl alcohol | 72 | 760,910 | 424,781 | 129,510 | 827,562 | 497 | 2,143,260 |
| 85-68-7 | Butyl benzyl phthalate | 119 | 109,517 | 192,762 | 1,177 | 0 | 75,866 | 379,322 |
| 106-88-7 | 1,2-Butylene oxide | 156 | 48,928 | 10,836 | 3,490 | 0 | 5 | 63,259 |
| 123-72-8 | Butyraldehyde | 107 | 165,671 | 267,829 | 575 | 144,427 | 28 | 578,530 |
| 569-64-2 | C.I. Basic Green 4 | 262 | 6 | 6 | 14 | 0 | 0 | 26 |
| 989-38-8 | C.I. Basic Red 1 | 246 | 0 | 0 | 0 | 0 | 375 | 375 |
| 2832-40-8 | C.I. Disperse Yellow 3 | 231 | 336 | 0 | 26 | 0 | 782 | 1,144 |
| 81-88-9 | C.I. Food Red 15 | 278 | 0 | 1 | 0 | 0 | 0 | 1 |
| 97-56-3 | C.I. Solvent Yellow 3 | 272 | 0 | 5 | 0 | 0 | 0 | 5 |
| 7440-43-9 | Cadmium | 197 | 1,857 | 3,091 | 661 | 0 | 2,753 | 8,362 |
| 156-62-7 | Calcium cyanamide | 158 | 12,000 | 625 | 0 | 0 | 40,005 | 52,630 |
| 133-06-2 | Captan | 190 | 1,883 | 5,233 | 260 | 4,500 | 260 | 12,136 |

| Chemical | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|
| Acetaldehyde | 153,583 | 250,717 | 1,043 | 128,185 | 12,300 | 0 | 545,828 |
| Acetamide | 29,000 | 2,638 | 0 | 0 | 0 | 0 | 31,638 |
| Acetone | 14,475,090 | 13,328,807 | 515,726 | 40,265,509 | 17,524,793 | 102,116 | 86,212,041 |
| Acetonitrile | 581,095 | 2,540,160 | 150,672 | 2,434,262 | 5,224,305 | 0 | 10,930,494 |
| Acrolein | 0 | 13 | 3 | 10,681 | 0 | 0 | 10,697 |
| Acrylamide | 95,578 | 35,230 | 9,175 | 1,019 | 138 | 0 | 141,140 |
| Acrylic acid | 47,439 | 349,226 | 63,956 | 5,010,030 | 6,690 | 0 | 5,477,341 |
| Acrylonitrile | 297,197 | 2,034,833 | 21,244 | 81,902 | 16,540 | 0 | 2,451,716 |
| Allyl alcohol | 119,183 | 376,143 | 107,580 | 370,214 | 0 | 0 | 973,120 |
| Allyl chloride | 11,754 | 302,388 | 240 | 33,000 | 0 | 0 | 347,382 |
| Aluminum (fume or dust) | 13,271 | 341,976 | 5,836,393 | 310 | 9,476,329 | 3,933 | 15,672,212 |
| Aluminum oxide (fibrous forms) | 269,012 | 87,339 | 2,087,546 | 21,800 | 1,176,337 | 13,736 | 3,655,770 |
| 4-Aminoazobenzene | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4-Aminobiphenyl | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ammonia | 96,492,357 | 6,964,023 | 4,945,536 | 100,788 | 7,177,077 | 102,961 | 115,782,742 |
| Ammonium nitrate (solution) | 5,984,399 | 557,468 | 39,237,767 | 0 | 767,770 | 0 | 46,547,404 |
| Ammonium sulfate (solution) | 42,154,207 | 6,588,517 | 487,522 | 0 | 400,000 | 33,971 | 49,664,217 |
| Aniline | 1,306,755 | 383,469 | 71,241 | 1,632,669 | 0 | 2,442 | 3,396,576 |
| o-Anisidine | 3,395 | 10 | 71 | 0 | 0 | 0 | 3,476 |
| p-Anisidine | 8 | 0 | 0 | 0 | 0 | 0 | 8 |
| Anthracene | 597 | 25,279 | 124,353 | 399,543 | 100 | 0 | 549,872 |
| Antimony | 3,228 | 10,097 | 509,533 | 1,997 | 881,923 | 12,350 | 1,419,128 |
| Arsenic | 566 | 160,462 | 464,151 | 18 | 150,723 | 0 | 775,920 |
| Asbestos (friable) | 1,707 | 33,790 | 5,534,023 | 0 | 0 | 0 | 5,569,520 |
| Barium | 84,381 | 70,137 | 556,032 | 4,423 | 35,941 | 2,400 | 753,314 |
| Benzal chloride | 0 | 0 | 0 | 35,000 | 0 | 0 | 35,000 |
| Benzene | 613,449 | 1,656,194 | 142,460 | 3,675,466 | 353,205 | 385 | 6,441,159 |
| Benzoic trichloride | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Benzoyl chloride | 230 | 493,270 | 0 | 18,421 | 0 | 0 | 511,921 |
| Benzoyl peroxide | 17,192 | 62,192 | 5,860 | 911 | 11,000 | 0 | 97,155 |
| Benzyl chloride | 28,749 | 73,051 | 205 | 200,005 | 0 | 0 | 302,010 |
| Beryllium | 0 | 245 | 117,582 | 10 | 77,731 | 0 | 195,568 |
| Biphenyl | 782,600 | 183,296 | 40,601 | 315,254 | 194,826 | 300 | 1,516,877 |
| Bis(2-chloroethyl) ether | 15,841 | 447,600 | 0 | 350 | 0 | 0 | 463,791 |
| Bis(chloromethyl) ether | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| Bis(2-chloro-1-methyl-ethyl)ether | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bis(2-ethylhexyl) adipate | 20,155 | 34,491 | 213,194 | 106,868 | 16,709 | 0 | 391,417 |
| Bromochlorodifluoromethane (Halon 1211) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bromoform | 0 | 250 | 99,300 | 0 | 0 | 0 | 99,550 |
| Bromomethane | 0 | 320 | 15 | 420 | 121,000 | 0 | 121,755 |
| Bromotrifluoromethane (Halon 1301) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1,3-Butadiene | 11,650 | 124,385 | 13,362 | 377,354 | 5,537,690 | 0 | 6,064,441 |
| Butyl acrylate | 138,351 | 38,736 | 15,098 | 124,590 | 114,618 | 0 | 431,393 |
| n-Butyl alcohol | 2,208,281 | 3,349,795 | 293,657 | 6,750,269 | 2,813,102 | 30,083 | 15,445,187 |
| sec-Butyl alcohol | 14,464 | 27,216 | 1,723 | 3,904,139 | 25,317 | 0 | 3,972,859 |
| tert-Butyl alcohol | 1,339,777 | 324,704 | 788,854 | 26,160,445 | 0 | 0 | 28,613,780 |
| Butyl benzyl phthalate | 40,364 | 149,535 | 308,212 | 117,271 | 98,043 | 0 | 713,425 |
| 1,2-Butylene oxide | 5 | 907 | 0 | 326,019 | 10 | 0 | 326,941 |
| Butyraldehyde | 260,475 | 2,083 | 388 | 911 | 0 | 0 | 263,857 |
| C.I. Basic Green 4 | 18,132 | 0 | 1,995 | 0 | 0 | 499 | 20,626 |
| C.I. Basic Red 1 | 0 | 0 | 375 | 271 | 0 | 0 | 646 |
| C.I. Disperse Yellow 3 | 0 | 0 | 125 | 0 | 0 | 0 | 125 |
| C.I. Food Red 15 | 1,400 | 0 | 0 | 5 | 0 | 0 | 1,405 |
| C.I. Solvent Yellow 3 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| Cadmium | 260,309 | 68,200 | 665,482 | 813 | 135,266 | 4,804 | 1,134,874 |
| Calcium cyanamide | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Captan | 255 | 3,755 | 12,748 | 0 | 0 | 0 | 16,758 |

**Table 1-20. Releases and Transfers of All TRI Chemicals, 1991 (Ordered Alphabetically), 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 |
|---|---|---|---|---|---|---|---|---|
| 63-25-2 | Carbaryl | 199 | 2,022 | 4,825 | 260 | 0 | 1,170 | 8,277 |
| 75-15-0 | Carbon disulfide | 12 | 2,626,842 | 86,712,281 | 58,634 | 2,835 | 260 | 89,400,852 |
| 56-23-5 | Carbon tetrachloride | 83 | 528,100 | 1,018,701 | 2,844 | 42,470 | 2,152 | 1,594,267 |
| 463-58-1 | Carbonyl sulfide | 37 | 5,627 | 16,719,541 | 0 | 0 | 0 | 16,725,168 |
| 120-80-9 | Catechol | 122 | 4,035 | 1,751 | 254,267 | 0 | 86,600 | 346,653 |
| 57-74-9 | Chlordane | 228 | 1,248 | 179 | 1 | 0 | 0 | 1,428 |
| 7782-50-5 | Chlorine | 14 | 1,715,251 | 75,894,219 | 696,282 | 72,552 | 119,630 | 78,497,934 |
| 10049-04-4 | Chlorine dioxide | 58 | 146,153 | 3,816,182 | 13,760 | 0 | 120 | 3,976,215 |
| 79-11-8 | Chloroacetic acid | 103 | 66,762 | 446,920 | 1,696 | 0 | 123,675 | 639,053 |
| 532-27-4 | 2-Chloroacetophenone | 277 | 1 | 1 | 0 | 0 | 0 | 2 |
| 108-90-7 | Chlorobenzene | 67 | 1,228,868 | 1,167,233 | 5,165 | 177,032 | 1,534 | 2,579,832 |
| 75-00-3 | Chloroethane | 64 | 1,397,212 | 1,466,057 | 16,078 | 300 | 10 | 2,879,657 |
| 67-66-3 | Chloroform | 29 | 7,660,997 | 11,421,891 | 769,569 | 65,089 | 22,150 | 19,939,696 |
| 74-87-3 | Chloromethane | 51 | 1,431,983 | 4,266,748 | 101,838 | 192,600 | 0 | 5,993,169 |
| 107-30-2 | Chloromethyl methyl ether | 216 | 30 | 3,305 | 0 | 0 | 0 | 3,335 |
| 126-99-8 | Chloroprene | 80 | 103,489 | 1,367,033 | 2 | 71,000 | 137,011 | 1,678,535 |
| 1897-45-6 | Chlorothalonil | 217 | 1,921 | 1,330 | 13 | 0 | 0 | 3,264 |
| 7440-47-3 | Chromium | 79 | 450,919 | 105,487 | 17,289 | 531 | 1,155,527 | 1,729,753 |
| 7440-48-4 | Cobalt | 148 | 29,787 | 42,134 | 4,289 | 0 | 13,706 | 89,916 |
| 7440-50-8 | Copper | 35 | 408,618 | 864,627 | 56,040 | 14,011 | 15,439,598 | 16,782,894 |
| 8001-58-9 | Creosote | 76 | 622,554 | 1,139,297 | 3,862 | 0 | 10,780 | 1,776,493 |
| 120-71-8 | p-Cresidine | 243 | 160 | 68 | 5 | 0 | 250 | 483 |
| 1319-77-3 | Cresol (mixed isomers) | 84 | 349,690 | 391,758 | 3,661 | 749,531 | 2,528 | 1,497,168 |
| 108-39-4 | m-Cresol | 104 | 66,736 | 11,098 | 445 | 560,000 | 10 | 638,289 |
| 95-48-7 | o-Cresol | 105 | 29,463 | 31,802 | 11 | 550,000 | 4,860 | 616,136 |
| 106-44-5 | p-Cresol | 117 | 45,348 | 90,329 | 2,046 | 252,200 | 3,259 | 393,182 |
| 98-82-8 | Cumene | 61 | 1,080,084 | 2,197,610 | 2,011 | 9,189 | 21,757 | 3,310,651 |
| 80-15-9 | Cumene hydroperoxide | 110 | 83,935 | 13,922 | 242 | 422,600 | 240 | 520,939 |
| 135-20-6 | Cupferron | 230 | 0 | 1,200 | 0 | 0 | 0 | 1,200 |
| 110-82-7 | Cyclohexane | 32 | 6,605,946 | 10,577,659 | 12,606 | 591,703 | 27,757 | 17,815,671 |
| 94-75-7 | 2,4-D (acetic acid) | 173 | 10,049 | 6,161 | 262 | 1,291 | 13,260 | 31,023 |
| 1163-19-5 | Decabromodiphenyl oxide | 132 | 21,697 | 26,043 | 3,817 | 38 | 220,075 | 271,670 |
| 615-05-4 | 2,4-Diaminoanisole | 280 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39156-41-7 | 2,4-Diaminoanisole sulfate | 281 | 0 | 0 | 0 | 0 | 0 | 0 |
| 101-80-4 | 4,4'-Diaminodiphenyl ether | 233 | 7 | 697 | 337 | 0 | 0 | 1,041 |
| 25376-45-8 | Diaminotoluene (mixed isomers) | 163 | 17,963 | 2,620 | 1,110 | 24,000 | 10 | 45,703 |
| 95-80-7 | 2,4-Diaminotoluene | 210 | 3,800 | 10 | 250 | 0 | 0 | 4,060 |
| 132-64-9 | Dibenzofuran | 167 | 18,439 | 21,608 | 505 | 0 | 1,882 | 42,434 |
| 96-12-8 | 1,2-Dibromo-3-chloropropane | 249 | 290 | 0 | 0 | 0 | 0 | 290 |
| 106-93-4 | 1,2-Dibromoethane | 169 | 8,642 | 29,560 | 73 | 240 | 2 | 38,517 |
| 124-73-2 | Dibromotetrafluoroethane (Halon 2402) | 203 | 250 | 6,300 | 0 | 0 | 0 | 6,550 |
| 84-74-2 | Dibutyl phthalate | 126 | 58,761 | 91,271 | 8,907 | 160,000 | 5,069 | 324,008 |
| 25321-22-6 | Dichlorobenzene (mixed isomers) | 150 | 4,446 | 73,649 | 2 | 0 | 9 | 78,106 |
| 95-50-1 | 1,2-Dichlorobenzene | 113 | 175,806 | 242,646 | 3,962 | 19,000 | 21,153 | 462,567 |
| 541-73-1 | 1,3-Dichlorobenzene | 204 | 878 | 3,941 | 779 | 0 | 0 | 5,598 |
| 106-46-7 | 1,4-Dichlorobenzene | 123 | 47,159 | 289,005 | 2,146 | 2,000 | 420 | 340,730 |
| 91-94-1 | 3,3'-Dichlorobenzidine | 268 | 5 | 5 | 0 | 0 | 0 | 10 |
| 75-27-4 | Dichlorobromomethane | 253 | 200 | 0 | 0 | 0 | 0 | 200 |
| 75-71-8 | Dichlorodifluoromethane (CFC-12) | 40 | 8,506,516 | 6,545,211 | 89 | 16,008 | 32,805 | 15,100,629 |
| 107-06-2 | 1,2-Dichloroethane | 57 | 812,464 | 3,182,959 | 23,564 | 6,334 | 7,051 | 4,032,372 |
| 540-59-0 | 1,2-Dichloroethylene | 164 | 14,925 | 29,857 | 12 | 0 | 0 | 44,794 |
| 75-09-2 | Dichloromethane | 13 | 31,726,830 | 47,611,641 | 98,877 | 1,317,706 | 117,788 | 80,872,842 |
| 120-83-2 | 2,4-Dichlorophenol | 165 | 885 | 547 | 1 | 42,800 | 1 | 44,234 |
| 78-87-5 | 1,2-Dichloropropane | 98 | 227,847 | 545,596 | 6,570 | 0 | 0 | 780,013 |
| 78-88-6 | 2,3-Dichloropropene | 189 | 4,600 | 486 | 47 | 7,132 | 0 | 12,265 |
| 542-75-6 | 1,3-Dichloropropylene | 185 | 11,895 | 8,510 | 0 | 0 | 0 | 20,405 |

| Chemical | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|
| Carbaryl | 0 | 9,937 | 6,032 | 0 | 0 | 0 | 15,969 |
| Carbon disulfide | 193,658 | 331,628 | 3,746 | 174,690 | 33,804 | 0 | 737,526 |
| Carbon tetrachloride | 621 | 939,774 | 39,111 | 11,061 | 390,625 | 1,684 | 1,382,876 |
| Carbonyl sulfide | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catechol | 237,081 | 39,630 | 74,667 | 35,305 | 50 | 0 | 386,733 |
| Chlordane | 69 | 292 | 0 | 0 | 0 | 0 | 361 |
| Chlorine | 964,055 | 402,410 | 57,594 | 5 | 621,626 | 39,020 | 2,084,710 |
| Chlorine dioxide | 14,783 | 0 | 0 | 0 | 0 | 0 | 14,783 |
| Chloroacetic acid | 3,279 | 4,427 | 1,954 | 0 | 0 | 0 | 9,660 |
| 2-Chloroacetophenone | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chlorobenzene | 15,346 | 3,769,332 | 105,184 | 869,603 | 854,720 | 0 | 5,614,185 |
| Chloroethane | 5 | 310,731 | 0 | 24,440 | 140,250 | 0 | 475,426 |
| Chloroform | 809,427 | 1,755,778 | 71,518 | 255,288 | 2,077,870 | 3 | 4,969,884 |
| Chloromethane | 73,961 | 2,807,970 | 3,061 | 14,910 | 52,663 | 0 | 2,952,565 |
| Chloromethyl methyl ether | 0 | 0 | 35 | 0 | 0 | 0 | 35 |
| Chloroprene | 35,000 | 168,345 | 3,241 | 3,700 | 130,000 | 0 | 340,286 |
| Chlorothalonil | 293 | 6,412 | 204,538 | 653 | 0 | 0 | 211,896 |
| Chromium | 396,151 | 913,036 | 5,500,165 | 6,576 | 50,766,527 | 174,775 | 57,757,230 |
| Cobalt | 9,878 | 29,542 | 566,662 | 4 | 5,273,087 | 12 | 5,879,185 |
| Copper | 414,699 | 2,487,264 | 12,273,545 | 3,518 | 289,976,983 | 834,018 | 305,990,027 |
| Creosote | 17,024 | 586,725 | 1,995,572 | 663,755 | 471,700 | 13,680 | 3,748,456 |
| p-Cresidine | 18,368 | 1 | 2,680 | 0 | 0 | 0 | 21,049 |
| Cresol (mixed isomers) | 18,356 | 252,873 | 6,563 | 256,262 | 635,081 | 0 | 1,169,135 |
| m-Cresol | 11,918 | 39,458 | 23,451 | 9,622 | 490 | 0 | 84,939 |
| o-Cresol | 55,341 | 18,922 | 11,759 | 4,342 | 258 | 0 | 90,622 |
| p-Cresol | 1,062,305 | 24,251 | 16,104 | 28,829 | 0 | 0 | 1,131,489 |
| Cumene | 163,552 | 55,282 | 16,392 | 744,749 | 80,857 | 0 | 1,060,832 |
| Cumene hydroperoxide | 265 | 7,423 | 25,465 | 2,101 | 0 | 0 | 35,254 |
| Cupferron | 1,200 | 0 | 0 | 0 | 0 | 0 | 1,200 |
| Cyclohexane | 26,599 | 1,087,208 | 24,184 | 4,114,655 | 579,083 | 119,416 | 5,951,145 |
| 2,4-D (acetic acid) | 350 | 105,891 | 13,326 | 0 | 0 | 0 | 119,567 |
| Decabromodiphenyl oxide | 43,538 | 43,567 | 743,947 | 8,551 | 49,163 | 0 | 888,766 |
| 2,4-Diaminoanisole | 85 | 0 | 0 | 0 | 0 | 0 | 85 |
| 2,4-Diaminoanisole sulfate | 250 | 0 | 0 | 0 | 0 | 0 | 250 |
| 4,4'-Diaminodiphenyl ether | 5 | 3,962 | 120 | 0 | 0 | 0 | 4,087 |
| Diaminotoluene (mixed isomers) | 54,369 | 544,862 | 21,702 | 578,455 | 0 | 0 | 1,199,388 |
| 2,4-Diaminotoluene | 620 | 5,710 | 6,060 | 8,396 | 0 | 0 | 20,786 |
| Dibenzofuran | 500 | 16,943 | 108,602 | 4,346 | 0 | 0 | 130,391 |
| 1,2-Dibromo-3-chloropropane | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1,2-Dibromoethane | 2 | 838 | 750 | 842 | 0 | 0 | 2,432 |
| Dibromotetrafluoroethane (Halon 2402) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dibutyl phthalate | 14,535 | 109,797 | 70,751 | 176,958 | 4,660 | 10,063 | 386,764 |
| Dichlorobenzene (mixed isomers) | 7,410 | 111,339 | 9 | 325,693 | 0 | 0 | 444,451 |
| 1,2-Dichlorobenzene | 84,218 | 2,413,025 | 427,032 | 1,079,191 | 1,490,896 | 0 | 5,494,362 |
| 1,3-Dichlorobenzene | 160 | 3,966 | 22 | 0 | 800 | 0 | 4,948 |
| 1,4-Dichlorobenzene | 11,068 | 111,019 | 770 | 36,530 | 4 | 0 | 159,391 |
| 3,3'-Dichlorobenzidine | 15 | 19,116 | 4,650 | 0 | 0 | 0 | 23,781 |
| Dichlorobromomethane | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dichlorodifluoromethane (CFC-12) | 4,484 | 93,114 | 34,275 | 1,841 | 91,660 | 0 | 225,374 |
| 1,2-Dichloroethane | 26,294 | 5,722,194 | 6,479 | 51,917 | 19,363,730 | 0 | 25,170,614 |
| 1,2-Dichloroethylene | 0 | 359 | 0 | 0 | 2,000 | 0 | 2,359 |
| Dichloromethane | 1,308,202 | 11,956,118 | 495,762 | 3,717,385 | 29,163,629 | 153,456 | 46,794,552 |
| 2,4-Dichlorophenol | 0 | 0 | 0 | 750 | 0 | 0 | 750 |
| 1,2-Dichloropropane | 7,100 | 2 | 2,073 | 0 | 0 | 0 | 9,175 |
| 2,3-Dichloropropene | 0 | 454,340 | 0 | 0 | 0 | 0 | 454,340 |
| 1,3-Dichloropropylene | 0 | 920 | 0 | 0 | 0 | 0 | 920 |

**Table 1-20. Releases and Transfers of All TRI Chemicals, 1991 (Ordered Alphabetically), 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 |
|---|---|---|---|---|---|---|---|---|
| 76-14-2 | Dichlorotetrafluoroethane (CFC-114) | 74 | 1,694,535 | 207,258 | 35 | 5 | 5 | 1,901,838 |
| 62-73-7 | Dichlorvos | 236 | 326 | 318 | 0 | 0 | 0 | 644 |
| 115-32-2 | Dicofol | 271 | 5 | 1 | 0 | 0 | 0 | 6 |
| 1464-53-5 | Diepoxybutane | 282 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111-42-2 | Diethanolamine | 96 | 187,534 | 83,573 | 434,060 | 60,000 | 132,585 | 897,752 |
| 117-81-7 | Di-(2-ethylhexyl) phthalate | 89 | 95,409 | 948,011 | 3,842 | 370 | 155,773 | 1,203,405 |
| 84-66-2 | Diethyl phthalate | 146 | 11,032 | 99,649 | 678 | 0 | 2,977 | 114,336 |
| 64-67-5 | Diethyl sulfate | 211 | 3,610 | 408 | 5 | 0 | 10 | 4,033 |
| 119-90-4 | 3,3'-Dimethoxybenzidine | 275 | 0 | 0 | 4 | 0 | 0 | 4 |
| 57-14-7 | 1,1-Dimethyl hydrazine | 242 | 111 | 378 | 0 | 0 | 0 | 489 |
| 105-67-9 | 2,4-Dimethylphenol | 143 | 18,008 | 15,686 | 8 | 101,000 | 26 | 134,728 |
| 131-11-3 | Dimethyl phthalate | 153 | 14,147 | 51,690 | 1,198 | 865 | 811 | 68,711 |
| 77-78-1 | Dimethyl sulfate | 193 | 9,670 | 427 | 293 | 0 | 0 | 10,390 |
| 99-65-0 | m-Dinitrobenzene | 224 | 502 | 899 | 0 | 0 | 309 | 1,710 |
| 528-29-0 | o-Dinitrobenzene | 235 | 51 | 116 | 0 | 0 | 509 | 676 |
| 100-25-4 | p-Dinitrobenzene | 254 | 50 | 88 | 0 | 0 | 24 | 162 |
| 534-52-1 | 4,6-Dinitro-o-cresol | 256 | 7 | 43 | 33 | 0 | 0 | 83 |
| 51-28-5 | 2,4-Dinitrophenol | 155 | 16,585 | 7,557 | 3,888 | 35,532 | 10 | 63,572 |
| 121-14-2 | 2,4-Dinitrotoluene | 196 | 5,103 | 312 | 2,682 | 0 | 1,424 | 9,521 |
| 606-20-2 | 2,6-Dinitrotoluene | 219 | 1,197 | 751 | 702 | 0 | 0 | 2,650 |
| 25321-14-6 | Dinitrotoluene (mixed isomers) | 151 | 4,593 | 10,386 | 135 | 60,000 | 0 | 75,114 |
| 117-84-0 | n-Dioctyl phthalate | 172 | 16,139 | 15,691 | 557 | 0 | 255 | 32,642 |
| 123-91-1 | 1,4-Dioxane | 91 | 365,544 | 352,960 | 318,133 | 0 | 15,952 | 1,052,589 |
| 106-89-8 | Epichlorohydrin | 112 | 277,040 | 182,110 | 5,456 | 0 | 3,675 | 468,281 |
| 110-80-5 | 2-Ethoxyethanol | 101 | 224,795 | 447,143 | 5,022 | 0 | 0 | 676,960 |
| 140-88-5 | Ethyl acrylate | 138 | 108,970 | 122,991 | 423 | 947 | 939 | 234,270 |
| 100-41-4 | Ethylbenzene | 47 | 2,876,381 | 5,764,613 | 16,608 | 94,637 | 53,124 | 8,805,363 |
| 541-41-3 | Ethyl chloroformate | 223 | 1,254 | 576 | 0 | 0 | 0 | 1,830 |
| 74-85-1 | Ethylene | 19 | 16,137,889 | 22,133,970 | 17,015 | 0 | 0 | 38,288,874 |
| 107-21-1 | Ethylene glycol | 33 | 4,467,944 | 6,192,193 | 2,299,613 | 3,654,273 | 908,167 | 17,522,190 |
| 75-21-8 | Ethylene oxide | 75 | 805,152 | 987,896 | 2,260 | 25,416 | 50,336 | 1,871,060 |
| 96-45-7 | Ethylene thiourea | 237 | 24 | 558 | 0 | 0 | 0 | 582 |
| 2164-17-2 | Fluometuron | 252 | 104 | 113 | 10 | 0 | 5 | 232 |
| 50-00-0 | Formaldehyde | 38 | 1,780,780 | 8,437,687 | 616,001 | 5,220,067 | 242,466 | 16,297,001 |
| 76-13-1 | Freon 113 | 20 | 23,983,423 | 11,874,228 | 3,264 | 558 | 89,780 | 35,951,253 |
| 76-44-8 | Heptachlor | 273 | 5 | 0 | 0 | 0 | 0 | 5 |
| 118-74-1 | Hexachlorobenzene | 234 | 549 | 292 | 111 | 60 | 1 | 1,013 |
| 87-68-3 | Hexachloro-1,3-butadiene | 209 | 2,420 | 990 | 681 | 200 | 2 | 4,293 |
| 77-47-4 | Hexachlorocyclopentadiene | 182 | 24,744 | 717 | 23 | 5 | 0 | 25,489 |
| 67-72-1 | Hexachloroethane | 183 | 1,783 | 20,926 | 0 | 160 | 2 | 22,871 |
| 302-01-2 | Hydrazine | 176 | 22,354 | 6,079 | 1,520 | 0 | 5 | 29,958 |
| 10034-93-2 | Hydrazine sulfate | 142 | 0 | 2 | 0 | 150,000 | 0 | 150,002 |
| 7647-01-0 | Hydrochloric acid | 2 | 4,634,850 | 78,286,624 | 2,143,954 | 190,422,615 | 12,193,916 | 287,681,959 |
| 74-90-8 | Hydrogen cyanide | 70 | 64,031 | 1,190,762 | 8,839 | 945,926 | 17 | 2,209,575 |
| 7664-39-3 | Hydrogen fluoride | 46 | 3,565,926 | 5,615,266 | 5,464 | 1 | 25,259 | 9,211,916 |
| 123-31-9 | Hydroquinone | 133 | 6,434 | 4,367 | 4,388 | 255,705 | 6 | 270,900 |
| 78-84-2 | Isobutyraldehyde | 116 | 118,100 | 272,124 | 91 | 6,810 | 262 | 397,387 |
| 67-63-0 | Isopropyl alcohol (manufacturing) | 85 | 471,421 | 977,470 | 21,735 | 200 | 2,077 | 1,472,903 |
| 80-05-7 | 4,4'-Isopropylidenediphenol | 100 | 116,488 | 191,370 | 4,492 | 43,000 | 374,926 | 730,276 |
| 120-58-1 | Isosafrole | 270 | 5 | 5 | 0 | 0 | 0 | 10 |
| 7439-92-1 | Lead | 60 | 205,524 | 226,253 | 20,457 | 0 | 3,323,695 | 3,775,929 |
| 58-89-9 | Lindane | 240 | 271 | 291 | 0 | 0 | 5 | 567 |
| 108-31-6 | Maleic anhydride | 114 | 77,182 | 381,807 | 460 | 255 | 1,155 | 460,859 |
| 12427-38-2 | Maneb | 261 | 10 | 19 | 0 | 0 | 0 | 29 |
| 7439-96-5 | Manganese | 43 | 687,932 | 409,038 | 144,676 | 522 | 9,848,116 | 11,090,284 |
| 7439-97-6 | Mercury | 184 | 10,557 | 6,355 | 624 | 0 | 5,287 | 22,823 |
| 67-56-1 | Methanol | 3 | 35,913,043 | 163,769,926 | 20,064,023 | 28,877,462 | 3,634,255 | 252,258,709 |
| 72-43-5 | Methoxychlor | 238 | 251 | 314 | 10 | 0 | 5 | 580 |

| Chemical | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|
| Dichlorotetrafluoroethane (CFC-114) | 250 | 17,400 | 7 | 0 | 0 | 0 | 17,657 |
| Dichlorvos | 0 | 2,000 | 1,610 | 500 | 0 | 0 | 4,110 |
| Dicofol | 0 | 7,899 | 10 | 0 | 0 | 0 | 7,909 |
| Diepoxybutane | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diethanolamine | 1,311,723 | 367,573 | 220,993 | 171,046 | 173,587 | 434 | 2,245,356 |
| Di-(2-ethylhexyl) phthalate | 50,531 | 184,000 | 969,654 | 304,179 | 1,102,094 | 440 | 2,610,898 |
| Diethyl phthalate | 313,332 | 77,678 | 48,747 | 12,927 | 183,064 | 281 | 636,029 |
| Diethyl sulfate | 633 | 805 | 0 | 50 | 7,137,400 | 0 | 7,138,888 |
| 3,3'-Dimethoxybenzidine | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1,1-Dimethyl hydrazine | 0 | 6,360 | 26 | 0 | 3 | 0 | 6,389 |
| 2,4-Dimethylphenol | 2,675 | 3,364 | 1,595 | 22,069 | 0 | 0 | 29,703 |
| Dimethyl phthalate | 82,565 | 58,623 | 17,434 | 16,102 | 250 | 0 | 174,974 |
| Dimethyl sulfate | 260 | 0 | 0 | 0 | 0 | 0 | 260 |
| m-Dinitrobenzene | 0 | 26,700 | 0 | 0 | 0 | 0 | 26,700 |
| o-Dinitrobenzene | 0 | 340 | 0 | 0 | 0 | 0 | 340 |
| p-Dinitrobenzene | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4,6-Dinitro-o-cresol | 26,255 | 5,915 | 11,455 | 100 | 0 | 0 | 43,725 |
| 2,4-Dinitrophenol | 255 | 5 | 1,200 | 2,600 | 0 | 0 | 4,060 |
| 2,4-Dinitrotoluene | 0 | 53,250 | 57 | 110,750 | 0 | 0 | 164,057 |
| 2,6-Dinitrotoluene | 0 | 250 | 0 | 250 | 0 | 0 | 500 |
| Dinitrotoluene (mixed isomers) | 890,000 | 14,720 | 55 | 0 | 0 | 0 | 904,775 |
| n-Dioctyl phthalate | 3,175 | 45,825 | 108,523 | 21,693 | 73,352 | 0 | 252,568 |
| 1,4-Dioxane | 254,304 | 526,359 | 76,537 | 232,949 | 44,222 | 1 | 1,134,372 |
| Epichlorohydrin | 12,703 | 919,235 | 594 | 7,800 | 4,669 | 0 | 945,001 |
| 2-Ethoxyethanol | 217,923 | 139,537 | 20,451 | 201,806 | 36,186 | 2 | 615,905 |
| Ethyl acrylate | 19,855 | 167,145 | 24,621 | 783,299 | 200 | 440 | 995,560 |
| Ethylbenzene | 101,944 | 1,316,257 | 181,096 | 8,664,046 | 2,704,241 | 11,677 | 12,979,261 |
| Ethyl chloroformate | 0 | 390 | 0 | 1,200 | 0 | 0 | 1,590 |
| Ethylene | 17 | 897,754 | 504 | 40,096 | 0 | 0 | 938,371 |
| Ethylene glycol | 18,602,841 | 5,948,273 | 1,300,080 | 4,082,995 | 91,411,758 | 3,450 | 121,349,397 |
| Ethylene oxide | 114,004 | 1,015 | 1,604 | 0 | 0 | 0 | 116,623 |
| Ethylene thiourea | 15 | 11,367 | 7,750 | 250 | 0 | 0 | 19,382 |
| Fluometuron | 1,012 | 11,625 | 17,010 | 0 | 0 | 0 | 29,647 |
| Formaldehyde | 5,482,598 | 928,275 | 497,947 | 102,312 | 62,290 | 8,433 | 7,081,855 |
| Freon 113 | 38,402 | 1,181,848 | 114,338 | 454,663 | 7,784,450 | 98,217 | 9,671,918 |
| Heptachlor | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| Hexachlorobenzene | 5 | 127,143 | 1,064,793 | 0 | 1 | 0 | 1,191,942 |
| Hexachloro-1,3-butadiene | 4 | 1,709,379 | 4,263 | 0 | 0 | 0 | 1,713,646 |
| Hexachlorocyclopentadiene | 624 | 27,803 | 3,000 | 4,000 | 0 | 0 | 35,427 |
| Hexachloroethane | 0 | 166,013 | 5,011 | 39,000 | 0 | 0 | 210,024 |
| Hydrazine | 6,368 | 13,515 | 2,434 | 38,000 | 3 | 29 | 60,349 |
| Hydrazine sulfate | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hydrochloric acid | 16,566,697 | 35,103,614 | 12,733,345 | 4,415,525 | 42,004,594 | 616,043 | 111,439,818 |
| Hydrogen cyanide | 271 | 315 | 120 | 250 | 0 | 0 | 956 |
| Hydrogen fluoride | 356,983 | 2,513,853 | 1,080,205 | 750 | 46,814 | 250 | 3,998,855 |
| Hydroquinone | 168,069 | 22,736 | 214,630 | 4,132 | 10 | 440 | 410,017 |
| Isobutyraldehyde | 37,444 | 47,587 | 0 | 553,000 | 0 | 0 | 638,031 |
| Isopropyl alcohol (manufacturing) | 141,364 | 127,264 | 29,555 | 412,827 | 42,173 | 440 | 753,623 |
| 4,4'-Isopropylidenediphenol | 32,776 | 21,064 | 231,212 | 67,980 | 4,707 | 1,214 | 358,953 |
| Isosafrole | 0 | 0 | 0 | 5 | 0 | 0 | 5 |
| Lead | 306,444 | 1,702,811 | 5,512,965 | 9,082 | 38,232,373 | 39,308 | 45,802,983 |
| Lindane | 5 | 7,258 | 66 | 0 | 0 | 0 | 7,329 |
| Maleic anhydride | 6,073 | 700,645 | 18,370 | 36,342 | 47 | 1 | 761,478 |
| Maneb | 0 | 255 | 2,370 | 0 | 0 | 0 | 2,625 |
| Manganese | 161,114 | 694,623 | 12,738,621 | 24,538 | 41,442,691 | 177,609 | 55,239,196 |
| Mercury | 42 | 43,401 | 114,550 | 0 | 444,961 | 0 | 602,954 |
| Methanol | 113,854,683 | 37,951,338 | 4,666,333 | 63,132,911 | 12,179,529 | 1,456,494 | 233,241,288 |
| Methoxychlor | 0 | 159 | 5 | 0 | 0 | 0 | 164 |

## Table 1-20. Releases and Transfers of All TRI Chemicals, 1991 (Ordered Alphabetically), 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 |
|---|---|---|---|---|---|---|---|---|
| 109-86-4 | 2-Methoxyethanol | 71 | 1,105,988 | 712,351 | 364,059 | 0 | 20 | 2,182,418 |
| 96-33-3 | Methyl acrylate | 135 | 65,781 | 169,686 | 919 | 161 | 0 | 236,547 |
| 1634-04-4 | Methyl tert-butyl ether | 62 | 788,244 | 2,249,807 | 30,901 | 81,690 | 2,903 | 3,153,545 |
| 101-14-4 | 4,4'-Methylenebis (2-chloroaniline) | 229 | 1,015 | 347 | 0 | 0 | 0 | 1,362 |
| 101-68-8 | Methylenebis(phenyl-isocyanate) | 99 | 391,550 | 234,784 | 10 | 0 | 125,989 | 752,333 |
| 74-95-3 | Methylene bromide | 159 | 38,277 | 13,010 | 0 | 0 | 0 | 51,287 |
| 101-77-9 | 4,4'-Methylenedianiline | 170 | 9,013 | 4,155 | 1,486 | 22,062 | 3 | 36,719 |
| 78-93-3 | Methyl ethyl ketone | 11 | 33,149,766 | 70,271,889 | 141,354 | 355,736 | 180,492 | 104,099,237 |
| 60-34-4 | Methyl hydrazine | 279 | 0 | 0 | 0 | 0 | 0 | 0 |
| 74-88-4 | Methyl iodide | 181 | 22,544 | 2,870 | 13 | 740 | 0 | 26,167 |
| 108-10-1 | Methyl isobutyl ketone | 24 | 8,411,877 | 18,786,642 | 167,405 | 161,600 | 177,939 | 27,705,463 |
| 624-83-9 | Methyl isocyanate | 202 | 6,987 | 798 | 0 | 0 | 0 | 7,785 |
| 80-62-6 | Methyl methacrylate | 65 | 587,732 | 1,969,763 | 6,373 | 270,000 | 4,305 | 2,838,173 |
| 90-94-8 | Michler's ketone | 283 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1313-27-5 | Molybdenum trioxide | 125 | 46,026 | 47,911 | 78,785 | 134,965 | 23,415 | 331,102 |
| 76-15-3 | Monochloropenta-fluoroethane (CFC-115) | 121 | 190,872 | 171,291 | 5 | 0 | 0 | 362,168 |
| 91-20-3 | Naphthalene | 66 | 1,391,603 | 1,280,285 | 31,484 | 39,112 | 54,343 | 2,796,827 |
| 134-32-7 | alpha-Naphthylamine | 269 | 5 | 5 | 0 | 0 | 0 | 10 |
| 7440-02-0 | Nickel | 93 | 408,694 | 140,609 | 53,883 | 4,418 | 393,775 | 1,001,379 |
| 7697-37-2 | Nitric acid | 26 | 685,940 | 2,594,202 | 167,773 | 21,128,099 | 585,053 | 25,161,067 |
| 139-13-9 | Nitrilotriacetic acid | 192 | 5 | 0 | 4,100 | 7,800 | 0 | 11,905 |
| 99-59-2 | 5-Nitro-o-anisidine | 266 | 5 | 10 | 0 | 0 | 0 | 15 |
| 98-95-3 | Nitrobenzene | 109 | 34,483 | 18,125 | 850 | 468,404 | 365 | 522,227 |
| 55-63-0 | Nitroglycerin | 160 | 1,790 | 26,657 | 12,399 | 0 | 9,550 | 50,396 |
| 88-75-5 | 2-Nitrophenol | 258 | 0 | 2 | 40 | 0 | 0 | 42 |
| 100-02-7 | 4-Nitrophenol | 194 | 9,406 | 127 | 600 | 0 | 0 | 10,133 |
| 79-46-9 | 2-Nitropropane | 134 | 31,052 | 74,695 | 380 | 139,342 | 0 | 245,469 |
| 156-10-5 | p-Nitrosodiphenylamine | 207 | 24 | 0 | 0 | 4,700 | 0 | 4,724 |
| 121-69-7 | N,N-Dimethylaniline | 149 | 24,751 | 26,605 | 30,430 | 0 | 0 | 81,786 |
| 86-30-6 | N-Nitrosodiphenylamine | 284 | 0 | 0 | 0 | 0 | 0 | 0 |
| 56-38-2 | Parathion | 232 | 267 | 280 | 255 | 0 | 255 | 1,057 |
| 87-86-5 | Pentachlorophenol | 186 | 6,991 | 5,517 | 2,278 | 0 | 1,510 | 16,296 |
| 79-21-0 | Peracetic acid | 198 | 1,110 | 3,982 | 10 | 5 | 3,220 | 8,327 |
| 108-95-2 | Phenol | 44 | 2,498,507 | 3,832,788 | 163,915 | 3,192,210 | 324,921 | 10,012,341 |
| 106-50-3 | p-Phenylenediamine | 214 | 1,054 | 2,497 | 0 | 0 | 2 | 3,553 |
| 90-43-7 | 2-Phenylphenol | 195 | 8,403 | 1,054 | 224 | 0 | 5 | 9,686 |
| 75-44-5 | Phosgene | 208 | 2,279 | 2,109 | 5 | 5 | 0 | 4,398 |
| 7664-38-2 | Phosphoric acid | 6 | 314,776 | 1,002,123 | 114,363,613 | 26,545 | 47,311,554 | 163,018,611 |
| 7723-14-0 | Phosphorus (yellow or white) | 120 | 19,662 | 3,847 | 2,273 | 0 | 339,229 | 365,011 |
| 85-44-9 | Phthalic anhydride | 102 | 112,154 | 519,670 | 13,164 | 0 | 944 | 645,932 |
| 88-89-1 | Picric acid | 82 | 2 | 1 | 2 | 1,634,494 | 19 | 1,634,518 |
| 1336-36-3 | Polychlorinated biphenyls (PCBs) | 267 | 0 | 0 | 0 | 0 | 10 | 10 |
| 123-38-6 | Propionaldehyde | 86 | 598,008 | 790,001 | 63 | 66,741 | 0 | 1,454,813 |
| 114-26-1 | Propoxur | 265 | 10 | 5 | 0 | 0 | 0 | 15 |
| 115-07-1 | Propylene | 27 | 13,422,010 | 9,418,860 | 4,685 | 0 | 114,000 | 22,959,555 |
| 75-55-8 | Propyleneimine | 245 | 50 | 350 | 0 | 0 | 0 | 400 |
| 75-56-9 | Propylene oxide | 90 | 450,934 | 615,690 | 10,181 | 20,710 | 2,450 | 1,099,965 |
| 110-86-1 | Pyridine | 111 | 58,405 | 51,587 | 4,930 | 370,750 | 13 | 485,685 |
| 91-22-5 | Quinoline | 152 | 20,133 | 24,958 | 2,660 | 23,000 | 286 | 71,037 |
| 106-51-4 | Quinone | 212 | 2,205 | 1,807 | 0 | 5 | 0 | 4,017 |
| 82-68-8 | Quintozene | 248 | 20 | 286 | 0 | 0 | 0 | 306 |
| 81-07-2 | Saccharin (manufacturing) | 247 | 63 | 251 | 0 | 0 | 0 | 314 |
| 7782-49-2 | Selenium | 227 | 525 | 511 | 188 | 0 | 260 | 1,484 |
| 7440-22-4 | Silver | 188 | 5,555 | 7,849 | 119 | 28 | 250 | 13,801 |
| 100-42-5 | Styrene | 23 | 10,161,049 | 18,315,297 | 25,609 | 22,080 | 389,929 | 28,913,964 |
| 96-09-3 | Styrene oxide | 225 | 1,628 | 47 | 0 | 0 | 0 | 1,675 |
| 7664-93-9 | Sulfuric acid | 7 | 1,577,640 | 20,099,089 | 37,243,237 | 94,720,218 | 7,678,646 | 161,318,830 |

| Chemical | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|
| 2-Methoxyethanol | 399,241 | 393,034 | 702 | 542,690 | 26,025 | 0 | 1,361,692 |
| Methyl acrylate | 5,311 | 38,476 | 1,025 | 221,846 | 5,000 | 0 | 271,658 |
| Methyl tert-butyl ether | 129,131 | 20,321 | 6,060 | 522,457 | 6,618 | 0 | 684,587 |
| 4,4'-Methylenebis (2-chloroaniline) | 5 | 4,228 | 0 | 1,000 | 0 | 0 | 5,233 |
| Methylenebis(phenyl-isocyanate) | 911 | 529,923 | 1,004,233 | 49,445 | 375,246 | 83,036 | 2,042,794 |
| Methylene bromide | 5,417 | 0 | 0 | 0 | 0 | 0 | 5,417 |
| 4,4'-Methylenedianiline | 1,759 | 44,218 | 16,913 | 28,000 | 0 | 0 | 90,890 |
| Methyl ethyl ketone | 772,861 | 9,365,077 | 512,746 | 35,111,556 | 26,033,673 | 121,043 | 71,916,956 |
| Methyl hydrazine | 1 | 0 | 0 | 0 | 0 | 2 | 3 |
| Methyl iodide | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| Methyl isobutyl ketone | 816,066 | 2,112,745 | 155,643 | 18,801,198 | 20,346,186 | 5,907 | 42,237,745 |
| Methyl isocyanate | 0 | 0 | 15,067 | 0 | 0 | 0 | 15,067 |
| Methyl methacrylate | 131,991 | 525,679 | 187,596 | 1,255,989 | 458,907 | 9 | 2,560,171 |
| Michler's ketone | 3 | 0 | 0 | 703 | 0 | 0 | 706 |
| Molybdenum trioxide | 80,682 | 48,998 | 534,959 | 0 | 2,424,255 | 86,736 | 3,175,630 |
| Monochloropenta-fluoroethane (CFC-115) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Naphthalene | 63,546 | 488,867 | 1,378,524 | 1,522,280 | 206,040 | 16,406 | 3,675,663 |
| alpha-Naphthylamine | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nickel | 506,495 | 588,824 | 3,548,970 | 7,812 | 38,882,197 | 343,261 | 43,877,559 |
| Nitric acid | 8,648,779 | 14,022,809 | 3,889,873 | 750 | 2,224,835 | 10,455 | 28,797,501 |
| Nitrilotriacetic acid | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5-Nitro-o-anisidine | 255 | 0 | 250 | 0 | 0 | 0 | 505 |
| Nitrobenzene | 100 | 326,969 | 8,403 | 243,550 | 35,606 | 4,048 | 618,676 |
| Nitroglycerin | 86 | 87,122 | 0 | 8 | 2,683 | 0 | 89,899 |
| 2-Nitrophenol | 140 | 11,441 | 221 | 0 | 0 | 0 | 11,802 |
| 4-Nitrophenol | 21,067 | 561,290 | 0 | 0 | 0 | 0 | 582,357 |
| 2-Nitropropane | 0 | 2,837 | 33,650 | 0 | 39,204 | 0 | 75,691 |
| p-Nitrosodiphenylamine | 0 | 0 | 0 | 2,200 | 0 | 0 | 2,200 |
| N,N-Dimethylaniline | 206,399 | 84,654 | 0 | 489,869 | 0 | 0 | 780,922 |
| N-Nitrosodiphenylamine | 0 | 470,000 | 0 | 0 | 0 | 0 | 470,000 |
| Parathion | 0 | 361 | 505 | 0 | 0 | 2,307 | 3,173 |
| Pentachlorophenol | 834 | 65,491 | 187,231 | 10,613 | 1,755 | 90 | 266,014 |
| Peracetic acid | 1,672 | 0 | 0 | 0 | 0 | 0 | 1,672 |
| Phenol | 5,401,118 | 2,375,455 | 901,912 | 1,573,947 | 1,047,096 | 25,892 | 11,325,420 |
| p-Phenylenediamine | 3,239 | 1,200 | 13,000 | 0 | 0 | 0 | 17,439 |
| 2-Phenylphenol | 4,858 | 5 | 510 | 260 | 0 | 0 | 5,633 |
| Phosgene | 0 | 2,425 | 5 | 0 | 0 | 0 | 2,430 |
| Phosphoric acid | 5,498,173 | 2,319,204 | 1,657,538 | 17,353 | 8,325,508 | 552,865 | 18,370,641 |
| Phosphorus (yellow or white) | 266 | 3,652 | 506 | 0 | 141,598 | 0 | 146,022 |
| Phthalic anhydride | 3,281 | 436,077 | 279,776 | 4,684,778 | 0 | 1 | 5,403,913 |
| Picric acid | 0 | 12,465 | 0 | 25,000 | 0 | 0 | 37,465 |
| Polychlorinated biphenyls (PCBs) | 0 | 2,319,927 | 112,850 | 0 | 14 | 0 | 2,432,791 |
| Propionaldehyde | 12,922 | 250 | 4,975 | 5,100 | 0 | 0 | 23,247 |
| Propoxur | 255 | 455 | 5 | 0 | 0 | 0 | 715 |
| Propylene | 5 | 724,173 | 6,039 | 288,300 | 0 | 0 | 1,018,517 |
| Propyleneimine | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Propylene oxide | 49,854 | 6,887 | 40,392 | 1,361,220 | 5 | 0 | 1,458,358 |
| Pyridine | 264,235 | 202,765 | 4,560 | 177,321 | 33,804 | 0 | 682,685 |
| Quinoline | 255 | 4,248 | 3,702 | 0 | 0 | 0 | 8,205 |
| Quinone | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Quintozene | 11 | 61,470 | 1,480 | 105 | 0 | 0 | 63,066 |
| Saccharin (manufacturing) | 260 | 350 | 1,400 | 0 | 0 | 0 | 2,010 |
| Selenium | 265 | 965 | 5,407 | 0 | 43,378 | 0 | 50,015 |
| Silver | 259,353 | 9,105 | 116,004 | 0 | 995,281 | 337 | 1,380,080 |
| Styrene | 243,118 | 2,858,300 | 1,998,082 | 8,502,579 | 67,095 | 8,385 | 13,677,559 |
| Styrene oxide | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sulfuric acid | 34,175,276 | 44,343,292 | 31,353,990 | 94,151 | 883,134,485 | 566,510 | 993,667,704 |

**Table 1-20. Releases and Transfers of All TRI Chemicals, 1991 (Ordered Alphabetically), 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 |
|---|---|---|---|---|---|---|---|---|
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 154 | 40,927 | 23,324 | 2,102 | 0 | 0 | 66,353 |
| 127-18-4 | Tetrachloroethylene | 36 | 6,482,575 | 10,204,876 | 7,448 | 14,000 | 23,302 | 16,732,201 |
| 961-11-5 | Tetrachlorvinphos | 255 | 1 | 129 | 2 | 0 | 0 | 132 |
| 7440-28-0 | Thallium | 260 | 1 | 29 | 1 | 0 | 0 | 31 |
| 62-55-5 | Thioacetamide | 285 | 0 | 0 | 0 | 0 | 0 | 0 |
| 62-56-6 | Thiourea | 200 | 873 | 555 | 717 | 5,400 | 505 | 8,050 |
| 1314-20-1 | Thorium dioxide | 251 | 0 | 250 | 0 | 0 | 0 | 250 |
| 7550-45-0 | Titanium tetrachloride | 171 | 27,370 | 6,236 | 0 | 0 | 0 | 33,606 |
| 108-88-3 | Toluene | 4 | 73,620,294 | 124,944,414 | 104,645 | 1,373,207 | 185,012 | 200,227,572 |
| 584-84-9 | Toluene-2,4-diisocyanate | 88 | 12,148 | 1,311,804 | 0 | 0 | 250 | 1,324,202 |
| 91-08-7 | Toluene-2,6-diisocyanate | 124 | 303,581 | 28,507 | 0 | 0 | 250 | 332,338 |
| 26471-62-5 | Toluenediisocyanate (mixed isomers) | 162 | 18,359 | 29,526 | 0 | 0 | 10 | 47,895 |
| 95-53-4 | o-Toluidine | 168 | 8,904 | 1,925 | 260 | 21,100 | 8,111 | 40,300 |
| 52-68-6 | Trichlorfon | 250 | 5 | 254 | 9 | 0 | 0 | 268 |
| 120-82-1 | 1,2,4-Trichlorobenzene | 115 | 127,598 | 282,051 | 1,669 | 3,134 | 4,573 | 419,025 |
| 71-55-6 | 1,1,1-Trichloroethane | 8 | 69,230,762 | 68,274,801 | 21,803 | 2,805 | 171,807 | 137,701,978 |
| 79-00-5 | 1,1,2-Trichloroethane | 108 | 94,329 | 433,437 | 1,382 | 2 | 256 | 529,406 |
| 79-01-6 | Trichloroethylene | 21 | 16,642,065 | 18,416,403 | 12,750 | 800 | 62,991 | 35,135,009 |
| 75-69-4 | Trichlorofluoromethane (CFC-11) | 41 | 5,339,896 | 6,382,210 | 5,156 | 1,428 | 10,203 | 11,738,893 |
| 95-95-4 | 2,4,5-Trichlorophenol | 178 | 0 | 0 | 0 | 28,000 | 0 | 28,000 |
| 88-06-2 | 2,4,6-Trichlorophenol | 257 | 1 | 79 | 1 | 0 | 1 | 82 |
| 1582-09-8 | Trifluralin | 166 | 8,449 | 2,711 | 80 | 0 | 31,835 | 43,075 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 52 | 2,723,947 | 2,618,627 | 15,756 | 16,898 | 17,732 | 5,392,960 |
| 51-79-6 | Urethane | 221 | 0 | 2,050 | 0 | 0 | 0 | 2,050 |
| 7440-62-2 | Vanadium (fume or dust) | 147 | 1,739 | 14,664 | 685 | 0 | 74,730 | 91,818 |
| 108-05-4 | Vinyl acetate | 48 | 1,102,871 | 4,383,624 | 9,900 | 3,088,362 | 7,237 | 8,591,994 |
| 593-60-2 | Vinyl bromide | 213 | 260 | 3,300 | 0 | 0 | 0 | 3,560 |
| 75-01-4 | Vinyl chloride | 92 | 390,119 | 657,366 | 4,625 | 4 | 251 | 1,052,365 |
| 75-35-4 | Vinylidene chloride | 129 | 71,772 | 213,418 | 832 | 0 | 15 | 286,037 |
| 1330-20-7 | Xylene (mixed isomers) | 10 | 27,683,616 | 87,869,367 | 50,801 | 139,948 | 335,613 | 116,079,345 |
| 108-38-3 | m-Xylene | 87 | 926,807 | 509,426 | 2,260 | 5 | 3,186 | 1,441,684 |
| 95-47-6 | o-Xylene | 78 | 1,153,483 | 576,448 | 6,507 | 5 | 1,618 | 1,738,061 |
| 106-42-3 | p-Xylene | 53 | 1,343,694 | 3,934,677 | 1,076 | 5 | 3,635 | 5,283,087 |
| 87-62-7 | 2,6-Xylidine | 263 | 5 | 16 | 0 | 0 | 0 | 21 |
| 7440-66-6 | Zinc (fume or dust) | 42 | 765,614 | 1,168,410 | 28,080 | 115 | 9,216,574 | 11,178,793 |
| 12122-67-7 | Zineb | 274 | 5 | 0 | 0 | 0 | 0 | 5 |
| | Antimony compounds | 81 | 30,395 | 55,746 | 45,593 | 6,509 | 1,522,871 | 1,661,114 |
| | Arsenic compounds | 63 | 25,007 | 165,308 | 4,496 | 23,000 | 2,738,853 | 2,956,664 |
| | Barium compounds | 54 | 248,569 | 614,578 | 100,702 | 408 | 4,005,169 | 4,969,426 |
| | Beryllium compounds | 175 | 1 | 241 | 9 | 0 | 30,000 | 30,251 |
| | Cadmium compounds | 127 | 17,066 | 52,427 | 3,580 | 1,540 | 248,374 | 322,987 |
| | Chlorophenols | 136 | 3,368 | 968 | 782 | 229,798 | 56 | 234,972 |
| | Chromium compounds | 25 | 134,838 | 427,257 | 335,233 | 34,619 | 24,761,345 | 25,693,292 |
| | Cobalt compounds | 131 | 7,857 | 25,946 | 78,593 | 19,949 | 142,152 | 274,497 |
| | Copper compounds | 17 | 2,378,725 | 1,870,707 | 158,621 | 225,310 | 42,424,235 | 47,057,598 |
| | Cyanide compounds | 55 | 61,839 | 708,282 | 111,021 | 3,781,837 | 26,768 | 4,689,747 |
| | Glycol ethers | 18 | 10,235,089 | 33,678,910 | 507,487 | 176,033 | 711,313 | 45,308,832 |
| | Lead compounds | 39 | 348,258 | 1,059,351 | 117,976 | 928 | 13,699,094 | 15,225,607 |
| | Manganese compounds | 15 | 490,885 | 755,529 | 698,968 | 15,327 | 68,528,067 | 70,488,776 |
| | Mercury compounds | 218 | 1,355 | 1,475 | 47 | 9 | 28 | 2,914 |
| | Nickel compounds | 73 | 60,804 | 182,380 | 73,071 | 366,530 | 1,278,693 | 1,961,478 |
| | Selenium compounds | 145 | 2,381 | 34,679 | 722 | 4,100 | 80,295 | 122,177 |
| | Silver compounds | 161 | 6,590 | 18,238 | 8,309 | 25 | 16,993 | 50,155 |
| | Thallium compounds | 241 | 5 | 250 | 0 | 0 | 255 | 510 |
| | Zinc compounds | 9 | 1,517,384 | 2,710,343 | 1,325,812 | 228,007 | 114,062,672 | 119,844,218 |
| | Mixtures and other trade names | 95 | 189,755 | 680,261 | 6,063 | 1,540 | 50,384 | 928,003 |
| | Trade Secrets | 220 | 56 | 893 | 1,400 | 0 | 0 | 2,349 |
| | Total | | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

| Chemical | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|
| 1,1,2,2-Tetrachloroethane | 2,005 | 214,173 | 262 | 17,800 | 852,908 | 1 | 1,087,149 |
| Tetrachloroethylene | 234,637 | 3,580,303 | 112,237 | 1,232,887 | 10,694,611 | 138,019 | 15,992,694 |
| Tetrachlorvinphos | 9 | 5,300 | 27,969 | 0 | 0 | 0 | 33,278 |
| Thallium | 0 | 1 | 953 | 0 | 0 | 0 | 954 |
| Thioacetamide | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Thiourea | 15,906 | 4,107 | 1,661 | 750 | 335 | 0 | 22,759 |
| Thorium dioxide | 250 | 0 | 102,249 | 0 | 0 | 0 | 102,499 |
| Titanium tetrachloride | 5 | 2,367,140 | 958 | 2,688 | 0 | 0 | 2,370,791 |
| Toluene | 1,266,355 | 20,171,434 | 1,636,162 | 80,207,715 | 24,882,493 | 198,649 | 128,362,808 |
| Toluene-2,4-diisocyanate | 0 | 35,711 | 14,098 | 12,911 | 10,900 | 0 | 73,620 |
| Toluene-2,6-diisocyanate | 0 | 14,423 | 0 | 10 | 1,950 | 0 | 16,383 |
| Toluenediisocyanate (mixed isomers) | 6 | 200,231 | 15,387 | 22,289 | 11,129 | 0 | 249,042 |
| o-Toluidine | 8,250 | 101,931 | 85 | 62,900 | 0 | 1,300 | 174,466 |
| Trichlorfon | 0 | 1,145 | 47 | 0 | 0 | 0 | 1,192 |
| 1,2,4-Trichlorobenzene | 136,769 | 315,761 | 59,051 | 68,617 | 85,165 | 0 | 665,363 |
| 1,1,1-Trichloroethane | 293,508 | 6,743,974 | 969,200 | 3,212,938 | 27,237,545 | 287,441 | 38,744,606 |
| 1,1,2-Trichloroethane | 819 | 4,995,437 | 8,580 | 0 | 8,179,318 | 0 | 13,184,154 |
| Trichloroethylene | 72,845 | 2,577,754 | 115,974 | 802,290 | 6,785,517 | 99,640 | 10,454,020 |
| Trichlorofluoromethane (CFC-11) | 10,252 | 175,662 | 410,963 | 32,314 | 175,082 | 0 | 804,273 |
| 2,4,5-Trichlorophenol | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2,4,6-Trichlorophenol | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trifluralin | 141 | 26,604 | 50,013 | 0 | 250 | 0 | 77,008 |
| 1,2,4-Trimethylbenzene | 238,993 | 216,540 | 143,827 | 1,535,784 | 469,483 | 8,600 | 2,613,227 |
| Urethane | 0 | 15,300 | 4,500 | 0 | 0 | 0 | 19,800 |
| Vanadium (fume or dust) | 270 | 1,646 | 426,571 | 61 | 154,749 | 0 | 583,297 |
| Vinyl acetate | 153,451 | 124,913 | 49,834 | 3,648,193 | 1,136 | 0 | 3,977,527 |
| Vinyl bromide | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vinyl chloride | 252 | 69,540 | 6,549 | 59 | 236,549 | 0 | 312,949 |
| Vinylidene chloride | 94 | 74,520 | 7 | 0 | 0 | 0 | 74,621 |
| Xylene (mixed isomers) | 1,437,628 | 19,031,424 | 914,695 | 66,547,878 | 38,885,924 | 195,932 | 127,013,481 |
| m-Xylene | 19,178 | 102,008 | 49,329 | 47,829 | 15,968 | 0 | 234,312 |
| o-Xylene | 117,628 | 101,894 | 23,242 | 2,614,447 | 10,249 | 61,354 | 2,928,814 |
| p-Xylene | 18,748 | 48,171 | 14,076 | 10,020 | 1,365 | 296 | 92,676 |
| 2,6-Xylidine | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zinc (fume or dust) | 40,658 | 1,061,859 | 4,144,417 | 50,022 | 67,787,514 | 147,137 | 73,231,607 |
| Zineb | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| Antimony compounds | 88,027 | 185,845 | 1,759,024 | 76,010 | 1,899,230 | 1,621 | 4,009,757 |
| Arsenic compounds | 1,384 | 416,169 | 1,148,904 | 250 | 949,197 | 157 | 2,516,061 |
| Barium compounds | 2,045,102 | 2,451,281 | 16,639,604 | 218,923 | 915,600 | 37,134 | 22,307,644 |
| Beryllium compounds | 0 | 1,081 | 1,800 | 0 | 7,135 | 0 | 10,016 |
| Cadmium compounds | 5,462 | 320,357 | 354,219 | 6,647 | 2,131,646 | 36,801 | 2,855,132 |
| Chlorophenols | 1,330 | 104,388 | 0 | 4,493 | 0 | 0 | 110,211 |
| Chromium compounds | 791,952 | 3,056,902 | 10,472,628 | 62,847 | 17,670,973 | 148,391 | 32,203,693 |
| Cobalt compounds | 15,242 | 117,768 | 214,330 | 2,802 | 1,188,055 | 25 | 1,538,222 |
| Copper compounds | 197,460 | 1,886,082 | 6,693,964 | 42,822 | 93,403,884 | 195,011 | 102,419,223 |
| Cyanide compounds | 121,457 | 446,980 | 365,189 | 250 | 82,660 | 12,390 | 1,028,926 |
| Glycol ethers | 9,286,863 | 3,409,543 | 719,838 | 11,663,373 | 3,928,476 | 36,430 | 29,044,523 |
| Lead compounds | 286,082 | 2,856,308 | 9,981,379 | 59,751 | 166,608,749 | 63,910 | 179,856,179 |
| Manganese compounds | 3,341,541 | 4,861,868 | 20,715,032 | 3,644 | 28,667,700 | 195,061 | 57,784,846 |
| Mercury compounds | 22 | 22,130 | 13,892 | 5 | 490 | 0 | 36,539 |
| Nickel compounds | 132,553 | 1,729,940 | 3,099,304 | 4,541 | 21,348,692 | 29,354 | 26,344,384 |
| Selenium compounds | 160 | 10,461 | 42,825 | 0 | 22,485 | 0 | 75,931 |
| Silver compounds | 3,308 | 1,328 | 2,901 | 0 | 1,138,708 | 500 | 1,146,745 |
| Thallium compounds | 5 | 0 | 0 | 0 | 1,500 | 0 | 1,505 |
| Zinc compounds | 623,374 | 9,336,028 | 40,753,446 | 475,859 | 141,091,759 | 1,750,175 | 194,030,641 |
| Mixtures and other trade names | 19,463 | 187,447 | 307,729 | 130,554 | 1,982,645 | 5,950 | 2,633,788 |
| Trade Secrets | 0 | 25,054 | 8,499 | 2,000 | 30,000 | 0 | 65,553 |
| Total | 411,907,098 | 352,433,168 | 299,042,451 | 438,225,342 | 2,354,123,586 | 9,549,879 | 3,865,281,524 |

# THE 1991 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE

## *1991 Releases and Transfers by Industry*

Table 1-21. TRI Releases by Industry, 1991.

| 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 | 13,872,902 | 14,580,590 | 2,402,141 | 210,595 | 8,962,351 | 40,028,579 |
| 21 | Tobacco | 377,909 | 3,119,723 | 14,583 | 0 | 0 | 3,512,215 |
| 22 | Textiles | 6,075,182 | 18,345,243 | 261,118 | 0 | 67,407 | 24,748,950 |
| 23 | Apparel | 420,788 | 953,006 | 182 | 0 | 14,710 | 1,388,686 |
| 24 | Lumber | 6,855,829 | 24,977,497 | 115,236 | 0 | 92,238 | 32,040,800 |
| 25 | Furniture | 7,861,553 | 46,931,358 | 625 | 0 | 261,748 | 55,055,284 |
| 26 | Paper | 28,926,646 | 179,322,026 | 29,662,182 | 5 | 4,102,113 | 242,012,972 |
| 27 | Printing | 26,016,422 | 18,803,301 | 406 | 1 | 23,486 | 44,843,616 |
| 28 | Chemicals | 190,321,556 | 425,379,355 | 187,984,295 | 656,159,121 | 89,877,402 | 1,549,721,729 |
| 29 | Petroleum | 34,558,058 | 22,083,995 | 3,330,517 | 14,271,606 | 981,862 | 75,226,038 |
| 30 | Plastics | 48,148,253 | 102,987,646 | 579,551 | 15,795 | 500,666 | 152,231,911 |
| 31 | Leather | 3,584,688 | 5,991,335 | 118,645 | 0 | 83,399 | 9,778,067 |
| 32 | Stone/Clay | 4,039,495 | 17,111,235 | 155,812 | 7,464,305 | 2,343,515 | 31,114,362 |
| 33 | Primary Metals | 41,864,730 | 114,271,776 | 8,503,659 | 13,536,557 | 254,917,719 | 433,094,441 |
| 34 | Fabr. Metals | 43,463,283 | 64,524,080 | 278,576 | 824 | 1,515,802 | 109,782,565 |
| 35 | Machinery | 15,326,157 | 23,677,309 | 50,739 | 35 | 443,717 | 39,497,957 |
| 36 | Electrical | 21,780,652 | 43,923,295 | 389,091 | 2,224 | 1,545,301 | 67,640,563 |
| 37 | Transportation | 49,100,172 | 97,738,993 | 139,004 | 1,000 | 1,916,444 | 148,895,613 |
| 38 | Measure./Photo. | 12,184,456 | 29,273,856 | 736,288 | 0 | 55,622 | 42,250,222 |
| 39 | Miscellaneous | 6,217,387 | 12,261,825 | 5,613 | 0 | 51,074 | 18,535,899 |
| Multiple codes 20-39(b) | | 61,204,127 | 107,881,781 | 8,416,223 | 9,614,319 | 49,548,271 | 236,664,721 |
| No codes 20-39 | | 4,179,151 | 10,035,444 | 369,286 | 9,100,750 | 4,123,297 | 27,807,928 |
| | Total | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

**Table 1-22. TRI Transfers by Industry, 1991.**

| SIC Code | Industry | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|---|
| 20 | Food | 38,232,701 | 3,584,204 | 1,261,865 | 126,600 | 1,180,705 | 211,115 | 44,597,190 |
| 21 | Tobacco | 14,644 | 0 | 20,295 | 7,681 | 4,732 | 0 | 47,352 |
| 22 | Textiles | 6,765,966 | 885,007 | 1,783,099 | 2,341,897 | 534,193 | 12,255 | 12,322,417 |
| 23 | Apparel | 186,721 | 198,598 | 58,271 | 58,278 | 3,013 | 11,635 | 516,516 |
| 24 | Lumber | 146,930 | 1,029,083 | 2,540,007 | 3,471,695 | 1,539,102 | 31,849 | 8,758,666 |
| 25 | Furniture | 142,883 | 1,894,187 | 800,824 | 5,855,106 | 3,320,643 | 102,731 | 12,116,374 |
| 26 | Paper | 44,908,367 | 7,383,049 | 3,993,620 | 6,550,477 | 2,921,456 | 94,919 | 65,851,888 |
| 27 | Printing | 329,875 | 1,722,515 | 261,170 | 4,301,514 | 5,108,510 | 9,517 | 11,733,101 |
| 28 | Chemicals | 237,266,136 | 187,871,839 | 87,227,928 | 320,448,696 | 388,042,082 | 3,026,559 | 1,223,883,240 |
| 29 | Petroleum | 7,218,566 | 610,142 | 2,897,394 | 1,618,330 | 627,692,089 | 47,387 | 640,083,908 |
| 30 | Plastics | 5,046,559 | 5,001,346 | 9,548,832 | 10,341,672 | 15,028,481 | 67,572 | 45,034,462 |
| 31 | Leather | 5,685,248 | 626,013 | 1,144,836 | 1,124,862 | 945,845 | 87,043 | 9,613,847 |
| 32 | Stone/Clay | 1,690,689 | 6,919,937 | 6,002,924 | 4,718,116 | 4,152,753 | 16,547 | 23,500,966 |
| 33 | Primary Metals | 21,555,153 | 52,949,912 | 85,603,553 | 7,846,104 | 620,328,782 | 1,999,447 | 790,282,951 |
| 34 | Fabr. Metals | 6,708,095 | 19,690,394 | 22,289,027 | 11,680,648 | 168,280,668 | 601,054 | 229,249,886 |
| 35 | Machinery | 2,429,666 | 3,260,536 | 5,142,199 | 3,011,108 | 37,473,362 | 393,964 | 51,710,835 |
| 36 | Electrical | 7,438,842 | 17,737,659 | 14,932,319 | 10,945,175 | 226,877,243 | 806,900 | 278,738,138 |
| 37 | Transportation | 7,422,111 | 13,374,330 | 12,016,582 | 22,586,611 | 109,427,642 | 717,453 | 165,544,729 |
| 38 | Measure./Photo. | 1,595,450 | 4,471,104 | 1,373,717 | 3,849,881 | 17,429,978 | 23,591 | 28,743,721 |
| 39 | Miscellaneous | 797,358 | 1,358,840 | 1,611,146 | 2,648,979 | 7,335,683 | 205,554 | 13,957,560 |
| Multiple codes 20-39(b) | | 15,302,267 | 21,418,869 | 33,990,233 | 13,926,445 | 112,805,694 | 831,993 | 198,275,501 |
| No codes 20-39 | | 1,022,871 | 445,604 | 4,542,610 | 765,467 | 3,690,930 | 250,794 | 10,718,276 |
| | Total | 411,907,098 | 352,433,168 | 299,042,451 | 438,225,342 | 2,354,123,586 | 9,549,879 | 3,865,281,524 |

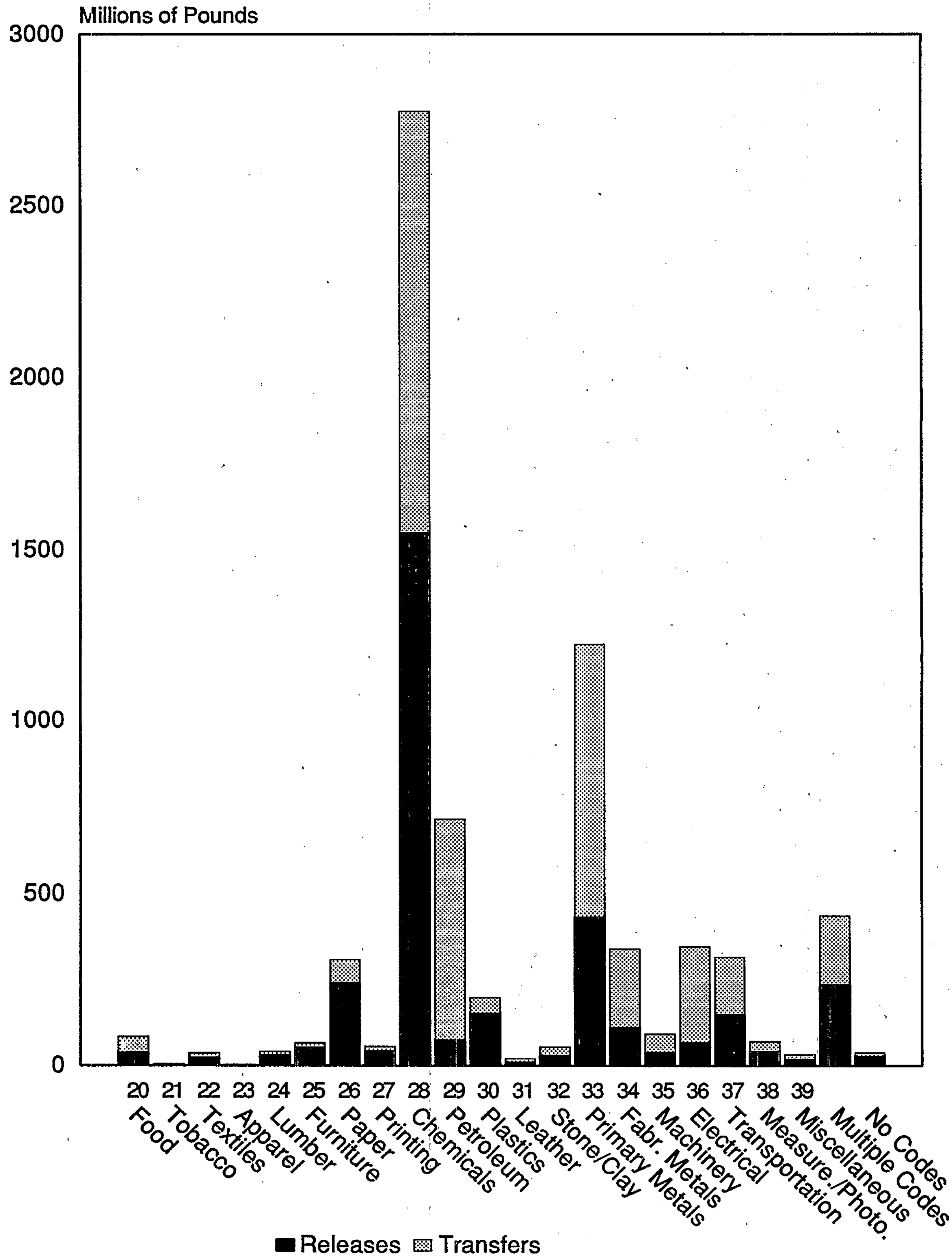



**Figure 1-5. TRI Releases and Transfers by Industry, 1991.**

**Table 1-23. Top 50 TRI Facilities with Largest Releases, 1991.**

| Facility Name | City | 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 |
|---|---|---|---|---|---|---|---|---|
| American Cyanamid Co. | Westwego | LA | 82,324 | 291,212 | 305,090 | 141,330,450 | 0 | 142,009,076 |
| Agrico Chemical Co. | Saint James | LA | 245,260 | 11,788,350 | 81,464,800 | 0 | 345,250 | 93,843,660 |
| Magnesium Corp. of America | Rowley | UT | 333,555 | 64,603,400 | 0 | 0 | 250 | 64,937,205 |
| Du Pont Johnsonville Plant | New Johnsonville | TN | 46,250 | 7,170,400 | 0 | 52,000,000 | 1,250 | 59,217,900 |
| Monsanto Co. | Alvin | TX | 71,120 | 109,169 | 0 | 54,019,610 | 44,000 | 54,243,899 |
| Agrico Chemical Co. | Uncle Sam | LA | 37,999 | 738,310 | 48,161,000 | 0 | 250,219 | 49,187,528 |
| Du Pont Delisle | Pass Christian | MS | 198,213 | 5,960,100 | 0 | 41,000,000 | 520 | 47,158,833 |
| Vulcan Chemicals | Wichita | KS | 133,032 | 637,051 | 0 | 44,860,820 | 0 | 45,630,903 |
| Courtaulds Fibers Inc. | Axis | AL | 452,005 | 42,002,515 | 43,105 | 0 | 430,000 | 42,927,625 |
| Eastman Kodak Co. | Kingsport | TN | 32,248,944 | 7,725,117 | 382,606 | 0 | 82,113 | 40,438,780 |
| Asarco Inc. | East Helena | MT | 36,770 | 84,560 | 0 | 0 | 38,502,100 | 38,623,430 |
| Sterling Chemicals Inc. | Texas City | TX | 392,030 | 963,680 | 10,560 | 35,383,465 | 0 | 36,749,735 |
| Du Pont Beaumont Plant | Beaumont | TX | 259,059 | 2,369,065 | 56,196 | 33,187,515 | 9,795 | 35,881,630 |
| Inland Steel Co. | East Chicago | IN | 553,480 | 258,370 | 658,100 | 0 | 31,079,455 | 32,549,405 |
| BP Chemicals Inc. | Port Lavaca | TX | 27,976 | 59,733 | 840 | 28,963,776 | 0 | 29,052,325 |
| BP Chemicals Inc. | Lima | OH | 342,545 | 2,649,855 | 60,455 | 24,508,895 | 0 | 27,561,750 |
| Du Pont Victoria Site | Victoria | TX | 32,459 | 1,580,972 | 2,267 | 25,602,557 | 13,125 | 27,231,380 |
| Asarco Inc. | Hayden | AZ | 591,540 | 146,006 | 0 | 0 | 25,746,045 | 26,483,591 |
| Magma Copper Co. | San Manuel | AZ | 32,563 | 168,200 | 0 | 0 | 23,877,136 | 24,077,899 |
| Phelps Dodge Mining Co. | Playas | NM | 750 | 676,643 | 0 | 0 | 23,170,254 | 23,847,647 |
| Arcadian Fertilizer L.P. | Geismar | LA | 127,256 | 1,501,965 | 21,592,465 | 0 | 341,655 | 23,563,341 |
| Du Pont | Louisville | KY | 222,579 | 945,947 | 0 | 22,000,000 | 0 | 23,168,526 |
| BASF Corp. | Lowland | TN | 1,578,310 | 18,048,250 | 30,960 | 0 | 1,532,600 | 21,190,120 |
| Cabot Corp. | Tuscola | IL | 750 | 4,552,406 | 0 | 14,217,020 | 0 | 18,770,176 |
| ICI Americas Inc. | Mount Pleasant | TN | 106,731 | 105,079 | 0 | 17,528,207 | 0 | 17,740,017 |
| Elkem Metals Co. | Marietta | OH | 3,385,250 | 124,200 | 3,136,200 | 0 | 10,837,624 | 17,483,274 |
| Herculaneum Smelter | Herculaneum | MO | 29,590 | 366,592 | 525 | 0 | 16,124,772 | 16,521,479 |
| Texasgulf Inc. | Aurora | NC | 200,310 | 1,623,950 | 63,550 | 0 | 13,953,650 | 15,841,460 |
| Eastman Kodak Co. | Rochester | NY | 1,806,214 | 11,919,308 | 633,003 | 0 | 396 | 14,358,921 |
| Kennecott Utah Copper | Magna | UT | 42,355 | 394,300 | 5,400 | 0 | 13,792,175 | 14,234,230 |
| 3M | Hutchinson | MN | 744,244 | 12,640,224 | 0 | 0 | 0 | 13,384,468 |
| BASF Corp. | Geismar | LA | 493,350 | 489,695 | 15,017 | 12,000,036 | 0 | 12,998,098 |
| Northwestern Steel & Wire Co | Sterling | IL | 73,670 | 309,350 | 2,620 | 0 | 11,590,000 | 11,975,640 |
| Mississippi Chemical Corp. | Yazoo City | MS | 707,800 | 10,486,291 | 613,324 | 0 | 0 | 11,807,415 |
| Unocal Corp. | Kenai | AK | 148,610 | 11,067,060 | 235,075 | 150 | 4,000 | 11,454,895 |
| Uniroyal Chemical Co. Inc. | Geismar | LA | 350,409 | 748,838 | 210 | 9,769,920 | 0 | 10,869,377 |
| Citgo Petroleum Corp. | Lake Charles | LA | 1,130,960 | 341,842 | 67,712 | 9,284,726 | 6,116 | 10,831,356 |
| American Chrome & Chemicals | Corpus Christi | TX | 5,110 | 154,250 | 18,150 | 0 | 10,000,000 | 10,177,510 |
| IMC Fertilizer Inc. | Mulberry | FL | 9,120 | 965,000 | 0 | 0 | 9,100,000 | 10,074,120 |
| Coastal Chem Inc. | Cheyenne | WY | 204,350 | 842,200 | 0 | 8,570,642 | 0 | 9,617,192 |
| Dow Chemical Co. | Freeport | TX | 3,858,658 | 5,097,756 | 464,378 | 0 | 21,664 | 9,442,456 |
| Monsanto Co. | Cantonment | FL | 56,100 | 537,655 | 870 | 8,644,827 | 0 | 9,239,452 |
| Occidental Chemical Corp. | Castle Hayne | NC | 607 | 31,002 | 36 | 0 | 9,200,255 | 9,231,900 |
| Hoechst Celanese | Narrows | VA | 4,900,700 | 4,166,700 | 497 | 0 | 6,700 | 9,074,597 |
| Amoco Oil Co. | Texas City | TX | 618,670 | 129,089 | 144,900 | 7,937,000 | 244,471 | 9,074,130 |
| General Motors Corporation | Saginaw | MI | 87,565 | 388,242 | 0 | 0 | 8,532,606 | 9,008,413 |
| Occidental Chemical Corp. | White Springs | FL | 260,020 | 310,000 | 3,490 | 0 | 8,400,000 | 8,973,510 |
| Du Pont La Porte Plant | La Porte | TX | 181,279 | 497,917 | 1,349 | 7,681,000 | 486 | 8,362,031 |
| Climax Chemical Co. | Monument | NM | 75,632 | 122,693 | 0 | 0 | 7,921,032 | 8,119,357 |
| ICI Americas Inc. | Bucks | AL | 10,295 | 46,135 | 74 | 7,982,277 | 0 | 8,038,781 |
| Subtotal | | | 57,534,368 | 238,936,644 | 158,174,824 | 606,472,893 | 265,161,714 | 1,326,280,443 |
| Total for All Facilities | | | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

Table 1-24. Top 10 Parent Companies With Largest Releases, 1991.

| Parent Company | 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 | 7,940,322 | 46,705,185 | 1,539,939 | 186,868,334 | 273,619 | 243,327,399 |
| Freeport-McMoran Inc. | 445,769 | 12,865,330 | 130,207,800 | 0 | 6,103,469 | 149,622,368 |
| American Cyanamid Company | 1,042,081 | 1,976,155 | 964,985 | 141,636,035 | 23,039 | 145,642,295 |
| Asarco Inc. | 881,233 | 671,807 | 11,563 | 5,881,195 | 70,945,957 | 78,391,755 |
| Monsanto Company | 1,398,303 | 6,289,913 | 2,102,608 | 66,150,237 | 84,558 | 76,025,619 |
| Eastman Kodak Company | 40,700,920 | 24,880,680 | 1,218,893 | 0 | 164,533 | 66,965,026 |
| Renco Group Inc. | 418,745 | 64,784,673 | 3,620 | 0 | 1,240,020 | 66,447,058 |
| BP America | 2,432,568 | 4,232,797 | 282,142 | 53,472,671 | 19,883 | 60,440,061 |
| General Motors Corporation | 8,599,571 | 26,452,717 | 148,742 | 0 | 16,022,918 | 51,223,948 |
| Vulcan Materials Company | 226,390 | 1,098,755 | 28,953 | 44,860,820 | 5 | 46,214,923 |
| Subtotal | 64,085,902 | 189,958,012 | 136,509,245 | 498,869,292 | 94,878,001 | 984,300,452 |
| Total for All TRI Facilities | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

| Parent Company (Continued) | Facilities Number | Forms Number | Total Releases Pounds |
|---|---|---|---|
| DuPont | 83 | 855 | 243,327,399 |
| Freeport-McMoran Inc. | 4 | 19 | 149,622,368 |
| American Cyanamid Company | 28 | 259 | 145,642,295 |
| Asarco Inc. | 12 | 94 | 78,391,755 |
| Monsanto Company | 34 | 303 | 76,025,619 |
| Eastman Kodak Company | 23 | 309 | 66,965,026 |
| Renco Group Inc. | 6 | 35 | 66,447,058 |
| BP America | 61 | 286 | 60,440,061 |
| General Motors Corporation | 133 | 1,209 | 51,223,948 |
| Vulcan Materials Company | 3 | 59 | 46,214,923 |
| Subtotal | 387 | 3,428 | 984,300,452 |
| Total for All TRI Facilities | 23,719 | 82,293 | 3,385,873,118 |

# THE 1991 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE

## *1991 Releases and Transfers of Highlighted Chemicals*

## 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 toxic substances listed on EPCRA section 313 because they do not degrade and are not destroyed. Other listed chemicals on EPCRA section 313 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 it.

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. The majority (65%) of the toxic metals released or transferred off-site was recycled. Release (including disposal), either on-site or off-site, accounted for 32% of all releases and transfers.

Facilities also reported transfers off-site for treatment and to publicly owned treatment works (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 metal wastes that remain in the treated wastewater will pass through the treatment plant and into the aquatic environment. The removed metals are then generally sent to a landfill for disposal.

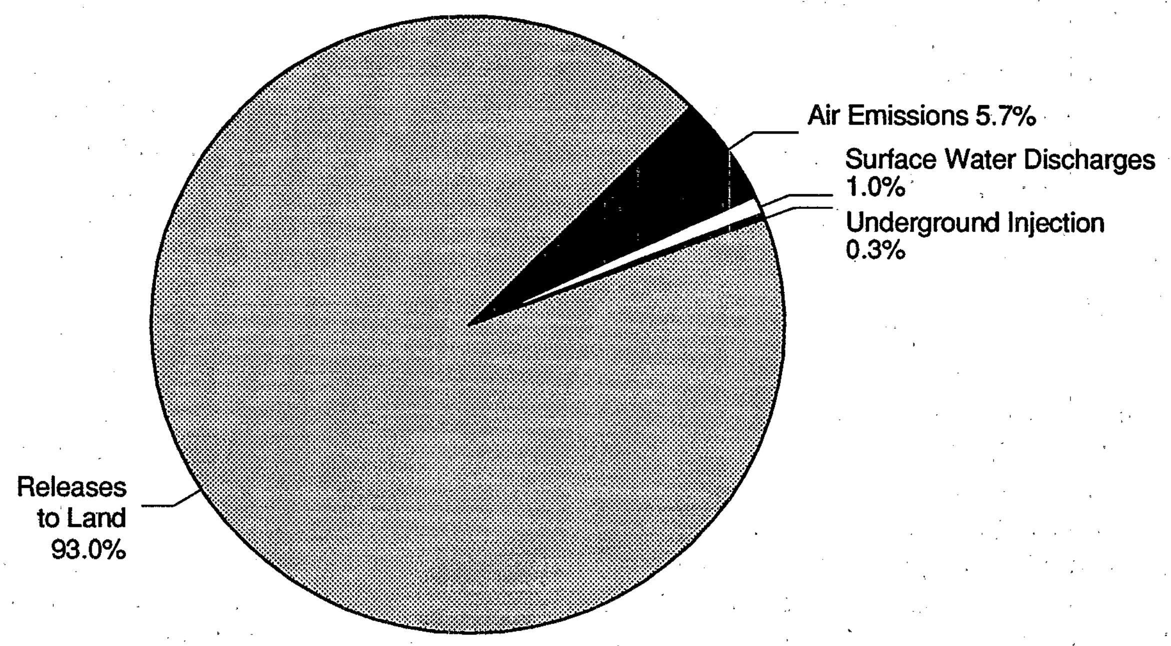



**Figure 1-6. Releases of TRI Metals and Metal Compounds, 1991.**

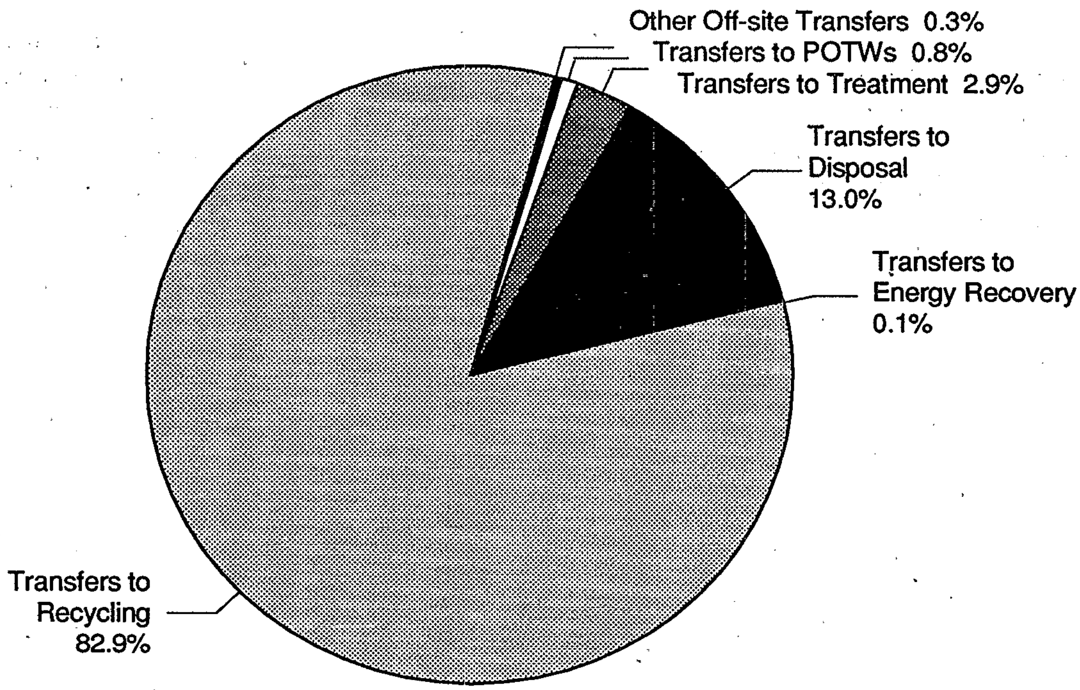



**Figure 1-7. Transfers of TRI Metals and Metal Compounds, 1991.**

**Table 1-25. Releases of TRI Metals and Metal Compounds, 1991.**

| Metal Category | Fugitive or Nonpoint Air Emissions Pounds | Stack or Point Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection Pounds | Releases to Land Pounds | Total Releases Pounds |
|---|---|---|---|---|---|---|
| Antimony and antimony compounds | 34,359 | 73,046 | 46,816 | 6,629 | 1,528,616 | 1,689,466 |
| Arsenic and arsenic compounds | 28,843 | 169,042 | 5,436 | 23,000 | 4,473,366 | 4,699,687 |
| Barium and barium compounds | 343,174 | 636,384 | 105,795 | 408 | 4,266,431 | 5,352,192 |
| Beryllium and beryllium compounds | 7 | 1,613 | 110 | 0 | 59,023 | 60,753 |
| Cadmium and cadmium compounds | 18,923 | 55,518 | 4,241 | 1,540 | 251,127 | 331,349 |
| Chromium and chromium compounds | 585,757 | 532,744 | 352,522 | 35,150 | 25,916,872 | 27,423,045 |
| Cobalt and cobalt compounds | 37,644 | 68,080 | 82,882 | 19,949 | 155,858 | 364,413 |
| Copper and copper compounds | 2,787,343 | 2,735,334 | 214,661 | 239,321 | 57,863,833 | 63,840,492 |
| Lead and lead compounds | 553,782 | 1,285,604 | 138,433 | 928 | 17,022,789 | 19,001,536 |
| Manganese and manganese compounds | 1,178,817 | 1,164,567 | 843,644 | 15,849 | 78,376,183 | 81,579,060 |
| Mercury and mercury compounds | 11,912 | 7,830 | 671 | 9 | 5,315 | 25,737 |
| Nickel and nickel compounds | 469,498 | 322,989 | 126,954 | 370,948 | 1,672,468 | 2,962,857 |
| Selenium and selenium compounds | 2,906 | 35,190 | 910 | 4,100 | 80,555 | 123,661 |
| Silver and silver compounds | 12,145 | 26,087 | 8,428 | 53 | 17,243 | 63,956 |
| Thallium and thallium compounds | 6 | 279 | 1 | 0 | 255 | 541 |
| Zinc and zinc compounds(c) | 2,282,998 | 3,878,753 | 1,353,892 | 228,122 | 123,279,246 | 131,023,011 |
| Total | 8,348,114 | 10,993,060 | 3,285,396 | 946,006 | 314,969,180 | 338,541,756 |

**Table 1-26. Transfers of TRI Metals and Metal Compounds, 1991.**

| Metal Category | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|
| Antimony and antimony compounds | 91,255 | 195,942 | 2,268,557 | 78,007 | 2,781,153 | 13,971 | 5,428,885 |
| Arsenic and arsenic compounds | 1,950 | 576,631 | 1,613,055 | 268 | 1,099,920 | 157 | 3,291,981 |
| Barium and barium compounds | 2,129,483 | 2,521,418 | 17,195,636 | 223,346 | 951,541 | 39,534 | 23,060,958 |
| Beryllium and beryllium compounds | 0 | 1,326 | 119,382 | 10 | 84,866 | 0 | 205,584 |
| Cadmium and cadmium compounds | 265,771 | 388,557 | 1,019,701 | 7,460 | 2,266,912 | 41,605 | 3,990,006 |
| Chromium and chromium compounds | 1,188,103 | 3,969,938 | 15,972,793 | 69,423 | 68,437,500 | 323,166 | 89,960,923 |
| Cobalt and cobalt compounds | 25,120 | 147,310 | 780,992 | 2,806 | 6,461,142 | 37 | 7,417,407 |
| Copper and copper compounds | 612,159 | 4,373,346 | 18,967,509 | 46,340 | 383,380,867 | 1,029,029 | 408,409,250 |
| Lead and lead compounds | 592,526 | 4,559,119 | 15,494,344 | 68,833 | 204,841,122 | 103,218 | 225,659,162 |
| Manganese and manganese compounds | 3,502,655 | 5,556,491 | 33,453,653 | 28,182 | 70,110,391 | 372,670 | 113,024,042 |
| Mercury and mercury compounds | 64 | 65,531 | 128,442 | 5 | 445,451 | 0 | 639,493 |
| Nickel and nickel compounds | 639,048 | 2,318,764 | 6,648,274 | 12,353 | 60,230,889 | 372,615 | 70,221,943 |
| Selenium and selenium compounds | 425 | 11426 | 48232 | 0 | 65863 | 0 | 125,946 |
| Silver and silver compounds | 262,661 | 10,433 | 118,905 | 0 | 2,133,989 | 837 | 2,526,825 |
| Thallium and thallium compounds | 5 | 1 | 953 | 0 | 1,500 | 0 | 2,459 |
| Zinc and zinc compounds(c) | 664,032 | 10,397,887 | 44,897,863 | 525,881 | 208,879,273 | 1,897,312 | 267,262,248 |
| Total | 9,975,257 | 35,094,120 | 158,728,291 | 1,062,914 | 1,012,172,379 | 4,194,151 | 1,221,227,112 |

## OZONE DEPLETERS

Ozone depleters, such as chlorofluorocarbons (CFCs), halons, methyl chloroform, carbon tetrachloride, and 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, including increased incidence of skin cancer and suppression of the immune system in animals, and possibly in humans. (See Potential Health and Environmental Effects in the Appendix for a more detailed description of the adverse effects associated with ultraviolet-B radiation.)

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. EPA has proposed that the production phase-out be accelerated, resulting in a phase-out by January 1, 1996.

Interim substitutes, such as hydrochlorofluorocarbons (HCFCs), also decrease ozone in the stratosphere. HCFCs have much lower ozone depletion potentials. The HCFCs will serve as first generation substitutes, but will themselves be phased out. On June 24, 1992, EPA proposed the addition of HCFCs to TRI list because HCFCs decrease stratospheric ozone resulting in adverse health and environmental effects. EPA plans to finalize the addition by late 1993.

The following ozone depleters are currently listed on TRI:

Bromochlorodifluoromethane (Halon 1211)
Bromomethane (methyl bromide)
Bromotrifluoromethane (Halon 1301)
Carbon tetrachloride
Dibromotetrafluoroethane (Halon 2402)
Dichlorodifluoromethane (CFC-12)
Dichlorotetrafluoroethane (CFC-114)
Freon-113
Monochloropentafluoroethane (CFC-115)
1,1,1-Trichloroethane (methyl chloroform)
Trichlorofluoromethane (CFC-11)

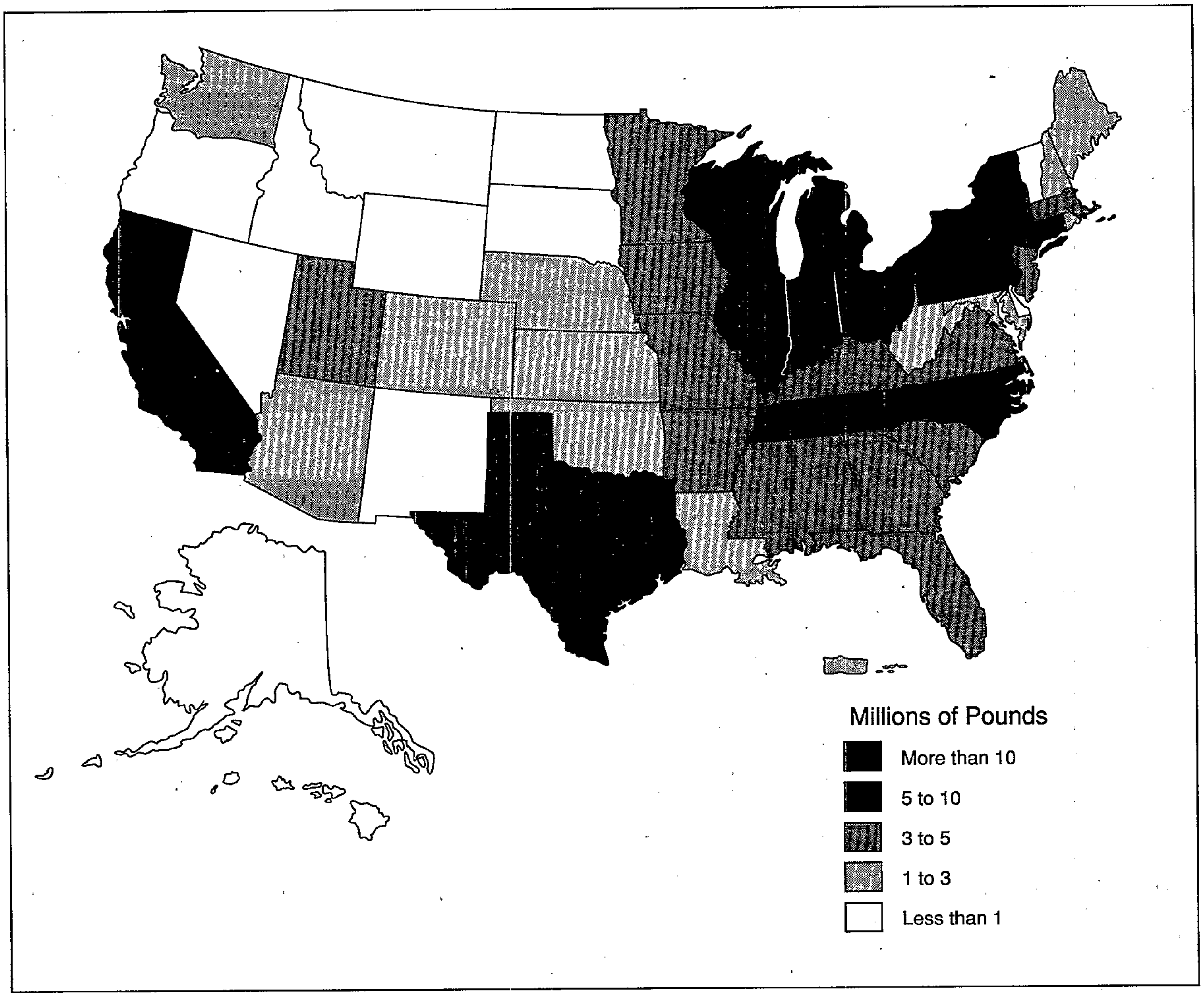
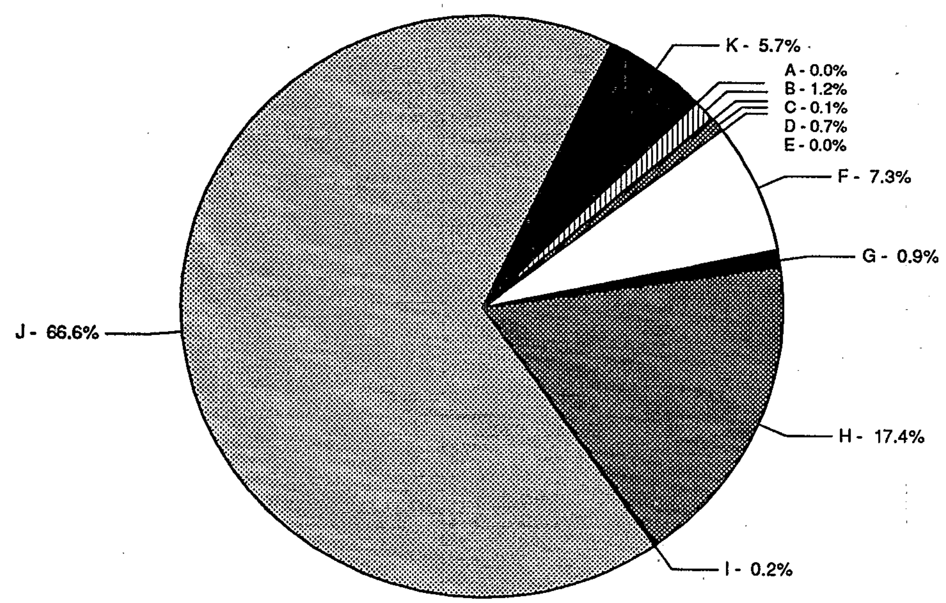



Figure 1-8. TRI Releases of Ozone Depleters to Air, 1991

**Table 1-27. TRI Releases of Ozone Depleters, 1991.**

| 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) | 8,388 | 3,570 | 0 | 0 | 0 | 11,958 |
| 74-83-9 | Bromomethane (methyl bromide) | 404,146 | 2,041,449 | 0 | 1,000 | 0 | 2,446,595 |
| 75-63-8 | Bromotrifluoromethane (Halon 1301) | 171,287 | 8,820 | 0 | 0 | 0 | 180,107 |
| 56-23-5 | Carbon tetrachloride | 528,100 | 1,018,701 | 2,844 | 42,470 | 2,152 | 1,594,267 |
| 124-73-2 | Dibromotetrafluoroethane (Halon 2402) | 250 | 6,300 | 0 | 0 | 0 | 6,550 |
| 75-71-8 | Dichlorodifluoromethane (CFC-12) | 8,506,516 | 6,545,211 | 89 | 16,008 | 32,805 | 15,100,629 |
| 76-14-2 | Dichlorotetrafluoroethane (CFC-114) | 1,694,535 | 207,258 | 35 | 5 | 5 | 1,901,838 |
| 76-13-1 | Freon 113 | 23,983,423 | 11,874,228 | 3,264 | 558 | 89,780 | 35,951,253 |
| 76-15-3 | Monochloropentafluoroethane (CFC-115) | 190,872 | 171,291 | 5 | 0 | 0 | 362,168 |
| 71-55-6 | 1,1,1-Trichloroethane (methyl chloroform) | 69,230,762 | 68,274,801 | 21,803 | 2,805 | 171,807 | 137,701,978 |
| 75-69-4 | Trichlorofluoromethane (CFC-11) | 5,339,896 | 6,382,210 | 5,156 | 1,428 | 10,203 | 11,738,893 |
| | Total | 110,058,175 | 96,533,839 | 33,196 | 64,274 | 306,752 | 206,996,236 |




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 1-9. TRI Releases of Ozone Depleters to Air, by Chemical, 1991.**

**Table 1-28. TRI Transfers of Ozone Depleters, 1991.**

| CAS Number | Chemical | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|---|
| 353-59-3 | Bromochlorodifluoromethane (Halon 1211) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 74-83-9 | Bromomethane (methyl bromide) | 0 | 320 | 15 | 420 | 121,000 | 0 | 121,755 |
| 75-63-8 | Bromotrifluoromethane (Halon 1301)0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 56-23-5 | Carbon tetrachloride | 621 | 939,774 | 39,111 | 11,061 | 390,625 | 1,684 | 1,382,876 |
| 124-73-2 | Dibromotetrafluoroethane (Halon 2402) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 75-71-8 | Dichlorodifluoromethane (CFC-12) | 4,484 | 93,114 | 34,275 | 1,841 | 91,660 | 0 | 225,374 |
| 76-14-2 | Dichlorotetrafluoroethane (CFC-114) | 250 | 17,400 | 7 | 0 | 0 | 0 | 17,657 |
| 76-13-1 | Freon 113 | 38,402 | 1,181,848 | 114,338 | 454,663 | 7,784,450 | 98,217 | 9,671,918 |
| 76-15-3 | Monochloropentafluoroethane (CFC-115) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71-55-6 | 1,1,1-Trichloroethane (methyl chloroform) | 293,508 | 6,743,974 | 969,200 | 3,212,938 | 27,237,545 | 287,441 | 38,744,606 |
| 75-69-4 | Trichlorofluoromethane (CFC-11) | 10,252 | 175,662 | 410,963 | 32,314 | 175,082 | 0 | 804,273 |
| | Total | 347,517 | 9,152,092 | 1,567,909 | 3,713,237 | 35,800,362 | 387,342 | 50,968,459 |

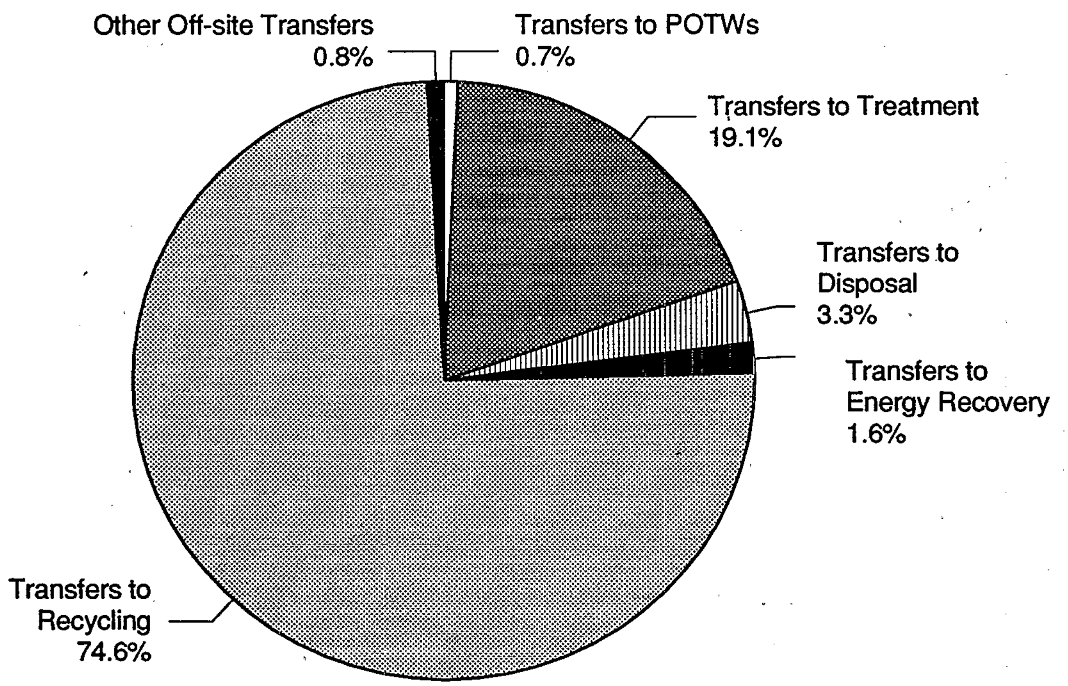



**Figure 1-10. TRI Transfers of Ozone Depleters, 1991.**

## 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 1991, releases of the bioaccumulators listed on TRI to water were 29,276 pounds; while releases to air and land were 2,556,928 pounds and 416,341 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.

The following TRI chemicals have been identified as chemicals which will bioaccumulate:

Aldrin
Anthracene
Benzoic trichloride
Chlordane
Decabromodiphenyl oxide
Dibutyl phthalate
1,2-Dichlorobenzene
1,4-Dichlorobenzene
Di-(2-ethylhexyl) phthalate
Heptachlor
Hexachlorobenzene
Hexachloro-1,3-butadiene
Hexachlorocyclopentadiene
Hexachloroethane
Mercury
Mercury compounds
Methoxychlor
4,4'-Methylenebis (2-chloroaniline)
Pentachlorophenol
Polychlorinated biphenyls (PCBs)
Toxaphene
1,2,4-Trichlorobenzene

**Table 1-29. TRI Releases of Bioaccumulators to Air, Water, and Land, 1991.**

| CAS Number | 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 | 55,494 | 1,158 | 2,433 | 59,085 |
| 98-07-7 | Benzoic trichloride | 7,947 | 0 | 0 | 7,947 |
| 57-74-9 | Chlordane | 1,427 | 1 | 0 | 1,428 |
| 1163-19-5 | Decabromodiphenyl oxide | 47,740 | 3,817 | 220,075 | 271,632 |
| 84-74-2 | Dibutyl phthalate | 150,032 | 8,907 | 5,069 | 164,008 |
| 95-50-1 | 1,2-Dichlorobenzene | 418,452 | 3,962 | 21,153 | 443,567 |
| 106-46-7 | 1,4-Dichlorobenzene | 336,164 | 2,146 | 420 | 338,730 |
| 117-81-7 | Di-(2-ethylhexyl) phthalate | 1,043,420 | 3,842 | 155,773 | 1,203,035 |
| 76-44-8 | Heptachlor | 5 | 0 | 0 | 5 |
| 118-74-1 | Hexachlorobenzene | 841 | 111 | 1 | 953 |
| 87-68-3 | Hexachloro- | 3,410 | 681 | 2 | 4,093 |
| | 1,3-butadiene | 0 | | | |
| 77-47-4 | Hexachlorocyclo-pentadiene | 25,461 | 23 | 0 | 25,484 |
| 67-72-1 | Hexachloroethane | 22,709 | 0 | 2 | 22,711 |
| 7439-97-6 | Mercury | 16,912 | 624 | 5,287 | 22,823 |
| | Mercury compounds | 2,830 | 47 | 28 | 2,905 |
| 72-43-5 | Methoxychlor | 565 | 10 | 5 | 580 |
| 101-14-4 | 4,4'-Methylenebis (2-chloroaniline) | 1,362 | 0 | 0 | 1,362 |
| 87-86-5 | Pentachlorophenol | 12,508 | 2,278 | 1,510 | 16,296 |
| 1336-36-3 | Polychlorinated | 0 | 0 | 10 | 10 |
| | biphenyls (PCBs) | 0 | | | |
| 8001-35-2 | Toxaphene | 0 | 0 | 0 | 0 |
| 120-82-1 | 1,2,4-Trichlorobenzene | 409,649 | 1,669 | 4,573 | 415,891 |
| | Total | 2,556,928 | 29,276 | 416,341 | 3,002,545 |

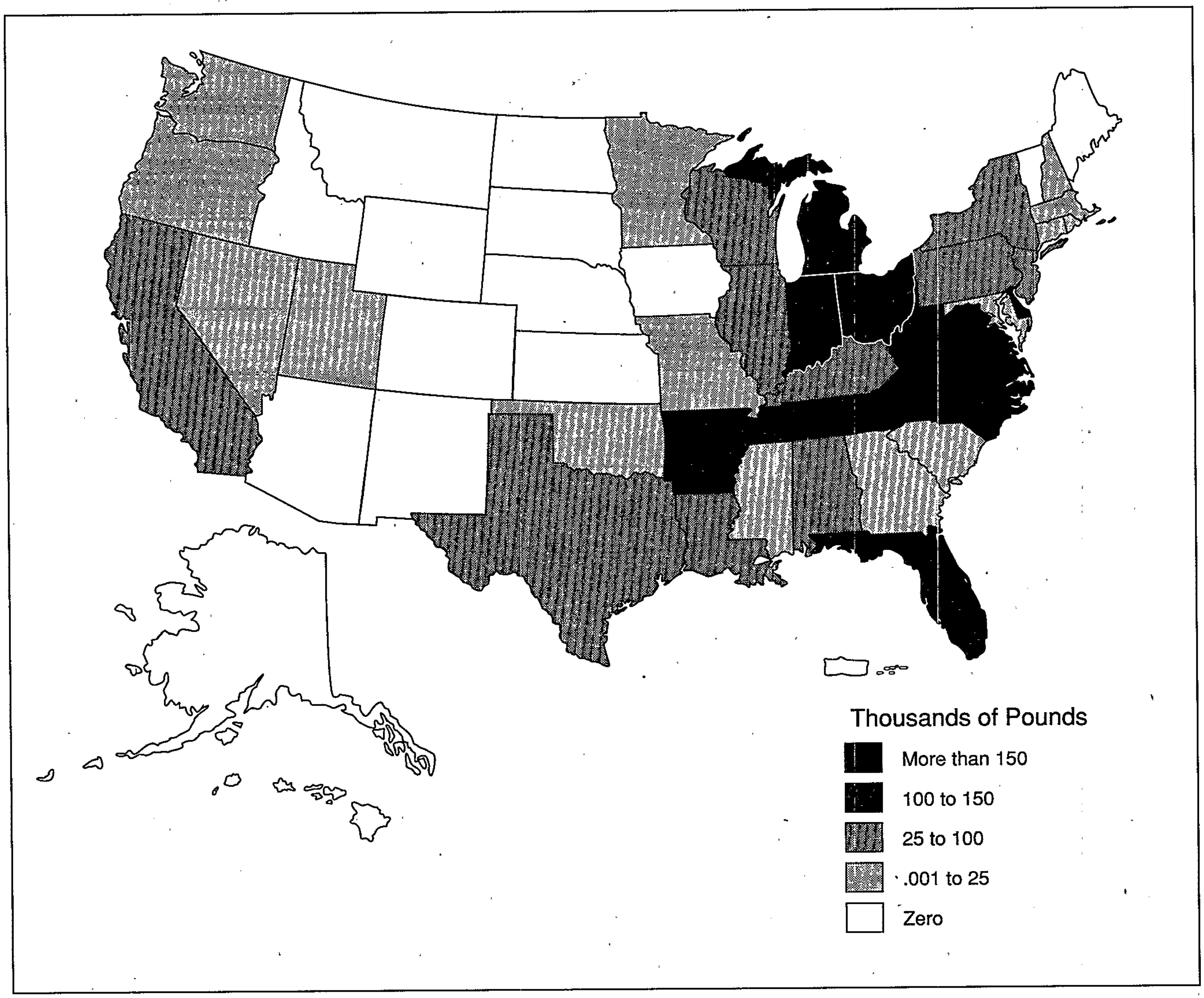



**Figure 1-11. TRI Releases of Bioaccumulators to Air, Water, and Land, 1991.**

## CARCINOGENS

Some chemicals on the TRI are listed because they are either known human carcinogens or suspect carcinogens. (Known human carcinogens are those that have been shown to cause cancer in humans. Suspect carcinogens are those chemicals that have been shown to cause cancer in animals.) Known and suspect carcinogens are highlighted on the TRI list because reportable *de minimis* concentration values are based on whether the chemical is considered to be an "OSHA Carcinogen" (see below). These known or suspect carcinogens are featured in this data public release package because these chemicals are specifically identified in EPCRA section 313.

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

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

1. National Toxicology Program (NTP), "Annual Report on Carcinogens" (Latest Edition)
2. International Agency for Research on Cancer (IARC) "Monographs" (Latest Editions); or
3. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

The *de minimis* limitation is 1.0% for chemicals that do not meet the above OSHA carcinogen criteria.

The carcinogen designations in the list of chemicals relate to any chemical that the Agency determined met the above OSHA criteria for the 0.1% *de minimis* limitation.

Following are the releases of chemicals on the EPCRA section 313 list that meet this definition of a carcinogen or suspect carcinogen.

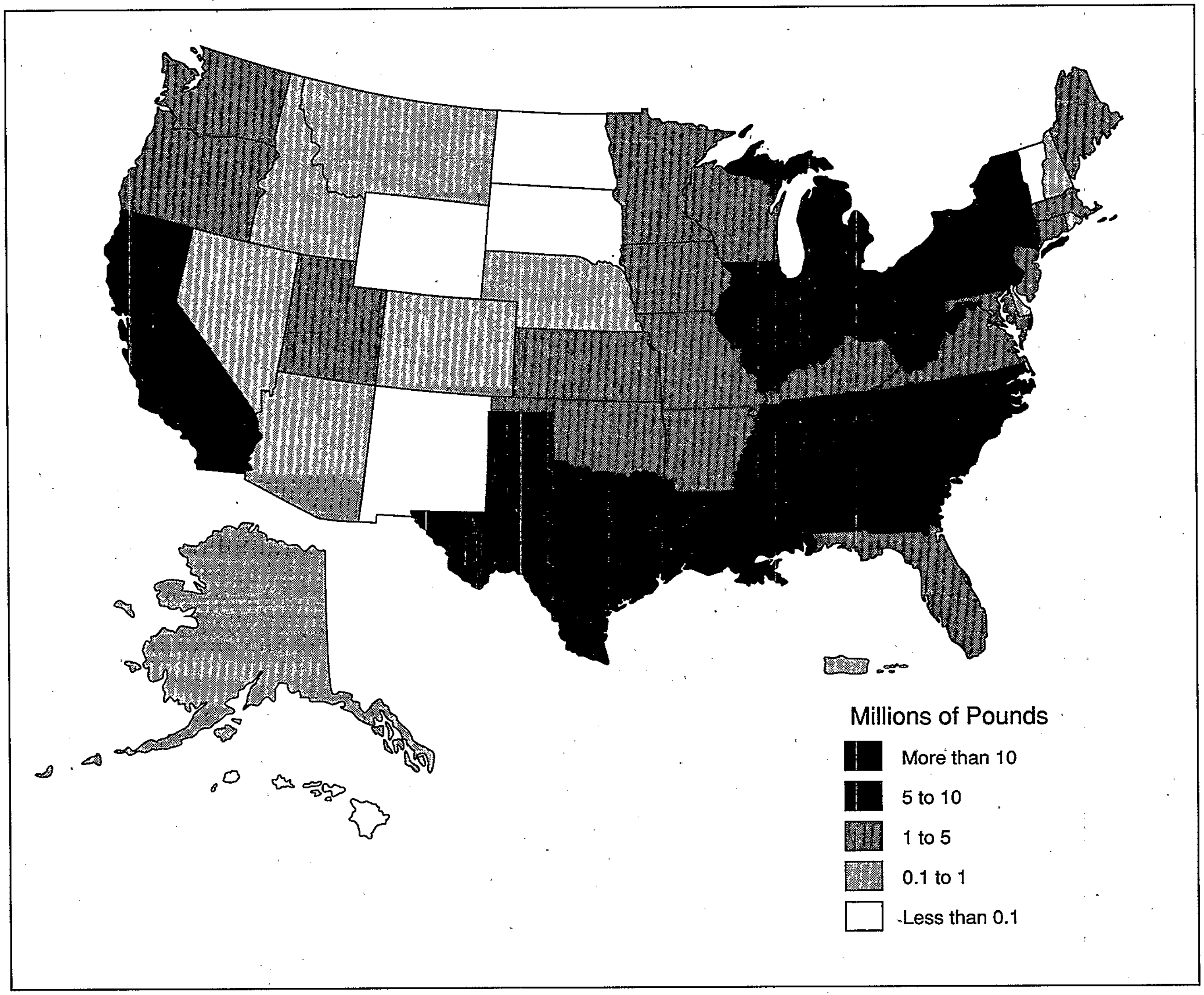



**Figure 1-12. TRI Releases of Carcinogens to Air, 1991.**

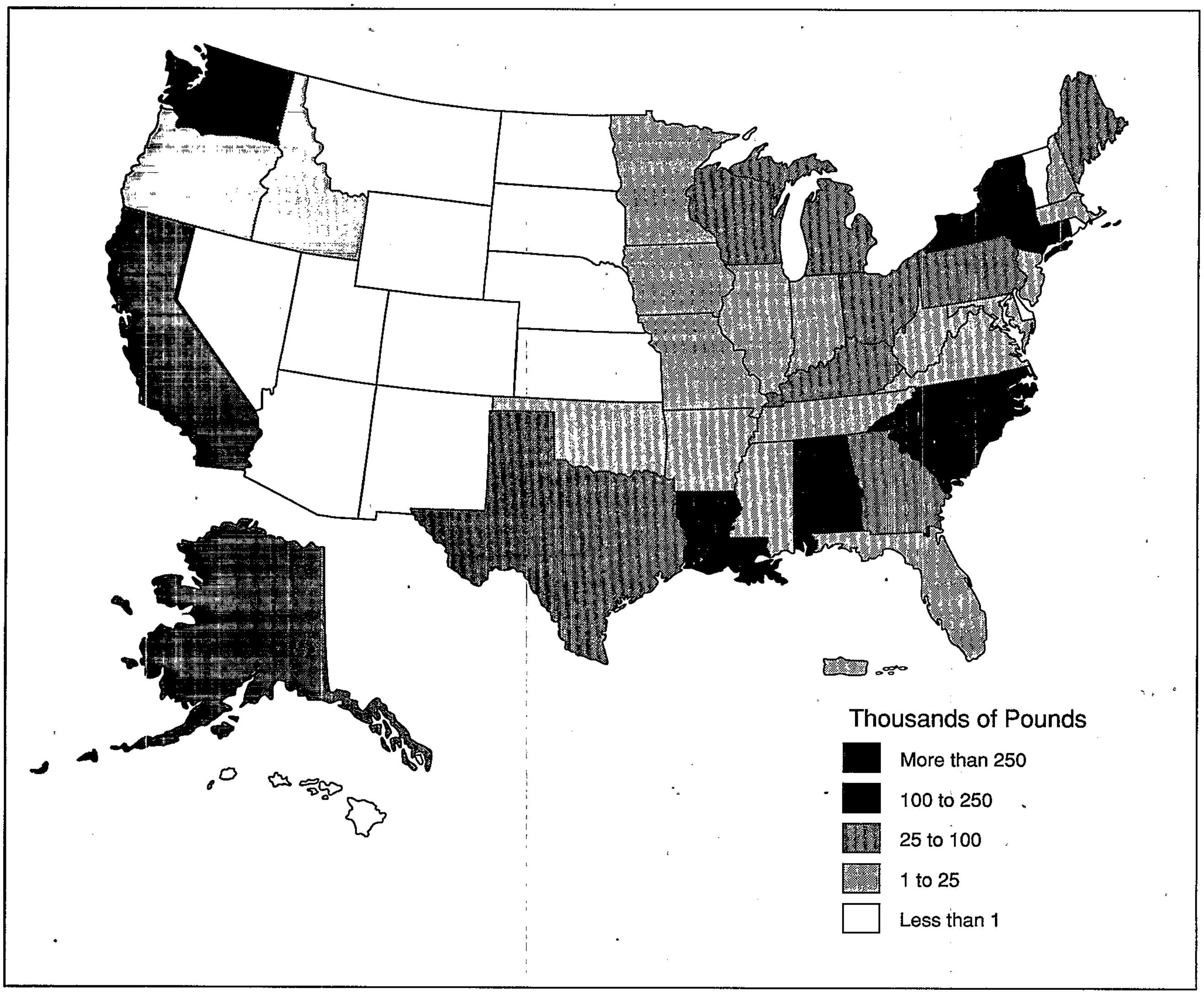



**Figure 1-13. TRI Releases of Carcinogens to Surface Water, 1991.**

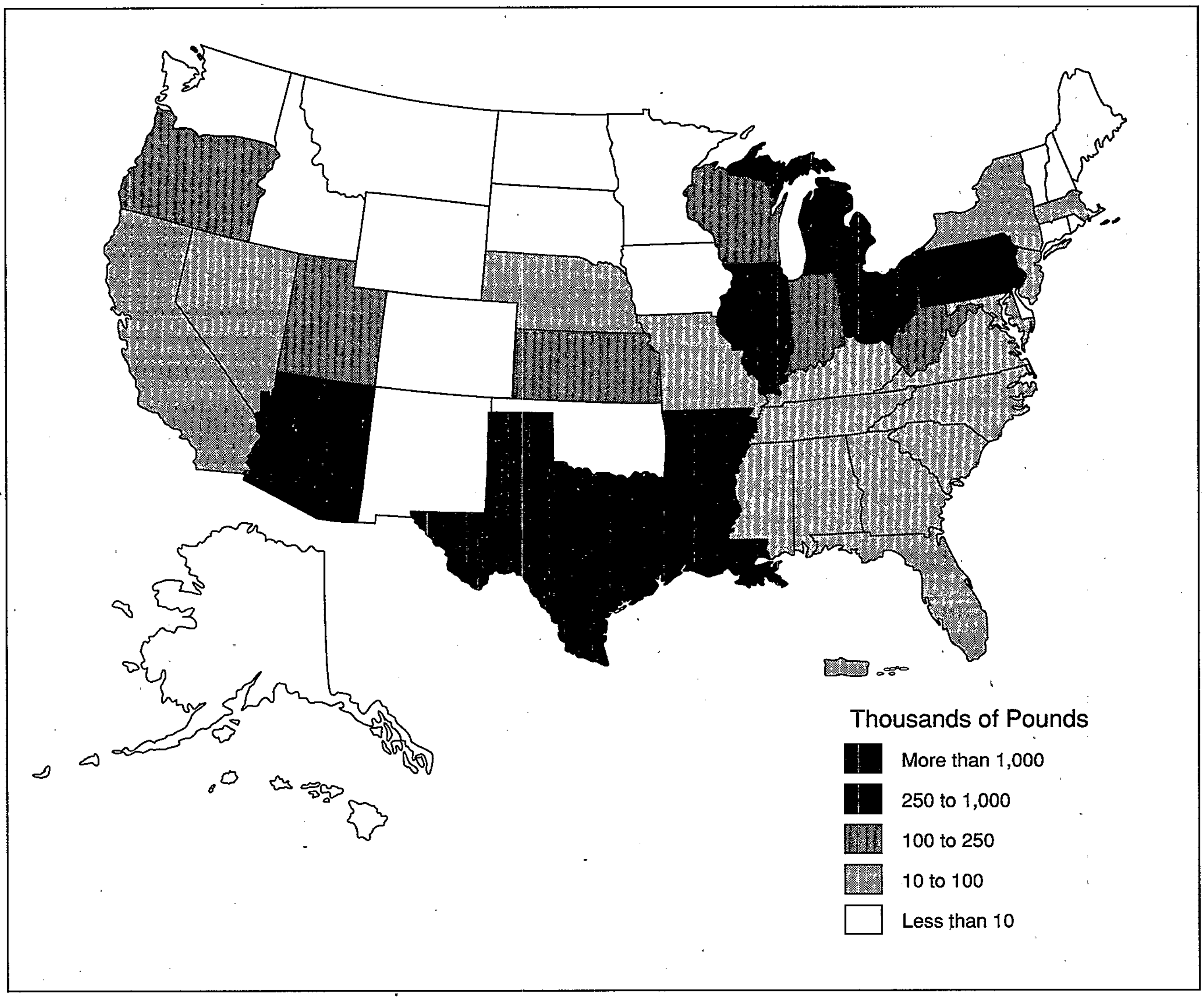



**Figure 1-14. TRI Releases of Carcinogens to Land, 1991.**

**Table 1-30. TRI Releases of Known or Suspect Carcinogens to Air, Surface Water, and Land, 1991 (Alphabetically Ordered).**

| CAS Number | Chemical | Total Air Emissions Pounds | Surface Water Discharges Pounds | Releases to Land Pounds | Total Air/ Water/Land Releases Pounds |
|---|---|---|---|---|---|
| 75-07-0 | Acetaldehyde | 7,080,917 | 75,314 | 37,904 | 7,194,135 |
| 60-35-5 | Acetamide | 35 | 5 | 0 | 40 |
| 79-06-1 | Acrylamide | 64,164 | 4,635 | 1,500 | 70,299 |
| 107-13-1 | Acrylonitrile | 2,188,889 | 1,959 | 13,293 | 2,204,141 |
| 60-09-3 | 4-Aminoazobenzene | 1 | 0 | 0 | 1 |
| 92-67-1 | 4-Aminobiphenyl | 0 | 0 | 0 | 0 |
| 90-04-0 | o-Anisidine | 1,025 | 187 | 3,800 | 5,012 |
| 7440-38-2 | Arsenic | 7,570 | 940 | 1,734,513 | 1,743,023 |
| 1332-21-4 | Asbestos (friable) | 12,562 | 252 | 585,676 | 598,490 |
| 71-43-2 | Benzene | 17,474,490 | 26,896 | 111,928 | 17,613,314 |
| 98-07-7 | Benzoic trichloride | 7,947 | 0 | 0 | 7,947 |
| 7440-41-7 | Beryllium | 1,378 | 101 | 29,023 | 30,502 |
| 542-88-1 | Bis(chloromethyl) ether | 574 | 0 | 0 | 574 |
| 106-99-0 | 1,3-Butadiene | 3,950,377 | 5,049 | 8,881 | 3,964,307 |
| 81-88-9 | C.I. Food Red 15 | 1 | 0 | 0 | 1 |
| 97-56-3 | C.I. Solvent Yellow 3 | 5 | 0 | 0 | 5 |
| 7440-43-9 | Cadmium | 4,948 | 661 | 2,753 | 8,362 |
| 56-23-5 | Carbon tetrachloride | 1,546,801 | 2,844 | 2,152 | 1,551,797 |
| 67-66-3 | Chloroform | 19,082,888 | 769,569 | 22,150 | 19,874,607 |
| 107-30-2 | Chloromethyl methyl ether | 3,335 | 0 | 0 | 3,335 |
| 7440-47-3 | Chromium | 556,406 | 17,289 | 1,155,527 | 1,729,222 |
| 8001-58-9 | Creosote | 1,761,851 | 3,862 | 10,780 | 1,776,493 |
| 120-71-8 | p-Cresidine | 228 | 5 | 250 | 483 |
| 135-20-6 | Cupferron | 1,200 | 0 | 0 | 1,200 |
| 615-05-4 | 2,4-Diaminoanisole | 0 | 0 | 0 | 0 |
| 39156-41-7 | 2,4-Diaminoanisole sulfate | 0 | 0 | 0 | 0 |
| 101-80-4 | 4,4'-Diaminodiphenyl ether | 704 | 337 | 0 | 1,041 |
| 25376-45-8 | Diaminotoluene (mixed isomers) | 20,583 | 1,110 | 10 | 21,703 |
| 95-80-7 | 2,4-Diaminotoluene | 3,810 | 250 | 0 | 4,060 |
| 96-12-8 | 1,2-Dibromo-3-chloropropane | 290 | 0 | 0 | 290 |
| 106-93-4 | 1,2-Dibromoethane | 38,202 | 73 | 2 | 38,277 |
| 25321-22-6 | Dichlorobenzene (mixed isomers) | 78,095 | 2 | 9 | 78,106 |
| 106-46-7 | 1,4-Dichlorobenzene | 336,164 | 2,146 | 420 | 338,730 |
| 91-94-1 | 3,3'-Dichlorobenzidine | 10 | 0 | 0 | 10 |
| 107-06-2 | 1,2-Dichloroethane | 3,995,423 | 23,564 | 7,051 | 4,026,038 |
| 75-09-2 | Dichloromethane | 79,338,471 | 98,877 | 117,788 | 79,555,136 |
| 542-75-6 | 1,3-Dichloropropylene | 20,405 | 0 | 0 | 20,405 |
| 1464-53-5 | Diepoxybutane | 0 | 0 | 0 | 0 |
| 117-81-7 | Di-(2-ethylhexyl) phthalate | 1,043,420 | 3,842 | 155,773 | 1,203,035 |
| 64-67-5 | Diethyl sulfate | 4,018 | 5 | 10 | 4,033 |
| 119-90-4 | 3,3'-Dimethoxybenzidine | 0 | 4 | 0 | 4 |
| 57-14-7 | 1,1-Dimethyl hydrazine | 489 | 0 | 0 | 489 |
| 77-78-1 | Dimethyl sulfate | 10,097 | 293 | 0 | 10,390 |

**Table 1-30. TRI Releases of Known or Suspect Carcinogens to Air, Surface Water, and Land, 1991 (Alphabetically Ordered), Continued.**

| CAS Number | Chemical | Total Air Emissions Pounds | Surface Water Discharges Pounds | Releases to Land Pounds | Total Air/ Water/Land Releases Pounds |
|---|---|---|---|---|---|
| 123-91-1 | 1,4-Dioxane | 718,504 | 318,133 | 15,952 | 1,052,589 |
| 106-89-8 | Epichlorohydrin | 459,150 | 5,456 | 3,675 | 468,281 |
| 140-88-5 | Ethyl acrylate | 231,961 | 423 | 939 | 233,323 |
| 75-21-8 | Ethylene oxide | 1,793,048 | 2,260 | 50,336 | 1,845,644 |
| 96-45-7 | Ethylene thiourea | 582 | 0 | 0 | 582 |
| 50-00-0 | Formaldehyde | 10,218,467 | 616,001 | 242,466 | 11,076,934 |
| 118-74-1 | Hexachlorobenzene | 841 | 111 | 1 | 953 |
| 302-01-2 | Hydrazine | 28,433 | 1,520 | 5 | 29,958 |
| 10034-93-2 | Hydrazine sulfate | 2 | 0 | 0 | 2 |
| 7439-92-1 | Lead | 431,777 | 20,457 | 3,323,695 | 3,775,929 |
| 58-89-9 | Lindane | 562 | 0 | 5 | 567 |
| 101-14-4 | 4,4'-Methylenebis-(2-chloroaniline) | 1,362 | 0 | 0 | 1,362 |
| 101-77-9 | 4,4'-Methylenedianiline | 13,168 | 1,486 | 3 | 14,657 |
| 74-88-4 | Methyl iodide | 25,414 | 13 | 0 | 25,427 |
| 90-94-8 | Michler's ketone | 0 | 0 | 0 | 0 |
| 134-32-7 | alpha-Naphthylamine | 10 | 0 | 0 | 10 |
| 7440-02-0 | Nickel | 549,303 | 53,883 | 393,775 | 996,961 |
| 139-13-9 | Nitrilotriacetic acid | 5 | 4,100 | 0 | 4,105 |
| 99-59-2 | 5-Nitro-o-anisidine | 15 | 0 | 0 | 15 |
| 79-46-9 | 2-Nitropropane | 105,747 | 380 | 0 | 106,127 |
| 156-10-5 | p-Nitrosodiphenylamine | 24 | 0 | 0 | 24 |
| 1336-36-3 | Polychlorinated biphenyls (PCBs) | 0 | 0 | 10 | 10 |
| 75-55-8 | Propyleneimine | 400 | 0 | 0 | 400 |
| 75-56-9 | Propylene oxide | 1,066,624 | 10,181 | 2,450 | 1,079,255 |
| 81-07-2 | Saccharin (manufacturing) | 314 | 0 | 0 | 314 |
| 100-42-5 | Styrene | 28,476,346 | 25,609 | 389,929 | 28,891,884 |
| 96-09-3 | Styrene oxide | 1,675 | 0 | 0 | 1,675 |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 64,251 | 2,102 | 0 | 66,353 |
| 127-18-4 | Tetrachloroethylene | 16,687,451 | 7,448 | 23,302 | 16,718,201 |
| 62-55-5 | Thioacetamide | 0 | 0 | 0 | 0 |
| 62-56-6 | Thiourea | 1,428 | 717 | 505 | 2,650 |
| 584-84-9 | Toluene-2,4-diisocyanate | 1,323,952 | 0 | 250 | 1,324,202 |
| 91-08-7 | Toluene-2,6-diisocyanate | 332,088 | 0 | 250 | 332,338 |
| 26471-62-5 | Toluenediisocyanate (mixed isomers) | 47,885 | 0 | 10 | 47,895 |
| 95-53-4 | o-Toluidine | 10,829 | 260 | 8,111 | 19,200 |
| 88-06-2 | 2,4,6-Trichlorophenol | 80 | 1 | 1 | 82 |
| 51-79-6 | Urethane | 2,050 | 0 | 0 | 2,050 |
| 593-60-2 | Vinyl bromide | 3,560 | 0 | 0 | 3,560 |
| 75-01-4 | Vinyl chloride | 1,047,485 | 4,625 | 251 | 1,052,361 |
| | Subtotal | 202,282,566 | 2,115,237 | 8,457,114 | 212,854,917 |
| | Total for All TRI Chemicals | 2,010,554,065 | 243,513,772 | 421,428,144 | 2,675,495,981 |

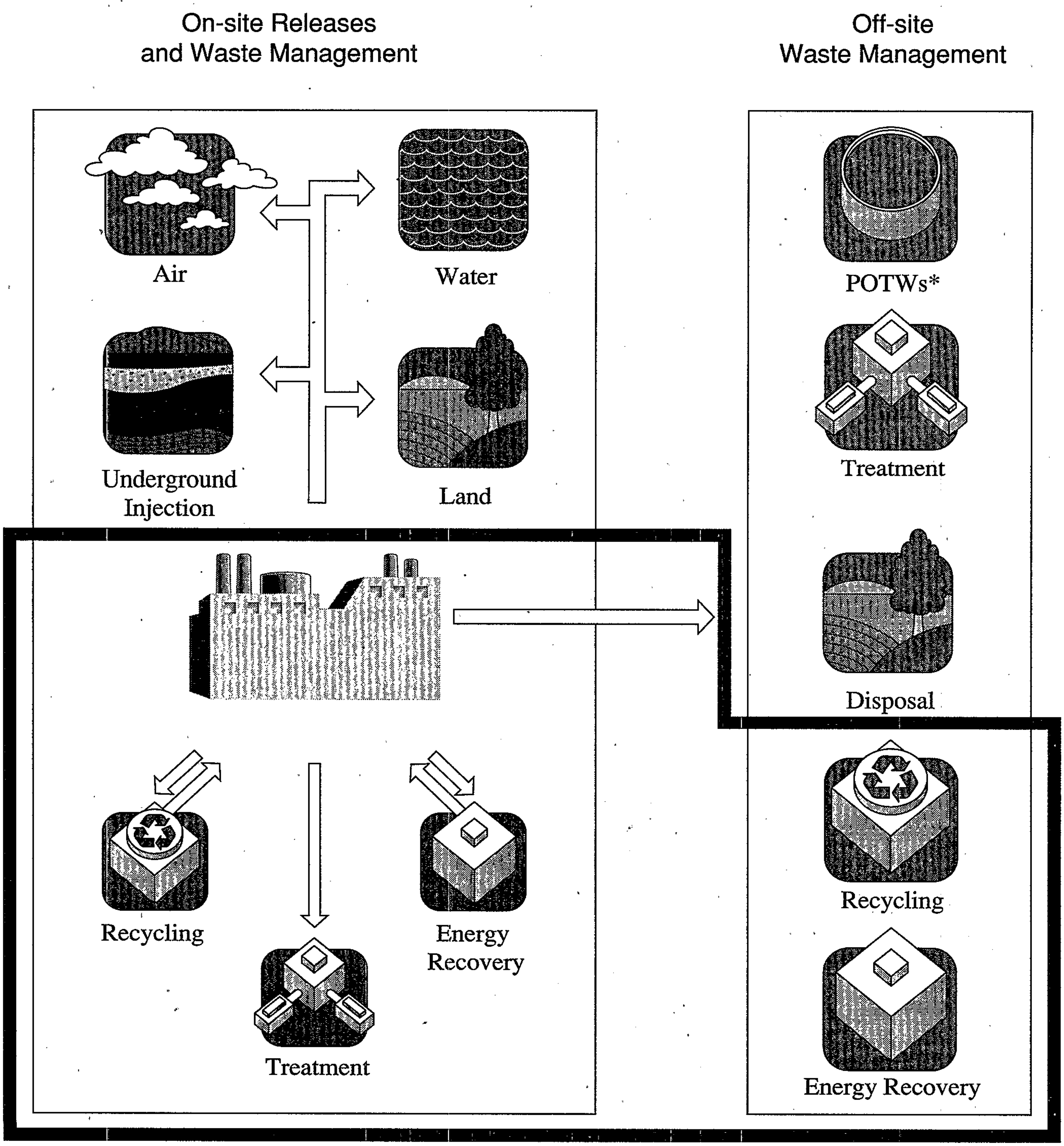
## Notes

(a) Other includes wastes sent to other countries and sites not identified by state (Table 1-7).

(b) Facilities that reported more than one two-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)] (Tables 1-21 and 1-22).

(c) For purposes of EPCRA section 313, only fume or dust forms of zinc metal are reportable (Tables 1-25 and 1-26).

# Chapter 2
# Pollution Prevention Act Data




* Publicly Owned Treatment Works

# INFORMATION ON THE PREVENTION AND MANAGEMENT OF TOXIC CHEMICALS IN WASTE

New to Form R, beginning with the 1991 reporting year, is information required by the Pollution Prevention Act of 1990 (PPA). This new information gives, for the first time, a comprehensive look at the quantities of TRI chemicals in wastes, an indication of how those quantities are managed, and an indication of what efforts are being made to reduce or eliminate those quantities. As shown in the graphic on the previous page and in Figures 2-1 and 2-2, this information expands the data collected under TRI, beyond on-site releases and transfers off-site for treatment and disposal, to include transfers off-site for recycling and energy recovery as well as on-site recycling, energy recovery, and treatment. This new information provides a baseline for assessing progress in the prevention of quantities of toxic chemicals from entering wastes as well as assessing the management of toxic chemicals that are not prevented from entering wastes.

In learning what this new information is, what it means, and how it relates to the information that has been collected on Form R in the past, it may be helpful to look at the Form R in the Appendix of this document. Some of this information is completely new, while some, such as the quantities released and the quantities sent off-site for treatment, has been reported prior to 1991, but is now aggregated and reported in a new and additional way on Form R. A comparison of the information collected prior to 1991 and the information collected beginning with 1991 is shown in Figures 2-1 and 2-2. The following quantities of toxic chemicals in wastes are now required on EPA's Form R (in Section 8) to meet the requirements of section 6607(b) of the PPA:

- quantity released at the facility and disposed off-site;
- quantity used for energy recovery at the facility;
- quantity used for energy recovery off-site;
- quantity recycled at the facility;
- quantity recycled off-site;
- quantity treated at the facility;
- quantity treated off-site; and
- quantity released or transferred off-site due to catastrophic events or remedial actions.

Facilities also provide an indication of changes in production or activity at the facility to help assess changes in the quantities of toxic chemicals in wastes relative to changes in production. Facilities also indicate what, if any, source reduction activities have been implemented to reduce or eliminate quantities of the reported toxic chemical in wastes.

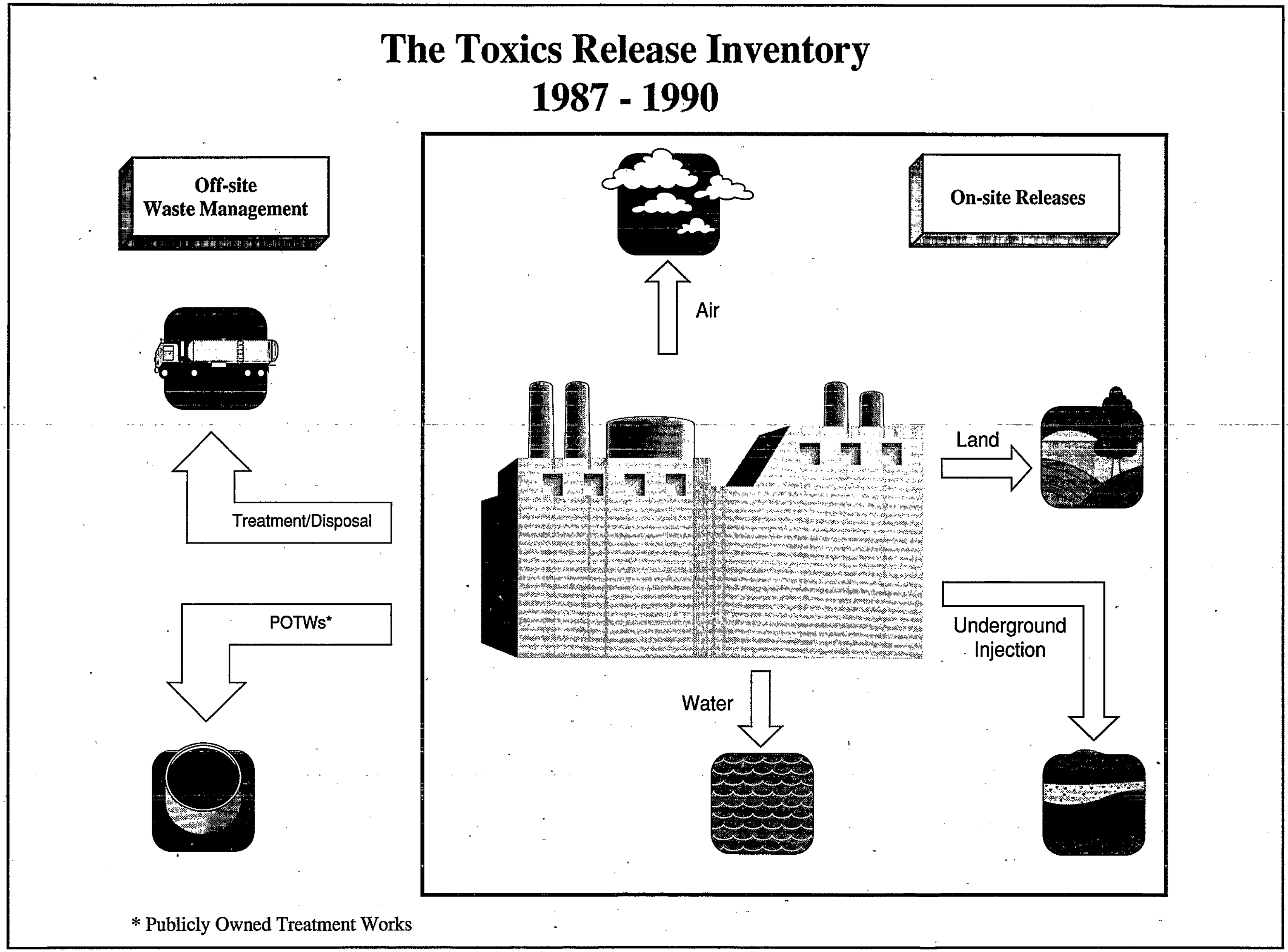



Figure 2-1. Toxics Release Inventory, 1987 - 1990.

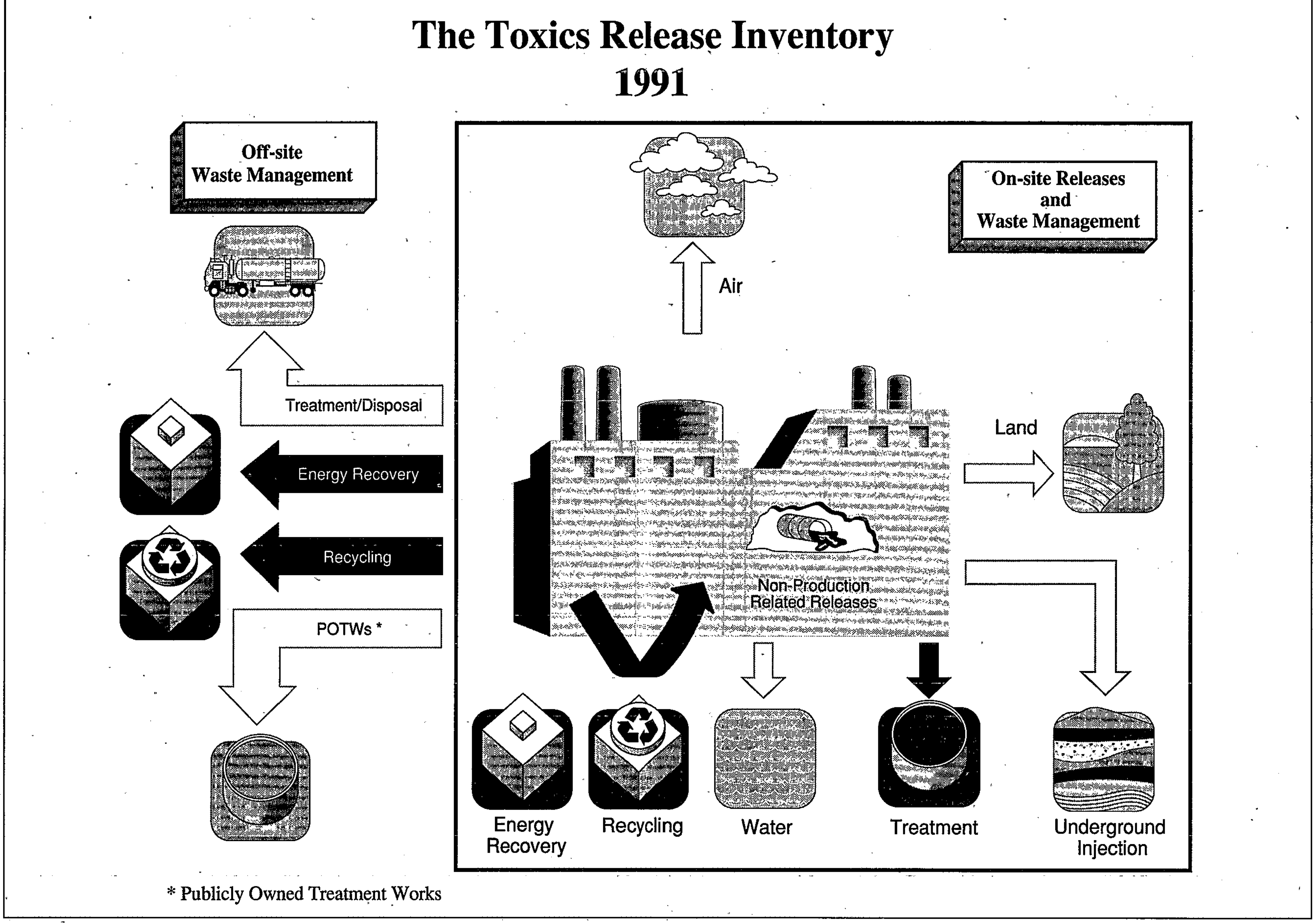



**Figure 2-2.** **Toxics Release Inventory, 1991.**

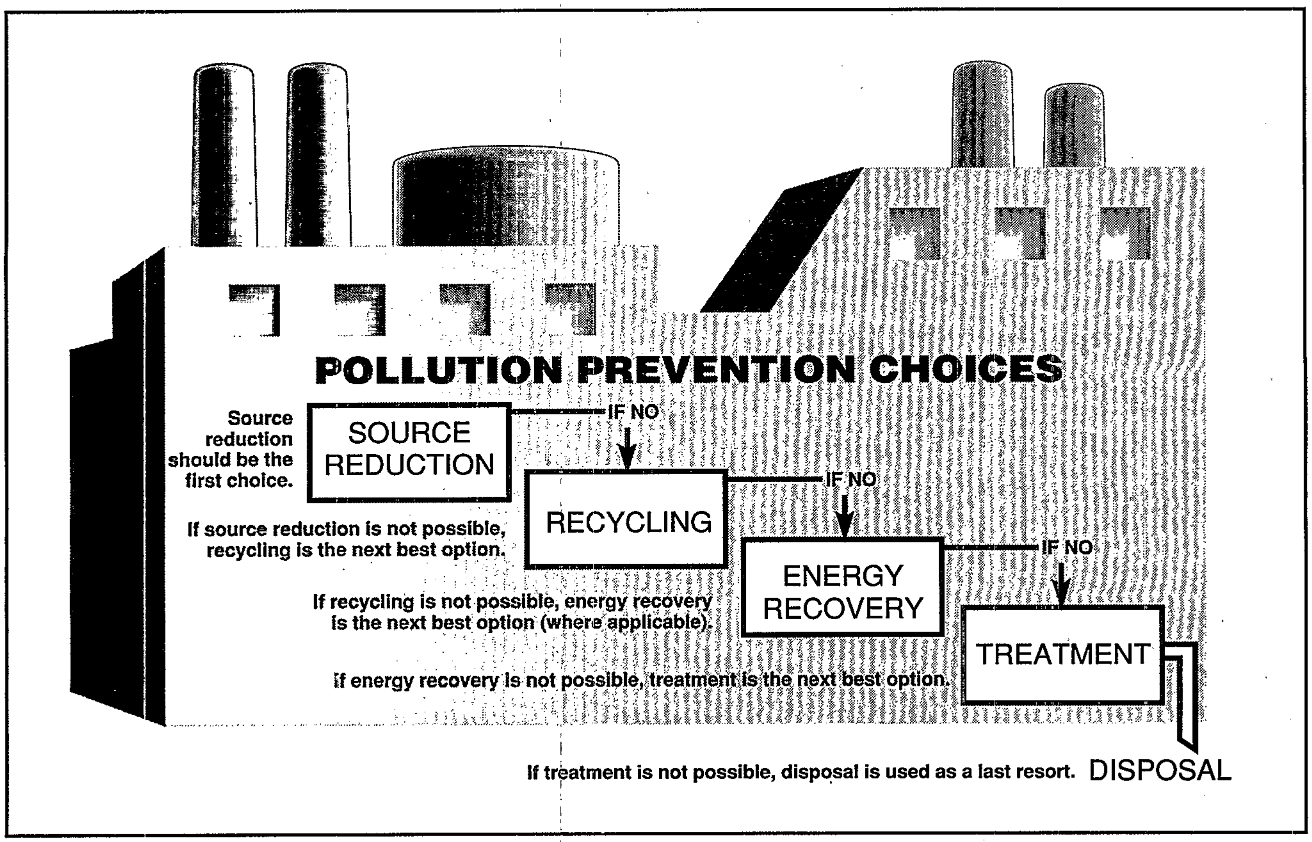



**Figure 2-3. Waste Management Hierarchy.**

This new information can help assess movement in the waste management hierarchy, established in the PPA as national policy:

- pollution should be prevented at the source whenever feasible;
- pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible;
- pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and
- disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

The decision-making that should be used when determining how to prevent and manage toxic chemicals in wastes is illustrated in Figure 2-3.

For 1991, a total of approximately 37.8 billion pounds of toxic chemicals in production-related wastes were reported managed as follows:

| | |
|---|---|
| Recycled on-site: | 16.379 billion pounds |
| Recycled off-site: | 3.262 billion pounds |

| | |
|---|---|
| Used for energy recovery on-site: | 3.187 billion pounds |
| Used for energy recovery off-site: | 0.498 billion pounds |
| Treated on-site: | 9.783 billion pounds |
| Treated off-site: | 0.874 billion pounds |
| Released on-site and disposed off-site: | 3.771 billion pounds |
| Total: | 37.754 billion pounds |

Looking at the hierarchy of waste management, approximately 52% of the toxic chemicals in wastes, 19.641 billion pounds, were reported as recycled; 10%, 3.685 billion pounds, were reported as combusted for energy recovery; 28%, 10.657 billion pounds, were reported as treated; and 10%, 3.771 billion pounds, were reported as released or disposed 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 with some subsequent releases to the environment or released directly to the environment. In addition to these production-related wastes, a total of approximately 31.4 million pounds of toxic chemicals in wastes not associated with production (from catastrophic or remedial actions) were reported.

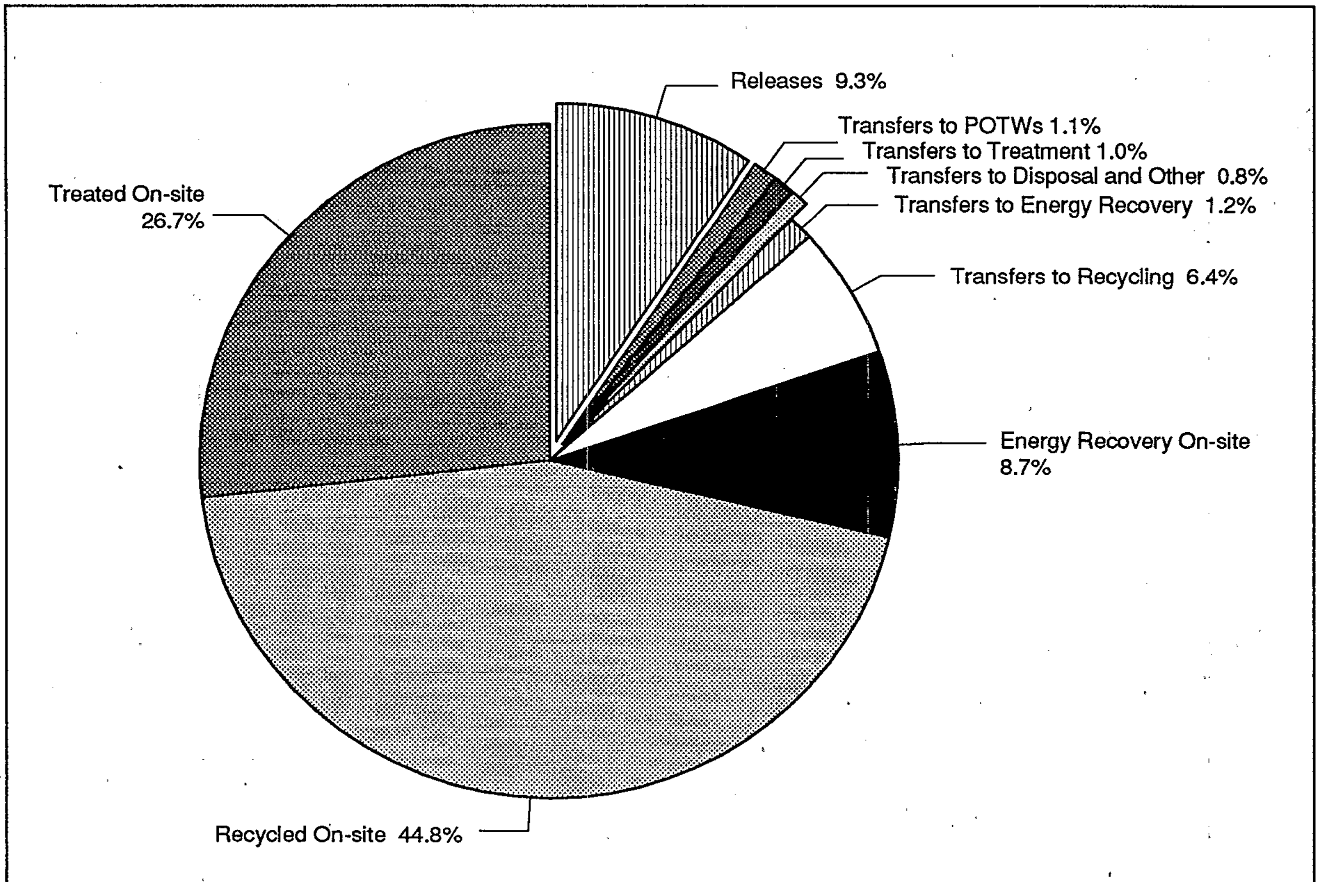



**Figure 2-4. Quantities Reported by Management Technique, 1991.**

The management of the 37.8 billion pounds of toxic chemicals in production-related wastes reported for 1991 is further illustrated in Figure 2-4. The extended pieces of the pie chart show those quantities reported in 1991 that have been reported since the inception of the TRI program:

releases to air, land, water, and underground wells; transfers to POTWs; transfers to other off-site locations for the purposes of treatment or disposal; and "other" transfers. These quantities (about 4.4 billion pounds) comprise approximately 12% of the total quantities of toxic chemicals in wastes now collected under TRI.

## Data Required by the Pollution Prevention Act (PPA)

*Quantity released* (Section 8.1 of Form R). This is the total quantity that was released to the environment at the facility (directly discharged to air, land, and water, and injected underground), and sent off-site for the purposes of disposal. Because this quantity includes amounts disposed off-site, it differs from the total releases to the environment that facilities report in Section 5 of Form R (those releases are presented in Chapter 1).

*Quantity used for energy recovery on-site* (Section 8.2 of Form R). This is the quantity that was actually combusted for the purposes of energy recovery on-site. The reported toxic chemical has to have a heating value that is high enough to sustain combustion in some form of energy recovery device, such as a furnace, including kilns, or a boiler. For example, metals or metal compounds should not be reported as combusted for energy recovery because the parent metals do not contribute any heating value to the wastes being combusted. The parent metals would be discharged to air or remain in the ash, which is usually disposed. The amount reported should represent the amount actually destroyed in the combustion process, not the amount that entered the energy recovery unit. For example, 100,000 pounds of toluene entered a boiler which, on average, combusted 98% of the toluene. The remaining toluene was discharged to air. A total of 98,000 pounds is reported as combusted for energy recovery, and the remaining 2,000 pounds is reported as released to air.

*Quantity used for energy recovery off-site* (Section 8.3 of Form R). This is the quantity that was sent off-site for the purposes of energy recovery. It is the quantity that left the facility boundary, not the amount actually 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. These quantities should also have been reported in Section 6 of Form R as off-site transfers, along with the receiving facility's name and location (these quantities are also presented in Chapter 1).

*Quantity recycled on-site* (Section 8.4 of Form R). This is the quantity that was recovered and made available for further use at the facility. It is not the quantity that entered a recycling or recovery operation. This quantity may be greater than the actual amount of the toxic chemical managed 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 225,000 pounds of 1,1,1-trichloroethane recycled during that year. This quantity is much greater than the amount of the toxic chemical that was actually used at the facility, but reflects the amounts of 1,1,1-trichloroethane in wastes that were managed at the facility during the reporting year. However, not all facilities have reported in this manner.

*Quantity recycled off-site* (Section 8.5 of Form R). This is the quantity that was sent off-site for the purposes of recycling. It is the quantity that left the facility boundary, not the amount actually recovered at the off-site location. These quantities should also have been reported in Section 6 of Form R as off-site transfers, along with the receiving facility's name and location (these quantities are also presented in Chapter 1).

*Quantity treated on-site* (Section 8.6 of Form R). This is the quantity that was destroyed in on-site waste treatment operations, not the amount that entered any treatment operation. If 100,000 pounds of benzene were combusted in an incinerator that destroyed 99% of the benzene, the facility would have reported 99,000 pounds as treated on-site. If the remaining 1,000 pounds were released through a stack, the 1,000 pounds would have been reported as a quantity released (Section 8.1). For this data element, destroyed means that the chemical no longer exists in its reportable form. For example, reduction of a certain quantity of hexavalent chromium to trivalent chromium would not be reported as a quantity treated because the chromium was not destroyed and was still in its reportable form.

*Quantity treated off-site* (Section 8.7 of Form R). This is the quantity that was sent to POTWs and other off-site locations for the purposes of treatment. It is the quantity that left the facility boundary, not the amount that was actually treated at the off-site location. Quantities included here should also have been reported in Section 6 of Form R (these quantities are also presented in Chapter 1). Data users should be aware that off-site locations can have varying levels of treatment capabilities, which means that a toxic chemical sent to a POTW or other off-site location may or may not have been treated in the sense that the chemical was destroyed and not released to the environment. For example, metals and certain organic chemicals may have been "passed through" a POTW, meaning that they were discharged directly from the POTW. Metals may also have been contained in the sludges from POTWs, which were disposed on land. As a result, quantities may have been reported as treated when they were ultimately released to the environment. This could also have occurred at other off-site locations in that the toxic chemical in wastes may have been treated and then disposed. In situations where the toxic chemical was stabilized and/or solidified, this is almost always a treatment step prior to disposal, usually to a landfill.

*Quantity released to the environment due to one-time events* (Section 8.8 of Form R). This is the quantity that was 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, and remedial actions. 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. While the aggregation of these quantities in one place is new to reporting under TRI, some of the quantities due to accidental or non-routine events have been reported since 1987. Releases to the environment, as reported in Section 5 of Form R, have included accidental as well as routine discharges, and wastes transferred off-site for treatment or disposal have included quantities from accidental events or remedial actions since 1987.

An important consideration when looking at and using these data is that the individual quantities are intended to be mutually exclusive of each other in order to avoid double-counting. This is important because the sum of the quantities reported as recycled (on- and off-site), used for energy recovery (on- and off-site), treated (on- and off-site), and released provides the total production-related quantity of the toxic chemical in wastes that a facility must manage in that year.

As required under the PPA, the quantities of the toxic chemical in production-related wastes are to be reported not only for the reporting year, but for the year prior to and the two years following the reporting year. Because 1991 was the first year for which this new information was required, the PPA did not require facilities to report quantities for 1990 when they did not have sufficient information to make a reasonable estimate. For example, if a facility recycled the chemical on-site during both 1990 and 1991, but felt that it did not have sufficient records to estimate the quantity recycled in 1990, the facility could have entered "NA" (Not Applicable) for the quantity recycled on-site during 1990. As a result, information for 1990 may not be available for comparisons across the four years reported.

The quantities reported for 1992 and 1993, the two years following the reporting year, are projections only. The intent of this information is to encourage facilities to plan to implement source reduction and move up the waste management hierarchy in the future. Future year estimates are not commitments that facilities reporting under TRI are required to meet.

Tables 2-1 and 2-2 show the quantities of toxic chemicals in production-related wastes reported for 1990 through 1993, aggregated at the national level. In addition to the production-related quantities reported for 1991, a total of 31,451,032 pounds of toxic chemicals in non-production-related wastes were reported for that year. All of the quantities reported for 1990 through 1993 are shown in Table 2-1, which includes forms that did not have information for all four years. Table 2-1 indicates an increase from 1990 to 1991, but it should be noted that this apparent increase is due in part to facilities which did not report quantities for 1990. Table 2-2 shows the quantities for only those forms that provided quantities consistently for all four years. This allows for a consistent comparison to see potential trends in the quantities recycled, combusted for energy recovery, treated, and disposed. While both tables indicate that the quantities of toxic chemicals in wastes projected for future years are relatively stable, the stability in the quantities is more pronounced when looking at Table 2-2. Table 2-2 shows a slight decrease in the quantities of toxic chemicals in wastes between 1990 and 1991. 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 2-3 through 2-5.

**Table 2-1. TRI Data Collected under the Pollution Prevention Act, National Summary, 1991.(a)**

| Category of Waste Generated | 1990 Pounds | 1990 Percent | 1991 Pounds | 1991 Percent | Projected Data 1992 Pounds | 1992 Percent | 1993 Pounds | 1993 Percent |
|---|---|---|---|---|---|---|---|---|
| Recycled On-site | 14,452,166,728 | 42.7 | 16,379,108,682 | 43.4 | 15,899,500,419 | 42.6 | 16,001,626,071 | 42.9 |
| Recycled Off-site | 2,534,357,669 | 7.5 | 3,261,980,931 | 8.6 | 3,216,228,147 | 8.6 | 3,216,883,647 | 8.6 |
| Energy Recovery On-site | 2,761,172,935 | 8.2 | 3,186,795,733 | 8.4 | 3,223,687,332 | 8.6 | 3,594,430,633 | 9.6 |
| Energy Recovery Off-site | 426,955,395 | 1.3 | 497,757,471 | 1.3 | 485,893,116 | 1.3 | 472,764,385 | 1.3 |
| Treated On-site | 9,047,390,554 | 26.7 | 9,783,374,620 | 25.9 | 10,157,362,541 | 27.2 | 10,156,260,220 | 27.2 |
| Treated Off-site | 853,899,904 | 2.5 | 874,285,432 | 2.3 | 772,735,826 | 2.1 | 736,192,317 | 2.0 |
| Quantity Released(b) | 3,796,689,036 | 11.2 | 3,771,194,892 | 10.0 | 3,558,849,540 | 9.5 | 3,107,462,103 | 8.3 |
| Total | 33,872,632,221 | 100.0 | 37,754,497,761 | 100.0 | 37,314,256,921 | 100.0 | 37,285,619,376 | 100.0 |

**Table 2-2. TRI Data Collected under the Pollution Prevention Act, Forms Reporting Consistent Data, National Summary, 1991.(a)**

| Category of Waste Generated | 1990 Pounds | 1990 Percent | 1991 Pounds | 1991 Percent | Projected Data 1992 Pounds | 1992 Percent | 1993 Pounds | 1993 Percent |
|---|---|---|---|---|---|---|---|---|
| Recycled On-site | 10,942,012,010 | 43.4 | 10,434,507,021 | 42.8 | 10,590,327,883 | 42.5 | 10,656,117,053 | 42.9 |
| Recycled Off-site | 1,880,406,286 | 7.5 | 1,813,514,462 | 7.4 | 1,870,204,744 | 7.5 | 1,912,326,015 | 7.7 |
| Energy Recovery On-site | 1,944,233,283 | 7.7 | 1,942,194,161 | 8.0 | 1,944,233,283 | 7.8 | 1,986,069,691 | 8.0 |
| Energy Recovery Off-site | 193,861,662 | 0.8 | 195,733,170 | 0.8 | 197,552,762 | 0.8 | 198,429,939 | 0.8 |
| Treated On-site | 7,314,412,863 | 29.0 | 7,210,331,737 | 29.6 | 7,633,642,658 | 30.6 | 7,590,338,237 | 30.5 |
| Treated Off-site | 585,608,267 | 2.3 | 536,578,610 | 2.2 | 537,777,233 | 2.2 | 539,167,232 | 2.2 |
| Quantity Released(b) | 2,354,083,854 | 9.3 | 2,260,187,150 | 9.3 | 2,133,506,424 | 8.6 | 1,981,233,694 | 8.0 |
| Total | 25,214,618,225 | 100.0 | 24,393,046,311 | 100.0 | 24,907,244,987 | 100.0 | 24,863,681,861 | 100.0 |

**Table 2-3. TRI Data Collected under the Pollution Prevention Act, by State, 1991 (Alphabetically Ordered).**

| State | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|
| Alabama | 311,325,143 | 64,461,431 | 66,131,883 | 48,413,773 |
| Alaska | 889 | 0 | 2,922,000 | 0 |
| American Samoa | 0 | 0 | 0 | 0 |
| Arizona | 463,325,079 | 25,466,219 | 348,615 | 925,883 |
| Arkansas | 90,346,644 | 34,731,355 | 34,303,642 | 4,943,795 |
| California | 127,036,992 | 135,220,535 | 210,343,553 | 14,182,009 |
| Colorado | 38,750,612 | 7,190,858 | 11,378,000 | 1,509,052 |
| Connecticut | 189,870,407 | 25,628,435 | 6,726,315 | 4,530,769 |
| Delaware | 54,572,494 | 7,389,305 | 138,544 | 1,228,685 |
| Florida | 325,916,896 | 26,145,360 | 40,607,150 | 7,495,397 |
| Georgia | 658,552,343 | 64,942,806 | 57,384,878 | 7,298,247 |
| Hawaii | 6,567 | 225,879 | 1,430,000 | 0 |
| Idaho | 937,485 | 500,367 | 180 | 285,045 |
| Illinois | 235,615,511 | 476,165,014 | 145,774,540 | 47,334,880 |
| Indiana | 461,628,922 | 331,482,347 | 73,750,452 | 20,109,496 |
| Iowa | 24,601,949 | 21,224,191 | 1,168,055 | 4,575,001 |
| Kansas | 251,236,642 | 33,043,722 | 425,389,721 | 2,338,234 |
| Kentucky | 154,979,666 | 65,674,839 | 71,998,890 | 6,109,170 |
| Louisiana | 980,424,001 | 126,591,721 | 314,051,351 | 5,105,804 |
| Maine | 7,714,020 | 5,403,527 | 10,653,914 | 437,639 |
| Maryland | 86,969,675 | 23,124,382 | 10,137,459 | 1,832,923 |
| Massachusetts | 62,202,595 | 19,818,516 | 8,682,927 | 7,207,035 |
| Michigan | 227,060,950 | 148,165,063 | 65,826,271 | 56,909,494 |
| Minnesota | 79,471,452 | 19,778,105 | 6,100,350 | 3,597,326 |
| Mississippi | 162,721,869 | 48,146,529 | 14,581,845 | 4,788,371 |
| Missouri | 220,450,142 | 59,958,407 | 263,912,077 | 10,627,732 |
| Montana | 36,506,236 | 2,874,103 | 688,684 | 214,541 |
| Nebraska | 31,265,938 | 13,195,491 | 4,631,666 | 1,082,015 |
| Nevada | 3,014,564 | 736,070 | 0 | 9,274 |
| New Hampshire | 21,600,409 | 3,634,548 | 1,300,388 | 458,520 |
| New Jersey | 266,375,224 | 93,779,433 | 16,910,321 | 25,189,563 |
| New Mexico | 28,264,528 | 200,809 | 18,603,230 | 161,324 |
| New York | 484,131,284 | 47,251,890 | 21,824,990 | 9,981,795 |
| North Carolina | 184,644,800 | 123,157,215 | 33,961,227 | 8,846,979 |
| North Dakota | 66,259 | 32,850 | 0 | 48,339 |
| Ohio | 1,364,248,014 | 263,262,046 | 108,000,391 | 38,282,153 |
| Oklahoma | 48,568,021 | 16,586,941 | 19,550,290 | 1,529,997 |
| Oregon | 42,823,959 | 9,883,149 | 14,100,716 | 567,050 |
| Pennsylvania | 1,714,115,597 | 180,714,964 | 84,012,599 | 18,670,088 |
| Puerto Rico | 77,569,711 | 9,583,868 | 48,677 | 7,985,302 |
| Rhode Island | 10,372,313 | 9,027,390 | 248,700 | 456,354 |
| South Carolina | 590,031,785 | 81,022,016 | 102,172,038 | 6,810,666 |
| South Dakota | 548,406 | 261,106 | 0 | 210,649 |
| Tennessee | 442,206,527 | 39,175,518 | 32,496,372 | 8,651,307 |
| Texas | 5,233,989,351 | 364,755,948 | 717,185,391 | 77,125,983 |
| Utah | 10,751,166 | 33,065,891 | 11,941 | 388,194 |
| Vermont | 6,044,118 | 2,243,810 | 0 | 504,710 |
| Virgin Islands | 0 | 374,000 | 0 | 0 |
| Virginia | 133,115,463 | 26,507,497 | 81,463,418 | 10,775,685 |
| Washington | 91,974,319 | 64,778,277 | 9,860,028 | 816,268 |
| West Virginia | 267,557,607 | 26,124,281 | 10,069,064 | 7,493,124 |
| Wisconsin | 70,391,861 | 43,839,497 | 11,768,990 | 9,707,534 |
| Wyoming | 3,212,277 | 35,433,410 | 54,144,000 | 4,297 |
| Total | 16,379,108,682 | 3,261,980,931 | 3,186,795,733 | 497,757,471 |

| State | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| Alabama | 569,911,217 | 10,356,612 | 122,071,787 | 1,192,671,846 | 205,504 |
| Alaska | 2,803,916 | 0 | 17,809,574 | 23,536,379 | 84,980 |
| American Samoa | 0 | 0 | 22,000 | 22,000 | 0 |
| Arizona | 56,090,961 | 2,616,214 | 62,833,659 | 611,606,630 | 53,962 |
| Arkansas | 144,228,962 | 1,622,297 | 49,771,907 | 359,948,602 | 127,308 |
| California | 259,043,619 | 29,340,063 | 106,355,580 | 881,522,351 | 3,043,336 |
| Colorado | 20,034,890 | 2,533,060 | 6,918,328 | 88,314,800 | 117,397 |
| Connecticut | 33,570,688 | 7,587,799 | 22,002,683 | 289,917,096 | 137,572 |
| Delaware | 66,332,739 | 3,208,077 | 6,367,067 | 139,236,911 | 23,091 |
| Florida | 190,382,598 | 15,876,087 | 194,899,454 | 801,322,942 | 632,161 |
| Georgia | 279,567,337 | 8,790,838 | 77,972,956 | 1,154,509,405 | 236,641 |
| Hawaii | 5,647,742 | 6,294 | 1,005,748 | 8,322,230 | 725 |
| Idaho | 24,997,862 | 196,938 | 10,803,876 | 37,721,753 | 25,520 |
| Illinois | 588,767,617 | 72,395,140 | 159,762,885 | 1,725,815,587 | 1,158,325 |
| Indiana | 274,951,835 | 30,020,336 | 146,770,188 | 1,338,713,576 | 136,093 |
| Iowa | 206,877,605 | 8,791,589 | 41,919,256 | 309,157,646 | 136,746 |
| Kansas | 53,325,891 | 4,404,012 | 83,099,964 | 852,838,186 | 340,091 |
| Kentucky | 152,058,977 | 8,392,449 | 68,811,469 | 528,025,460 | 279,786 |
| Louisiana | 1,263,538,442 | 11,065,017 | 499,672,063 | 3,200,448,399 | 1,584,867 |
| Maine | 66,320,150 | 1,026,632 | 16,840,109 | 108,395,991 | 48,005 |
| Maryland | 285,787,567 | 7,086,274 | 15,554,909 | 430,493,189 | 73,217 |
| Massachusetts | 34,055,511 | 10,807,623 | 19,338,616 | 162,112,823 | 57,042 |
| Michigan | 310,628,049 | 32,209,345 | 108,295,694 | 949,094,866 | 393,796 |
| Minnesota | 204,350,506 | 3,756,074 | 45,680,567 | 362,734,380 | 53,181 |
| Mississippi | 210,656,737 | 3,221,398 | 103,465,389 | 547,582,138 | 865,657 |
| Missouri | 94,912,814 | 24,578,332 | 66,111,866 | 740,551,370 | 365,155 |
| Montana | 22,400,860 | 183,046 | 41,010,116 | 103,877,586 | 508 |
| Nebraska | 15,585,092 | 1,515,710 | 19,427,564 | 86,703,476 | 1,672,940 |
| Nevada | 15,444,605 | 25,477 | 3,345,568 | 22,575,558 | 123,917 |
| New Hampshire | 10,031,201 | 862,647 | 5,859,019 | 43,746,732 | 3,194 |
| New Jersey | 256,251,003 | 45,123,408 | 41,833,267 | 745,462,219 | 953,262 |
| New Mexico | 10,607,433 | 99,881 | 25,732,011 | 83,669,216 | 93 |
| New York | 198,456,069 | 16,242,855 | 75,719,045 | 853,607,928 | 205,629 |
| North Carolina | 388,317,967 | 11,537,044 | 108,306,377 | 858,771,609 | 187,369 |
| North Dakota | 1,991,325 | 37,636 | 1,789,945 | 3,966,354 | 0 |
| Ohio | 357,401,073 | 137,106,567 | 192,878,592 | 2,461,178,836 | 889,677 |
| Oklahoma | 65,724,386 | 3,934,313 | 40,650,847 | 196,544,795 | 217,514 |
| Oregon | 84,736,723 | 7,270,361 | 20,537,476 | 179,919,434 | 9,124 |
| Pennsylvania | 273,535,191 | 156,313,011 | 89,781,649 | 2,517,143,099 | 500,636 |
| Puerto Rico | 41,670,034 | 12,003,961 | 17,903,333 | 166,764,886 | 21,857 |
| Rhode Island | 23,456,450 | 988,968 | 6,351,719 | 50,901,894 | 12,682 |
| South Carolina | 222,080,470 | 8,403,343 | 66,784,507 | 1,077,304,825 | 166,916 |
| South Dakota | 25,912,652 | 174,067 | 2,602,268 | 29,709,148 | 5,250 |
| Tennessee | 236,429,369 | 12,529,646 | 237,453,044 | 1,008,941,783 | 4,780,707 |
| Texas | 1,367,635,103 | 68,339,099 | 424,156,792 | 8,253,187,667 | 4,810,049 |
| Utah | 121,236,094 | 1,078,761 | 91,448,031 | 257,980,078 | 6,043,775 |
| Vermont | 7,478,873 | 202,861 | 1,036,053 | 17,510,425 | 43,991 |
| Virgin Islands | 835,100 | 0 | 1,517,422 | 2,726,522 | 303 |
| Virginia | 101,256,953 | 68,532,927 | 76,350,461 | 498,002,404 | 195,966 |
| Washington | 249,372,017 | 5,467,505 | 30,922,992 | 453,191,406 | 55,425 |
| West Virginia | 162,884,113 | 4,058,339 | 31,289,070 | 509,475,598 | 228,903 |
| Wisconsin | 120,918,126 | 12,236,998 | 50,793,328 | 319,656,334 | 137,237 |
| Wyoming | 2,882,106 | 128,501 | 11,556,802 | 107,361,393 | 3,950 |
| Total | 9,783,374,620 | 874,285,432 | 3,771,194,892 | 37,754,497,761 | 31,451,032 |

Table 2-4. TRI Data Collected under the Pollution Prevention Act, by Industry, 1991.

| SIC Code | Industry | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|---|
| 20 | Food | 28,693,388 | 15,823,776 | 225,511 | 126,764 |
| 21 | Tobacco | 49,901,029 | 4,732 | 0 | 7,283 |
| 22 | Textiles | 14,245,415 | 639,028 | 3,441,643 | 2,642,001 |
| 23 | Apparel | 285,402 | 4,196 | 0 | 73,159 |
| 24 | Lumber | 17,404,088 | 980,201 | 10,087,285 | 4,632,305 |
| 25 | Furniture | 3,194,367 | 2,913,755 | 349,338 | 6,396,713 |
| 26 | Paper | 235,840,123 | 4,840,527 | 232,574,942 | 7,639,416 |
| 27 | Printing | 173,444,146 | 6,654,051 | 154,500 | 5,028,466 |
| 28 | Chemicals | 9,617,201,024 | 743,213,473 | 1,160,651,996 | 347,019,942 |
| 29 | Petroleum | 1,516,923,524 | 823,887,184 | 790,294,549 | 16,516,376 |
| 30 | Plastics | 1,165,402,111 | 15,523,700 | 21,784,734 | 11,329,814 |
| 31 | Leather | 5,461,257 | 971,966 | 0 | 1,202,374 |
| 32 | Stone/Clay | 66,278,038 | 3,324,181 | 842,977,323 | 7,883,184 |
| 33 | Primary Metals | 1,802,597,905 | 769,973,476 | 44,963,133 | 9,365,924 |
| 34 | Fabr. Metals | 247,230,727 | 188,764,193 | 10,133,825 | 13,031,073 |
| 35 | Machinery | 114,064,107 | 41,035,299 | 146,205 | 3,550,023 |
| 36 | Electrical | 290,714,374 | 297,482,768 | 2,042,583 | 12,935,178 |
| 37 | Transportation | 69,460,436 | 114,809,540 | 2,612,763 | 25,822,932 |
| 38 | Measure./Photo. | 26,487,748 | 17,474,423 | 282,691 | 4,183,214 |
| 39 | Miscellaneous | 13,617,541 | 10,186,252 | 17,056 | 2,869,950 |
| | Multiple codes 20-39 | 910,956,070 | 199,538,960 | 57,897,942 | 14,795,522 |
| | No codes 20-39 | 9,705,862 | 3,935,250 | 6,157,714 | 705,858 |
| | Total | 16,379,108,682 | 3,261,980,931 | 3,186,795,733 | 497,757,471 |

| Industry | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| Food | 255,529,684 | 27,561,655 | 58,885,967 | 386,846,745 | 606,096 |
| Tobacco | 1,320,937 | 2,330 | 3,520,704 | 54,757,015 | 14,118 |
| Textiles | 44,886,119 | 5,584,573 | 27,857,671 | 99,296,450 | 70,902 |
| Apparel | 1,956,308 | 233,055 | 1,519,593 | 4,071,713 | 6,066 |
| Lumber | 3,487,884 | 966,863 | 32,370,947 | 69,929,573 | 591,971 |
| Furniture | 1,525,621 | 981,565 | 49,347,778 | 64,709,137 | 379,201 |
| Paper | 1,747,788,583 | 46,011,387 | 249,705,333 | 2,524,400,311 | 363,551 |
| Printing | 33,210,972 | 1,700,039 | 44,127,911 | 264,320,085 | 37,074 |
| Chemicals | 4,673,882,659 | 377,758,962 | 1,649,540,049 | 18,569,268,105 | 15,018,438 |
| Petroleum | 492,329,288 | 116,730,107 | 72,677,419 | 3,829,358,447 | 215,422 |
| Plastics | 65,237,965 | 4,781,250 | 159,751,796 | 1,443,811,370 | 372,822 |
| Leather | 21,328,100 | 4,140,528 | 11,822,116 | 44,926,341 | 14,981 |
| Stone/Clay | 204,076,346 | 3,585,464 | 136,830,664 | 1,264,955,200 | 59,300 |
| Primary Metals | 580,623,199 | 165,331,868 | 524,347,728 | 3,897,203,233 | 6,546,840 |
| Fabr. Metals | 405,104,166 | 26,653,510 | 122,889,476 | 1,013,806,970 | 924,636 |
| Machinery | 19,138,999 | 5,266,934 | 43,473,581 | 226,675,148 | 494,526 |
| Electrical | 248,092,358 | 23,140,036 | 87,114,711 | 961,522,008 | 2,176,760 |
| Transportation | 58,123,925 | 18,236,933 | 151,807,154 | 440,873,683 | 651,559 |
| Measur./Photo. | 44,974,483 | 5,782,295 | 42,788,091 | 141,972,945 | 82,199 |
| Miscellaneous | 6,410,458 | 1,685,689 | 19,391,842 | 54,178,788 | 36,709 |
| Multiple Codes | 735,256,006 | 37,349,310 | 249,123,284 | 2,204,917,094 | 2,597,879 |
| No codes | 139,090,560 | 801,079 | 32,301,077 | 192,697,400 | 189,982 |
| Total | 9,783,374,620 | 874,285,432 | 3,771,194,892 | 37,754,497,761 | 31,451,032 |

Table 2-5. TRI Data Collected under the Pollution Prevention Act, by Chemical, 1991 (Alphabetically Ordered).

| CAS Number | Chemical | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|---|
| 75-07-0 | Acetaldehyde | 114,695 | 300 | 7,620,347 | 127,935 |
| 60-35-5 | Acetamide | 0 | 0 | 82,200 | 2,138 |
| 67-64-1 | Acetone | 268,728,692 | 18,262,490 | 134,433,568 | 42,758,635 |
| 75-05-8 | Acetonitrile | 2,421,520,190 | 5,153,900 | 27,510,882 | 2,776,771 |
| 107-02-8 | Acrolein | 6,400 | 0 | 1,692,831 | 10,681 |
| 79-06-1 | Acrylamide | 2,286 | 0 | 0 | 1,154 |
| 79-10-7 | Acrylic acid | 147,220 | 17,727 | 16,406,396 | 4,977,741 |
| 107-13-1 | Acrylonitrile | 159,893,164 | 16,540 | 1,923,569 | 234,312 |
| 107-18-6 | Allyl alcohol | 203,764 | 0 | 46,880 | 370,224 |
| 107-05-1 | Allyl chloride | 1,466,000 | 0 | 1,750,600 | 33,000 |
| 7429-90-5 | Aluminum (fume or dust) | 13,185,989 | 46,204,582 | 0 | 64,989 |
| 1344-28-1 | Aluminum oxide (fibrous forms) | 31,235 | 333,653 | 0 | 1,400 |
| 60-09-3 | 4-Aminoazobenzene | 0 | 0 | 0 | 0 |
| 92-67-1 | 4-Aminobiphenyl | 0 | 0 | 0 | 0 |
| 7664-41-7 | Ammonia | 258,127,545 | 7,697,327 | 40,686,457 | 337,774 |
| 6484-52-2 | Ammonium nitrate (solution) | 71,981,665 | 7,966,410 | 0 | 0 |
| 7783-20-2 | Ammonium sulfate (solution) | 708,087 | 936,937 | 0 | 0 |
| 62-53-3 | Aniline | 11,628,476 | 1 | 4,623,996 | 2,166,273 |
| 90-04-0 | o-Anisidine | 0 | 0 | 290 | 0 |
| 104-94-9 | p-Anisidine | 0 | 0 | 0 | 0 |
| 120-12-7 | Anthracene | 604,718 | 36,870 | 2,642,616 | 406,996 |
| 7440-36-0 | Antimony | 3,218,036 | 1,300,881 | 0 | 2,997 |
| 7440-38-2 | Arsenic | 470,019 | 41,707 | 0 | 4 |
| 1332-21-4 | Asbestos (friable) | 1,864,544 | 0 | 0 | 0 |
| 7440-39-3 | Barium | 30,976 | 53,008 | 0 | 3,973 |
| 98-87-3 | Benzal chloride | 0 | 0 | 0 | 24,000 |
| 71-43-2 | Benzene | 196,393,605 | 1,414,752 | 33,714,288 | 4,932,365 |
| 98-07-7 | Benzoic trichloride | 0 | 0 | 0 | 0 |
| 98-88-4 | Benzoyl chloride | 0 | 0 | 0 | 0 |
| 94-36-0 | Benzoyl peroxide | 6,355 | 11,150 | 343 | 914 |
| 100-44-7 | Benzyl chloride | 1,049 | 0 | 0 | 200,581 |
| 7440-41-7 | Beryllium | 0 | 77,621 | 0 | 0 |
| 92-52-4 | Biphenyl | 24,179,485 | 356,720 | 1,322,257 | 318,516 |
| 111-44-4 | Bis(2-chloroethyl) ether | 0 | 0 | 441,148 | 350 |
| 542-88-1 | Bis(chloromethyl) ether | 0 | 0 | 0 | 0 |
| 108-60-1 | Bis(2-chloro-1-methylethyl)ether | 0 | 0 | 11,130,000 | 0 |
| 103-23-1 | Bis(2-ethylhexyl) adipate | 6,439,053 | 198,369 | 29,899 | 108,210 |
| 353-59-3 | Bromochlorodifluoromethane (Halon 1211) | 0 | 0 | 0 | 0 |
| 75-25-2 | Bromoform | 0 | 0 | 0 | 0 |
| 74-83-9 | Bromomethane | 9,370 | 0 | 0 | 250 |
| 75-63-8 | Bromotrifluoromethane (Halon 1301) | 29,100 | 0 | 0 | 0 |
| 106-99-0 | 1,3-Butadiene | 250,467,140 | 18,124,104 | 77,705,621 | 47,154 |
| 141-32-2 | Butyl acrylate | 210 | 95,190 | 713,563 | 233,635 |
| 71-36-3 | n-Butyl alcohol | 70,407,582 | 2,472,385 | 27,563,365 | 8,139,497 |
| 78-92-2 | sec-Butyl alcohol | 226,306 | 27,492 | 8,299,980 | 3,921,952 |
| 75-65-0 | tert-Butyl alcohol | 33,478 | 13,497 | 43,721,233 | 26,858,983 |
| 85-68-7 | Butyl benzyl phthalate | 1,444,692 | 95,448 | 30,024 | 119,080 |
| 106-88-7 | 1,2-Butylene oxide | 26,300 | 7 | 564,180 | 330,019 |
| 123-72-8 | Butyraldehyde | 111,280 | 0 | 2,152,960 | 911 |
| 569-64-2 | C.I. Basic Green 4 | 338 | 0 | 0 | 0 |
| 989-38-8 | C.I. Basic Red 1 | 0 | 0 | 0 | 270 |
| 2832-40-8 | C.I. Disperse Yellow 3 | 0 | 0 | 0 | 0 |
| 81-88-9 | C.I. Food Red 15 | 0 | 0 | 0 | 3 |

| Chemical | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| Acetaldehyde | 6,847,653 | 414,309 | 9,584,996 | 24,710,235 | 1,808 |
| Acetamide | 1 | 29,708 | 36 | 114,083 | 0 |
| Acetone | 117,452,577 | 23,052,335 | 161,632,499 | 766,320,796 | 254,475 |
| Acetonitrile | 11,732,428 | 2,272,173 | 20,958,975 | 2,491,925,319 | 12,102 |
| Acrolein | 1,614,888 | 13 | 233,909 | 3,558,722 | 4 |
| Acrylamide | 311,373 | 114,684 | 4,675,782 | 5,105,279 | 96 |
| Acrylic acid | 29,698,686 | 387,851 | 56,335,783 | 107,971,404 | 37,671 |
| Acrylonitrile | 15,634,889 | 2,277,301 | 7,003,311 | 186,983,086 | 181,299 |
| Allyl alcohol | 406,545 | 494,292 | 229,711 | 1,751,416 | 330 |
| Allyl chloride | 589,504 | 311,600 | 179,248 | 4,329,952 | 704 |
| Aluminum (fume or dust) | 18,274,473 | 1,801,400 | 12,484,791 | 92,016,224 | 3,665 |
| Aluminum oxide (fibrous forms) | 210,306 | 1,363,953 | 2,786,394 | 4,726,941 | 0 |
| 4-Aminoazobenzene | 130 | 0 | 440 | 570 | 0 |
| 4-Aminobiphenyl | 100,000 | 0 | 4 | 100,004 | 0 |
| Ammonia | 306,924,511 | 65,253,002 | 499,483,105 | 1,178,509,721 | 759,303 |
| Ammonium nitrate (solution) | 31,137,428 | 4,168,908 | 52,594,025 | 167,848,436 | 40,361 |
| Ammonium sulfate (solution) | 8,780,248 | 27,119,422 | 39,871,936 | 77,416,630 | 5,401 |
| Aniline | 2,989,882 | 1,228,518 | 2,452,780 | 25,089,926 | 11,837 |
| o-Anisidine | 4,598 | 10 | 8,494 | 13,392 | 0 |
| p-Anisidine | 764 | 13 | 36 | 813 | 0 |
| Anthracene | 7,643,176 | 27,077 | 191,626 | 11,553,079 | 6,251 |
| Antimony | 1,114,708 | 36,679 | 489,457 | 6,162,758 | 865 |
| Arsenic | 14,058 | 701,767 | 1,727,668 | 2,955,223 | 1,187 |
| Asbestos (friable) | 1,242,202 | 319,020 | 4,710,975 | 8,136,741 | 121,709 |
| Barium | 22,354 | 109,319 | 853,974 | 1,073,604 | 18,975 |
| Benzal chloride | 2,500 | 0 | 1,556 | 28,056 | 12,000 |
| Benzene | 31,256,769 | 2,163,924 | 18,760,658 | 288,636,361 | 108,722 |
| Benzoic trichloride | 280,001 | 0 | 7,937 | 287,938 | 0 |
| Benzoyl chloride | 514,218 | 511,861 | 27,073 | 1,053,152 | 0 |
| Benzoyl peroxide | 31,389 | 69,690 | 29,867 | 149,708 | 280 |
| Benzyl chloride | 315,645 | 89,302 | 106,840 | 713,417 | 4,400 |
| Beryllium | 610 | 0 | 146,835 | 225,066 | 710 |
| Biphenyl | 1,602,163 | 644,626 | 1,365,731 | 29,789,498 | 18,979 |
| Bis(2-chloroethyl) ether | 690,569 | 379,664 | 19,049 | 1,530,780 | 15 |
| Bis(chloromethyl) ether | 177 | 0 | 582 | 759 | 0 |
| Bis(2-chloro-1-methylethyl)ether | 1,106,300 | 0 | 5,400 | 12,241,700 | 0 |
| Bis(2-ethylhexyl) adipate | 415,076 | 36,036 | 434,978 | 7,661,621 | 26 |
| Bromochlorodifluoromethane (Halon 1211) | 0 | 0 | 11,948 | 11,948 | 9 |
| Bromoform | 0 | 190 | 101,000 | 101,190 | 0 |
| Bromomethane | 545,521 | 240 | 2,512,116 | 3,067,497 | 0 |
| Bromotrifluoromethane (Halon 1301) | 213 | 0 | 168,302 | 197,615 | 12,005 |
| 1,3-Butadiene | 51,069,422 | 1,364,892 | 3,926,193 | 402,704,526 | 228,991 |
| Butyl acrylate | 1,495,681 | 175,987 | 299,794 | 3,014,060 | 5 |
| n-Butyl alcohol | 18,996,616 | 4,104,959 | 33,949,277 | 165,633,681 | 56,149 |
| sec-Butyl alcohol | 2,557,628 | 46,554 | 778,507 | 15,858,419 | 2,810 |
| tert-Butyl alcohol | 3,074,168 | 1,543,628 | 2,217,688 | 77,462,675 | 10,137 |
| Butyl benzyl phthalate | 1,443,936 | 198,683 | 621,176 | 3,953,039 | 234 |
| 1,2-Butylene oxide | 223,214 | 910 | 62,645 | 1,207,275 | 19 |
| Butyraldehyde | 1,413,382 | 261,213 | 579,317 | 4,519,063 | 38 |
| C.I. Basic Green 4 | 3,520 | 504 | 20,158 | 24,520 | 0 |
| C.I. Basic Red 1 | 0 | 0 | 370 | 640 | 0 |
| C.I. Disperse Yellow 3 | 933 | 125 | 1,144 | 2,202 | 0 |
| C.I. Food Red 15 | 0 | 1,400 | 1 | 1,404 | 0 |

**Table 2-5. TRI Data Collected under the Pollution Prevention Act, by Chemical, 1991, Continued.**

| CAS Number | Chemical | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|---|
| 97-56-3 | C.I. Solvent Yellow 3 | 0 | 0 | 0 | 2 |
| 7440-43-9 | Cadmium | 73,823 | 249,260 | 0 | 813 |
| 156-62-7 | Calcium cyanamide | 0 | 0 | 0 | 0 |
| 133-06-2 | Captan | 1,277 | 0 | 0 | 0 |
| 63-25-2 | Carbaryl | 30,517 | 0 | 0 | 0 |
| 75-15-0 | Carbon disulfide | 17,506,225 | 1 | 5,446,169 | 187,804 |
| 56-23-5 | Carbon tetrachloride | 10,238,966 | 390,538 | 5,964,156 | 10,849 |
| 463-58-1 | Carbonyl sulfide | 0 | 0 | 2,396,121 | 0 |
| 120-80-9 | Catechol | 270,000 | 1,000,065 | 31,816,947 | 308,304 |
| 57-74-9 | Chlordane | 500 | 0 | 0 | 0 |
| 7782-50-5 | Chlorine | 102,076,338 | 647,823 | 6 | 0 |
| 10049-04-4 | Chlorine dioxide | 1,842,355 | 0 | 0 | 0 |
| 79-11-8 | Chloroacetic acid | 27,298 | 0 | 0 | 0 |
| 532-27-4 | 2-Chloroacetophenone | 0 | 0 | 240,000 | 0 |
| 108-90-7 | Chlorobenzene | 72,196,590 | 892,902 | 2,676,212 | 793,470 |
| 75-00-3 | Chloroethane | 36,811,490 | 140,339 | 15,751,315 | 24,448 |
| 67-66-3 | Chloroform | 4,125,901 | 2,078,744 | 5,499,527 | 720,671 |
| 74-87-3 | Chloromethane | 3,187,122 | 52,813 | 3,031,087 | 20,932 |
| 107-30-2 | Chloromethyl methyl ether | 0 | 0 | 0 | 0 |
| 126-99-8 | Chloroprene | 0 | 130,000 | 454,294 | 3,700 |
| 1897-45-6 | Chlorothalonil | 2,614 | 670 | 0 | 3 |
| 7440-47-3 | Chromium | 39,566,674 | 78,576,055 | 0 | 215 |
| 7440-48-4 | Cobalt | 2,171,203 | 8,015,392 | 0 | 4 |
| 7440-50-8 | Copper | 584,266,533 | 350,356,528 | 0 | 306,951 |
| 8001-58-9 | Creosote | 14,878,637 | 43,000 | 73,000 | 581,029 |
| 120-71-8 | p-Cresidine | 0 | 0 | 0 | 0 |
| 1319-77-3 | Cresol (mixed isomers) | 321,037 | 615,657 | 3,081,999 | 256,346 |
| 108-39-4 | m-Cresol | 886,822 | 200,520 | 619,002 | 10,275 |
| 95-48-7 | o-Cresol | 78,150 | 278 | 432,000 | 4,560 |
| 106-44-5 | p-Cresol | 65,859 | 120,020 | 345,685 | 29,600 |
| 98-82-8 | Cumene | 4,077,543 | 84,792 | 8,227,728 | 802,715 |
| 80-15-9 | Cumene hydroperoxide | 25,000 | 0 | 277 | 1,741 |
| 135-20-6 | Cupferron | 0 | 0 | 0 | 0 |
| 110-82-7 | Cyclohexane | 160,571,531 | 918,113 | 11,936,571 | 4,213,423 |
| 94-75-7 | 2,4-D (acetic acid) | 39,546 | 0 | 0 | 0 |
| 1163-19-5 | Decabromodiphenyl oxide | 1,282,881 | 49,617 | 0 | 8,550 |
| 615-05-4 | 2,4-Diaminoanisole | 0 | 0 | 0 | 0 |
| 39156-41-7 | 2,4-Diaminoanisole sulfate | 0 | 0 | 0 | 0 |
| 101-80-4 | 4,4'-Diaminodiphenyl ether | 0 | 0 | 0 | 0 |
| 25376-45-8 | Diaminotoluene (mixed isomers) | 0 | 0 | 5,527,057 | 547,000 |
| 95-80-7 | 2,4-Diaminotoluene | 0 | 0 | 0 | 8,400 |
| 132-64-9 | Dibenzofuran | 192,924 | 24,373 | 0 | 8,492 |
| 96-12-8 | 1,2-Dibromo-3-chloropropane | 0 | 0 | 0 | 0 |
| 106-93-4 | 1,2-Dibromoethane | 3,550 | 2 | 1,200 | 2 |
| 124-73-2 | Dibromotetrafluoroethane (Halon 2402) | 0 | 0 | 0 | 0 |
| 84-74-2 | Dibutyl phthalate | 87,500 | 11,230 | 658,230 | 166,163 |
| 25321-22-6 | Dichlorobenzene (mixed isomers) | 769,000 | 0 | 460,380 | 325,362 |
| 95-50-1 | 1,2-Dichlorobenzene | 5,498,705 | 1,618,813 | 1,041,134 | 1,101,491 |
| 541-73-1 | 1,3-Dichlorobenzene | 360 | 800 | 117,000 | 0 |
| 106-46-7 | 1,4-Dichlorobenzene | 1,044,855 | 4 | 292,145 | 18,525 |
| 91-94-1 | 3,3'-Dichlorobenzidine | 0 | 0 | 0 | 0 |
| 75-27-4 | Dichlorobromomethane | 0 | 0 | 0 | 0 |
| 75-71-8 | Dichlorodifluoromethane (CFC-12) | 1,155,150 | 118,984 | 0 | 2,836 |
| 107-06-2 | 1,2-Dichloroethane | 63,246,628 | 20,100,792 | 33,544,750 | 342,418 |

| Chemical | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| C.I. Solvent Yellow 3 | 0 | 0 | 0 | 2 | 0 |
| Cadmium | 301,920 | 56,070 | 597,394 | 1,279,280 | 1,100 |
| Calcium cyanamide | 0 | 0 | 53,005 | 53,005 | 0 |
| Captan | 12,000 | 3,603 | 19,403 | 36,283 | 200 |
| Carbaryl | 994,705 | 10,972 | 6,892 | 1,043,086 | 0 |
| Carbon disulfide | 8,287,633 | 349,984 | 89,223,077 | 121,000,893 | 5,406 |
| Carbon tetrachloride | 15,074,894 | 840,933 | 1,649,063 | 34,169,399 | 101,757 |
| Carbonyl sulfide | 6,949,151 | 0 | 16,719,646 | 26,064,918 | 0 |
| Catechol | 28,591,989 | 329,154 | 458,499 | 62,774,958 | 441 |
| Chlordane | 7,000 | 130 | 1,410 | 9,040 | 0 |
| Chlorine | 298,236,718 | 1,186,637 | 78,875,756 | 481,023,278 | 115,533 |
| Chlorine dioxide | 31,827,326 | 75 | 3,978,197 | 37,647,953 | 1,362 |
| Chloroacetic acid | 906,317 | 4,779 | 27,302 | 965,696 | 0 |
| 2-Chloroacetophenone | 0 | 0 | 2 | 240,002 | 0 |
| Chlorobenzene | 2,343,144 | 3,783,313 | 2,694,828 | 85,380,459 | 29,728 |
| Chloroethane | 18,553,147 | 310,486 | 2,884,899 | 74,476,124 | 4,310 |
| Chloroform | 26,581,978 | 2,007,797 | 19,739,220 | 60,753,838 | 124,714 |
| Chloromethane | 9,807,000 | 2,880,895 | 5,962,158 | 24,942,007 | 12,944 |
| Chloromethyl methyl ether | 39,600 | 0 | 3,333 | 42,933 | 0 |
| Chloroprene | 8,095,215 | 201,550 | 1,545,363 | 10,430,122 | 12,140 |
| Chlorothalonil | 1,979 | 3,515 | 209,773 | 218,554 | 6 |
| Chromium | 1,672,436 | 1,971,783 | 5,312,357 | 127,099,520 | 83,117 |
| Cobalt | 104,911 | 44,063 | 575,993 | 10,911,566 | 1,744 |
| Copper | 3,718,997 | 4,296,749 | 39,995,968 | 982,941,726 | 196,626 |
| Creosote | 158,282 | 494,037 | 3,557,867 | 19,785,852 | 722,369 |
| p-Cresidine | 697 | 18,380 | 3,037 | 22,114 | 0 |
| Cresol (mixed isomers) | 5,819,640 | 241,048 | 2,144,262 | 12,479,989 | 46,905 |
| m-Cresol | 184,313 | 50,943 | 707,786 | 2,659,661 | 66 |
| o-Cresol | 21,215 | 74,184 | 101,756 | 712,143 | 4,813 |
| p-Cresol | 133,758 | 1,087,453 | 410,223 | 2,192,598 | 1,050 |
| Cumene | 4,055,098 | 193,667 | 3,396,129 | 20,837,672 | 7,892 |
| Cumene hydroperoxide | 553,898 | 7,809 | 545,286 | 1,134,011 | 0 |
| Cupferron | 0 | 1,200 | 1,200 | 2,400 | 0 |
| Cyclohexane | 29,137,068 | 1,098,588 | 17,840,283 | 225,715,577 | 27,946 |
| 2,4-D (acetic acid) | 101,271 | 104,940 | 21,225 | 266,982 | 8 |
| Decabromodiphenyl oxide | 32,350 | 333,841 | 699,488 | 2,406,727 | 40,002 |
| 2,4-Diaminoanisole | 0 | 0 | 84 | 84 | 0 |
| 2,4-Diaminoanisole sulfate | 0 | 0 | 60 | 60 | 0 |
| 4,4'-Diaminodiphenyl ether | 126 | 3,964 | 1,158 | 5,248 | 2 |
| Diaminotoluene (mixed isomers) | 307,055 | 649,193 | 45,902 | 7,076,207 | 12 |
| 2,4-Diaminotoluene | 0 | 620 | 4,905 | 13,925 | 12,000 |
| Dibenzofuran | 5,000,415 | 16,969 | 140,304 | 5,383,477 | 3,192 |
| 1,2-Dibromo-3-chloropropane | 0 | 0 | 290 | 290 | 0 |
| 1,2-Dibromoethane | 2,362 | 1,557 | 39,290 | 47,963 | 0 |
| Dibromotetrafluoroethane (Halon 2402) | 0 | 0 | 141 | 141 | 6,300 |
| Dibutyl phthalate | 196,688 | 90,180 | 374,257 | 1,584,248 | 4,400 |
| Dichlorobenzene (mixed isomers) | 225,964 | 118,619 | 77,890 | 1,977,215 | 5,977 |
| 1,2-Dichlorobenzene | 1,022,472 | 2,484,569 | 479,928 | 13,247,112 | 49,174 |
| 1,3-Dichlorobenzene | 25 | 3,816 | 5,566 | 127,567 | 100 |
| 1,4-Dichlorobenzene | 2,796 | 91,972 | 340,448 | 1,790,745 | 19,527 |
| 3,3'-Dichlorobenzidine | 2,666 | 19,014 | 4,900 | 26,580 | 0 |
| Dichlorobromomethane | 1 | 0 | 200 | 201 | 0 |
| Dichlorodifluoromethane (CFC-12) | 538,074 | 135,841 | 15,121,234 | 17,072,119 | 288,242 |
| 1,2-Dichloroethane | 79,445,841 | 5,479,660 | 4,003,821 | 206,163,910 | 65,194 |

Table 2-5. TRI Data Collected under the Pollution Prevention Act, by Chemical, 1991, Continued.

| CAS Number | Chemical | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|---|
| 540-59-0 | 1,2-Dichloroethylene | 166,000 | 2,000 | 1,990,182 | 0 |
| 75-09-2 | Dichloromethane | 182,108,296 | 26,224,925 | 14,270,049 | 6,066,234 |
| 120-83-2 | 2,4-Dichlorophenol | 1,695,856 | 0 | 0 | 750 |
| 78-87-5 | 1,2-Dichloropropane | 23,971,016 | 0 | 18,100,000 | 0 |
| 78-88-6 | 2,3-Dichloropropene | 1,400,000 | 0 | 290,000 | 0 |
| 542-75-6 | 1,3-Dichloropropylene | 2,139,000 | 0 | 17,410,000 | 0 |
| 76-14-2 | Dichlorotetrafluoroethane (CFC-114) | 2,439,175 | 0 | 0 | 0 |
| 62-73-7 | Dichlorvos | 15 | 0 | 0 | 0 |
| 115-32-2 | Dicofol | 34 | 0 | 0 | 0 |
| 1464-53-5 | Diepoxybutane | 0 | 0 | 68,000 | 0 |
| 111-42-2 | Diethanolamine | 129,475 | 290,162,457 | 23,159 | 168,704 |
| 117-81-7 | Di-(2-ethylhexyl) phthalate | 632,549 | 960,722 | 555,060 | 305,846 |
| 84-66-2 | Diethyl phthalate | 330,527 | 218,770 | 120,930 | 12,866 |
| 64-67-5 | Diethyl sulfate | 0 | 7,100,000 | 0 | 50 |
| 119-90-4 | 3,3'-Dimethoxybenzidine | 0 | 0 | 0 | 0 |
| 57-14-7 | 1,1-Dimethyl hydrazine | 0 | 3 | 0 | 0 |
| 105-67-9 | 2,4-Dimethylphenol | 233,175 | 0 | 1,021,097 | 21,737 |
| 131-11-3 | Dimethyl phthalate | 5,100 | 0 | 638,300 | 23,000 |
| 77-78-1 | Dimethyl sulfate | 0 | 0 | 0 | 0 |
| 99-65-0 | m-Dinitrobenzene | 0 | 0 | 0 | 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 | 7 | 0 | 322,831 | 100 |
| 51-28-5 | 2,4-Dinitrophenol | 0 | 0 | 40,003 | 0 |
| 121-14-2 | 2,4-Dinitrotoluene | 0 | 0 | 191,000 | 150,000 |
| 606-20-2 | 2,6-Dinitrotoluene | 0 | 0 | 0 | 0 |
| 25321-14-6 | Dinitrotoluene (mixed isomers) | 0 | 0 | 140,000 | 0 |
| 117-84-0 | n-Dioctyl phthalate | 113,506 | 64,964 | 0 | 21,982 |
| 123-91-1 | 1,4-Dioxane | 243,685 | 41,427 | 242,907 | 281,040 |
| 106-89-8 | Epichlorohydrin | 7,085,172 | 0 | 321,963 | 12,469 |
| 110-80-5 | 2-Ethoxyethanol | 787,572 | 22,136 | 1,443,183 | 250,869 |
| 140-88-5 | Ethyl acrylate | 170,760 | 8,470 | 5,683,198 | 782,437 |
| 100-41-4 | Ethylbenzene | 13,411,266 | 3,891,948 | 64,124,373 | 8,890,416 |
| 541-41-3 | Ethyl chloroformate | 0 | 0 | 0 | 1,200 |
| 74-85-1 | Ethylene | 373,576,147 | 0 | 413,351,136 | 18,039,963 |
| 107-21-1 | Ethylene glycol | 304,686,059 | 89,881,367 | 4,840,047 | 4,315,400 |
| 75-21-8 | Ethylene oxide | 409,742 | 276 | 300,669 | 0 |
| 96-45-7 | Ethylene thiourea | 0 | 0 | 0 | 834 |
| 2164-17-2 | Fluometuron | 0 | 0 | 0 | 0 |
| 50-00-0 | Formaldehyde | 151,962,186 | 84,020 | 15,022,870 | 162,522 |
| 76-13-1 | Freon 113 | 38,428,078 | 8,150,576 | 404,431 | 556,864 |
| 76-44-8 | Heptachlor | 0 | 0 | 0 | 0 |
| 118-74-1 | Hexachlorobenzene | 350,000 | 1 | 340,000 | 0 |
| 87-68-3 | Hexachloro-1,3-butadiene | 566,000 | 0 | 0 | 0 |
| 77-47-4 | Hexachlorocyclopentadiene | 0 | 0 | 0 | 3,800 |
| 67-72-1 | Hexachloroethane | 1,670,000 | 0 | 508,000 | 39,000 |
| 302-01-2 | Hydrazine | 30,300 | 3 | 0 | 38,000 |
| 10034-93-2 | Hydrazine sulfate | 0 | 0 | 0 | 0 |
| 7647-01-0 | Hydrochloric acid | 115,138,071 | 69,481,240 | 3,600 | 1,738 |
| 74-90-8 | Hydrogen cyanide | 59,247 | 0 | 22,589,396 | 18 |
| 7664-39-3 | Hydrogen fluoride | 90,063,658 | 338,535 | 6,250 | 640 |
| 123-31-9 | Hydroquinone | 103,615 | 0 | 109,953 | 4,132 |
| 78-84-2 | Isobutyraldehyde | 900,000 | 0 | 2,057,865 | 563,277 |
| 67-63-0 | Isopropyl alcohol (manufacturing) | 142,915 | 40,661 | 6,971,566 | 266,982 |

| Chemical | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| 1,2-Dichloroethylene | 4,685,579 | 149 | 41,971 | 6,885,881 | 2,830 |
| Dichloromethane | 34,185,873 | 10,528,620 | 80,189,944 | 353,573,941 | 490,093 |
| 2,4-Dichlorophenol | 198,451 | 0 | 34,198 | 1,929,255 | 581 |
| 1,2-Dichloropropane | 4,512,537 | 6,852 | 789,405 | 47,379,810 | 4 |
| 2,3-Dichloropropene | 338,000 | 450,000 | 12,206 | 2,490,206 | 0 |
| 1,3-Dichloropropylene | 250,577 | 920 | 20,521 | 19,821,018 | 96 |
| Dichlorotetrafluoroethane (CFC-114) | 35,000 | 14,000 | 1,914,392 | 4,402,567 | 7,007 |
| Dichlorvos | 18 | 2,215 | 1,530 | 3,778 | 0 |
| Dicofol | 0 | 12 | 5 | 51 | 0 |
| Diepoxybutane | 0 | 0 | 0 | 68,000 | 0 |
| Diethanolamine | 3,587,721 | 1,544,975 | 1,291,566 | 296,908,057 | 2,005 |
| Di-(2-ethylhexyl) phthalate | 474,892 | 178,949 | 2,110,679 | 5,218,697 | 11,777 |
| Diethyl phthalate | 365,207 | 490,833 | 196,670 | 1,735,803 | 2,400 |
| Diethyl sulfate | 7,498 | 1,139 | 4,322 | 7,113,009 | 0 |
| 3,3'-Dimethoxybenzidine | 40 | 0 | 4 | 44 | 0 |
| 1,1-Dimethyl hydrazine | 3,097 | 6,338 | 489 | 9,927 | 1 |
| 2,4-Dimethylphenol | 142,070 | 3,221 | 112,759 | 1,534,059 | 213 |
| Dimethyl phthalate | 231,068 | 90,983 | 119,519 | 1,107,970 | 450 |
| Dimethyl sulfate | 1,185,665 | 12 | 9,599 | 1,195,276 | 0 |
| m-Dinitrobenzene | 756,855 | 0 | 1,628 | 758,483 | 25,522 |
| o-Dinitrobenzene | 203,312 | 0 | 693 | 204,005 | 3 |
| p-Dinitrobenzene | 26,713 | 0 | 162 | 26,875 | 2 |
| 4,6-Dinitro-o-cresol | 30,080 | 26,500 | 11,549 | 391,067 | 10 |
| 2,4-Dinitrophenol | 239,323 | 30 | 64,710 | 344,066 | 0 |
| 2,4-Dinitrotoluene | 181,970 | 700 | 8,641 | 532,311 | 0 |
| 2,6-Dinitrotoluene | 90,500 | 178 | 2,200 | 92,878 | 0 |
| Dinitrotoluene (mixed isomers) | 239,804 | 901,789 | 75,248 | 1,356,841 | 4 |
| n-Dioctyl phthalate | 22,104 | 22,888 | 132,373 | 377,817 | 330 |
| 1,4-Dioxane | 1,532,321 | 792,119 | 1,103,776 | 4,237,275 | 57 |
| Epichlorohydrin | 12,451,808 | 926,506 | 478,344 | 21,276,262 | 1,747 |
| 2-Ethoxyethanol | 1,194,976 | 231,883 | 664,408 | 4,595,027 | 79,509 |
| Ethyl acrylate | 711,507 | 177,569 | 252,163 | 7,786,104 | 6,400 |
| Ethylbenzene | 9,448,914 | 1,051,964 | 9,565,158 | 110,384,039 | 54,164 |
| Ethyl chloroformate | 78,075 | 390 | 1,801 | 81,466 | 0 |
| Ethylene | 408,736,057 | 897,766 | 37,235,717 | 1,251,836,786 | 967,102 |
| Ethylene glycol | 151,084,348 | 72,211,672 | 23,950,078 | 650,968,971 | 429,786 |
| Ethylene oxide | 5,588,024 | 66,365 | 1,899,453 | 8,264,529 | 19,926 |
| Ethylene thiourea | 10 | 1,862 | 16,053 | 18,759 | 0 |
| Fluometuron | 0 | 12,450 | 1,950 | 14,400 | 15,000 |
| Formaldehyde | 95,071,775 | 4,268,664 | 17,446,887 | 284,018,924 | 701,388 |
| Freon 113 | 12,454,301 | 1,034,760 | 33,589,244 | 94,618,254 | 51,871 |
| Heptachlor | 0 | 4 | 1 | 5 | 0 |
| Hexachlorobenzene | 3,376,840 | 342,241 | 1,138,670 | 5,547,752 | 2,219 |
| Hexachloro-1,3-butadiene | 9,995,723 | 1,709,381 | 8,607 | 12,279,711 | 450,005 |
| Hexachlorocyclopentadiene | 178,000 | 28,718 | 28,415 | 238,933 | 50 |
| Hexachloroethane | 4,554,946 | 165,944 | 37,403 | 6,975,293 | 45,034 |
| Hydrazine | 98,075 | 18,925 | 32,146 | 217,449 | 0 |
| Hydrazine sulfate | 0 | 0 | 150,002 | 150,002 | 0 |
| Hydrochloric acid | 1,987,515,900 | 56,241,684 | 285,888,060 | 2,514,270,293 | 554,365 |
| Hydrogen cyanide | 7,404,268 | 176 | 2,202,588 | 32,255,693 | 807 |
| Hydrogen fluoride | 124,400,903 | 2,482,376 | 9,839,263 | 227,131,625 | 5,009 |
| Hydroquinone | 396,182 | 398,008 | 285,742 | 1,297,632 | 115 |
| Isobutyraldehyde | 285,896 | 71,754 | 189,000 | 4,067,792 | 8 |
| Isopropyl alcohol (manufacturing) | 6,224,655 | 105,524 | 1,487,258 | 15,239,561 | 34,768 |

Table 2-5. TRI Data Collected under the Pollution Prevention Act, by Chemical, 1991, Continued.

| CAS Number | Chemical | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|---|
| 80-05-7 | 4,4'-Isopropylidenediphenol | 3,424 | 18,337 | 12,260,865 | 85,974 |
| 120-58-1 | Isosafrole | 0 | 0 | 0 | 0 |
| 7439-92-1 | Lead | 107,175,655 | 48,534,922 | 0 | 14,746 |
| 58-89-9 | Lindane | 518 | 0 | 0 | 0 |
| 108-31-6 | Maleic anhydride | 130,130 | 47 | 2,370,836 | 36,390 |
| 12427-38-2 | Maneb | 326 | 0 | 0 | 0 |
| 7439-96-5 | Manganese | 17,237,590 | 68,197,746 | 0 | 3,004 |
| 7439-97-6 | Mercury | 1,236,162 | 210,434 | 0 | 0 |
| 67-56-1 | Methanol | 755,239,883 | 15,026,446 | 346,497,993 | 71,372,795 |
| 72-43-5 | Methoxychlor | 0 | 0 | 0 | 0 |
| 109-86-4 | 2-Methoxyethanol | 3,858,560 | 8,289 | 1,411,613 | 725,921 |
| 96-33-3 | Methyl acrylate | 0 | 13,000 | 260,324 | 180,737 |
| 1634-04-4 | Methyl tert-butyl ether | 448,194 | 10,918 | 230,000 | 990,370 |
| 101-14-4 | 4,4'-Methylenebis(2-chloroaniline) | 0 | 0 | 0 | 2,965 |
| 101-68-8 | Methylenebis(phenylisocyanate) | 26,556 | 422,735 | 112,824 | 72,373 |
| 74-95-3 | Methylene bromide | 2,000,000 | 0 | 0 | 0 |
| 101-77-9 | 4,4'-Methylenedianiline | 2,000 | 0 | 33,024 | 28,000 |
| 78-93-3 | Methyl ethyl ketone | 864,307,237 | 24,888,298 | 94,341,416 | 38,424,594 |
| 60-34-4 | Methyl hydrazine | 0 | 0 | 0 | 0 |
| 74-88-4 | Methyl iodide | 30 | 0 | 2,500 | 0 |
| 108-10-1 | Methyl isobutyl ketone | 184,837,606 | 17,952,566 | 36,906,508 | 19,306,703 |
| 624-83-9 | Methyl isocyanate | 0 | 0 | 0 | 0 |
| 80-62-6 | Methyl methacrylate | 56,882,336 | 518,077 | 3,570,890 | 1,496,143 |
| 90-94-8 | Michler's ketone | 0 | 0 | 0 | 703 |
| 1313-27-5 | Molybdenum trioxide | 5,503,205 | 2,707,629 | 0 | 12 |
| 76-15-3 | Monochloropentafluoroethane (CFC-115) | 28,300 | 0 | 0 | 0 |
| 91-20-3 | Naphthalene | 10,909,619 | 334,569 | 3,920,377 | 1,496,297 |
| 134-32-7 | alpha-Naphthylamine | 0 | 0 | 0 | 0 |
| 7440-02-0 | Nickel | 25,335,425 | 54,080,127 | 0 | 5,382 |
| 7697-37-2 | Nitric acid | 273,024,584 | 2,510,301 | 0 | 620 |
| 139-13-9 | Nitrilotriacetic acid | 0 | 0 | 0 | 0 |
| 99-59-2 | 5-Nitro-o-anisidine | 0 | 0 | 0 | 0 |
| 98-95-3 | Nitrobenzene | 2,878,230 | 0 | 4,507,114 | 424,004 |
| 55-63-0 | Nitroglycerin | 24,711 | 0 | 0 | 8 |
| 88-75-5 | 2-Nitrophenol | 0 | 0 | 0 | 0 |
| 100-02-7 | 4-Nitrophenol | 0 | 0 | 2,000 | 0 |
| 79-46-9 | 2-Nitropropane | 0 | 5,400 | 2,213,299 | 12,804 |
| 156-10-5 | p-Nitrosodiphenylamine | 0 | 0 | 18,000 | 2,200 |
| 121-69-7 | N,N-Dimethylaniline | 43,692 | 0 | 0 | 489,869 |
| 86-30-6 | N-Nitrosodiphenylamine | 0 | 0 | 0 | 0 |
| 56-38-2 | Parathion | 130 | 0 | 0 | 0 |
| 87-86-5 | Pentachlorophenol | 52,221 | 2,001 | 7,800 | 1,189,577 |
| 79-21-0 | Peracetic acid | 21,060 | 0 | 0 | 0 |
| 108-95-2 | Phenol | 66,093,239 | 992,279 | 23,114,311 | 1,490,413 |
| 106-50-3 | p-Phenylenediamine | 0 | 0 | 0 | 0 |
| 90-43-7 | 2-Phenylphenol | 0 | 0 | 27 | 31 |
| 75-44-5 | Phosgene | 0 | 0 | 100,128 | 0 |
| 7664-38-2 | Phosphoric acid | 42,654,131 | 10,463,531 | 7,463 | 14,472 |
| 7723-14-0 | Phosphorus (yellow or white) | 793,608 | 194,690 | 0 | 0 |
| 85-44-9 | Phthalic anhydride | 1,804,546 | 0 | 3,396,807 | 4,561,112 |
| 88-89-1 | Picric acid | 0 | 0 | 43,003 | 35,000 |
| 1336-36-3 | Polychlorinated biphenyls (PCBs) | 0 | 0 | 0 | 0 |
| 123-38-6 | Propionaldehyde | 68,517 | 0 | 2,577,021 | 0 |
| 114-26-1 | Propoxur | 0 | 0 | 0 | 0 |

| Chemical | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| 4,4'-Isopropylidenediphenol | 2,187,911 | 91,425 | 1,075,149 | 15,723,085 | 13,300 |
| Isosafrole | 0 | 2 | 2 | 4 | 0 |
| Lead | 2,193,348 | 1,509,856 | 9,393,695 | 168,822,222 | 154,451 |
| Lindane | 1,500 | 213 | 393 | 2,624 | 100 |
| Maleic anhydride | 28,501,365 | 699,649 | 463,004 | 32,201,421 | 5,541 |
| Maneb | 3,600 | 0 | 413 | 4,339 | 0 |
| Manganese | 1,568,413 | 989,270 | 22,633,135 | 110,629,158 | 7,342 |
| Mercury | 28,356 | 46,079 | 83,333 | 1,604,364 | 5,279 |
| Methanol | 908,629,441 | 113,696,524 | 274,052,271 | 2,484,515,353 | 460,732 |
| Methoxychlor | 133 | 161 | 105 | 399 | 0 |
| 2-Methoxyethanol | 5,596,958 | 788,769 | 2,189,282 | 14,579,392 | 717 |
| Methyl acrylate | 1,289,503 | 42,452 | 242,592 | 2,028,608 | 42,054 |
| Methyl tert-butyl ether | 843,536 | 143,168 | 2,906,134 | 5,572,320 | 11,435 |
| 4,4'-Methylenebis(2-chloroaniline) | 10 | 386 | 1,113 | 4,474 | 0 |
| Methylenebis(phenylisocyanate) | 255,941 | 613,229 | 1,958,277 | 3,461,935 | 5,814 |
| Methylene bromide | 285,224 | 5,417 | 51,207 | 2,341,848 | 0 |
| 4,4'-Methylenedianiline | 356,543 | 33,088 | 57,976 | 510,631 | 33 |
| Methyl ethyl ketone | 45,423,894 | 7,757,468 | 102,309,424 | 1,177,452,331 | 164,607 |
| Methyl hydrazine | 16 | 0 | 0 | 16 | 0 |
| Methyl iodide | 43,630 | 5 | 25,765 | 71,930 | 0 |
| Methyl isobutyl ketone | 11,765,185 | 2,532,919 | 28,194,835 | 301,496,322 | 57,244 |
| Methyl isocyanate | 167,410 | 0 | 22,641 | 190,051 | 1 |
| Methyl methacrylate | 3,457,755 | 764,346 | 3,108,407 | 69,797,954 | 12,248 |
| Michler's ketone | 0 | 0 | 3 | 706 | 0 |
| Molybdenum trioxide | 1,229,356 | 282,842 | 755,171 | 10,478,215 | 0 |
| Monochloropentafluoroethane (CFC-115) | 61,000 | 0 | 362,770 | 452,070 | 7 |
| Naphthalene | 20,313,626 | 636,042 | 5,110,251 | 42,720,781 | 403,721 |
| alpha-Naphthylamine | 0 | 0 | 2 | 2 | 0 |
| Nickel | 1,769,176 | 1,252,338 | 3,498,010 | 85,940,458 | 4,127 |
| Nitric acid | 193,661,500 | 26,691,465 | 29,235,035 | 525,123,505 | 51,652 |
| Nitrilotriacetic acid | 804,340 | 0 | 12,000 | 816,340 | 1 |
| 5-Nitro-o-anisidine | 48 | 3 | 52 | 103 | 0 |
| Nitrobenzene | 328,302 | 40,147 | 523,517 | 8,701,314 | 61,146 |
| Nitroglycerin | 357,420 | 92,807 | 40,809 | 515,755 | 0 |
| 2-Nitrophenol | 41,616 | 11,340 | 263 | 53,219 | 99 |
| 4-Nitrophenol | 114,000 | 581,307 | 10,130 | 707,437 | 0 |
| 2-Nitropropane | 29,921 | 2,837 | 276,365 | 2,540,626 | 0 |
| p-Nitrosodiphenylamine | 0 | 0 | 4,724 | 24,924 | 0 |
| N,N-Dimethylaniline | 202,500 | 271,018 | 100,848 | 1,107,927 | 1 |
| N-Nitrosodiphenylamine | 0 | 470,000 | 0 | 470,000 | 0 |
| Parathion | 24 | 100 | 2,097 | 2,351 | 10 |
| Pentachlorophenol | 14,799 | 66,021 | 23,540 | 1,355,959 | 148 |
| Peracetic acid | 16,478 | 49 | 6,148 | 43,735 | 0 |
| Phenol | 23,424,780 | 5,939,412 | 13,151,029 | 134,205,463 | 64,523 |
| p-Phenylenediamine | 233,372 | 2,989 | 20,402 | 256,763 | 0 |
| 2-Phenylphenol | 9,786 | 2,944 | 11,740 | 24,528 | 0 |
| Phosgene | 7,277,282 | 1,695 | 4,988 | 7,384,093 | 376 |
| Phosphoric acid | 388,737,290 | 5,591,044 | 166,538,605 | 614,006,536 | 93,946 |
| Phosphorus (yellow or white) | 35,671 | 3,339 | 364,462 | 1,391,770 | 248 |
| Phthalic anhydride | 14,084,952 | 375,666 | 740,274 | 24,963,357 | 254,523 |
| Picric acid | 1,500 | 465 | 1,634,501 | 1,714,469 | 0 |
| Polychlorinated biphenyls (PCBs) | 2,422,736 | 412,339 | 12,949 | 2,848,024 | 801 |
| Propionaldehyde | 973,343 | 13,172 | 1,456,534 | 5,088,587 | 3,125 |
| Propoxur | 30 | 41 | 120 | 191 | 0 |

**Table 2-5. TRI Data Collected under the Pollution Prevention Act, by Chemical, 1991, Continued.**

| CAS Number | Chemical | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|---|
| 115-07-1 | Propylene | 423,397,754 | 400 | 710,551,553 | 2,888,300 |
| 75-55-8 | Propyleneimine | 0 | 0 | 0 | 0 |
| 75-56-9 | Propylene oxide | 66,250 | 490 | 11,839,820 | 1,356,901 |
| 110-86-1 | Pyridine | 4,853,632 | 0 | 764,655 | 198,462 |
| 91-22-5 | Quinoline | 8,292 | 0 | 236,001 | 1,307 |
| 106-51-4 | Quinone | 0 | 0 | 73,530 | 0 |
| 82-68-8 | Quintozene | 1,399 | 0 | 0 | 0 |
| 81-07-2 | Saccharin (manufacturing) | 0 | 0 | 0 | 0 |
| 7782-49-2 | Selenium | 275 | 46,378 | 0 | 0 |
| 7440-22-4 | Silver | 961,016 | 1,061,670 | 0 | 0 |
| 100-42-5 | Styrene | 175,897,839 | 2,051,733 | 28,800,292 | 8,343,383 |
| 96-09-3 | Styrene oxide | 2,210 | 0 | 75,000 | 0 |
| 7664-93-9 | Sulfuric acid | 2,971,421,150 | 1,168,804,572 | 63,405 | 27,466 |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 7,000,896 | 852,909 | 1,000,000 | 32,000 |
| 127-18-4 | Tetrachloroethylene | 118,584,078 | 9,035,196 | 4,013,084 | 1,504,622 |
| 961-11-5 | Tetrachlorvinphos | 0 | 0 | 0 | 0 |
| 7440-28-0 | Thallium | 109 | 0 | 0 | 0 |
| 62-55-5 | Thioacetamide | 0 | 0 | 0 | 0 |
| 62-56-6 | Thiourea | 0 | 335 | 0 | 0 |
| 1314-20-1 | Thorium dioxide | 0 | 0 | 0 | 0 |
| 7550-45-0 | Titanium tetrachloride | 0 | 0 | 0 | 3,688 |
| 108-88-3 | Toluene | 1,118,482,253 | 24,557,245 | 254,980,246 | 86,805,609 |
| 584-84-9 | Toluene-2,4-diisocyanate | 855 | 10,948 | 35,394 | 26,931 |
| 91-08-7 | Toluene-2,6-diisocyanate | 68 | 1,800 | 8,849 | 10 |
| 26471-62-5 | Toluenediisocyanate (mixed isomers) | 9,710 | 11,129 | 7,000,396 | 17,949 |
| 95-53-4 | o-Toluidine | 1,130,001 | 0 | 193,880 | 161,600 |
| 52-68-6 | Trichlorfon | 90 | 0 | 0 | 0 |
| 120-82-1 | 1,2,4-Trichlorobenzene | 48,567 | 153,144 | 2,115,121 | 84,043 |
| 71-55-6 | 1,1,1-Trichloroethane | 204,077,933 | 28,751,600 | 14,001,816 | 3,913,519 |
| 79-00-5 | 1,1,2-Trichloroethane | 12,500,000 | 7,917,850 | 12,897,170 | 0 |
| 79-01-6 | Trichloroethylene | 253,517,471 | 7,446,327 | 6,188,130 | 1,045,752 |
| 75-69-4 | Trichlorofluoromethane (CFC-11) | 51,196,415 | 169,952 | 0 | 135,077 |
| 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 | 1,320 | 0 | 0 | 0 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 10,579,279 | 517,663 | 2,872,790 | 1,840,129 |
| 51-79-6 | Urethane | 0 | 0 | 0 | 0 |
| 7440-62-2 | Vanadium (fume or dust) | 204,000 | 149,573 | 0 | 0 |
| 108-05-4 | Vinyl acetate | 268,332 | 22 | 18,299,865 | 3,662,152 |
| 593-60-2 | Vinyl bromide | 0 | 0 | 0 | 0 |
| 75-01-4 | Vinyl chloride | 158,902,260 | 236,549 | 26,360,193 | 0 |
| 75-35-4 | Vinylidene chloride | 583,500 | 0 | 177,709 | 0 |
| 1330-20-7 | Xylene (mixed isomers) | 203,232,878 | 33,656,703 | 176,910,275 | 75,074,433 |
| 108-38-3 | m-Xylene | 1,317,099 | 32,989 | 515,889 | 66,612 |
| 95-47-6 | o-Xylene | 1,590,087 | 10,350 | 39,605,761 | 2,803,861 |
| 106-42-3 | p-Xylene | 940,964 | 1,265 | 104,776 | 111,936 |
| 87-62-7 | 2,6-Xylidine | 0 | 0 | 0 | 0 |
| 7440-66-6 | Zinc (fume or dust) | 14,301,992 | 63,661,338 | 0 | 108,822 |
| 12122-67-7 | Zineb | 0 | 0 | 0 | 0 |
| | Antimony compounds | 4,190,189 | 2,114,000 | 0 | 75,602 |
| | Arsenic compounds | 3,376,528 | 949,028 | 0 | 141 |
| | Barium compounds | 18,378,282 | 999,880 | 6,102 | 253,297 |
| | Beryllium compounds | 22,000 | 7,210 | 0 | 0 |
| | Cadmium compounds | 3,791,460 | 1,790,381 | 0 | 7,504 |

| Chemical | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| Propylene | 464,419,038 | 724,123 | 21,564,865 | 1,623,546,033 | 1,805,211 |
| Propyleneimine | 95 | 0 | 413 | 508 | 0 |
| Propylene oxide | 6,728,657 | 21,831 | 1,086,594 | 21,100,543 | 17,954 |
| Pyridine | 2,007,022 | 366,441 | 576,810 | 8,767,022 | 353 |
| Quinoline | 31,065 | 4,310 | 71,570 | 352,545 | 73 |
| Quinone | 151,600 | 0 | 4,004 | 229,134 | 0 |
| Quintozene | 0 | 61,410 | 1,361 | 64,170 | 0 |
| Saccharin (manufacturing) | 10,000 | 370 | 1,400 | 11,770 | 0 |
| Selenium | 4,074 | 810 | 5,221 | 56,758 | 0 |
| Silver | 724,317 | 1,719 | 126,314 | 2,875,036 | 0 |
| Styrene | 9,494,938 | 3,122,162 | 28,884,115 | 256,594,462 | 442,670 |
| Styrene oxide | 43,932 | 0 | 1,571 | 122,713 | 0 |
| Sulfuric acid | 2,733,731,874 | 261,105,871 | 283,483,678 | 7,418,638,016 | 9,903,100 |
| 1,1,2,2-Tetrachloroethane | 17,463,961 | 180,608 | 65,768 | 26,596,142 | 10 |
| Tetrachloroethylene | 15,284,084 | 3,305,286 | 16,407,683 | 168,134,033 | 221,631 |
| Tetrachlorvinphos | 0 | 26,300 | 6,882 | 33,182 | 0 |
| Thallium | 5,298 | 0 | 985 | 6,392 | 0 |
| Thioacetamide | 31,000 | 0 | 0 | 31,000 | 0 |
| Thiourea | 756 | 12,666 | 18,798 | 32,555 | 0 |
| Thorium dioxide | 0 | 0 | 102,749 | 102,749 | 0 |
| Titanium tetrachloride | 24,931,111 | 2,133,598 | 243,074 | 27,311,471 | 3,607 |
| Toluene | 128,268,450 | 13,865,706 | 196,784,903 | 1,823,744,412 | 666,612 |
| Toluene-2,4-diisocyanate | 13,606 | 37,526 | 1,467,006 | 1,592,266 | 894 |
| Toluene-2,6-diisocyanate | 1,291 | 6,085 | 364,476 | 382,579 | 223 |
| Toluenediisocyanate (mixed isomers) | 12,676 | 207,730 | 38,400 | 7,297,990 | 10,673 |
| o-Toluidine | 116,413 | 12,086 | 39,916 | 1,653,896 | 1,328 |
| Trichlorfon | 219 | 1,145 | 141 | 1,595 | 13 |
| 1,2,4-Trichlorobenzene | 592,603 | 424,563 | 486,669 | 3,904,710 | 1,515 |
| 1,1,1-Trichloroethane | 3,047,769 | 5,253,041 | 132,160,136 | 391,205,814 | 293,081 |
| 1,1,2-Trichloroethane | 30,737,565 | 5,358,381 | 538,029 | 69,948,995 | 3,629 |
| Trichloroethylene | 4,886,629 | 2,630,021 | 34,532,204 | 310,246,534 | 161,449 |
| Trichlorofluoromethane (CFC-11) | 158,292 | 180,035 | 11,935,150 | 63,774,921 | 60,800 |
| 2,4,5-Trichlorophenol | 28,000 | 0 | 0 | 28,000 | 0 |
| 2,4,6-Trichlorophenol | 742,684 | 0 | 82 | 742,766 | 0 |
| Trifluralin | 1,950 | 25,265 | 64,959 | 93,494 | 224 |
| 1,2,4-Trimethylbenzene | 8,418,511 | 342,982 | 5,379,986 | 29,951,340 | 17,810 |
| Urethane | 0 | 15,300 | 5,300 | 20,600 | 2,500 |
| Vanadium (fume or dust) | 198,589 | 860 | 488,049 | 1,041,071 | 0 |
| Vinyl acetate | 8,987,168 | 283,756 | 8,743,998 | 40,245,293 | 23,884 |
| Vinyl bromide | 330,000 | 0 | 3,600 | 333,600 | 0 |
| Vinyl chloride | 34,888,514 | 130,526 | 1,017,049 | 221,535,091 | 51,456 |
| Vinylidene chloride | 4,374,008 | 74,619 | 270,541 | 5,480,377 | 1,327 |
| Xylene (mixed isomers) | 32,953,777 | 11,623,545 | 114,334,033 | 647,785,644 | 615,512 |
| m-Xylene | 503,442 | 107,184 | 1,533,942 | 4,077,157 | 3,779 |
| o-Xylene | 15,579,611 | 205,507 | 1,728,058 | 61,523,235 | 11,842 |
| p-Xylene | 143,558 | 58,749 | 5,368,692 | 6,729,940 | 2,029 |
| 2,6-Xylidine | 1,384 | 0 | 12 | 1,396 | 0 |
| Zinc (fume or dust) | 1,078,882 | 2,600,684 | 14,974,953 | 96,726,671 | 50,838 |
| Zineb | 0 | 2 | 10 | 12 | 0 |
| Antimony compounds | 12,841,148 | 246,743 | 3,227,554 | 22,695,236 | 124,398 |
| Arsenic compounds | 391,058 | 500,470 | 4,149,954 | 9,367,179 | 16,200 |
| Barium compounds | 2,669,418 | 3,749,327 | 20,086,332 | 46,142,638 | 73,471 |
| Beryllium compounds | 0 | 611 | 31,801 | 61,622 | 0 |
| Cadmium compounds | 410,413 | 301,489 | 637,968 | 6,939,215 | 114,033 |

**Table 2-5. TRI Data Collected under the Pollution Prevention Act, by Chemical, 1991, Continued.**

| CAS Number | Chemical | Recycled On-site Pounds | Recycled Off-site Pounds | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds |
|---|---|---|---|---|---|
| | Chlorophenols | 2,007,786 | 0 | 21,000 | 4,273 |
| | Chromium compounds | 52,384,427 | 28,022,971 | 0 | 74,778 |
| | Cobalt compounds | 539,577 | 1,296,538 | 2 | 2,630 |
| | Copper compounds | 62,522,745 | 114,991,063 | 40 | 225,860 |
| | Cyanide compounds | 3,756,207 | 38,280 | 260,040 | 6 |
| | Glycol ethers | 17,576,034 | 3,978,151 | 21,932,134 | 12,472,029 |
| | Lead compounds | 666,910,750 | 224,964,761 | 116,475 | 55,085 |
| | Manganese compounds | 34,748,470 | 29,413,152 | 0 | 36,002 |
| | Mercury compounds | 46,763 | 63,813 | 0 | 3,241 |
| | Nickel compounds | 23,266,310 | 24,657,694 | 0 | 4,247 |
| | Selenium compounds | 146,320 | 22,910 | 0 | 0 |
| | Silver compounds | 1,711,699 | 1,195,554 | 0 | 0 |
| | Thallium compounds | 1,000 | 1,500 | 0 | 0 |
| | Zinc compounds | 218,519,583 | 155,616,570 | 260,584 | 558,574 |
| | Mixtures and other trade names | 32,801 | 1,573,309 | 126,272,110 | 768 |
| | Trade Secrets(e) | 900,000,000 | 30,000 | 390,000 | 2,000 |
| | Total | 16,379,108,682 | 3,261,980,931 | 3,186,795,733 | 497,757,471 |

| Chemical | Treated On-site Pounds | Treated Off-site Pounds | Quantity Released(b) Pounds | Total Production Related Wastes(c) Pounds | Non-Production Related Wastes(d) Pounds |
|---|---|---|---|---|---|
| Chlorophenols | 1,407 | 105,675 | 235,854 | 2,375,995 | 1 |
| Chromium compounds | 34,025,419 | 3,000,271 | 34,767,990 | 152,275,856 | 287,078 |
| Cobalt compounds | 1,210,890 | 115,275 | 482,193 | 3,647,105 | 5,337 |
| Copper compounds | 101,927,104 | 1,961,933 | 46,287,976 | 327,916,721 | 389,649 |
| Cyanide compounds | 43,123,280 | 418,798 | 4,852,857 | 52,449,468 | 2,701 |
| Glycol ethers | 19,168,317 | 9,276,458 | 46,952,235 | 131,355,358 | 441,221 |
| Lead compounds | 40,049,865 | 4,209,180 | 26,062,277 | 962,368,393 | 676,323 |
| Manganese compounds | 572,185 | 8,544,482 | 85,599,347 | 158,913,638 | 4,302,300 |
| Mercury compounds | 7,497 | 18,718 | 15,453 | 155,485 | 20 |
| Nickel compounds | 17,776,097 | 1,340,727 | 5,210,092 | 72,255,167 | 141,331 |
| Selenium compounds | 65,000 | 48,943 | 126,351 | 409,524 | 34 |
| Silver compounds | 587,032 | 1,784 | 612,297 | 4,108,366 | 292 |
| Thallium compounds | 0 | 0 | 1,000 | 3,500 | 0 |
| Zinc compounds | 124,287,132 | 21,298,188 | 153,846,469 | 674,387,100 | 648,431 |
| Mixtures and other trade names | 173,799 | 480,353 | 529,678 | 129,062,818 | 100,304 |
| Trade Secrets | 600,000 | 25,054 | 10,848 | 901,057,902 | 0 |
| Total | 9,783,374,620 | 874,285,432 | 3,771,194,892 | 37,754,497,761 | 31,451,032 |

Tables 2-6 through 2-9 show the top 25 toxic chemicals (by quantity) in each category of the waste management hierarchy: recycle; energy recovery; treatment; and release (including disposal). Sulfuric acid was reported as recycled in the greatest quantity, both on-site and off-site. Propylene was reported as combusted in the greatest quantity for the purposes of energy recovery in total as well as on-site. Toluene (#4 overall) was reported as transferred off-site for the purposes of energy recovery in the greatest quantity. Sulfuric acid was reported as the greatest quantity treated, both on-site and off-site. The top 25 chemicals released (including off-site disposal) are listed in Table 2-9. Comparing this group of chemicals to the top 50 chemicals released on-site shows that these 25 include the top 22 released on-site (presented in Table 1-10 in Chapter 1). The relative rankings are different due to the inclusion of off-site disposal in the quantities released as presented in this chapter.

Table 2-6. Top 25 TRI Chemicals Reported as Recycled, 1991.

| CAS Number | Chemical | Recycled On-site Pounds | Recycled Off-site Pounds | Total Recycled Pounds |
|---|---|---|---|---|
| 7664-93-9 | Sulfuric acid | 2,971,421,150 | 1,168,804,572 | 4,140,225,722 |
| 75-05-8 | Acetonitrile | 2,421,520,190 | 5,153,900 | 2,426,674,090 |
| 108-88-3 | Toluene | 1,118,482,253 | 24,557,245 | 1,143,039,498 |
| 7440-50-8 | Copper | 584,266,533 | 350,356,528 | 934,623,061 |
| | Trade Secrets(e) | 900,000,000 | 30,000 | 900,030,000 |
| | Lead compounds | 666,910,750 | 224,964,761 | 891,875,511 |
| 78-93-3 | Methyl ethyl ketone | 864,307,237 | 24,888,298 | 889,195,535 |
| 67-56-1 | Methanol | 755,239,883 | 15,026,446 | 770,266,329 |
| 115-07-1 | Propylene | 423,397,754 | 400 | 423,398,154 |
| 107-21-1 | Ethylene glycol | 304,686,059 | 89,881,367 | 394,567,426 |
| | Zinc compounds | 218,519,583 | 155,616,570 | 374,136,153 |
| 74-85-1 | Ethylene | 373,576,147 | 0 | 373,576,147 |
| 111-42-2 | Diethanolamine | 129,475 | 290,162,457 | 290,291,932 |
| 67-64-1 | Acetone | 268,728,692 | 18,262,490 | 286,991,182 |
| 7697-37-2 | Nitric acid | 273,024,584 | 2,510,301 | 275,534,885 |
| 106-99-0 | 1,3-Butadiene | 250,467,140 | 18,124,104 | 268,591,244 |
| 7664-41-7 | Ammonia | 258,127,545 | 7,697,327 | 265,824,872 |
| 79-01-6 | Trichloroethylene | 253,517,471 | 7,446,327 | 260,963,798 |
| 1330-20-7 | Xylene (mixed isomers) | 203,232,878 | 33,656,703 | 236,889,581 |
| 71-55-6 | 1,1,1-Trichloroethane | 204,077,933 | 28,751,600 | 232,829,533 |
| 75-09-2 | Dichloromethane | 182,108,296 | 26,224,925 | 208,333,221 |
| 108-10-1 | Methyl isobutyl ketone | 184,837,606 | 17,952,566 | 202,790,172 |
| 71-43-2 | Benzene | 196,393,605 | 1,414,752 | 197,808,357 |
| 7647-01-0 | Hydrochloric acid | 115,138,071 | 69,481,240 | 184,619,311 |
| 100-42-5 | Styrene | 175,897,839 | 2,051,733 | 177,949,572 |
| | Subtotal | 14,168,008,674 | 2,583,016,612 | 16,751,025,286 |
| | Total for All TRI Chemicals | 16,379,108,682 | 3,261,980,931 | 19,641,089,613 |

Table 2-7. Top 25 TRI Chemicals Reported as Combusted for Energy Recovery, 1991.

| CAS Number | Chemical | Energy Recovery On-site Pounds | Energy Recovery Off-site Pounds | Total Energy Recovery Pounds |
|---|---|---|---|---|
| 115-07-1 | Propylene | 710,551,553 | 2,888,300 | 713,439,853 |
| 74-85-1 | Ethylene | 413,351,136 | 18,039,963 | 431,391,099 |
| 67-56-1 | Methanol | 346,497,993 | 71,372,795 | 417,870,788 |
| 108-88-3 | Toluene | 254,980,246 | 86,805,609 | 341,785,855 |
| 1330-20-7 | Xylene (mixed isomers) | 176,910,275 | 75,074,433 | 251,984,708 |
| 67-64-1 | Acetone | 134,433,568 | 42,758,635 | 177,192,203 |
| 78-93-3 | Methyl ethyl ketone | 94,341,416 | 38,424,594 | 132,766,010 |
| | Mixtures and other trade names | 126,272,110 | 768 | 126,272,878 |
| 106-99-0 | 1,3-Butadiene | 77,705,621 | 47,154 | 77,752,775 |
| 100-41-4 | Ethylbenzene | 64,124,373 | 8,890,416 | 73,014,789 |
| 75-65-0 | tert-Butyl alcohol | 43,721,233 | 26,858,983 | 70,580,216 |
| 108-10-1 | Methyl isobutyl ketone | 36,906,508 | 19,306,703 | 56,213,211 |
| 95-47-6 | o-Xylene | 39,605,761 | 2,803,861 | 42,409,622 |
| 7664-41-7 | Ammonia | 40,686,457 | 337,774 | 41,024,231 |
| 71-43-2 | Benzene | 33,714,288 | 4,932,365 | 38,646,653 |
| 100-42-5 | Styrene | 28,800,292 | 8,343,383 | 37,143,675 |
| 71-36-3 | n-Butyl alcohol | 27,563,365 | 8,139,497 | 35,702,862 |
| | Glycol ethers | 21,932,134 | 12,472,029 | 34,404,163 |
| 107-06-2 | 1,2-Dichloroethane | 33,544,750 | 342,418 | 33,887,168 |
| 120-80-9 | Catechol | 31,816,947 | 308,304 | 32,125,251 |
| 75-05-8 | Acetonitrile | 27,510,882 | 2,776,771 | 30,287,653 |
| 75-01-4 | Vinyl chloride | 26,360,193 | 0 | 26,360,193 |
| 108-95-2 | Phenol | 23,114,311 | 1,490,413 | 24,604,724 |
| 74-90-8 | Hydrogen cyanide | 22,589,396 | 18 | 22,589,414 |
| 108-05-4 | Vinyl acetate | 18,299,865 | 3,662,152 | 21,962,017 |
| | Subtotal | 2,855,334,673 | 436,077,338 | 3,291,412,011 |
| | Total for All TRI Chemicals | 3,186,795,733 | 497,757,471 | 3,684,553,204 |

**Table 2-8. Top 25 TRI Chemicals Reported as Treated, 1991.**

| CAS Number | Chemical | Treated On-site Pounds | Treated Off-site Pounds | Total Treated Pounds |
|---|---|---|---|---|
| 7664-93-9 | Sulfuric acid | 2,733,731,874 | 261,105,871 | 2,994,837,745 |
| 7647-01-0 | Hydrochloric acid | 1,987,515,900 | 56,241,684 | 2,043,757,584 |
| 67-56-1 | Methanol | 908,629,441 | 113,696,524 | 1,022,325,965 |
| 115-07-1 | Propylene | 464,419,038 | 724,123 | 465,143,161 |
| 74-85-1 | Ethylene | 408,736,057 | 897,766 | 409,633,823 |
| 7664-38-2 | Phosphoric acid | 388,737,290 | 5,591,044 | 394,328,334 |
| 7664-41-7 | Ammonia | 306,924,511 | 65,253,002 | 372,177,513 |
| 7782-50-5 | Chlorine | 298,236,718 | 1,186,637 | 299,423,355 |
| 107-21-1 | Ethylene glycol | 151,084,348 | 72,211,672 | 223,296,020 |
| 7697-37-2 | Nitric acid | 193,661,500 | 26,691,465 | 220,352,965 |
| | Zinc compounds | 124,287,132 | 21,298,188 | 145,585,320 |
| 108-88-3 | Toluene | 128,268,450 | 13,865,706 | 142,134,156 |
| 67-64-1 | Acetone | 117,452,577 | 23,052,335 | 140,504,912 |
| 7664-39-3 | Hydrogen fluoride | 124,400,903 | 2,482,376 | 126,883,279 |
| | Copper compounds | 101,927,104 | 1,961,933 | 103,889,037 |
| 50-00-0 | Formaldehyde | 95,071,775 | 4,268,664 | 99,340,439 |
| 107-06-2 | 1,2-Dichloroethane | 79,445,841 | 5,479,660 | 84,925,501 |
| 78-93-3 | Methyl ethyl ketone | 45,423,894 | 7,757,468 | 53,181,362 |
| 106-99-0 | 1,3-Butadiene | 51,069,422 | 1,364,892 | 52,434,314 |
| 75-09-2 | Dichloromethane | 34,185,873 | 10,528,620 | 44,714,493 |
| 1330-20-7 | Xylene (mixed isomers) | 32,953,777 | 11,623,545 | 44,577,322 |
| | Lead compounds | 40,049,865 | 4,209,180 | 44,259,045 |
| | Cyanide compounds | 43,123,280 | 418,798 | 43,542,078 |
| | Chromium compounds | 34,025,419 | 3,000,271 | 37,025,690 |
| 79-00-5 | 1,1,2-Trichloroethane | 30,737,565 | 5,358,381 | 36,095,946 |
| | Subtotal | 8,924,099,554 | 720,269,805 | 9,644,369,359 |
| | Total for All TRI Chemicals | 9,783,374,620 | 874,285,432 | 10,657,660,052 |

Table 2-9. Top 25 Chemicals Reported as Released (Includes Off-site Disposal), 1991.

| CAS Number | Chemical | Quantity Released(b) Pounds |
|---|---|---|
| 7664-41-7 | Ammonia | 499,483,105 |
| 7647-01-0 | Hydrochloric acid | 285,888,060 |
| 7664-93-9 | Sulfuric acid | 283,483,678 |
| 67-56-1 | Methanol | 274,052,271 |
| 108-88-3 | Toluene | 196,784,903 |
| 7664-38-2 | Phosphoric acid | 166,538,605 |
| 67-64-1 | Acetone | 161,632,499 |
| | Zinc compounds | 153,846,469 |
| 71-55-6 | 1,1,1-Trichloroethane | 132,160,136 |
| 1330-20-7 | Xylene (mixed isomers) | 114,334,033 |
| 78-93-3 | Methyl ethyl ketone | 102,309,424 |
| 75-15-0 | Carbon disulfide | 89,223,077 |
| | Manganese compounds | 85,599,347 |
| 75-09-2 | Dichloromethane | 80,189,944 |
| 7782-50-5 | Chlorine | 78,875,756 |
| 79-10-7 | Acrylic acid | 56,335,783 |
| 6484-52-2 | Ammonium nitrate (solution) | 52,594,025 |
| | Glycol ethers | 46,952,235 |
| | Copper compounds | 46,287,976 |
| 7440-50-8 | Copper | 39,995,968 |
| 7783-20-2 | Ammonium sulfate (solution) | 39,871,936 |
| 74-85-1 | Ethylene | 37,235,717 |
| | Chromium compounds | 34,767,990 |
| 79-01-6 | Trichloroethylene | 34,532,204 |
| 71-36-3 | n-Butyl alcohol | 33,949,277 |
| | Subtotal | 3,126,924,418 |
| | Total for All TRI Chemicals | 3,771,194,892 |

## Issues Associated with the New Information Required on Form R

As with the first year of data collection under TRI (1987), EPA recognizes that the quality of the data required by the PPA and reported for the first time under TRI in 1991 is questionable. Just as the TRI program developed over time since 1987, the issues and problems associated with the collection of these additional data will be resolved with the help of the public. EPA is currently providing as much guidance as possible through training courses and workshops held across the country.

There are two main issues associated with these new data: (1) how the new data are to be reported and what they mean or do not mean; and (2) how these new data relate to the data collected under TRI prior to 1991. Table 2-8, the top 25 chemicals reported as treated, reveals one of the issues of how the new data are reported. Four of the top 25 chemicals reported as treated are metal compounds: zinc compounds, #11; copper compounds, #15; lead compounds, #22; and chromium compounds, #24. Because the amounts reported should reflect only the parent metal portion of the metal compound, and because the parent metals are not destroyed in on-site treatment, these metal compounds should not be reported as treated on-site. If a facility interprets the quantity treated on-site to represent the amount of the toxic chemical removed from wastes and not the amount of the toxic chemical in wastes destroyed, the facility may double-count the amount of the toxic chemical in wastes and incorrectly categorize the ultimate disposition of the toxic chemical in wastes. Quantities of metals undergoing on-site treatment are not destroyed, but are either released on-site or transferred off-site, and should be reported as such in Section 8 of Form R. If a facility reports a metal both as treated on-site and as released or disposed, this results in the double-counting of the quantity of the metal in waste. Because of this problem, metals should not be reported as treated on-site. Metals can, however, be reported as sent off-site for treatment. This is acceptable, because facilities are only required to report the ultimate known disposition of toxic chemicals transferred off-site and because quantities reported as treated off-site represent the quantities leaving the facility for the purposes of treatment, not the amount actually destroyed off-site. However, it should be realized that parent metals sent off-site for treatment will not be destroyed and will ultimately be released or disposed to the environment.

Further complicating this is the issue of how to report a quantity that is treated and subsequently disposed. In reporting transfers off-site, facilities should report the ultimate known disposition of the toxic chemical. 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, not treated, off-site in both Sections 6 and 8 of Form R. There may, however, be situations where the facility transfers the toxic chemical off-site and does not know that it is being landfilled or where it is being landfilled, and the only information available to the facility is the treatment prior to disposal. While the quantity can be reported as a quantity treated off-site, this makes it difficult to clearly categorize or assess the difference between the treatment and release/disposal categories of the waste management hierarchy.

The second issue associated with the new data, how they relate to the data that have been collected under TRI prior to 1991, is evident through comparisons of the information presented in this chapter and the information provided in Chapter 1. The new information reported on Form R

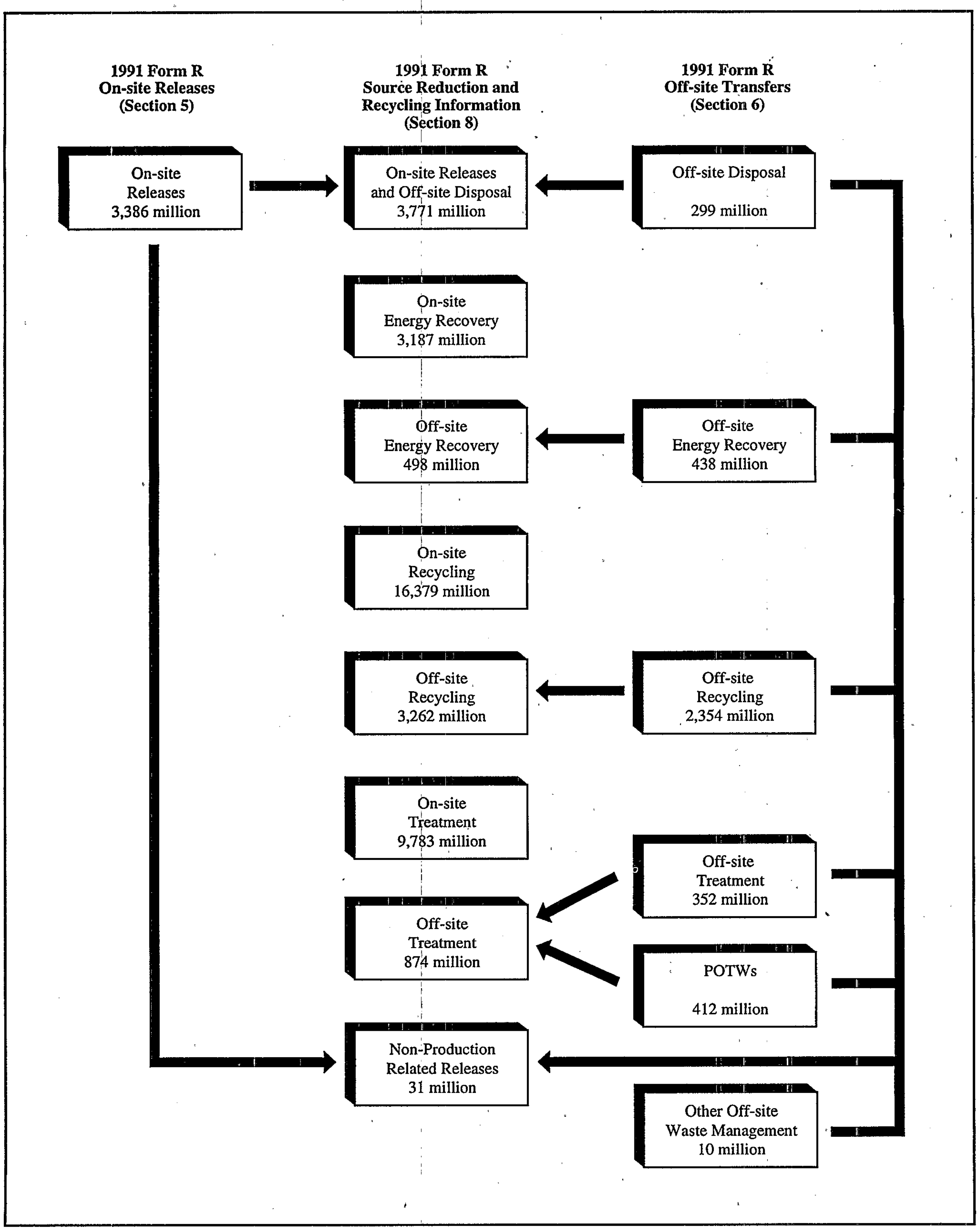



Figure 2-5. Relationship of Data from Various Form R Sections (amounts in pounds).

may not match exactly with the release and transfer information that has been collected since the inception of the TRI program. Figure 2-5 shows how quantities released on-site, quantities transferred off-site, and the new information relate, and the magnitudes of the differences between the reported quantities.

In some cases, information on quantities of the toxic chemicals transferred off-site (reported in Section 6) does not match with the new information (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 Form R; these codes cannot be assigned to any particular off-site activity and, along with the quantities that have no codes, are identified as "other" off-site activities.

Even with the use of valid codes, however, there still may exist some discrepancies. For example, the quantity released (including disposal) as reported in Section 8 of Form R may not equal the sum of the quantities reported as released on-site and the amounts reported as sent off-site for disposal (reported in Sections 5 and 6, respectively). EPA believes that this is a problem in relating the data that should be reported in different sections of Form R that will be reduced over time.

The largest discrepancy in the information reported is the difference between what is reported as recycled off-site in Section 8 of Form R and what is reported as sent off-site for recycling in the "Off-Site Transfers" section of Form R (Section 6). This discrepancy, which is greater than 1 billion 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 for the new information (Section 8) differently from what was to be reported as sent off-site as a transfer in wastes (Section 6.2).

To resolve these and other complex outstanding issues, EPA has initiated a public dialogue process, in which members of environmental groups, industry, States, and academia are being brought together. The representatives of these groups will discuss the issues associated with reporting this new information and provide EPA with advice and recommendations as to how to resolve them. This process will insure that the intent of the PPA is met and that the users of TRI data are provided with meaningful information on the management of toxic chemicals in wastes.

## 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 activities are those that reduced or prevented a quantity of the reported toxic chemical from being recycled, combusted for energy recovery, treated, or released (including disposal). Of the 23,719 facilities that submitted Form Rs for 1991, 8,821 (37%) indicated that they implemented source reduction. Of the total 82,293 Form Rs submitted, 21,381 (26%) indicated that source reduction had been implemented.

The categories or types of source reduction actions that can be reported are:

- Good operating practices
- Inventory control
- Spill and leak prevention
- Raw material modifications
- Process modifications
- Cleaning and degreasing
- Surface preparation and finishing
- Product modifications

Under these categories are more specific activities that are reported on Form R using specific codes. For example, raw material modifications include increasing the purity of raw materials, substitution of raw materials, and "other" raw material modifications. The most frequently reported source reduction activities were good operating practices, process modifications, and spill and leak prevention activities.

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 was managed than the implementation of the same activity earlier in the reporting year.

## What is Pollution Prevention?

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 2-1. What is Pollution Prevention?**

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

- 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 internal pollution prevention opportunity audits and participative team management. 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 2-10.

The states of California, Illinois, Indiana, Ohio, Pennsylvania, and Texas 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 2-11). Consistent with the national picture, the most frequent method of identifying opportunities for source reduction for facilities in these states were internal pollution prevention opportunity audits and participative team management (see Table 2-12).

Among industries, the greatest number of forms submitted indicating source reduction were from the chemical industry and fabricated metals sector. Of the total forms submitted by each sector, the greatest percentage of forms indicating source reduction were those from the furniture, measurements/photographic equipment, and printing sectors. Of the total facilities in each industry submitting Form Rs, the greatest percentage of facilities reporting source reduction activities are in the measurements/photographic equipment, electrical, and printing sectors. Looking at the distribution of activities, good operating practices, process modifications, and spill and leak prevention, were most frequently reported (see Tables 2-13 and 2-14).

The top 50 chemicals for which source reduction was reported are listed in Tables 2-15 and 2-16. 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 process modifications and good operating practices. The most frequent methods of identifying opportunities for source reduction for 1,1,1-trichloroethane were internal pollution prevention opportunity audits and participative team management.

**Table 2-10. Methods Used to Identify Source Reduction Activity for Each Source Reduction Activity, 1991 (number of occurrences of each method).**

| Source Reduction Activity(f) | Number of Occurrences | Percent of Total Occurrences | Pollution Prevention Opportunity Audit | | Materials Balance Audit | Participative Team Management |
|---|---|---|---|---|---|---|
| | | | Internal | External | | |
| **Good Operating Practices** | **16,672** | **27.0** | **3,797** | **359** | **1,429** | **5,296** |
| W13 | 7,212 | 11.7 | 1,826 | 215 | 740 | 2,169 |
| W14 | 3,379 | 5.5 | 648 | 42 | 292 | 1,269 |
| W19 | 6,081 | 9.8 | 1,323 | 102 | 397 | 1,858 |
| **Inventory Control** | **4,115** | **6.7** | **733** | **86** | **383** | **1,202** |
| W21 | 1,240 | 2.0 | 237 | 7 | 105 | 322 |
| W22 | 564 | 0.9 | 121 | 7 | 54 | 165 |
| W23 | 31 | 0.1 | 5 | 0 | 5 | 10 |
| W24 | 433 | 0.7 | 73 | 16 | 5 | 170 |
| W25 | 392 | 0.6 | 50 | 7 | 27 | 104 |
| W29 | 1,455 | 2.4 | 247 | 49 | 187 | 431 |
| **Spill and Leak Prevention** | **9,467** | **15.3** | **2,792** | **347** | **530** | **2,254** |
| W31 | 937 | 1.5 | 216 | 23 | 50 | 261 |
| W32 | 2,108 | 3.4 | 664 | 66 | 120 | 547 |
| W33 | 751 | 1.2 | 190 | 37 | 34 | 201 |
| W35 | 913 | 1.5 | 264 | 24 | 78 | 156 |
| W36 | 2,939 | 4.8 | 855 | 127 | 158 | 679 |
| W39 | 1,819 | 2.9 | 603 | 70 | 90 | 410 |
| **Raw Material Modifications** | **6,678** | **10.8** | **1,222** | **138** | **301** | **1,636** |
| W41 | 842 | 1.4 | 65 | 5 | 31 | 319 |
| W42 | 4,967 | 8.0 | 1,014 | 124 | 221 | 1,143 |
| W49 | 869 | 1.4 | 143 | 9 | 49 | 174 |
| **Process Modifications** | **12,774** | **20.7** | **2,887** | **346** | **928** | **3,405** |
| W51 | 2,498 | 4.0 | 657 | 63 | 269 | 717 |
| W52 | 4,686 | 7.6 | 1,146 | 164 | 342 | 1,154 |
| W53 | 275 | 0.4 | 50 | 4 | 13 | 53 |
| W54 | 395 | 0.6 | 63 | 4 | 22 | 119 |
| W55 | 812 | 1.3 | 162 | 17 | 43 | 237 |
| W58 | 4,108 | 6.7 | 809 | 94 | 239 | 1,125 |
| **Cleaning and Degreasing** | **5,206** | **8.4** | **1,258** | **89** | **286** | **1,332** |
| W59 | 486 | 0.8 | 121 | 5 | 48 | 124 |
| W60 | 186 | 0.3 | 47 | 3 | 10 | 49 |
| W61 | 2,008 | 3.3 | 511 | 53 | 85 | 498 |
| W63 | 264 | 0.4 | 66 | 6 | 14 | 67 |
| W64 | 375 | 0.6 | 98 | 3 | 23 | 92 |
| W65 | 202 | 0.3 | 43 | 2 | 10 | 50 |
| W66 | 195 | 0.3 | 45 | 0 | 5 | 57 |
| W67 | 140 | 0.2 | 34 | 1 | 7 | 29 |
| W68 | 280 | 0.5 | 77 | 2 | 28 | 81 |
| W71 | 1,070 | 1.7 | 216 | 14 | 56 | 285 |
| **Surface Preparation/Finishing** | **4,116** | **6.7** | **661** | **99** | **214** | **888** |
| W72 | 1,380 | 2.2 | 211 | 25 | 84 | 262 |
| W73 | 1,275 | 2.1 | 221 | 37 | 61 | 259 |
| W74 | 947 | 1.5 | 134 | 18 | 47 | 243 |
| W75 | 155 | 0.3 | 27 | 8 | 12 | 39 |
| W78 | 359 | 0.6 | 68 | 11 | 10 | 85 |
| **Product Modifications** | **2,745** | **4.4** | **432** | **54** | **116** | **679** |
| W81 | 855 | 1.4 | 160 | 20 | 53 | 189 |
| W82 | 1,409 | 2.3 | 186 | 31 | 46 | 388 |
| W83 | 58 | 0.1 | 6 | 1 | 0 | 10 |
| W89 | 423 | 0.7 | 80 | 2 | 17 | 92 |
| Total | 61,773 | 100.0 | 13,782 | 1,518 | 4,187 | 16,692 |
| Percent of Total | 100.0 | | 22.3 | 2.5 | 6.8 | 27.0 |

| Source Reduction Activity | Employee Recommendation Informal | Employee Recommendation Formal Program | State Program | Federal Program | Trade/Industry Program | Vendor Assistance | Other |
|---|---|---|---|---|---|---|---|
| **Good Operating Practices** | **2,159** | **1,036** | **103** | **18** | **420** | **887** | **1,168** |
| W13 | 842 | 453 | 45 | 11 | 154 | 401 | 356 |
| W14 | 640 | 153 | 11 | 3 | 53 | 109 | 159 |
| W19 | 677 | 430 | 47 | 4 | 213 | 377 | 653 |
| **Inventory Control** | **470** | **258** | **20** | **11** | **187** | **388** | **377** |
| W21 | 156 | 92 | 6 | 5 | 56 | 144 | 110 |
| W22 | 91 | 27 | 0 | 0 | 1 | 58 | 40 |
| W23 | 1 | 4 | 1 | 1 | 1 | 2 | 1 |
| W24 | 37 | 28 | 3 | 5 | 27 | 25 | 44 |
| W25 | 78 | 11 | 9 | 0 | 4 | 37 | 65 |
| W29 | 107 | 96 | 1 | 0 | 98 | 122 | 117 |
| **Spill and Leak Prevention** | **1,025** | **558** | **63** | **31** | **242** | **562** | **1,063** |
| W31 | 109 | 53 | 11 | 5 | 15 | 58 | 136 |
| W32 | 296 | 109 | 6 | 2 | 49 | 121 | 128 |
| W33 | 78 | 62 | 6 | 4 | 20 | 57 | 62 |
| W35 | 59 | 39 | 7 | 2 | 34 | 87 | 163 |
| W36 | 261 | 203 | 19 | 8 | 82 | 139 | 408 |
| W39 | 222 | 92 | 14 | 10 | 42 | 100 | 166 |
| **Raw Material Modifications** | **726** | **317** | **23** | **22** | **284** | **1,461** | **548** |
| W41 | 277 | 9 | 0 | 0 | 11 | 98 | 27 |
| W42 | 381 | 271 | 21 | 17 | 221 | 1,103 | 451 |
| W49 | 68 | 37 | 2 | 5 | 52 | 260 | 70 |
| **Process Modifications** | **1,408** | **785** | **47** | **12** | **436** | **1,263** | **1,257** |
| W51 | 296 | 157 | 12 | 1 | 51 | 177 | 98 |
| W52 | 530 | 277 | 19 | 4 | 162 | 481 | 407 |
| W53 | 44 | 7 | 1 | 0 | 15 | 52 | 36 |
| W54 | 55 | 31 | 4 | 0 | 14 | 51 | 32 |
| W55 | 104 | 43 | 1 | 0 | 8 | 134 | 63 |
| W58 | 379 | 270 | 10 | 7 | 186 | 368 | 621 |
| **Cleaning and Degreasing** | **605** | **349** | **48** | **17** | **190** | **758** | **274** |
| W59 | 57 | 43 | 3 | 1 | 7 | 59 | 18 |
| W60 | 10 | 10 | 1 | 1 | 11 | 29 | 15 |
| W61 | 134 | 133 | 21 | 9 | 94 | 367 | 103 |
| W63 | 49 | 7 | 5 | 1 | 7 | 36 | 6 |
| W64 | 78 | 17 | 4 | 0 | 17 | 37 | 6 |
| W65 | 35 | 13 | 6 | 1 | 3 | 27 | 12 |
| W66 | 35 | 4 | 3 | 1 | 8 | 28 | 9 |
| W67 | 33 | 9 | 1 | 0 | 5 | 13 | 8 |
| W68 | 35 | 28 | 1 | 0 | 4 | 18 | 6 |
| W71 | 139 | 85 | 3 | 3 | 34 | 144 | 91 |
| **Surface Preparation/Finishing** | **279** | **152** | **26** | **11** | **344** | **1,151** | **291** |
| W72 | 99 | 49 | 10 | 1 | 141 | 431 | 67 |
| W73 | 58 | 29 | 2 | 2 | 92 | 424 | 90 |
| W74 | 99 | 35 | 9 | 1 | 79 | 201 | 81 |
| W75 | 7 | 2 | 0 | 0 | 10 | 36 | 14 |
| W78 | 16 | 37 | 5 | 7 | 22 | 59 | 39 |
| **Product Modifications** | **239** | **156** | **7** | **4** | **158** | **440** | **460** |
| W81 | 77 | 45 | 2 | 0 | 33 | 144 | 132 |
| W82 | 115 | 86 | 5 | 4 | 111 | 231 | 206 |
| W83 | 9 | 2 | 0 | 0 | 1 | 13 | 16 |
| W89 | 38 | 23 | 0 | 0 | 13 | 52 | 106 |
| Total | 6,911 | 3,611 | 337 | 126 | 2,261 | 6,910 | 5,438 |
| Percent of Total | 11.2 | 5.8 | 0.5 | 0.2 | 3.7 | 11.2 | 8.8 |

**Table 2-11. Number of TRI Facilities and Forms Reporting Source Reduction, by Source Reduction Category, by State, 1991.**

| 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 from the State |
|---|---|---|---|---|---|---|
| Alabama | 480 | 154 | 32.1 | 1,840 | 430 | 23.4 |
| Alaska | 7 | 4 | 57.1 | 48 | 10 | 20.8 |
| American Samoa | 2 | 1 | 50.0 | 2 | 1 | 50.0 |
| Arizona | 186 | 95 | 51.1 | 576 | 220 | 38.2 |
| Arkansas | 394 | 148 | 37.6 | 1,221 | 314 | 25.7 |
| California | 1,891 | 815 | 43.1 | 5,788 | 1974 | 34.1 |
| Colorado | 208 | 75 | 36.1 | 597 | 152 | 25.5 |
| Connecticut | 441 | 178 | 40.4 | 1,295 | 331 | 25.6 |
| Delaware | 70 | 26 | 37.1 | 293 | 51 | 17.4 |
| Florida | 520 | 206 | 39.6 | 1,497 | 390 | 26.1 |
| Georgia | 741 | 267 | 36.0 | 2,400 | 608 | 25.3 |
| Hawaii | 27 | 6 | 22.2 | 87 | 32 | 36.8 |
| Idaho | 55 | 18 | 32.7 | 183 | 34 | 18.6 |
| Illinois | 1,425 | 490 | 34.4 | 5,062 | 1234 | 24.4 |
| Indiana | 1,000 | 414 | 41.4 | 3,520 | 1082 | 30.7 |
| Iowa | 442 | 148 | 33.5 | 1,330 | 316 | 23.8 |
| Kansas | 268 | 99 | 36.9 | 941 | 284 | 30.2 |
| Kentucky | 427 | 161 | 37.7 | 1,640 | 345 | 21.0 |
| Louisiana | 320 | 109 | 34.1 | 2,008 | 372 | 18.5 |
| Maine | 109 | 46 | 42.2 | 368 | 88 | 23.9 |
| Maryland | 230 | 66 | 28.7 | 757 | 136 | 18.0 |
| Massachusetts | 633 | 285 | 45.0 | 1,789 | 593 | 33.1 |
| Michigan | 982 | 342 | 34.8 | 3,818 | 994 | 26.0 |
| Minnesota | 560 | 259 | 46.3 | 1,617 | 577 | 35.7 |
| Mississippi | 315 | 116 | 36.8 | 1,083 | 271 | 25.0 |
| Missouri | 600 | 203 | 33.8 | 2,125 | 576 | 27.1 |
| Montana | 24 | 7 | 29.2 | 137 | 11 | 8.0 |
| Nebraska | 183 | 59 | 32.2 | 526 | 127 | 24.1 |
| Nevada | 40 | 14 | 35.0 | 105 | 35 | 33.3 |
| New Hampshire | 129 | 50 | 38.8 | 357 | 94 | 26.3 |
| New Jersey | 782 | 258 | 33.0 | 2,846 | 572 | 20.1 |
| New Mexico | 43 | 18 | 41.9 | 154 | 48 | 31.2 |
| New York | 894 | 356 | 39.8 | 2,809 | 889 | 31.6 |
| North Carolina | 971 | 354 | 36.5 | 3,033 | 843 | 27.8 |
| North Dakota | 38 | 13 | 34.2 | 102 | 22 | 21.6 |
| Ohio | 1,653 | 555 | 33.6 | 6,048 | 1404 | 23.2 |
| Oklahoma | 264 | 79 | 29.9 | 870 | 167 | 19.2 |
| Oregon | 250 | 109 | 43.6 | 787 | 256 | 32.5 |
| Pennsylvania | 1,241 | 421 | 33.9 | 4,264 | 1044 | 24.5 |
| Puerto Rico | 182 | 51 | 28.0 | 572 | 104 | 18.2 |
| Rhode Island | 179 | 78 | 43.6 | 477 | 157 | 32.9 |
| South Carolina | 477 | 183 | 38.4 | 1,880 | 463 | 24.6 |
| South Dakota | 56 | 20 | 35.7 | 110 | 34 | 30.9 |
| Tennessee | 671 | 282 | 42.0 | 2,242 | 622 | 27.7 |
| Texas | 1,254 | 442 | 35.2 | 6,084 | 1358 | 22.3 |
| Utah | 137 | 52 | 38.0 | 498 | 132 | 26.5 |
| Vermont | 53 | 23 | 43.4 | 125 | 48 | 38.4 |
| Virgin Islands | 3 | 1 | 33.3 | 29 | 9 | 31.0 |
| Virginia | 485 | 170 | 35.1 | 1,680 | 425 | 25.3 |
| Washington | 354 | 144 | 40.7 | 1,119 | 312 | 27.9 |
| West Virginia | 145 | 55 | 37.9 | 723 | 146 | 20.2 |
| Wisconsin | 852 | 291 | 34.2 | 2,703 | 616 | 22.8 |
| Wyoming | 26 | 5 | 19.2 | 128 | 28 | 21.9 |
| Total | 23,719 | 8,821 | 37.2 | 82,293 | 21,381 | 26.0 |

| State | 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) | | | | | | | |
| Alabama | 245 | 53 | 129 | 74 | 135 | 41 | 36 | 21 |
| Alaska | 6 | 0 | 7 | 1 | 16 | 0 | 0 | 0 |
| American Samoa | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Arizona | 111 | 18 | 93 | 42 | 92 | 65 | 12 | 11 |
| Arkansas | 105 | 41 | 110 | 57 | 114 | 35 | 71 | 45 |
| California | 1139 | 253 | 673 | 266 | 718 | 376 | 114 | 153 |
| Colorado | 72 | 12 | 44 | 20 | 60 | 18 | 27 | 7 |
| Connecticut | 177 | 35 | 55 | 49 | 109 | 107 | 15 | 32 |
| Delaware | 16 | 3 | 15 | 6 | 28 | 5 | 3 | 0 |
| Florida | 177 | 31 | 136 | 69 | 146 | 83 | 38 | 42 |
| Georgia | 331 | 49 | 245 | 116 | 223 | 68 | 31 | 46 |
| Hawaii | 0 | 17 | 32 | 0 | 5 | 0 | 0 | 0 |
| Idaho | 13 | 1 | 4 | 6 | 22 | 3 | 2 | 1 |
| Illinois | 605 | 140 | 360 | 316 | 455 | 177 | 90 | 133 |
| Indiana | 402 | 142 | 254 | 247 | 407 | 188 | 158 | 80 |
| Iowa | 150 | 13 | 72 | 71 | 105 | 37 | 56 | 21 |
| Kansas | 152 | 33 | 80 | 51 | 98 | 52 | 17 | 20 |
| Kentucky | 137 | 21 | 95 | 58 | 130 | 49 | 36 | 25 |
| Louisiana | 184 | 29 | 156 | 39 | 213 | 31 | 10 | 6 |
| Maine | 39 | 2 | 3 | 30 | 24 | 20 | 16 | 4 |
| Maryland | 73 | 8 | 24 | 51 | 42 | 21 | 10 | 15 |
| Massachusetts | 367 | 87 | 61 | 122 | 192 | 106 | 32 | 48 |
| Michigan | 492 | 210 | 225 | 186 | 443 | 153 | 173 | 143 |
| Minnesota | 256 | 78 | 130 | 118 | 211 | 113 | 78 | 36 |
| Mississippi | 124 | 27 | 123 | 54 | 66 | 25 | 42 | 10 |
| Missouri | 246 | 106 | 304 | 152 | 172 | 96 | 44 | 47 |
| Montana | 3 | 0 | 2 | 2 | 5 | 0 | 0 | 1 |
| Nebraska | 52 | 6 | 25 | 33 | 37 | 16 | 28 | 7 |
| Nevada | 12 | 5 | 13 | 5 | 10 | 2 | 0 | 1 |
| New Hampshire | 38 | 14 | 22 | 11 | 38 | 20 | 10 | 3 |
| New Jersey | 230 | 70 | 164 | 112 | 234 | 48 | 18 | 33 |
| New Mexico | 34 | 4 | 3 | 3 | 19 | 9 | 3 | 5 |
| New York | 396 | 117 | 201 | 147 | 348 | 125 | 108 | 91 |
| North Carolina | 303 | 190 | 215 | 173 | 259 | 84 | 215 | 67 |
| North Dakota | 8 | 0 | 1 | 7 | 11 | 4 | 8 | 3 |
| Ohio | 662 | 165 | 296 | 288 | 521 | 157 | 139 | 184 |
| Oklahoma | 70 | 39 | 60 | 37 | 47 | 16 | 31 | 29 |
| Oregon | 118 | 27 | 49 | 62 | 111 | 29 | 42 | 34 |
| Pennsylvania | 495 | 132 | 223 | 206 | 440 | 175 | 146 | 73 |
| Puerto Rico | 24 | 27 | 31 | 24 | 35 | 22 | 4 | 9 |
| Rhode Island | 82 | 17 | 67 | 25 | 47 | 42 | 18 | 5 |
| South Carolina | 204 | 32 | 132 | 63 | 190 | 47 | 39 | 47 |
| South Dakota | 22 | 6 | 21 | 2 | 6 | 7 | 3 | 1 |
| Tennessee | 260 | 51 | 145 | 135 | 204 | 52 | 84 | 47 |
| Texas | 536 | 129 | 550 | 204 | 566 | 140 | 82 | 82 |
| Utah | 45 | 11 | 30 | 18 | 72 | 9 | 10 | 6 |
| Vermont | 25 | 0 | 2 | 10 | 13 | 8 | 6 | 5 |
| Virgin Islands | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 |
| Virginia | 190 | 64 | 92 | 92 | 138 | 55 | 72 | 24 |
| Washington | 155 | 30 | 104 | 70 | 137 | 56 | 34 | 24 |
| West Virginia | 61 | 11 | 33 | 20 | 95 | 5 | 7 | 7 |
| Wisconsin | 298 | 54 | 126 | 140 | 208 | 94 | 93 | 64 |
| Wyoming | 24 | 0 | 33 | 4 | 4 | 2 | 0 | 0 |
| Total | 9,966 | 2,610 | 6,071 | 4,094 | 8,030 | 3,093 | 2,311 | 1,798 |

**Table 2-12. Methods Used to Identify Reported Source Reduction Activities, by State, 1991.**

| State | Pollution Prevention Opportunity Audit: Internal | Pollution Prevention Opportunity Audit: External | Materials Balance Audit | Participative Team Management | Employee Recommendation: Informal | Employee Recommendation: Formal Program |
|---|---|---|---|---|---|---|
| Alabama | 180 | 29 | 74 | 230 | 71 | 74 |
| Alaska | 7 | 0 | 1 | 1 | 7 | 0 |
| American Samoa | 0 | 0 | 0 | 0 | 1 | 0 |
| Arizona | 97 | 10 | 44 | 144 | 45 | 14 |
| Arkansas | 122 | 10 | 33 | 111 | 62 | 34 |
| California | 888 | 165 | 280 | 857 | 312 | 140 |
| Colorado | 66 | 8 | 15 | 65 | 39 | 20 |
| Connecticut | 143 | 14 | 42 | 171 | 77 | 44 |
| Delaware | 17 | 1 | 6 | 23 | 11 | 8 |
| Florida | 154 | 9 | 59 | 164 | 95 | 28 |
| Georgia | 247 | 25 | 90 | 243 | 87 | 42 |
| Hawaii | 27 | 0 | 0 | 5 | 0 | 0 |
| Idaho | 9 | 2 | 2 | 16 | 3 | 9 |
| Illinois | 408 | 47 | 95 | 551 | 306 | 129 |
| Indiana | 373 | 48 | 109 | 490 | 208 | 128 |
| Iowa | 105 | 20 | 53 | 142 | 65 | 26 |
| Kansas | 73 | 2 | 55 | 153 | 54 | 54 |
| Kentucky | 122 | 14 | 47 | 140 | 64 | 28 |
| Louisiana | 178 | 9 | 62 | 160 | 44 | 79 |
| Maine | 30 | 1 | 12 | 47 | 16 | 10 |
| Maryland | 39 | 3 | 12 | 68 | 37 | 15 |
| Massachusetts | 200 | 24 | 71 | 272 | 109 | 52 |
| Michigan | 360 | 41 | 134 | 440 | 184 | 96 |
| Minnesota | 263 | 18 | 47 | 268 | 129 | 53 |
| Mississippi | 112 | 5 | 42 | 124 | 57 | 19 |
| Missouri | 250 | 11 | 31 | 216 | 93 | 81 |
| Montana | 1 | 0 | 0 | 4 | 4 | 0 |
| Nebraska | 51 | 4 | 8 | 55 | 26 | 26 |
| Nevada | 9 | 0 | 7 | 12 | 12 | 0 |
| New Hampshire | 26 | 1 | 16 | 33 | 34 | 11 |
| New Jersey | 165 | 37 | 66 | 226 | 116 | 37 |
| New Mexico | 24 | 0 | 4 | 25 | 6 | 2 |
| New York | 332 | 38 | 89 | 361 | 140 | 116 |
| North Carolina | 321 | 32 | 55 | 352 | 178 | 68 |
| North Dakota | 1 | 0 | 2 | 13 | 2 | 4 |
| Ohio | 498 | 71 | 173 | 682 | 339 | 119 |
| Oklahoma | 60 | 9 | 37 | 79 | 45 | 27 |
| Oregon | 105 | 0 | 47 | 126 | 78 | 36 |
| Pennsylvania | 373 | 84 | 129 | 497 | 238 | 120 |
| Puerto Rico | 42 | 14 | 8 | 43 | 15 | 13 |
| Rhode Island | 64 | 15 | 16 | 59 | 29 | 17 |
| South Carolina | 228 | 13 | 93 | 249 | 79 | 27 |
| South Dakota | 2 | 0 | 4 | 17 | 8 | 3 |
| Tennessee | 209 | 28 | 70 | 238 | 147 | 42 |
| Texas | 549 | 46 | 171 | 609 | 275 | 158 |
| Utah | 42 | 13 | 16 | 52 | 37 | 8 |
| Vermont | 17 | 0 | 12 | 26 | 5 | 8 |
| Virgin Islands | 0 | 0 | 0 | 0 | 9 | 0 |
| Virginia | 158 | 8 | 59 | 182 | 65 | 17 |
| Washington | 169 | 26 | 17 | 163 | 68 | 47 |
| West Virginia | 63 | 4 | 27 | 71 | 26 | 9 |
| Wisconsin | 219 | 25 | 79 | 302 | 150 | 61 |
| Wyoming | 10 | 0 | 12 | 3 | 13 | 13 |
| Total | 8,208 | 984 | 2,633 | 9,580 | 4,320 | 2,172 |
| Percent of Total | 21.4 | 2.6 | 6.9 | 24.9 | 11.2 | 5.7 |

| State | State Program | Federal Program | Trade/ Industry Program | Vendor Assistance | Other | Number of Forms | Percent of Total Forms |
|---|---|---|---|---|---|---|---|
| Alabama | 1 | 3 | 35 | 109 | 54 | 860 | 2.2 |
| Alaska | 0 | 0 | 1 | 1 | 1 | 19 | 0.0 |
| American Samoa | 0 | 0 | 0 | 0 | 0 | 1 | 0.0 |
| Arizona | 0 | 2 | 16 | 41 | 18 | 431 | 1.1 |
| Arkansas | 0 | 0 | 17 | 83 | 58 | 530 | 1.4 |
| California | 18 | 2 | 144 | 335 | 376 | 3517 | 9.2 |
| Colorado | 4 | 1 | 2 | 24 | 23 | 267 | 0.7 |
| Connecticut | 1 | 2 | 17 | 72 | 36 | 619 | 1.6 |
| Delaware | 1 | 0 | 2 | 6 | 7 | 82 | 0.2 |
| Florida | 8 | 3 | 19 | 70 | 52 | 661 | 1.7 |
| Georgia | 11 | 4 | 47 | 130 | 122 | 1048 | 2.7 |
| Hawaii | 0 | 0 | 0 | 0 | 16 | 48 | 0.1 |
| Idaho | 0 | 0 | 6 | 5 | 6 | 58 | 0.2 |
| Illinois | 8 | 0 | 87 | 249 | 275 | 2155 | 5.6 |
| Indiana | 6 | 10 | 84 | 322 | 248 | 2026 | 5.3 |
| Iowa | 7 | 0 | 19 | 112 | 36 | 585 | 1.5 |
| Kansas | 1 | 1 | 7 | 64 | 62 | 526 | 1.4 |
| Kentucky | 4 | 1 | 14 | 62 | 67 | 563 | 1.5 |
| Louisiana | 1 | 0 | 19 | 42 | 62 | 656 | 1.7 |
| Maine | 0 | 1 | 3 | 31 | 16 | 167 | 0.4 |
| Maryland | 5 | 0 | 12 | 41 | 29 | 261 | 0.7 |
| Massachusetts | 14 | 1 | 29 | 90 | 124 | 986 | 2.6 |
| Michigan | 2 | 8 | 61 | 294 | 201 | 1821 | 4.7 |
| Minnesota | 30 | 1 | 25 | 149 | 58 | 1041 | 2.7 |
| Mississippi | 4 | 0 | 16 | 81 | 48 | 508 | 1.3 |
| Missouri | 0 | 1 | 14 | 90 | 115 | 902 | 2.3 |
| Montana | 0 | 0 | 0 | 2 | 3 | 14 | 0.0 |
| Nebraska | 0 | 1 | 9 | 47 | 17 | 244 | 0.6 |
| Nevada | 2 | 0 | 1 | 3 | 5 | 51 | 0.1 |
| New Hampshire | 1 | 1 | 1 | 22 | 16 | 162 | 0.4 |
| New Jersey | 10 | 0 | 46 | 79 | 140 | 922 | 2.4 |
| New Mexico | 0 | 0 | 2 | 8 | 5 | 76 | 0.2 |
| New York | 3 | 6 | 59 | 243 | 159 | 1546 | 4.0 |
| North Carolina | 15 | 1 | 128 | 338 | 107 | 1595 | 4.2 |
| North Dakota | 0 | 0 | 0 | 12 | 2 | 36 | 0.1 |
| Ohio | 9 | 2 | 60 | 308 | 262 | 2523 | 6.6 |
| Oklahoma | 2 | 0 | 7 | 40 | 35 | 341 | 0.9 |
| Oregon | 5 | 3 | 38 | 44 | 27 | 509 | 1.3 |
| Pennsylvania | 7 | 14 | 71 | 242 | 161 | 1936 | 5.0 |
| Puerto Rico | 1 | 0 | 2 | 21 | 34 | 193 | 0.5 |
| Rhode Island | 3 | 0 | 6 | 34 | 23 | 266 | 0.7 |
| South Carolina | 5 | 1 | 15 | 97 | 35 | 842 | 2.2 |
| South Dakota | 1 | 0 | 9 | 10 | 7 | 61 | 0.2 |
| Tennessee | 13 | 5 | 64 | 148 | 100 | 1064 | 2.8 |
| Texas | 16 | 5 | 38 | 233 | 321 | 2421 | 6.3 |
| Utah | 0 | 0 | 5 | 24 | 37 | 234 | 0.6 |
| Vermont | 0 | 0 | 2 | 17 | 0 | 87 | 0.2 |
| Virgin Islands | 0 | 0 | 0 | 0 | 0 | 9 | 0.0 |
| Virginia | 10 | 3 | 34 | 104 | 94 | 734 | 1.9 |
| Washington | 16 | 5 | 41 | 83 | 59 | 694 | 1.8 |
| West Virginia | 0 | 0 | 5 | 47 | 21 | 273 | 0.7 |
| Wisconsin | 5 | 2 | 51 | 189 | 82 | 1165 | 3.0 |
| Wyoming | 0 | 0 | 1 | 13 | 13 | 78 | 0.2 |
| Total | 250 | 90 | 1,391 | 4,911 | 3,875 | 38,414 | 100.0 |
| Percent of Total | 0.7 | 0.2 | 3.6 | 12.8 | 10.1 | 100.0 | |

**Table 2-13. Number of Forms Reporting Source Reduction, by Source Reduction Category, by Industry, 1991.**

| 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 | 2,021 | 420 | 20.8 | 3,742 | 597 | 16.0 |
| 21 | Tobacco | 23 | 7 | 30.4 | 47 | 9 | 19.1 |
| 22 | Textiles | 448 | 147 | 32.8 | 985 | 256 | 26.0 |
| 23 | Apparel | 42 | 12 | 28.6 | 78 | 22 | 28.2 |
| 24 | Lumber | 728 | 234 | 32.1 | 1,946 | 532 | 27.3 |
| 25 | Furniture | 537 | 226 | 42.1 | 1,722 | 674 | 39.1 |
| 26 | Paper | 619 | 277 | 44.7 | 2,498 | 577 | 23.1 |
| 27 | Printing | 385 | 180 | 46.8 | 796 | 286 | 35.9 |
| 28 | Chemicals | 4,262 | 1741 | 40.8 | 23,093 | 6163 | 26.7 |
| 29 | Petroleum | 426 | 154 | 36.2 | 3,344 | 789 | 23.6 |
| 30 | Plastics | 1,832 | 730 | 39.8 | 4,470 | 1278 | 28.6 |
| 31 | Leather | 153 | 64 | 41.8 | 382 | 125 | 32.7 |
| 32 | Stone/Clay | 659 | 194 | 29.4 | 1,665 | 453 | 27.2 |
| 33 | Primary Metals | 1,858 | 496 | 26.7 | 6,796 | 1308 | 19.2 |
| 34 | Fabr. Metals | 3,153 | 1084 | 34.4 | 8,995 | 2067 | 23.0 |
| 35 | Machinery | 1,091 | 397 | 36.4 | 3,012 | 703 | 23.3 |
| 36 | Electrical | 1,635 | 772 | 47.2 | 4,938 | 1561 | 31.6 |
| 37 | Transportation | 1,256 | 545 | 43.4 | 4,928 | 1437 | 29.2 |
| 38 | Measure./Photo. | 438 | 224 | 51.1 | 1,141 | 432 | 37.9 |
| 39 | Miscellaneous | 387 | 155 | 40.1 | 981 | 305 | 31.1 |
| | Multiple codes 20-39 | 1,545 | 706 | 45.7 | 5,946 | 1692 | 28.5 |
| | No codes 20-39 | 221 | 56 | 25.3 | 788 | 115 | 14.6 |
| | Total | 23,719 | 8,821 | 37.2 | 82,293 | 21,381 | 26.0 |

| 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 | 357 | 36 | 340 | 25 | 198 | 38 | 6 | 18 |
| Tobacco | 5 | 0 | 1 | 1 | 6 | 0 | 0 | 0 |
| Textiles | 72 | 26 | 74 | 89 | 88 | 21 | 17 | 24 |
| Apparel | 5 | 2 | 7 | 5 | 8 | 3 | 5 | 0 |
| Lumber | 320 | 68 | 158 | 78 | 186 | 24 | 166 | 29 |
| Furniture | 163 | 218 | 98 | 131 | 137 | 48 | 551 | 61 |
| Paper | 232 | 40 | 48 | 227 | 204 | 36 | 14 | 61 |
| Printing | 86 | 10 | 25 | 136 | 52 | 57 | 16 | 12 |
| Chemicals | 3227 | 963 | 2480 | 1141 | 2781 | 430 | 28 | 719 |
| Petroleum | 312 | 65 | 479 | 99 | 374 | 17 | 0 | 43 |
| Plastics | 475 | 141 | 230 | 410 | 407 | 203 | 171 | 131 |
| Leather | 35 | 6 | 10 | 61 | 29 | 22 | 61 | 8 |
| Stone/Clay | 196 | 55 | 340 | 90 | 108 | 12 | 9 | 35 |
| Primary Metals | 587 | 66 | 398 | 193 | 626 | 133 | 68 | 53 |
| Fabr. Metals | 962 | 206 | 338 | 344 | 696 | 536 | 358 | 93 |
| Machinery | 306 | 55 | 67 | 138 | 172 | 197 | 136 | 55 |
| Electrical | 708 | 156 | 265 | 209 | 704 | 403 | 89 | 101 |
| Transportation | 680 | 171 | 175 | 259 | 401 | 334 | 319 | 138 |
| Measure./Photo. | 238 | 51 | 65 | 67 | 111 | 154 | 25 | 49 |
| Miscellaneous | 158 | 59 | 22 | 56 | 95 | 68 | 72 | 33 |
| Multiple codes 20-39 | 796 | 194 | 419 | 305 | 618 | 322 | 176 | 122 |
| No codes 20-39 | 46 | 22 | 32 | 30 | 29 | 35 | 24 | 13 |
| Total | 9,966 | 2,610 | 6,071 | 4,094 | 8,030 | 3,093 | 2,311 | 1,798 |

**Table 2-14. Methods Used to Identify Source Reduction Activity, by Industry, 1991.**

| SIC Code | Industry | Pollution Prevention Opportunity Audit | | Materials Balance Audit | Participative Team Management | Employee Recommendation | |
|---|---|---|---|---|---|---|---|
| | | Internal | External | | | Informal | Formal Program |
| 20 | Food | 235 | 25 | 87 | 245 | 92 | 36 |
| 21 | Tobacco | 9 | 2 | 4 | 1 | 1 | 0 |
| 22 | Textiles | 79 | 4 | 27 | 123 | 39 | 22 |
| 23 | Apparel | 9 | 2 | 1 | 13 | 2 | 0 |
| 24 | Lumber | 183 | 11 | 18 | 221 | 107 | 22 |
| 25 | Furniture | 181 | 35 | 53 | 235 | 154 | 35 |
| 26 | Paper | 199 | 17 | 37 | 251 | 110 | 51 |
| 27 | Printing | 102 | 9 | 37 | 81 | 42 | 37 |
| 28 | Chemicals | 2,388 | 312 | 816 | 3,176 | 1,536 | 752 |
| 29 | Petroleum | 345 | 48 | 37 | 219 | 105 | 67 |
| 30 | Plastics | 469 | 68 | 153 | 519 | 244 | 100 |
| 31 | Leather | 45 | 7 | 19 | 67 | 20 | 5 |
| 32 | Stone/Clay | 161 | 11 | 30 | 146 | 47 | 64 |
| 33 | Primary Metals | 523 | 80 | 169 | 504 | 216 | 86 |
| 34 | Fabr. Metals | 750 | 106 | 282 | 835 | 411 | 188 |
| 35 | Machinery | 282 | 45 | 79 | 285 | 153 | 82 |
| 36 | Electrical | 665 | 52 | 185 | 768 | 310 | 171 |
| 37 | Transportation | 629 | 55 | 183 | 715 | 207 | 189 |
| 38 | Measure./Photo. | 158 | 11 | 57 | 226 | 74 | 50 |
| 39 | Miscellaneous | 107 | 16 | 47 | 115 | 68 | 24 |
| | Multiple codes 20-39 | 638 | 59 | 295 | 775 | 356 | 176 |
| | No codes 20-39 | 51 | 9 | 17 | 60 | 26 | 15 |
| | Total | 8,208 | 984 | 2,633 | 9,580 | 4,320 | 2,172 |
| | Percent of Total | 21.4 | 2.6 | 6.8 | 24.9 | 11.2 | 5.6 |

| Industry | State Program | Federal Program | Trade/ Industry Program | Vendor Assistance | Other | Number of Forms | Percent of Total Forms |
|---|---|---|---|---|---|---|---|
| Food | 6 | 2 | 46 | 165 | 57 | 996 | 2.6 |
| Tobacco | 0 | 0 | 0 | 1 | 0 | 18 | 0.0 |
| Textiles | 1 | 2 | 20 | 110 | 35 | 462 | 1.2 |
| Apparel | 0 | 0 | 1 | 10 | 1 | 39 | 0.1 |
| Lumber | 23 | 12 | 66 | 197 | 71 | 931 | 2.4 |
| Furniture | 9 | 0 | 165 | 437 | 82 | 1,386 | 3.6 |
| Paper | 1 | 1 | 42 | 141 | 136 | 986 | 2.6 |
| Printing | 4 | 4 | 12 | 115 | 38 | 481 | 1.3 |
| Chemicals | 41 | 15 | 257 | 623 | 1,210 | 11,126 | 29.0 |
| Petroleum | 12 | 0 | 29 | 61 | 232 | 1,155 | 3.0 |
| Plastics | 9 | 8 | 132 | 430 | 211 | 2,343 | 6.1 |
| Leather | 1 | 1 | 19 | 63 | 21 | 268 | 0.7 |
| Stone/Clay | 0 | 0 | 19 | 64 | 172 | 714 | 1.9 |
| Primary Metals | 28 | 3 | 91 | 285 | 328 | 2,313 | 6.0 |
| Fabr. Metals | 43 | 21 | 163 | 642 | 312 | 3,753 | 9.8 |
| Machinery | 14 | 1 | 43 | 247 | 89 | 1,320 | 3.4 |
| Electrical | 17 | 0 | 71 | 345 | 238 | 2,822 | 7.3 |
| Transportation | 8 | 8 | 92 | 384 | 205 | 2,675 | 7.0 |
| Measure./Photo. | 8 | 2 | 11 | 85 | 79 | 761 | 2.0 |
| Miscellaneous | 2 | 0 | 20 | 114 | 46 | 559 | 1.5 |
| Multiple codes 20-39 | 23 | 9 | 88 | 361 | 297 | 3,077 | 8.0 |
| No codes 20-39 | 0 | 1 | 4 | 31 | 15 | 229 | 0.6 |
| Total | 250 | 90 | 1,391 | 4,911 | 3,875 | 38,414 | 100.0 |
| Percent of Total | 0.6 | 0.2 | 3.7 | 12.8 | 10.1 | 100.0 | |

Table 2-15. Number of Forms Reporting Source Reduction, by Source Reduction Category, for the Top 50 TRI Chemicals by Number of Forms Reporting Source Reduction Activities, 1991.

| 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 | 3,563 | 1,590 | 44.6 |
| 108-88-3 | Toluene | 3,794 | 1,475 | 38.9 |
| 1330-20-7 | Xylene (mixed isomers) | 3,440 | 1,274 | 37.0 |
| 67-64-1 | Acetone | 2,634 | 961 | 36.5 |
| 78-93-3 | Methyl ethyl ketone | 2,499 | 958 | 38.3 |
| 7664-93-9 | Sulfuric acid | 5,600 | 911 | 16.3 |
| 7664-41-7 | Ammonia | 3,219 | 689 | 21.4 |
| 67-56-1 | Methanol | 2,478 | 640 | 25.8 |
| | Glycol ethers | 2,037 | 607 | 29.8 |
| 76-13-1 | Freon 113 | 1,061 | 591 | 55.7 |
| 7647-01-0 | Hydrochloric acid | 3,290 | 560 | 17.0 |
| 75-09-2 | Dichloromethane | 1,258 | 517 | 41.1 |
| | Zinc compounds | 2,281 | 497 | 21.8 |
| 7664-38-2 | Phosphoric acid | 2,640 | 414 | 15.7 |
| 108-10-1 | Methyl isobutyl ketone | 1,015 | 382 | 37.6 |
| 71-36-3 | n-Butyl alcohol | 1,144 | 379 | 33.1 |
| | Chromium compounds | 1,454 | 377 | 25.9 |
| 100-42-5 | Styrene | 1,381 | 373 | 27.0 |
| 7697-37-2 | Nitric acid | 1,848 | 340 | 18.4 |
| 7440-50-8 | Copper | 2,237 | 320 | 14.3 |
| | Lead compounds | 912 | 307 | 33.7 |
| 107-21-1 | Ethylene glycol | 1,346 | 299 | 22.2 |
| 100-41-4 | Ethylbenzene | 833 | 299 | 35.9 |
| 79-01-6 | Trichloroethylene | 697 | 290 | 41.6 |
| | Copper compounds | 1,392 | 257 | 18.5 |
| 7782-50-5 | Chlorine | 1,614 | 249 | 15.4 |
| | Barium compounds | 987 | 243 | 24.6 |
| 127-18-4 | Tetrachloroethylene | 558 | 210 | 37.6 |
| 7440-02-0 | Nickel | 1,453 | 204 | 14.0 |
| 7440-47-3 | Chromium | 1,413 | 201 | 14.2 |
| 7439-92-1 | Lead | 827 | 173 | 20.9 |
| 50-00-0 | Formaldehyde | 804 | 172 | 21.4 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 536 | 171 | 31.9 |
| | Nickel compounds | 765 | 160 | 20.9 |
| 71-43-2 | Benzene | 480 | 155 | 32.3 |
| 108-95-2 | Phenol | 655 | 147 | 22.4 |
| 91-20-3 | Naphthalene | 448 | 136 | 30.4 |
| 7664-39-3 | Hydrogen fluoride | 518 | 126 | 24.3 |
| | Manganese compounds | 880 | 122 | 13.9 |
| 75-69-4 | Trichlorofluoromethane (CFC-11) | 297 | 116 | 39.1 |
| 101-68-8 | Methylenebis(phenylisocyanate) | 710 | 110 | 15.5 |
| 75-71-8 | Dichlorodifluoromethane (CFC-12) | 372 | 108 | 29.0 |
| 7439-96-5 | Manganese | 1,109 | 104 | 9.4 |
| | Antimony compounds | 463 | 100 | 21.6 |
| 110-82-7 | Cyclohexane | 348 | 99 | 28.4 |
| 7440-66-6 | Zinc (fume or dust) | 472 | 84 | 17.8 |
| | Cyanide compounds | 271 | 79 | 29.2 |
| 111-42-2 | Diethanolamine | 353 | 75 | 21.2 |
| 117-81-7 | Di-(2-ethylhexyl) phthalate | 332 | 73 | 22.0 |
| 115-07-1 | Propylene | 335 | 70 | 20.9 |
| | Subtotal | 71,053 | 18,794 | 26.5 |
| | Total for All TRI Chemicals | 82,293 | 21,381 | 26.0 |

| Chemical | Category of Source Reduction Activity (number of forms reporting) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Good Operating Practices | Inventory Control | Spill and Leak Prevention | Raw Material Modifications | Process Modifications | Cleaning and Degreasing | Surface Preparation and Finishing | Product Modifications |
| 1,1,1-Trichloroethane | 678 | 106 | 192 | 304 | 302 | 812 | 119 | 138 |
| Toluene | 620 | 243 | 328 | 420 | 463 | 157 | 401 | 173 |
| Xylene (mixed isomers) | 542 | 212 | 299 | 297 | 415 | 110 | 481 | 138 |
| Acetone | 428 | 152 | 210 | 197 | 275 | 231 | 129 | 84 |
| Methyl ethyl ketone | 433 | 184 | 187 | 265 | 267 | 134 | 296 | 106 |
| Sulfuric acid | 467 | 86 | 289 | 95 | 416 | 95 | 16 | 31 |
| Ammonia | 348 | 31 | 303 | 64 | 328 | 17 | 6 | 23 |
| Methanol | 281 | 95 | 203 | 138 | 244 | 54 | 108 | 54 |
| Glycol ethers | 274 | 123 | 114 | 179 | 201 | 46 | 100 | 73 |
| Freon 113 | 289 | 39 | 91 | 115 | 152 | 365 | 22 | 38 |
| Hydrochloric acid | 271 | 57 | 200 | 44 | 247 | 64 | 15 | 16 |
| Dichloromethane | 202 | 31 | 109 | 138 | 153 | 152 | 22 | 51 |
| Zinc compounds | 266 | 77 | 132 | 81 | 215 | 30 | 16 | 47 |
| Phosphoric acid | 212 | 67 | 161 | 41 | 146 | 42 | 11 | 22 |
| Methyl isobutyl ketone | 189 | 64 | 101 | 90 | 141 | 42 | 125 | 53 |
| n-Butyl alcohol | 181 | 85 | 97 | 75 | 147 | 25 | 136 | 25 |
| Chromium compounds | 155 | 39 | 90 | 105 | 169 | 27 | 27 | 42 |
| Styrene | 137 | 68 | 132 | 76 | 153 | 28 | 43 | 43 |
| Nitric acid | 165 | 54 | 102 | 31 | 162 | 43 | 13 | 6 |
| Copper | 214 | 35 | 59 | 32 | 150 | 22 | 7 | 30 |
| Lead compounds | 145 | 35 | 62 | 107 | 135 | 5 | 11 | 48 |
| Ethylene glycol | 152 | 43 | 104 | 63 | 101 | 10 | 5 | 25 |
| Ethylbenzene | 148 | 46 | 144 | 60 | 140 | 24 | 24 | 22 |
| Trichloroethylene | 132 | 18 | 44 | 16 | 71 | 168 | 6 | 9 |
| Copper compounds | 163 | 27 | 103 | 26 | 141 | 14 | 6 | 12 |
| Chlorine | 72 | 10 | 54 | 57 | 141 | 8 | 3 | 7 |
| Barium compounds | 118 | 37 | 58 | 68 | 89 | 7 | 18 | 28 |
| Tetrachloroethylene | 117 | 17 | 61 | 25 | 45 | 88 | 4 | 7 |
| Nickel | 108 | 29 | 43 | 28 | 100 | 22 | 4 | 16 |
| Chromium | 108 | 25 | 22 | 28 | 83 | 22 | 11 | 18 |
| Lead | 77 | 6 | 29 | 49 | 64 | 7 | 5 | 31 |
| Formaldehyde | 70 | 16 | 60 | 43 | 75 | 8 | 3 | 17 |
| 1,2,4-Trimethylbenzene | 81 | 24 | 78 | 37 | 73 | 11 | 12 | 12 |
| Nickel compounds | 84 | 10 | 43 | 20 | 95 | 20 | 5 | 14 |
| Benzene | 47 | 5 | 121 | 10 | 98 | 1 | 0 | 4 |
| Phenol | 72 | 22 | 55 | 25 | 74 | 6 | 2 | 7 |
| Naphthalene | 59 | 10 | 88 | 21 | 54 | 5 | 7 | 6 |
| Hydrogen fluoride | 61 | 17 | 32 | 11 | 72 | 12 | 2 | 3 |
| Manganese compounds | 77 | 6 | 34 | 16 | 58 | 2 | 3 | 8 |
| Trichlorofluoromethane (CFC-11) | 40 | 7 | 28 | 39 | 34 | 3 | 8 | 15 |
| Methylenebis(phenylisocyanate) | 61 | 15 | 25 | 13 | 42 | 6 | 7 | 12 |
| Dichlorodifluoromethane (CFC-12) | 40 | 2 | 45 | 21 | 49 | 0 | 0 | 13 |
| Manganese | 68 | 21 | 18 | 17 | 38 | 4 | 4 | 12 |
| Antimony compounds | 58 | 12 | 26 | 13 | 47 | 4 | 0 | 11 |
| Cyclohexane | 38 | 10 | 62 | 9 | 46 | 4 | 1 | 6 |
| Zinc (fume or dust) | 51 | 9 | 30 | 20 | 37 | 6 | 3 | 7 |
| Cyanide compounds | 26 | 10 | 20 | 16 | 44 | 13 | 2 | 2 |
| Diethanolamine | 34 | 8 | 26 | 12 | 29 | 1 | 0 | 13 |
| Di-(2-ethylhexyl) phthalate | 26 | 3 | 12 | 34 | 19 | 0 | 1 | 11 |
| Propylene | 23 | 2 | 44 | 1 | 30 | 0 | 0 | 0 |
| Subtotal | 8,708 | 2,350 | 4,970 | 3,692 | 6,870 | 2,977 | 2,250 | 1,589 |
| Total for All TRI Chemicals | 9,966 | 2,610 | 6,071 | 4,094 | 8,030 | 3,093 | 2,311 | 1,798 |

**Table 2-16. Methods Used to Identify Source Reduction Activities for the Top 50 Chemicals by Number of Forms Reporting Source Reduction Activities, 1991.**

| CAS Number | Chemical | Number of Forms Reporting Source Reduction Activities | Pollution Prevention Opportunity Audit | | Materials Balance Audit | Participative Team Management | Employee Recommendation | |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | Informal | Formal Program |
| 71-55-6 | 1,1,1-Trichloroethane | 1,590 | 680 | 87 | 197 | 690 | 306 | 212 |
| 108-88-3 | Toluene | 1,475 | 512 | 76 | 178 | 650 | 289 | 143 |
| 1330-20-7 | Xylene (mixed isomers) | 1,274 | 494 | 60 | 142 | 550 | 276 | 111 |
| 67-64-1 | Acetone | 961 | 362 | 47 | 118 | 423 | 183 | 97 |
| 78-93-3 | Methyl ethyl ketone | 958 | 350 | 45 | 131 | 456 | 206 | 98 |
| 7664-93-9 | Sulfuric acid | 911 | 331 | 30 | 94 | 418 | 218 | 76 |
| 7664-41-7 | Ammonia | 689 | 249 | 25 | 89 | 285 | 151 | 63 |
| 67-56-1 | Methanol | 640 | 226 | 14 | 86 | 270 | 146 | 71 |
| | Glycol ethers | 607 | 206 | 19 | 73 | 293 | 122 | 63 |
| 76-13-1 | Freon 113 | 591 | 278 | 22 | 85 | 316 | 111 | 82 |
| 7647-01-0 | Hydrochloric acid | 560 | 209 | 23 | 77 | 237 | 141 | 53 |
| 75-09-2 | Dichloromethane | 517 | 194 | 20 | 82 | 214 | 96 | 50 |
| | Zinc compounds | 497 | 200 | 25 | 57 | 229 | 111 | 55 |
| 7664-38-2 | Phosphoric acid | 414 | 123 | 13 | 63 | 192 | 75 | 32 |
| 108-10-1 | Methyl isobutyl ketone | 382 | 149 | 19 | 53 | 183 | 76 | 45 |
| 71-36-3 | n-Butyl alcohol | 379 | 133 | 19 | 47 | 169 | 91 | 51 |
| | Chromium compounds | 377 | 156 | 20 | 38 | 163 | 70 | 29 |
| 100-42-5 | Styrene | 373 | 134 | 23 | 41 | 138 | 63 | 34 |
| 7697-37-2 | Nitric acid | 340 | 121 | 9 | 44 | 175 | 75 | 30 |
| 7440-50-8 | Copper | 320 | 117 | 25 | 56 | 145 | 53 | 40 |
| | Lead compounds | 307 | 120 | 16 | 32 | 150 | 68 | 36 |
| 107-21-1 | Ethylene glycol | 299 | 118 | 8 | 38 | 134 | 55 | 28 |
| 100-41-4 | Ethylbenzene | 299 | 128 | 20 | 23 | 130 | 65 | 44 |
| 79-01-6 | Trichloroethylene | 290 | 120 | 9 | 37 | 120 | 68 | 28 |
| | Copper compounds | 257 | 114 | 9 | 22 | 113 | 72 | 20 |
| 7782-50-5 | Chlorine | 249 | 100 | 10 | 18 | 91 | 41 | 21 |
| | Barium compounds | 243 | 89 | 9 | 34 | 116 | 55 | 27 |
| 127-18-4 | Tetrachloroethylene | 210 | 93 | 14 | 23 | 96 | 39 | 19 |
| 7440-02-0 | Nickel | 204 | 61 | 9 | 35 | 93 | 43 | 19 |
| 7440-47-3 | Chromium | 201 | 56 | 4 | 37 | 90 | 40 | 18 |
| 7439-92-1 | Lead | 173 | 63 | 15 | 22 | 73 | 33 | 14 |
| 50-00-0 | Formaldehyde | 172 | 73 | 7 | 21 | 76 | 42 | 18 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 171 | 66 | 8 | 11 | 71 | 33 | 18 |
| | Nickel compounds | 160 | 77 | 4 | 22 | 76 | 42 | 11 |
| 71-43-2 | Benzene | 155 | 71 | 16 | 14 | 37 | 19 | 14 |
| 108-95-2 | Phenol | 147 | 61 | 10 | 22 | 69 | 18 | 14 |
| 91-20-3 | Naphthalene | 136 | 57 | 10 | 6 | 45 | 28 | 10 |
| 7664-39-3 | Hydrogen fluoride | 126 | 44 | 3 | 20 | 57 | 27 | 15 |
| | Manganese compounds | 122 | 57 | 3 | 10 | 51 | 26 | 11 |
| 75-69-4 | Trichlorofluoro-methane (CFC-11) | 116 | 29 | 1 | 17 | 41 | 19 | 7 |
| 101-68-8 | Methylenebis(phenyl-isocyanate) | 110 | 35 | 5 | 9 | 58 | 21 | 6 |
| 75-71-8 | Dichlorodifluoromethane (CFC-12) | 108 | 40 | 11 | 16 | 40 | 17 | 9 |
| 7439-96-5 | Manganese | 104 | 33 | 6 | 21 | 41 | 17 | 6 |
| | Antimony compounds | 100 | 39 | 1 | 21 | 53 | 28 | 16 |
| 110-82-7 | Cyclohexane | 99 | 44 | 6 | 7 | 33 | 13 | 13 |
| 7440-66-6 | Zinc (fume or dust) | 84 | 33 | 6 | 10 | 38 | 16 | 4 |
| | Cyanide compounds | 79 | 32 | 6 | 9 | 35 | 10 | 6 |
| 111-42-2 | Diethanolamine | 75 | 25 | 1 | 7 | 34 | 10 | 4 |
| 117-81-7 | Di-(2-ethylhexyl) phthalate | 73 | 25 | 3 | 9 | 32 | 16 | 8 |
| 115-07-1 | Propylene | 70 | 27 | 5 | 3 | 21 | 6 | 5 |
| | Subtotal | 18,794 | 7,154 | 856 | 2,327 | 8,310 | 3,846 | 1,904 |
| | Total for All TRI Chemicals | 21,381 | 8,208 | 984 | 2,633 | 9,580 | 4,320 | 2,172 |

| Chemical | State Program | Federal Program | Trade/ Industry Program | Vendor Assistance | Other | Number of Forms | Percent of Total Forms |
|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 21 | 13 | 111 | 443 | 197 | 2,957 | 7.7 |
| Toluene | 23 | 8 | 110 | 466 | 271 | 2,726 | 7.1 |
| Xylene (mixed isomers) | 20 | 4 | 98 | 454 | 222 | 2,431 | 6.3 |
| Acetone | 17 | 4 | 97 | 273 | 148 | 1,769 | 4.6 |
| Methyl ethyl ketone | 11 | 5 | 81 | 299 | 145 | 1,827 | 4.8 |
| Sulfuric acid | 3 | 2 | 39 | 168 | 162 | 1,541 | 4.0 |
| Ammonia | 4 | 1 | 42 | 113 | 117 | 1,139 | 3.0 |
| Methanol | 2 | 2 | 53 | 152 | 118 | 1,140 | 3.0 |
| Glycol ethers | 4 | 3 | 38 | 167 | 111 | 1,099 | 2.9 |
| Freon 113 | 7 | 2 | 31 | 140 | 88 | 1,162 | 3.0 |
| Hydrochloric acid | 5 | 2 | 23 | 82 | 108 | 960 | 2.5 |
| Dichloromethane | 6 | 4 | 26 | 117 | 104 | 913 | 2.4 |
| Zinc compounds | 3 | 1 | 22 | 81 | 87 | 871 | 2.3 |
| Phosphoric acid | 3 | 4 | 21 | 95 | 63 | 684 | 1.8 |
| Methyl isobutyl ketone | 11 | 3 | 35 | 107 | 68 | 749 | 1.9 |
| n-Butyl alcohol | 5 | 2 | 42 | 109 | 61 | 729 | 1.9 |
| Chromium compounds | 6 | 3 | 31 | 94 | 75 | 685 | 1.8 |
| Styrene | 5 | 6 | 53 | 114 | 86 | 697 | 1.8 |
| Nitric acid | 2 | 2 | 15 | 71 | 47 | 591 | 1.5 |
| Copper | 6 | 0 | 25 | 60 | 58 | 585 | 1.5 |
| Lead compounds | 5 | 0 | 13 | 64 | 74 | 578 | 1.5 |
| Ethylene glycol | 1 | 0 | 12 | 48 | 52 | 494 | 1.3 |
| Ethylbenzene | 3 | 0 | 11 | 48 | 73 | 545 | 1.4 |
| Trichloroethylene | 6 | 1 | 11 | 76 | 51 | 527 | 1.4 |
| Copper compounds | 7 | 4 | 22 | 55 | 26 | 464 | 1.2 |
| Chlorine | 1 | 0 | 16 | 52 | 52 | 402 | 1.0 |
| Barium compounds | 1 | 0 | 5 | 40 | 56 | 432 | 1.1 |
| Tetrachloroethylene | 2 | 1 | 21 | 49 | 37 | 394 | 1.0 |
| Nickel | 1 | 0 | 14 | 41 | 33 | 349 | 0.9 |
| Chromium | 1 | 1 | 14 | 38 | 35 | 334 | 0.9 |
| Lead | 3 | 0 | 18 | 26 | 50 | 317 | 0.8 |
| Formaldehyde | 1 | 0 | 6 | 29 | 27 | 300 | 0.8 |
| 1,2,4-Trimethylbenzene | 6 | 1 | 16 | 23 | 41 | 294 | 0.8 |
| Nickel compounds | 4 | 0 | 7 | 36 | 29 | 308 | 0.8 |
| Benzene | 3 | 1 | 7 | 17 | 57 | 256 | 0.7 |
| Phenol | 2 | 0 | 6 | 23 | 33 | 258 | 0.7 |
| Naphthalene | 0 | 0 | 5 | 18 | 41 | 220 | 0.6 |
| Hydrogen fluoride | 0 | 0 | 3 | 20 | 35 | 224 | 0.6 |
| Manganese compounds | 0 | 0 | 3 | 17 | 18 | 196 | 0.5 |
| Trichlorofluoromethane (CFC-11) | 1 | 0 | 16 | 55 | 20 | 206 | 0.5 |
| Methylenebis(phenyl-isocyanate) | 0 | 0 | 7 | 45 | 15 | 201 | 0.5 |
| Dichlorodifluoromethane (CFC-12) | 0 | 0 | 6 | 20 | 30 | 189 | 0.5 |
| Manganese | 2 | 0 | 8 | 25 | 20 | 179 | 0.5 |
| Antimony compounds | 1 | 0 | 2 | 14 | 11 | 186 | 0.5 |
| Cyclohexane | 2 | 0 | 4 | 10 | 25 | 157 | 0.4 |
| Zinc (fume or dust) | 4 | 0 | 8 | 23 | 11 | 153 | 0.4 |
| Cyanide compounds | 1 | 1 | 4 | 19 | 17 | 140 | 0.4 |
| Diethanolamine | 1 | 0 | 5 | 11 | 14 | 112 | 0.3 |
| Di-(2-ethylhexyl) phthalate | 0 | 0 | 7 | 18 | 8 | 126 | 0.3 |
| Propylene | 0 | 0 | 2 | 9 | 28 | 106 | 0.3 |
| Subtotal | 223 | 81 | 1,272 | 4,574 | 3,355 | 33,902 | 88.3 |
| Total for All TRI Chemicals | 250 | 90 | 1,391 | 4,911 | 3,875 | 38,414 | 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 Pollution Prevention Act 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 from the prior year to the reporting year. For the 1991 reporting year, the ratio is calculated by dividing the production or activity involving the reported toxic chemical in 1991 by the production or activity involving the reported toxic chemical in 1990. A ratio that is less than 1.0 indicates that production or activity is down in 1991 as compared to 1990. 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 2-17 shows the distribution of the ratios reported for 1991.

## 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 not any one clear method for measuring progress. Comparing changes in quantities of toxic chemicals in wastes when source reduction has been implemented is one, but this does not take production into account. There is also a method for using the new 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 would require more detailed information than is currently 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 1990 and 1991 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 following method shows 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.

**Table 2-17. Distribution of Production Index**

| Index | Number of Forms Reporting Number | Percent of Forms Reporting Percent | Cumulative Percent of Forms Reporting Percent | Production Related Wastes 1991 Pounds | Cumulative Percent of 1991 Waste Percent | Percent of 1991 Waste Percent |
|---|---|---|---|---|---|---|
| 0.1 | 387 | 0.5 | 0.5 | 99,844,277 | 0.3 | 0.3 |
| 0.2 | 319 | 0.4 | 1.0 | 23,003,097 | 0.1 | 0.3 |
| 0.3 | 538 | 0.7 | 1.7 | 42,828,818 | 0.1 | 0.4 |
| 0.4 | 664 | 0.9 | 2.6 | 112,231,094 | 0.3 | 0.7 |
| 0.5 | 1,165 | 1.6 | 4.2 | 304,143,844 | 0.8 | 1.6 |
| 0.6 | 1,929 | 2.6 | 6.9 | 251,348,459 | 0.7 | 2.2 |
| 0.7 | 3,402 | 4.7 | 11.5 | 1,249,794,006 | 3.4 | 5.6 |
| 0.8 | 6,482 | 8.9 | 20.4 | 1,891,423,137 | 5.1 | 10.7 |
| 0.9 | 11,928 | 16.3 | 36.7 | 5,000,228,330 | 13.5 | 24.2 |
| 1.0 | 19,901 | 27.3 | 64.0 | 17,645,545,829 | 47.5 | 71.7 |
| 1.1 | 10,236 | 14.0 | 78.0 | 5,165,680,745 | 13.9 | 85.6 |
| 1.2 | 5,154 | 7.1 | 85.1 | 1,329,404,937 | 3.6 | 89.2 |
| 1.3 | 2,966 | 4.1 | 89.1 | 810,013,352 | 2.2 | 91.4 |
| 1.4 | 1,518 | 2.1 | 91.2 | 704,114,957 | 1.9 | 93.3 |
| 1.5 | 1,188 | 1.6 | 92.8 | 250,509,085 | 0.7 | 94.0 |
| 1.6 | 651 | 0.9 | 93.7 | 363,009,377 | 1.0 | 95.0 |
| 1.7 | 540 | 0.7 | 94.5 | 119,523,807 | 0.3 | 95.3 |
| 1.8 | 364 | 0.5 | 95.0 | 44,817,386 | 0.1 | 95.4 |
| 1.9 | 350 | 0.5 | 95.5 | 211,063,288 | 0.6 | 96.0 |
| 2.0 - 2.9 | 1,337 | 1.8 | 97.3 | 495,322,653 | 1.3 | 97.3 |
| 3.0 - 3.9 | 416 | 0.6 | 97.9 | 135,318,940 | 0.4 | 97.7 |
| 4.0 - 4.9 | 217 | 0.3 | 98.2 | 122,436,848 | 0.3 | 98.0 |
| 5.0 - 9.9 | 381 | 0.5 | 98.7 | 211,425,605 | 0.6 | 98.6 |
| 10.0-24.9 | 224 | 0.3 | 99.0 | 22,708,453 | 0.1 | 98.6 |
| 25.0-49.9 | 89 | 0.1 | 99.1 | 43,041,558 | 0.1 | 98.7 |
| 50.0-99.9 | 426 | 0.6 | 99.7 | 433,011,949 | 1.2 | 99.9 |
| > 100 | 228 | 0.3 | 100.0 | 33,401,158 | 0.1 | 100.0 |
| Total | 73,000 | 100.0 | | 37,115,194,989 | 100.0 | |
| **Zero or Blank or NA for Index** | | | | | | |
| Zero | 604 | | | 10,878,392 | | |
| Blank | 4,537 | | | 263,939,613 | | |
| NA | 4,116 | | | 360,623,549 | | |
| Total | 9,257 | | | 635,441,554 | | |
| **Negative Number for Index** | | | | | | |
| Total | 36 | | | 3,861,218 | | |

1) Sum Sections 8.1 through 8.7 for the prior year (1990)
2) Sum Sections 8.1 through 8.7 for the current year (1991)
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 current 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 means that the total quantity of the toxic chemical in wastes the facility reported for the current year (1991) 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 the facility reported for the current year (1991) 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.

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 current and prior year data. A decrease could be an indication of progress while an increase could indicate that progress is not happening. An increase could also indicate that source reduction in the form of chemical substitution has been implemented.

As this is the first year of PPA data, it is not yet clear how best to interpret the data that have been submitted. Thus, this data release will provide some basic analyses to stimulate debate and input from the public on how best to measure progress. The following examples illustrate how the above method can be used to assess changes in the quantities of toxic chemicals in wastes relative to changes in production or activity. These examples also show some situations that can arise when performing these analyses. In all of the following examples, the facility has indicated that at least one source reduction activity has been implemented for the reported toxic chemical.

## *CASE 1 Facility A reports on methanol*

Facility A reports the following:
Total quantity of toxic chemical (methanol) in wastes, 1990 (pounds): 1,100,750
Total quantity of toxic chemical (methanol) in wastes, 1991 (pounds): 740,750
Production ratio: 1.00

The total quantity of methanol in wastes decreased by 33% between 1990 and 1991 ([740,750 - 1,100,750]/1,100,750 = -0.33). Since production is constant (i.e., the production ratio = 1.0), there is no difference between the quantity reported for 1990 and the quantity expected for 1991 (1,100,750 x 1 = 1,100,750). Thus, the relative (adjusted for production) and absolute changes in the quantity of methanol in wastes are the same, a decrease of 360,000 pounds. Given the assumption of a direct relationship between production and the generation of wastes which must subsequently be managed, this situation indicates that reduction of the toxic chemical in wastes may be occurring, as the quantity methanol in waste is decreasing while production remains constant.

## *CASE 2 Facility B reports on xylenes*

Facility B reports the following:
Total quantity of toxic chemical (xylenes) in wastes, 1990 (pounds): 2,317,000
Total quantity of toxic chemical (xylenes) in wastes, 1991 (pounds): 2,269,700
Production ratio: 0.98

The total quantity of xylenes in wastes decreased between 1990 and 1991 by approximately 2% ([2,269,700 - 2,317,000]/2,317,000 = -0.02), and production fell by 2% (0.98 - 1.00 = -0.02). Adjusting for production, the quantity of xylenes in wastes expected for 1991 is 2,270,660 pounds (2,317,000 x 0.98 = 2,270,660). The quantity reported for 1991 is 960 pounds less than what was expected for 1991 (2,269,700 - 2,270,660 = -960). In this instance, adjusting for production shows a slight decrease in the quantity of the toxic chemical in wastes from what could be expected. This decrease relative to changes in production (960 pounds) is smaller than the absolute decrease (47,300 pounds) in the amount of xylenes in wastes between the two years. Given the assumption of a direct relationship between production activities and the generation of wastes, this indicates that there could have been a small decrease in the amount of xylenes in waste generated per unit of production.

## *CASE 3 Facility C reports on 1,3-butadiene*

Facility C reports the following:
Total quantity of toxic chemical (1,3-butadiene) in wastes, 1990 (pounds): 3,320,000
Total quantity of toxic chemical (1,3-butadiene) in wastes, 1991 (pounds): 2,701,000
Production ratio: 1.10

The total quantity of 1,3-butadiene in wastes between 1990 and 1991 decreased by 19% ([2,701,000 - 3,320,000]/3,320,000 = -0.19), while production increased by 10% (1.10 - 1.00 = 0.10). Adjusting for production, the expected quantity of 1,3-butadiene in wastes for 1991 would be 3,652,000 pounds (3,320,000 x 1.10 = 3,652,000). The quantity reported for 1991 is 951,000 pounds (2,701,000 - 3,652,000 = 951,000) less than the quantity expected for that year. This indicates a relative decrease in 1,3-butadiene in wastes even greater than the absolute decrease of 619,000 pounds, and indicates that there could have been a substantial decrease in the amount of 1,3-butadiene in wastes generated per unit of production.

## *CASE 4 Facility D reports on dichloromethane*

Facility D reports the following:
Total quantity of toxic chemical (dichloromethane) in wastes, 1990 (pounds): 390,000
Total quantity of toxic chemical (dichloromethane) in wastes, 1991 (pounds): 730,000
Production ratio: 2.40

The total quantity of dichloromethane in wastes between 1990 and 1991 increased by 87% ([730,000 - 390,000]/390,000 = 0.87), while production increased by 140% (2.40 - 1.00 = 1.40). Adjusting for production, the expected quantity of dichloromethane in wastes for 1991 would be 936,000 pounds (390,000 x 2.40 = 936,000). The quantity reported for 1991 is 206,000 pounds (730,000 - 936,000 = -206,000) less than the quantity expected for that year. Given the assumption of a direct relationship between production activities and the generation of wastes, this indicates a decrease in dichloromethane in wastes relative to the large increase in production, and even though there was an absolute increase in the amount of dichloromethane in wastes, there could have been a substantial decrease in the amount of dichloromethane in wastes generated per unit of production.

## CHANGES IN QUANTITIES OF TOXIC CHEMICALS IN WASTES AT THE NATIONAL LEVEL

EPA performed a preliminary analysis of the data received for 1991 using the technique outlined above. Of the 82,293 Form Rs submitted for 1991, 50,957 forms had sufficient information for both 1990 and 1991 to perform an analysis of the changes of the quantity of toxic chemicals in wastes for those two years. Of those 50,957 forms, 13,679 (approximately 27%, or 17% of the total 82,293 forms submitted) indicated the implementation of a source reduction activity. For this subset of facilities that reported source reduction and provided sufficient information for both 1990 and 1991, the quantity of toxic chemicals in wastes reported on those forms decreased by 7% between 1990 and 1991 in absolute terms (see Table 2-18). Adjusting for production changes indicates a slightly greater decrease of almost 10%.

As shown in Table 2-19, forms that did not indicate the implementation of source reduction showed a slight increase in the total quantity of toxic chemicals entering wastes. This increase was 0.6% in absolute terms and 0.1% adjusted for production.

EPA has further analyzed this subset of the 1991 data further 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. 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 is continuing to analyze this data in order to more fully understand why increases and decreases in quantities in quantities of toxic chemicals in wastes are occurring. EPA will also be further developing methods for analyzing this new data and will be seeking public input on such analyses and what conclusions can be drawn from them.

**Table 2-18. Change in Quantities of Toxic Chemicals in Wastes from 1990 to 1991 for Facilities Reporting Source Reduction Activities.(g)**

| Category of Waste Generated | 1990 Reported Quantity Pounds | 1990 Reported Percent of Total | 1991 Reported Quantity Pounds | 1991 Reported Percent of Total | Amount Expected for 1991 Quantity Pounds | Amount Expected for 1991 Percent of Total |
|---|---|---|---|---|---|---|
| Recycled On-site | 4,288,934,120 | 44.1 | 4,142,850,655 | 45.9 | 4,221,103,018 | 42.3 |
| Recycled Off-site | 531,795,145 | 5.5 | 463,835,017 | 5.1 | 530,172,516 | 5.3 |
| Energy Recovery On-site | 802,755,967 | 8.3 | 795,579,596 | 8.8 | 860,121,878 | 8.6 |
| Energy Recovery Off-site | 154,851,112 | 1.6 | 148,940,697 | 1.6 | 166,264,791 | 1.7 |
| Treated On-site | 2,503,434,947 | 25.7 | 2,255,785,438 | 25.0 | 2,684,299,601 | 26.9 |
| Treated Off-site | 191,688,210 | 2.0 | 151,075,322 | 1.7 | 185,264,814 | 1.9 |
| Quantity Released(b) | 1,251,761,547 | 12.9 | 1,077,462,015 | 11.9 | 1,329,116,688 | 13.3 |
| Total | 9,725,221,048 | 100.0 | 9,035,528,740 | 100.0 | 9,976,343,306 | 100.0 |

| Category of Waste Generated | Absolute Change 1991-1990 Quantity Pounds | Absolute Change 1991-1990 Percent Change | Relative Change 1991 Rep. - 1991 Exp. Quantity Pounds | Relative Change 1991 Rep. - 1991 Exp. Percent Change |
|---|---|---|---|---|
| Recycled On-site | -146,083,465 | -3.4 | -78,252,363 | -1.8 |
| Recycled Off-site | -67,960,128 | -12.8 | -66,337,499 | -12.5 |
| Energy Recovery On-site | -7,176,371 | -0.9 | -64,542,282 | -8.0 |
| Energy Recovery Off-site | -5,910,415 | -3.8 | -17,324,094 | -11.2 |
| Treated On-site | -247,649,509 | -9.9 | -428,514,163 | -17.1 |
| Treated Off-site | -40,612,888 | -21.2 | -34,189,492 | -17.8 |
| Quantity Released(b) | -174,299,532 | -13.9 | -251,654,673 | -20.1 |
| Total | -689,692,308 | -7.1 | -940,814,566 | -9.7 |

**Table 2-19. Change in Quantities of Toxic Chemicals in Wastes from 1990 to 1991 for Facilities Not Reporting Source Reduction Activities.(h)**

| Category of Waste Generated | 1990 Reported Quantity Pounds | 1990 Reported Percent of Total | 1991 Reported Quantity Pounds | 1991 Reported Percent of Total | Amount Expected for 1991 Quantity Pounds | Amount Expected for 1991 Percent of Total |
|---|---|---|---|---|---|---|
| Recycled On-site | 8,377,872,770 | 44.5 | 8,404,984,183 | 44.4 | 8,246,932,874 | 43.6 |
| Recycled Off-site | 1,719,965,885 | 9.1 | 1,681,409,450 | 8.9 | 1,699,825,896 | 9.0 |
| Energy Recovery On-site | 1,306,776,700 | 6.9 | 1,359,061,268 | 7.2 | 1,376,186,334 | 7.3 |
| Energy Recovery Off-site | 114,743,884 | 0.6 | 116,702,877 | 0.6 | 121,598,004 | 0.6 |
| Treated On-site | 5,293,106,366 | 28.1 | 5,349,008,719 | 28.2 | 5,406,464,292 | 28.6 |
| Treated Off-site | 493,196,042 | 2.6 | 474,545,889 | 2.5 | 480,944,499 | 2.5 |
| Quantity Released(b) | 1,527,059,904 | 8.1 | 1,557,913,296 | 8.2 | 1,585,227,169 | 8.4 |
| Total | 18,832,721,551 | 100.0 | 18,943,625,682 | 100.0 | 18,917,179,068 | 100.0 |

| Category of Waste Generated | Absolute Change 1991-1990 Quantity Pounds | Absolute Change 1991-1990 Percent Change | Relative Change 1991 Rep. - 1991 Exp. Quantity Pounds | Relative Change 1991 Rep. - 1991 Exp. Percent Change |
|---|---|---|---|---|
| Recycled On-site | 27,111,413 | 0.3 | 158,051,309 | 1.9 |
| Recycled Off-site | -38,556,435 | -2.2 | -18,416,446 | -1.1 |
| Energy Recovery On-site | 52,284,568 | 4.0 | -17,125,066 | -1.3 |
| Energy Recovery Off-site | 1,958,993 | 1.7 | -4,895,127 | -4.2 |
| Treated On-site | 55,902,353 | 1.1 | -57,455,573 | -1.1 |
| Treated Off-site | -18,650,153 | -3.8 | -6,398,610 | -1.3 |
| Quantity Released(b) | 30,853,392 | 2.0 | -27,313,873 | -1.8 |
| Total | 110,904,131 | 0.6 | 26,446,614 | 0.1 |

## Notes

(a) Submission of prior year (1990) data was optional in this first year of reporting. Data for 1992 and 1993 were estimated projections by the facilities submitting Form Rs for the 1991 reporting year. They do not represent reported totals for the 1992 or 1993 reporting years (Tables 2-1 and 2-2).

(b) "Quantity Released" includes amounts released on-site and amounts sent off-site for disposal (Tables 2-1 through 2-5, 2-9, 2-18, and 2-19).

(c) "Total Production Related Wastes" refers to wastes associated with routine production processes and is the sum of the amounts in the preceding seven columns (i.e., amounts recycled on- and off-site, used for energy recovery on- and off-site, treated on- and off-site, and released) (Tables 2-3, 2-4, and 2-5).

(d) "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 (Tables 2-3, 2-4, and 2-5).

(e) The trade secret claim for 900,000,000 pounds recycled on-site and 360,000 pounds treated on-site has been withdrawn. The chemical has been identified as diethyl phthalate (Table 2-5).

**(f) Source Reduction Activity Codes (Table 2-10):**

**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

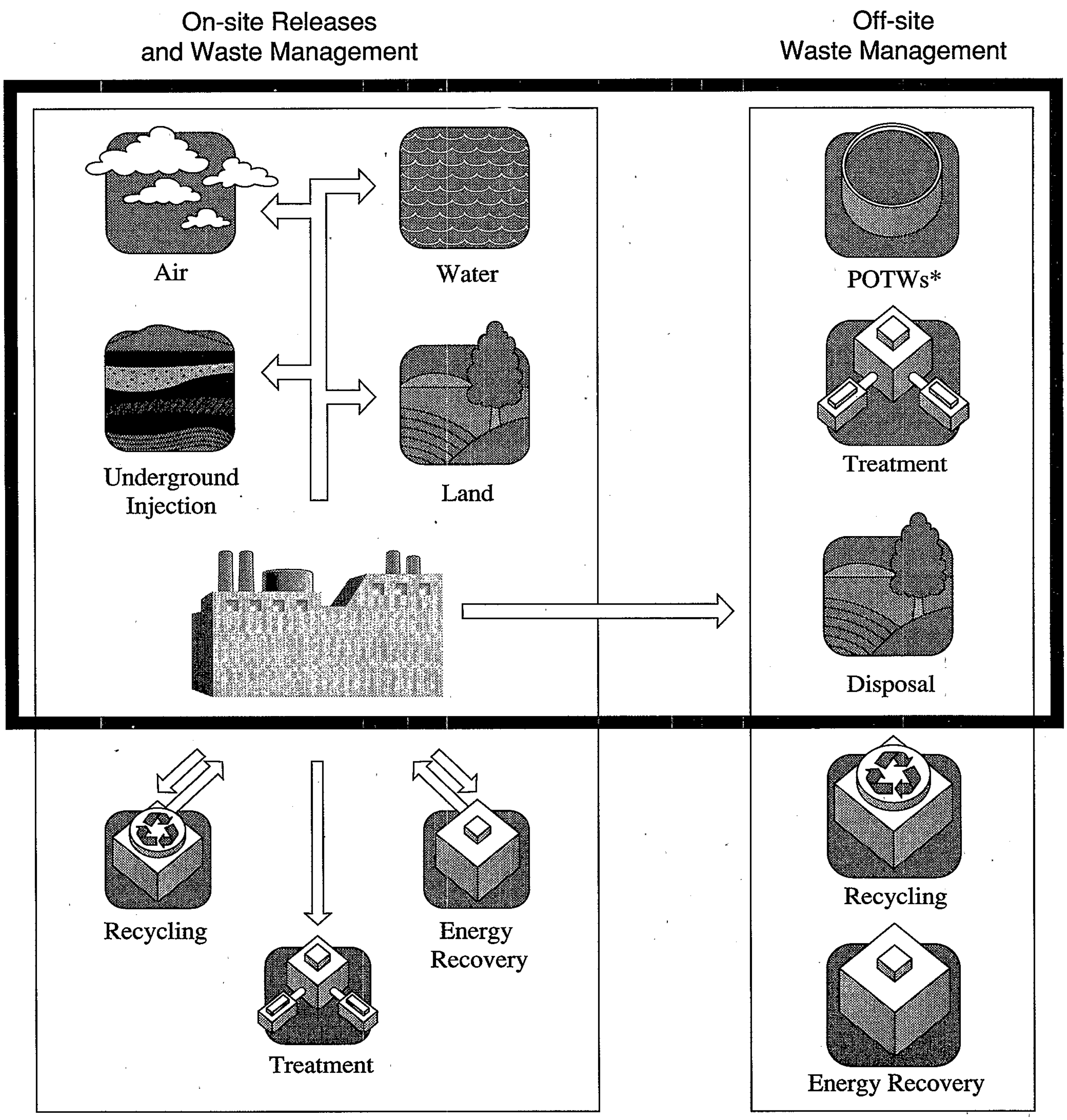
**Product Modifications**

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

(g) 13,679 of the 50,957 Form Rs met these criteria (Table 2-18).

(h) 37,278 of the 50,957 Form Rs met these criteria (Table 2-19).

# Chapter 3
# 1988 to 1991
# Comparison Year Data




* Publicly Owned Treatment Works

# 1988 TO 1991 COMPARISON YEAR DATA

## INTRODUCTION

### Baseline Year

1991 marks the fifth reporting year for the TRI program. This section of the report summarizes the TRI data for 1988 through 1991 to allow comparisons across years to help identify changes and trends. 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 seven individually listed chemicals and three members of the copper compounds category that did not meet the toxicity criteria. Also in response to a petition, EPA deleted non-fibrous aluminum oxide, but retained fibrous forms of aluminum oxide on the list. EPA has 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. More complete information about chemical list changes is included in Chapter 1 and the Question and Answer section of the Appendix.

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 1988-1991 comparison section may differ slightly from totals seen in the 1990-1991 comparison section and from the totals presented in Chapter 1 of this report.

### 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 or 1991 reporting years, so threshold changes should not be a factor in comparing 1991 data to 1990 or 1989 data. Threshold changes would be a factor to consider when comparing 1991 data to 1988 data.

## 1988 to 1991 Data Comparisons

This section compares summary release and transfer data for the 1988 through 1991 reporting years in order to highlight and help explain changes and possible trends.

Tables and text in this section include only those chemicals listed for all reporting years from 1988 through 1991; any chemicals added or deleted during that time are not included. This section includes releases to all media, as well as transfers to POTWs and to other off-site locations for treatment and disposal. Off-site transfers reported without waste management codes or with invalid codes are included in a category called "other off-site transfers." Transfers for recycling and energy recovery for 1991 are not included in this chapter, because they were first required to be reported for the 1991 reporting year.

### 1988 to 1991 Releases and Transfers

Since 1988, TRI reported releases have declined nearly 31%, from 4.85 billion pounds in 1988 to 3.35 billion pounds in 1991. Reported transfers have declined 33.5%, from 1.6 billion pounds in 1988 to 1.06 billion pounds in 1991.

**Table 3-1. Comparison of TRI Releases and Transfers, 1988 - 1991.**

| | 1988 | 1989 | 88-89 Percent Change | 1990 | 89-90 Percent Change | 1991 | 90-91 Percent Change | 88-91 Percent Change |
|---|---|---|---|---|---|---|---|---|
| | Number | Number | Percent | Number | Percent | Number | Percent | Percent |
| Total Facilities | 22,189 | 24,074 | 8.5 | 24,332 | 1.1 | 23,608 | -3.0 | 6.4 |
| Total Forms | 77,515 | 85,927 | 10.9 | 85,180 | -0.9 | 81,157 | -4.7 | 4.7 |
| | Pounds | Pounds | Percent | Pounds | Percent | Pounds | Percent | Percent |
| Total Air Emissions | 2,666,109,198 | 2,562,194,620 | -3.9 | 2,282,703,155 | -10.9 | 1,979,345,978 | -13.3 | -25.8 |
| Fugitive Air | 823,738,542 | 793,597,781 | -3.7 | 706,748,307 | -10.9 | 609,765,664 | -13.7 | -26.0 |
| Point source Air | 1,842,370,656 | 1,768,596,839 | -4.0 | 1,575,954,848 | -10.9 | 1,369,580,314 | -13.1 | -25.7 |
| Surface Water Discharges | 311,070,591 | 188,025,233 | -39.6 | 196,832,760 | 4.7 | 243,497,317 | 23.7 | -21.7 |
| Underground Injection | 1,343,633,468 | 1,175,583,836 | -12.5 | 745,413,562 | -36.6 | 710,248,004 | -4.7 | -47.1 |
| On-site Land Releases | 527,546,722 | 455,029,001 | -13.7 | 462,679,392 | 1.7 | 421,160,113 | -9.0 | -20.2 |
| Total Releases | 4,848,359,979 | 4,380,832,690 | -9.6 | 3,687,628,869 | -15.8 | 3,354,251,412 | -9.0 | -30.8 |
| Transfers to POTWs | 574,045,380 | 558,575,158 | -2.7 | 466,123,084 | -16.6 | 410,596,887 | -11.9 | -28.5 |
| Transfers to Treatment | 489,219,375 | 464,928,284 | -5.0 | 373,479,495 | -19.7 | 350,400,454 | -6.2 | -28.4 |
| Transfers to Disposal | 485,346,782 | 397,690,166 | -18.1 | 431,994,463 | 8.6 | 294,391,066 | -31.9 | -39.3 |
| Other Off-site Transfers(a) | 53,545,448 | 27,737,608 | -48.2 | 36,977,876 | 33.3 | 9,522,463 | — | — |
| Total Transfers | 1,602,156,985 | 1,448,931,216 | -9.6 | 1,308,574,918 | -9.7 | 1,064,910,870 | -18.6 | -33.5 |
| Total Releases and Transfers | 6,450,516,964 | 5,829,763,906 | -9.6 | 4,996,203,787 | -14.3 | 4,419,162,282 | -11.5 | -31.5 |

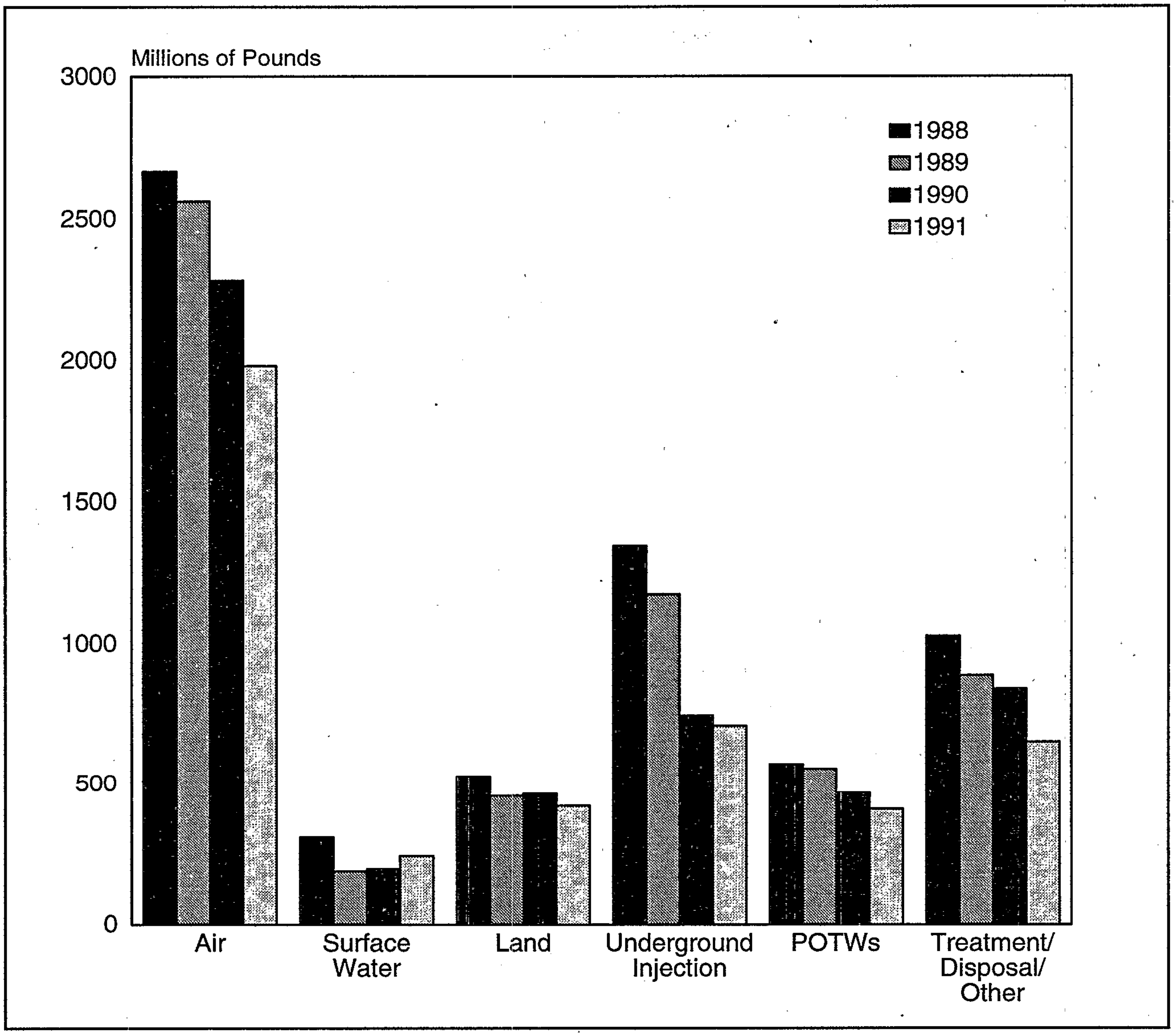



**Figure 3-1. TRI Releases and Transfers, 1988-1991.**

Air emissions have declined about 26%, from 2.67 billion pounds in 1988 to 1.98 billion pounds in 1991. Surface water discharges have declined nearly 22%, from 311 million pounds in 1988 to nearly 244 million pounds in 1991. Reported water releases decreased nearly 40% from 1988 to 1989, largely because facilities incorrectly reported mineral acid releases in the early years of the TRI program. Water releases have increased in each of the last two reporting years.

Reported underground injection of waste has decreased about 47%, from 1.34 billion pounds in 1988 to 710 million pounds in 1991. Reported land releases have declined about 20%, from 528 million pounds in 1988 to 421 million pounds in 1991. Transfers to POTWs decreased from 574 million pounds in 1988 to 411 million pounds in 1991, a decrease of over 28%. Transfers to off-site locations for treatment also declined more than 28%, from 489 million pounds in 1988 to 350 million pounds in 1991. Transfers to disposal declined more than 39%, from 485 million pounds in 1988 to 294 million pounds in 1991.

The greatest total net change from one year to the next occurred between 1989 and 1990, when reported releases decreased nearly 16% and reported transfers decreased nearly 10%. A significant portion of the reported decrease for total releases, as well as for transfers to POTWs, is attributable to a new reporting option for ammonium sulfate. Beginning with the 1990 reporting year, facilities were given the option of reporting their releases and transfers of ammonium sulfate either as ammonium sulfate or as ammonia. Sulfate accounts for 73%, by weight, of ammonium sulfate. Thus, facilities that chose to report ammonium sulfate as ammonia would have reported releases and transfers of ammonia that were approximately one-quarter of their 1989 ammonium sulfate numbers. EPA estimates roughly that, without this guidance change, total releases would have declined about 7% between 1989 and 1990 instead of the 16% reported. Transfers to POTWs would have increased about 1.6% instead of the 16.6% decrease reported. Reported air releases and transfers for treatment and disposal probably were not significantly affected by this optional reporting.

## 1988 to 1991 Number of Facilities and Forms

In general, the number of reporting facilities and the number of forms filed increased initially and then declined somewhat. Below are the total numbers of reporting facilities and submitted forms for each reporting year 1988-1991 (including only those forms for chemicals which were reportable in all years 1988-1991):

| | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|
| Number of forms | 77,515 | 85,927 | 85,180 | 81,157 |
| Number of facilities | 22,189 | 24,074 | 24,332 | 23,608 |

The number of facilities submitting at least one Form R increased between 1988 and 1989 and again from 1989 to 1990. However, between 1990 and 1991, the number of reporting facilities declined for the first time. This decline is examined in the 1990-1991 data comparison section of this chapter.

The total number of forms filed increased by more than 8,400 between 1988 and 1989; at least some of this increase was due to the lowered manufacturing and processing thresholds. Between 1989 and 1990, the total number of forms filed dropped slightly, even though the number of reporting facilities increased. Between 1990 and 1991, the total number of forms filed dropped by more than 4,000; this decline is explored in the 1990-1991 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, there was a noticeable drop in the number of forms submitted per chemical (see 1990-1991 data comparison section).

## 1990 to 1991 Data Comparisons

This section compares summary release and transfer data for the 1990 and 1991 reporting years 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 1990 and 1991. 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 not included here. All delisted chemicals are excluded from this analysis. (See Questions and Answers in the Appendix for details about list changes.) This section includes releases to all media, as well as off-site transfers to POTWs and to other off-site locations for treatment and disposal. Off-site transfers reported without waste management codes or with invalid codes are included in a category called "other off-site transfers." Transfers for recycling and energy recovery for 1991 are not included in this chapter, because they were first required to be reported for the 1991 reporting year.

**Table 3-2. Comparison of TRI Releases and Transfers, 1990 - 1991.**

| | 1990 | 1991 | Change in Amount | Percent Change |
|---|---|---|---|---|
| | Number | Number | Number | Percent |
| Total Facilities | 24,422 | 23,680 | -742 | -3.0 |
| Total Forms | 85,624 | 81,545 | -4,079 | -4.8 |
| | Pounds | Pounds | Pounds | Percent |
| Total Air | 2,285,710,798 | 1,981,317,661 | -304,393,137 | -13.3 |
| Fugitive Air | 707,617,279 | 610,467,652 | -97,149,627 | -13.7 |
| Point Source Air | 1,578,093,519 | 1,370,850,009 | -207,243,510 | -13.1 |
| Surface Water Discharges | 196,854,583 | 243,508,487 | 46,653,904 | 23.7 |
| Underground Injection | 745,450,747 | 710,359,696 | -35,091,051 | -4.7 |
| Releases to Land | 463,469,501 | 421,385,131 | -42,084,370 | -9.1 |
| Total Releases | 3,691,485,629 | 3,356,570,975 | -334,914,654 | -9.1 |
| Transfers to POTWs | 466,981,947 | 411,892,112 | -55,089,835 | -11.8 |
| Transfers to Treatment | 374,890,789 | 352,146,992 | -22,743,797 | -6.1 |
| Transfers to Disposal | 442,441,330 | 298,597,206 | -143,844,124 | -32.5 |
| Other Off-site Transfers(b) | 37,319,629 | 9,549,879 | -27,769,750 | -74.4 |
| Total Transfers | 1,321,633,695 | 1,072,186,189 | -249,447,506 | -18.9 |
| Total Releases and Transfers | 5,013,119,324 | 4,428,757,164 | -584,362,160 | -11.7 |

## 1990 TO 1991 RELEASES AND TRANSFERS

Total TRI reported releases declined 9% from 1990 to 1991, from 3.69 billion pounds to 3.36 billion pounds. Total reported transfers declined nearly 19%, from 1.32 billion pounds in 1990 to 1.07 billion pounds in 1991.

### Releases

Air releases declined more than 13%, from 2.29 billion pounds in 1990 to 1.98 billion pounds in 1991. Much of this decline was attributable to decreased emissions of a variety of solvents, including toluene, acetone, 1,1,1-trichloroethane, methyl ethyl ketone, dichloromethane, and xylene. Toluene alone accounted for more than 43 million pounds of the decrease. Many of these solvents have been targeted by EPA, states, and industry for pollution prevention efforts, including EPA's 33/50 program of voluntary industrial toxics reduction. Chlorine releases declined by more than 27 million pounds; most of this decrease appears to be due to reductions in chlorine emissions from Magnesium Corporation of America in Rowley, UT. Ammonia emissions declined by more than 21 million pounds, primarily due to large reductions from several facilities. 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.

Surface water discharges increased nearly 24%, from 197 million pounds in 1990 to nearly 244 million pounds in 1991, a net increase of nearly 47 million pounds. This increase can be attributed largely to increased runoff from phosphogypsum stacks at four fertilizer manufacturing facilities in Louisiana. Releases of phosphoric and sulfuric acid from these facilities increased about 60 million pounds from 1990 to 1991, more than the total net increase for all surface water

Looking at individual facilities' reductions for two commonly used solvents, toluene and methyl ethyl ketone, it appears that many facilities are reporting large reductions in air emissions from 1990 to 1991.

Of the top 25 emitters of toluene to air in 1990, 20 reported reductions. Among these were five 3M facilities that reported reductions ranging from 23% to 56%. Seven others reported reductions ranging from 10% to 23%. These 20 facilities' reductions accounted for about 14.6 million pounds of decrease of toluene air emissions, or about 34% of this chemical's net decrease to this environmental medium.

Of the top 25 emitters of methyl ethyl ketone to air in 1990, 22 reported reductions. Among these were four 3M facilities that reported reductions ranging from 2.3% to 65%. Eleven others reported reductions ranging from 32% to 94%. These 22 facilities' reductions accounted for about 14 million pounds of decrease, or about 56% of the net decrease of methyl ethyl ketone emissions to air.

**Box 3-1. Reductions in Air Emissions.**

discharges. (Similar releases from some of these same facilities contributed to a net increase of releases to surface water between 1989 and 1990, and to large net decreases from 1987-1988 and 1988-1989.) Eliminating these 1991 increases from the data, surface water discharges would have declined by about 7% overall. (See discussion of 1991 TRI Top Increasers, below.)

Releases to land decreased 9%, from 463 million pounds in 1990 to 421 million pounds in 1991. Most of this reported reduction appears to be due to reduced releases of phosphoric acid and several types of metal compounds, including copper, manganese, chromium, and barium compounds. The decrease for copper compounds, about 13 million pounds, was not a real decrease, but resulted from a change in reporting due to a change in SIC code determination by Copper Range in White Pine, MI. (Prior to 1991, this facility reported releases and transfers from all its operations. For the 1991 reporting year, the facility determined, using EPA guidance, that it was primarily a mining facility and therefore was not obligated to report under TRI.) Releases of copper increased by about 4 million pounds, largely due to an increased release from Magma Copper of San Manuel, AZ (see discussion of 1991 TRI Top Increasers, below).

Underground injection of waste declined by nearly 5%, from 745 million pounds in 1990 to 710 million pounds in 1991. This net decrease of 35 million pounds is the result of large increases and decreases for specific chemicals from a few facilities. Ammonia releases decreased by 25 million pounds, with four facilities accounting for 24.5 million pounds of decrease. For sulfuric acid, there was a net decrease of 17.4 million pounds, with three facilities responsible for 24.5 million pounds of decrease. However, on-site underground injection of hydrochloric acid increased by 32 million pounds, with five facilities having increases totalling about 50 million pounds.

## Transfers

Transfers to POTWs decreased nearly 12%, from 467 million pounds in 1990 to 412 million pounds in 1991. Ammonium sulfate accounts for about 20.5 million pounds of decrease; the ammonia portion of this decrease is about 5.5 million pounds. Transfers of ammonia to POTWs increased by almost 14 million pounds. Thus, it seems likely that the decrease in ammonium sulfate is due in part to reporting the ammonia portion under the ammonia listing. This would indicate that the changes are attributable to the optional reporting for ammonium sulfate, rather than a real reduction in transfers. Methanol, hydrochloric acid, and nitric acid together accounted for another 41 million pounds of decrease, while sulfuric acid increased almost 5 million pounds.

Transfers to treatment decreased more than 6%, from 375 million pounds in 1990 to 352 million pounds in 1991.

Transfers for disposal decreased more than 32%, from 442 million pounds in 1990 to 299 million pounds in 1991. Most of this decrease is attributable to decreased disposal of several metal compounds, aluminum, and hydrochloric acid. One facility, Kennecott Utah Copper in Magna, UT, accounted for more than 83 million pounds of decrease in transfers for disposal, and probably accounts for most of the decrease in transfers for disposal of copper compounds, lead compounds, arsenic compounds, and zinc compounds. This facility had a one-time transfer in 1990 of 81 million pounds of stockpiled flue dust; the facility's 1991 totals represent a decrease from this abnormally high level caused by the one-time transfer. Without this one facility's change, transfers off-site for disposal would have decreased by about 18% instead of 32%.

Transfers of the "other" type decreased by about 28 million pounds from 1990 to 1991; however, a valid comparison cannot be made between the two years for this category. EPA believes that the "other" category for 1990 includes about 24 million pounds of transfers for recycling and energy recovery that were incorrectly reported. EPA believes this because these transfers were reported along with RCRA codes for recycling and energy recovery that were not included in the Form R instructions and therefore were not valid TRI codes for 1990 and prior years. For the 1991 reporting year, the "other" category should contain few, if any, transfers for recycling and energy recovery, since those now must be reported under separate categories, and codes for them have been provided in the Form R instructions. Because the "other" category appears to contain this inconsistency between years, the amounts included in it should not be considered comparable.

## 1990 to 1991 Number of Forms

From 1990 to 1991, the total number of forms filed dropped by 4,079. There was also a noticeable drop in the number of forms submitted per individual chemical. For example, of the 85 chemicals having more than 100 forms per chemical submitted in 1991, 56 (67%) showed some decrease in the number of forms from 1990 to 1991. However, some chemicals had a more significant decline than others in the number of reports submitted from 1990 to 1991. Many of the commonly used solvents, such as toluene, 1,1,1-trichloroethane, dichloromethane, trichloroethylene, tetrachloroethylene, and 1,2-dichloroethane, had decreases in number of forms filed ranging from 8.6% to 16.4%. Freon 113 reports decreased by 21.4%. Submissions of 2-ethoxyethanol dropped by 28.7%. The number of forms filed for some metals, such as lead, zinc (fume or dust), antimony, barium, and aluminum (fume or dust), declined by 7.1% to 18.7%. The number of reports for cadmium decreased by 37.1%, and those for cyanide compounds decreased by 16.9%.

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 met. 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, either triggered 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.

## 1990 to 1991 Number of Facilities

The total number of reporting facilities declined by 742 between 1990 and 1991, representing a 3% net decrease. 2,995 facilities that reported in 1990 did not report in 1991, while 2,277 facilities that reported in 1991 did not report in 1990. The difference between these two numbers, 718 facilities, is approximately equal to the 742 facility net decrease apparent in the data. (The slight difference between the two numbers is due to difficulties cross-referencing facilities between the two reporting years.)

EPA examined the number of forms filed by facilities that reported only in 1990 or only in 1991 to determine how much of the decline in number of forms filed in 1991 was due to the decline in number of facilities reporting. 5,774 of the forms filed for 1990 were filed by facilities that reported in 1990 but not 1991. 4,335 of the forms filed in 1991 came from facilities that reported in 1991 but not 1990. This net decline of 1,439 forms accounts for 36% of the total net decrease in forms filed by all facilities in 1991.

Some facilities may not have reported in 1991 because they went out of business. Of the 2,995 facilities reporting in 1990 but not in 1991, EPA has identified at least 281 (9.4%) that have since closed down. Others may not have reported because they did not exceed the thresholds for any of the chemicals in 1991, 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. After reporting, some 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 1990 and 1991 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, 1990 or 1991, 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 adjusting for the change in the universe of reporting facilities, the decrease in releases between 1990 and 1991 is about 8.5% instead of 9%, while the decrease in transfers is about 18% instead of 18.9%.

## 1991 TRI Top Decreasers in Total Releases

Table 3-3 lists the 50 TRI facilities with the greatest decreases in total releases from 1990 to 1991, ranked by the magnitude of their decrease. Together, these facilities accounted for reductions totalling 285 million pounds. 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. Some of the reasons for change were found or supplemented by other published information on the TRI and are referenced at the end of this chapter.

*Magnesium Corporation of America* — *Rowley, UT*

Releases of chlorine to air decreased from 88 to 61 million pounds due to the installation of new chlorine reduction burners. The chlorine is a byproduct from the electrolytic reduction of magnesium chloride to magnesium. Also, releases of hydrochloric acid to air decreased from 6.7 to 3.6 million pounds due to the installation of a neutralizer for this acid.

*Inland Steel Co.* — *East Chicago, IN*

Releases of manganese compounds to landfill decreased from 39 to 28 million pounds and releases of zinc compounds to landfill decreased from 2.6 to 1.8 million pounds. The decrease was partly due to increased selling of slag containing these compounds as a product and partly due to a decrease in production.

*Vulcan Chemical* — *Wichita, KS*

Underground injection of hydrochloric acid decreased from 45 to 35 million pounds. Some of the acid is now converted to commercial grade calcium chloride for road deicing and dust control uses.

*Monsanto Co.* — *Alvin, TX*

Releases of ammonia to underground injection decreased from 58 to 49 million pounds due to a source reduction activity, characterized as an operating process change at the facility.

*TexasGulf Inc.* — *Aurora, NC*

Releases of phosphoric acid to land from phosphate fertilizer production decreased from 24 to 14 million pounds. This was due in part to better estimates from improved monitoring capabilities and in part to improved operating procedures within the plant that have resulted in lower concentrations of phosphoric acid in their wastewater.

*Monsanto Co.* — *Cantonment, FL*

Releases of ammonium nitrate (solution) to underground injection decreased from 14 to 5.6 million pounds. Ammonium nitrate is produced by neutralizing nitric acid (a byproduct of nylon production) with ammonia. The decrease is due to use of a different alkaline waste stream to neutralize some of the nitric acid.

*Star Enterprise* — *Convent, LA*

Releases of ammonia to underground injection decreased from 8.7 million to zero pounds. This was due to the installation of a new sour water stripping unit at the petroleum refinery. Ammonia vapors stripped from the sour water are then burned with oxygen to convert the ammonia to nitrogen and water. The facility's underground injection wells have now been permanently closed.

*Weyerhaeuser Paper Co.* — *Cosmopolis, WA*

Releases of sulfuric acid to water decreased from 8.1 million to 0.5 million pounds. In 1990, the state of Washington required a slightly acidic water discharge from the facility, a pulp mill, to control a fecal coliform contamination in oyster beds.

*3M Tape Mfg. CV & AP Plant* — *Hutchinson, MN*

Releases of toluene and methyl ethyl ketone to air decreased from 19.2 to 12.9 million pounds. Increased amounts of these solvents, used to apply the magnetic layer to videotape, are now recovered and reused.

**Table 3-3. Top 50 TRI Facilities with Greatest Decrease in Releases from 1990 to 1991 (by Total Decrease).(c)**

| Facility | City | State | Net Change from 1990 to 1991: Fugitive Nonpoint Air Emissions Pounds | Stack Point Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection Pounds | Releases to Land Pounds |
|---|---|---|---|---|---|---|---|
| Magnesium Corp. of America | Rowley | UT | -31,076 | -30,101,100 | 0 | 0 | 30 |
| American Cyanamid Co. | Westwego | LA | -107,588 | -101,365 | 42,597 | -19,855,550 | 0 |
| Inland Steel Co. | East Chicago | IN | -1,283,825 | -62,030 | -284,205 | -4,406,600 | -12,139,595 |
| Cyprus Miami Mining Corp. | Claypool | AZ | 57,000 | 11,300 | 2,600 | 0 | -16,022,060 |
| Vulcan Chemicals | Wichita | KS | 30,951 | -104,857 | 0 | -13,763,200 | 0 |
| Monsanto Co. | Alvin | TX | -68,210 | -101,530 | 0 | -10,384,690 | -25,400 |
| Texasgulf Inc. | Aurora | NC | 14,810 | 484,300 | -16,450 | 0 | -10,371,300 |
| Monsanto Co. | Cantonment | FL | -23,600 | -739,148 | -1,160 | -8,485,045 | 0 |
| Star Enterprise Inc. | Convent | LA | -2,762 | -859 | 2,583 | -8,740,905 | -468 |
| Du Pont Victoria Site | Victoria | TX | 0 | 102,371 | -2,507 | -7,758,124 | -220,603 |
| Weyerhaeuser Paper Co. | Cosmopolis | WA | -36,100 | 3,250 | -7,655,905 | 0 | 0 |
| Wheeling-Pittsburgh Steel Co. | Follansbee | WV | -1,949,260 | 1,542,730 | 23,220 | 0 | -7,237,280 |
| USS Fairless Works | Fairless Hills | PA | -45,158 | -38,802 | -497 | 0 | -7,240,000 |
| Piney Point Phosphates Inc. | Palmetto | FL | -3,681,000 | 86,091 | 324 | 0 | -3,346,000 |
| Union Camp Corp. | Savannah | GA | 77,352 | -7,091,890 | 199,520 | 0 | 0 |
| 3M Co. | Hutchinson | MN | 193,033 | -6,914,573 | 0 | 0 | 0 |
| Triad Chemical | Donaldsonville | LA | 375 | -6,017,856 | -101,639 | 0 | 0 |
| 3M Co. | Brownwood | TX | -1,583 | -5,307,520 | 0 | 0 | -387 |
| Holliston Mills Inc. | Church Hill | TN | -21,873 | -4,382,409 | -199 | 0 | -234 |
| Angus Chemical Co. | Sterlington | LA | -61,465 | -240,511 | -49,490 | -4,007,000 | 0 |
| CF Industries Inc. | Donaldsonville | LA | 15,195 | -4,455,884 | 435,070 | 0 | 0 |
| BASF Corp. | Lowland | TN | -406,995 | -2,613,000 | 14,810 | 0 | -865,700 |
| BP Chemicals Inc. | Port Lavaca | TX | -57,836 | -39,718 | -370 | -3,467,111 | -14 |
| Great Lakes Chemical Corp. | El Dorado | AR | 12,585 | 45,131 | -5 | -3,250,327 | -3,501 |
| Eastman Kodak Co. | Kingsport | TN | 589,943 | -1,104,762 | -2,204,405 | 0 | -363,646 |
| General Electric Co. Plastics | Mount Vernon | IN | -507,013 | -2,477,579 | -37,121 | 0 | 0 |
| Courtaulds Fibers Inc. | Axis | AL | -41,900 | -3,000,000 | 7,245 | 0 | 29,250 |
| Agricultural Minerals Corp. | Verdigris | OK | -159 | -1,280,000 | -23,222 | -1,522,000 | 250 |
| Jersey Miniere Zinc | Clarksville | TN | 1,952 | -43,607 | -9,664 | 0 | -2,751,278 |
| Borden Chemicals & Plastics | Geismar | LA | -114,102 | -32,526 | 26,461 | -2,645,740 | 0 |
| Shell Oil Co. | Norco | LA | -219,331 | -219,501 | 38,570 | -2,205,400 | -1,672 |
| Hoechst Celanese | Narrows | VA | -1,215,000 | -1,383,503 | -163 | 0 | 1,137 |
| Reynolds Metals Co. | Muscle Shoals | AL | -280,360 | -2,301,968 | 2 | 0 | 0 |
| U.S. Vanadium Corp. | Hot Springs | AR | -250 | 301,400 | -597,750 | 0 | -2,237,000 |
| Unocal Corp. | Kenai | AK | -7,494 | -2,439,664 | -20,440 | 150 | -22,905 |
| 3M Co. | Nevada | MO | -95,703 | -2,374,440 | 0 | 0 | -2,870 |
| Glenbrook Nickel Co. | Riddle | OR | -250 | -31,184 | -15 | 0 | -2,406,000 |
| 3M Co. | Knoxville | IA | -109 | -2,313,169 | 0 | 0 | 0 |
| Westinghouse Electric Corp. | Hampton | SC | 14,170 | -2,303,450 | 31 | 0 | 0 |
| Chemetals Inc. | New Johnsonville | TN | -88,768 | -89,933 | -336 | 0 | -2,063,647 |
| Union Carbide Chemicals | Texas City | TX | -2,310,197 | 70,190 | 0 | 0 | 0 |
| Hexcel Corp. | Casa Grande | AZ | 327,032 | -2,537,988 | 0 | 0 | 0 |
| Amoco Oil Co. | Texas City | TX | -159,680 | 20,884 | 56,205 | -1,229,000 | -880,198 |
| Georgia-Pacific | Woodland | ME | -133,352 | -1,938,400 | -28,820 | 0 | 0 |
| Amoco Chemical Co. | Alvin | TX | -1,943,556 | -149,873 | -3,362 | 0 | 2,010 |
| Macon Kraft Inc. | Macon | GA | 10,100 | -2,046,740 | -1,230 | 0 | 0 |
| Johnstown Corp. | Johnstown | PA | 0 | 0 | 0 | 0 | -2,014,730 |
| Eagle Ottawa Leather Co. | Grand Haven | MI | -1,779 | -1,981,375 | 0 | 0 | 0 |
| FMC Corp. | Pocatello | ID | -1,337 | -509 | 0 | 0 | -1,932,591 |
| O'Sullivan Corp. | Winchester | VA | -1,545,433 | -371,361 | 0 | 0 | 0 |
| Total | | | -15,099,606 | -96,066,937 | -10,189,717 | -91,720,542 | -72,116,402 |

| Facility | City | State | 1990 Total Releases Pounds | 1991 Total Releases Pounds | 1990 to 1991 Changes in Total Releases Pounds |
|---|---|---|---|---|---|
| Magnesium Corp. of America | Rowley | UT | 95,049,351 | 64,917,205 | -30,132,146 |
| American Cyanamid Co. | Westwego | LA | 162,030,982 | 142,009,076 | -20,021,906 |
| Inland Steel Co. | East Chicago | IN | 50,682,660 | 32,506,405 | -18,176,255 |
| Cyprus Miami Mining Corp. | Claypool | AZ | 19,712,060 | 3,760,900 | -15,951,160 |
| Vulcan Chemicals | Wichita | KS | 59,386,409 | 45,549,303 | -13,837,106 |
| Monsanto Co. | Alvin | TX | 64,823,729 | 54,243,899 | -10,579,830 |
| Texasgulf Inc. | Aurora | NC | 25,730,100 | 15,841,460 | -9,888,640 |
| Monsanto Co. | Cantonment | FL | 18,488,405 | 9,239,452 | -9,248,953 |
| Star Enterprise Inc. | Convent | LA | 8,910,554 | 168,143 | -8,742,411 |
| Du Pont Victoria Site | Victoria | TX | 35,097,213 | 27,218,350 | -7,878,863 |
| Weyerhaeuser Paper Co. | Cosmopolis | WA | 8,533,955 | 845,200 | -7,688,755 |
| Wheeling-Pittsburgh Steel Co. | Follansbee | WV | 10,325,464 | 2,704,874 | -7,620,590 |
| USS Fairless Works | Fairless Hills | PA | 7,927,782 | 603,325 | -7,324,457 |
| Piney Point Phosphates Inc. | Palmetto | FL | 7,773,300 | 832,715 | -6,940,585 |
| Union Camp Corp. | Savannah | GA | 10,659,854 | 3,844,836 | -6,815,018 |
| 3M Co. | Hutchinson | MN | 20,106,008 | 13,384,468 | -6,721,540 |
| Triad Chemical | Donaldsonville | LA | 11,777,898 | 5,658,778 | -6,119,120 |
| 3M Co. | Brownwood | TX | 7,145,945 | 1,836,455 | -5,309,490 |
| Holliston Mills Inc. | Church Hill | TN | 4,404,715 | 0 | -4,404,715 |
| Angus Chemical Co. | Sterlington | LA | 6,498,879 | 2,140,413 | -4,358,466 |
| CF Industries Inc. | Donaldsonville | LA | 11,430,589 | 7,424,970 | -4,005,619 |
| BASF Corp. | Lowland | TN | 25,061,005 | 21,190,120 | -3,870,885 |
| BP Chemicals Inc. | Port Lavaca | TX | 32,617,374 | 29,052,325 | -3,565,049 |
| Great Lakes Chemical Corp. | El Dorado | AR | 7,637,872 | 4,441,755 | -3,196,117 |
| Eastman Kodak Co. | Kingsport | TN | 43,497,650 | 40,414,780 | -3,082,870 |
| General Electric Co. Plastics | Mount Vernon | IN | 7,986,937 | 4,965,224 | -3,021,713 |
| Courtaulds Fibers Inc. | Axis | AL | 45,933,030 | 42,927,625 | -3,005,405 |
| Agricultural Minerals Corp. | Verdigris | OK | 7,067,729 | 4,242,598 | -2,825,131 |
| Jersey Miniere Zinc | Clarksville | TN | 3,026,541 | 223,944 | -2,802,597 |
| Borden Chemicals & Plastics | Geismar | LA | 5,791,347 | 3,025,440 | -2,765,907 |
| Shell Oil Co. | Norco | LA | 3,859,415 | 1,252,081 | -2,607,334 |
| Hoechst Celanese | Narrows | VA | 11,614,226 | 9,016,697 | -2,597,529 |
| Reynolds Metals Co. | Muscle Shoals | AL | 5,412,623 | 2,830,297 | -2,582,326 |
| U.S. Vanadium Corp. | Hot Springs | AR | 4,552,100 | 2,018,500 | -2,533,600 |
| Unocal Corp. | Kenai | AK | 13,945,248 | 11,454,895 | -2,490,353 |
| 3M Co. | Nevada | MO | 2,916,190 | 443,177 | -2,473,013 |
| Glenbrook Nickel Co. | Riddle | OR | 2,437,449 | 0 | -2,437,449 |
| 3M Co. | Knoxville | IA | 4,230,530 | 1,917,252 | -2,313,278 |
| Westinghouse Electric Corp. | Hampton | SC | 7,488,110 | 5,198,861 | -2,289,249 |
| Chemetals Inc. | New Johnsonville | TN | 2,242,684 | 0 | -2,242,684 |
| Union Carbide Chemicals | Texas City | TX | 7,011,225 | 4,771,218 | -2,240,007 |
| Hexcel Corp. | Casa Grande | AZ | 3,048,411 | 837,455 | -2,210,956 |
| Amoco Oil Co. | Texas City | TX | 11,265,919 | 9,074,130 | -2,191,789 |
| Georgia-Pacific | Woodland | ME | 2,107,522 | 6,950 | -2,100,572 |
| Amoco Chemical Co. | Alvin | TX | 4,040,289 | 1,945,508 | -2,094,781 |
| Macon Kraft Inc. | Macon | GA | 3,070,070 | 1,032,200 | -2,037,870 |
| Johnstown Corp. | Johnstown | PA | 2,014,730 | 0 | -2,014,730 |
| Eagle Ottawa Leather Co. | Grand Haven | MI | 2,164,629 | 181,475 | -1,983,154 |
| FMC Corp. | Pocatello | ID | 2,383,965 | 449,528 | -1,934,437 |
| O'Sullivan Corp. | Winchester | VA | 4,054,664 | 2,137,870 | -1,916,794 |
| Total | | | 924,975,336 | 639,782,132 | -285,193,204 |

## 1991 TRI Top Increasers in Total Releases

Table 3-4 lists the top 50 TRI facilities with the greatest increases in total releases from 1990 to 1991, ranked by the magnitude of their increase. Together, these facilities accounted for a total increase of 222 million pounds. 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. A few of the reasons for change were found or supplemented by other published information on the TRI. These reports are referenced at the end of this chapter.

*Agrico Chemical* — *Saint James, LA*

Releases to the Mississippi River of sulfuric acid increased from 5.1 to 14.2 million pounds and releases of phosphoric acid increased from 36.6 to 67.3 million pounds. The increases are due to the inability of the facility to recycle all the rainwater runoff from its gypsum storage piles, due to intense rainfalls over short periods of time or sustained moderate rainfall. Gypsum is a byproduct from the manufacturing of phosphoric acid.

*Agrico Chemical* — *Uncle Sam, LA*

Releases to the Mississippi River of sulfuric acid increased from 5.3 to 14.7 million pounds and of phosphoric acid increased from 29.9 to 33.5 million pounds due to increased stormwater runoff from gypsum storage piles.

*Du Pont* — *Louisville, KY*

Releases of hydrochloric acid to underground injection increased from 9.4 to 22 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.

*BASF Corp.* — *Geismar, LA*

Releases of hydrochloric acid to underground injection increased from 0.5 to 12 million pounds. Unfavorable market conditions prevented BASF from selling the hydrochloric acid as a product in 1991.

*Magma Copper Co.* — *San Manuel, AZ*

Releases to land of copper increased from 10.1 to 14.6 million pounds; zinc went from zero to 4.7 million pounds; arsenic compounds went from zero to 1.7 million pounds; and lead went from 0.4 to 2.5 million pounds. These releases come from the copper smelting and refining process. The increases are due to increased production and to better estimates from new analysis and performing a mass balance within their process. Improved analysis of zinc compounds and arsenic in 1991 showed that these chemicals slightly exceeded the *de minimis* concentration limit in process streams, so their releases were reported in 1991.

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

Underground injection of hydrochloric acid increased from 41 to 52 million pounds. The facility incorrectly reported their 1990 releases and has submitted a revision that will result in only a 0.2 million pounds increase in total reported releases.

*Du Pont Delisle* *Pass Christian, MS*

Releases of hydrochloric acid to underground injection increased from 33 to 41 million pounds. This was due in part to a 10% increase in production and, in large part, to increased stormwater collection and rainfall in 1991.

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

Reported releases to land of zinc compounds increased from zero to 7 million pounds. This increase is due primarily to a 1990 reporting error. In 1990, the facility incorrectly reported 6.5 million pounds of zinc compounds as off-site transfers instead of as land releases. The reason the material should not have been reported as an off-site transfer is that the material was actually sent to another establishment at the same facility and not to a different facility. An actual increase of .5 million pounds of zinc compounds was due to the use of a higher proportion of galvanized scrap steel as a raw material.

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

Releases to the Mississippi River of sulfuric acid increased from 5.8 to 7.3 million pounds and releases of phosphoric acid increased from 7.3 to 13 million pounds due to increased stormwater runoff from gypsum storage piles. Prior to 1991, Arcadian had had three years of substantial decreases due to projects undertaken as part of its initial voluntary reduction program.

*Cabot Corp.* *Tuscola, IL*

Release of hydrochloric acid (produced as a byproduct) to on-site deep well injection increased from 7 to 14 million pounds. The facility was unable to sell the waste hydrochloric acid due to a weak market, so they injected it underground.

*Zinc Corp. of America* *Bartlesville, OK*

Releases of metal compounds (zinc, copper, manganese, and cobalt) to land on-site increased from zero to 6.8 million pounds. This material is stored in piles at the facility and will later be removed or covered over as part of a remediation project. In 1991, the facility incorrectly reported it as land disposal under TRI because it was regulated under RCRA as a landfill. However, TRI guidance for this type of situation is to report the final disposal of the material. The facility has sent in revisions to correct their numbers.

*General Motors Corp. Powertrain Div.* *Defiance, OH*

Releases of manganese compounds and zinc compounds to land on-site increased from 1.6 to 6.2 million pounds. The facility is an iron foundry that produces a slag byproduct containing the compounds. The slag is stored in a settling basin and, periodically, the materials are dredged and removed to a landfill. Twenty percent of this increase was due to increased production. The remainder was due to a change in reporting. In previous years, the facility had only reported the

**Table 3-4. Top 50 TRI Facilities with Greatest Increase in Releases from 1990 to 1991 (by Total Increase).**

| Facility | City | State | Net Change from 1990 to 1991: Fugitive or Nonpoint Air Emissions Pounds | Stack or Point Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection Pounds | Releases to Land Pounds |
|---|---|---|---|---|---|---|---|
| Agrico Chemical Co. | Saint James | LA | 42,000 | -2,288,400 | 39,403,600 | 0 | 78,945 |
| Agrico Chemical Co. | Uncle Sam | LA | -13,120 | 28,167 | 12,950,700 | 0 | 8,269 |
| Du Pont | Louisville | KY | -18,749 | 139,626 | 0 | 12,552,181 | 0 |
| BASF Corp. | Geismar | LA | 87,496 | -40,571 | -18,667 | 11,521,226 | 0 |
| Magma Copper Co. | San Manuel | AZ | 27,410 | -341,168 | 0 | 0 | 11,370,091 |
| Du Pont Johnsonville Plant | New Johnsonville | TN | -34,065 | -1,711,600 | -40,400 | 11,000,000 | 0 |
| Du Pont Delisle | Pass Christian | MS | 3,213 | 264,400 | -430 | 8,000,000 | -1,480 |
| Wheeling-Pittsburgh Steel Co. | Mingo Junction | OH | 18,622 | 486 | -19,056 | 0 | 7,646,600 |
| Arcadian Fertilizer L.P. | Geismar | LA | -1,754 | 87,465 | 7,333,200 | 0 | 102,905 |
| Cabot Corp. | Tuscola | IL | 750 | 541,137 | 0 | 6,858,260 | 0 |
| Zinc Corp. of America | Bartlesville | OK | 2,516 | -2,482 | 0 | -2,164 | 6,806,039 |
| General Motors Corporation | Defiance | OH | -1,154 | -26,951 | -13,265 | 0 | 4,964,411 |
| Kennecott Utah Copper | Magna | UT | -2,560 | -123,700 | 200 | 0 | 4,665,555 |
| ICI Americas Inc. | Mount Pleasant | TN | 5,893 | 63,371 | -2,000 | 4,459,946 | 0 |
| Glaval Corp. | Bremen | IN | 4,465,128 | 0 | 0 | 0 | 0 |
| Sterling Chemicals Inc. | Texas City | TX | -71,220 | -102,205 | -4,540 | 4,551,110 | 0 |
| Climax Chemical Co. | Grantsville | UT | 56,620 | -21,775 | 0 | 0 | 3,629,914 |
| Molycorp Inc. | Mountain Pass | CA | -30,273 | -47,585 | 0 | 0 | 3,478,356 |
| Marine Shale Processors Inc. | Amelia | LA | 327 | 3,390,770 | -178 | 0 | 0 |
| BP Chemicals Inc. | Lima | OH | -46,850 | -524,395 | -17,900 | 3,868,880 | 0 |
| Du Pont La Porte Plant | La Porte | TX | -240,273 | -875 | 1,349 | 3,362,960 | 486 |
| Alumax Inc. of South Carolina | Goose Creek | SC | 7,545 | 2,570,373 | 0 | 0 | 0 |
| Northwestern Steel & Wire Co. | Sterling | IL | 7,270 | -3,470 | 994 | 0 | 2,490,000 |
| Herculaneum Smelter | Herculaneum | MO | 470 | 175 | 105 | 0 | 2,429,597 |
| Georgia-Pacific Corp. | Woodland | ME | 131,511 | 1,952,961 | 202,060 | 0 | 139 |
| Sid Richardson Carbon & Gasoline Co. | Big Spring | TX | -95 | 2,146,562 | 0 | 0 | 0 |
| Elkem Metals Co. | Marietta | OH | 319,878 | 14,200 | -27,343 | 0 | 1,787,879 |
| Du Pont | Memphis | TN | -94,962 | 2,031,219 | -19,821 | 0 | -8,300 |
| Laroche Industries Inc. | Cherokee | AL | 5,934 | 22,336 | 6,000 | 0 | 1,767,710 |
| Occidental Chemical Corp. | Castle Hayne | NC | -200 | -14,100 | -28 | 0 | 1,795,454 |
| ADM Corn Processing | Clinton | IA | -1,740 | 1,850,280 | -89,390 | 0 | 0 |
| Nitrogen Products Inc. | Helena | AR | 25,000 | 1,477,280 | 213,768 | 0 | 0 |
| Zinc Corp. of America | Monaca | PA | -83,551 | -214,926 | 677 | 0 | 2,009,805 |
| Phillips 66 Co. | Borger | TX | -973,285 | 3,252,981 | -512,826 | 0 | -56,380 |
| Coastal Chem Inc. | Cheyenne | WY | -23,004 | 61,510 | 0 | 1,752,415 | -82,390 |
| ICI Americas Inc. | Bucks | AL | 2,849 | 10,480 | 10 | 1,688,429 | 0 |
| PPG Industries Inc. | Oak Creek | WI | -8,669 | 1,625,636 | 16 | 0 | 0 |
| Mor-Flo Industries Inc. | Johnson City | TN | 303,454 | 1,300,232 | 0 | 0 | 0 |
| Inion Camp Corp. | Franklin | VA | -29,060 | 1,646,200 | -29,865 | 0 | 0 |
| Asarco Inc. | Hayden | AZ | 58,614 | -282,224 | -103 | 0 | 1,768,907 |
| Gaylord Container Corp. | Bogalusa | LA | -56,500 | 1,594,960 | 2,680 | 0 | 0 |
| American Chrome & Chemicals | Corpus Christi | TX | -50 | -26,000 | -196,300 | 0 | 1,700,000 |
| Ford Motor Co. | Louisville | KY | 10,714 | 1,459,952 | 0 | 0 | 0 |
| Procter & Gamble Co. | Perry | FL | -155,110 | 232,000 | 986,002 | 0 | 312,715 |
| Starcraft Automotive Corp. | Goshen | IN | 19,127 | 1,308,084 | 0 | 250 | 42,526 |
| Scott Paper Co. | Mobile | AL | -54,750 | 633,000 | 788,100 | 0 | 0 |
| Hoechst Celanese Chemical | Bay City | TX | -52,527 | 188,767 | -915 | 1,176,932 | 15,580 |
| Georgia-Pacific Corp. | Zachary | LA | 32,050 | 1,288,200 | 2,000 | 0 | 1,355 |
| Griffin Wheel Co. | Keokuk | IA | 755 | 755 | 0 | 0 | 1,301,580 |
| Bowater Carolina Co. | Catawba | SC | 122,737 | 1,112,769 | 53,409 | 0 | 191 |
| Total | | | 3,764,362 | 26,523,907 | 60,951,843 | 70,790,425 | 60,026,459 |

| Facility | City | State | 1990 Total Releases Pounds | 1991 Total Releases Pounds | 1990 to 1991 Changes in Total Releases Pounds |
|---|---|---|---|---|---|
| Agrico Chemical Co. | Saint James | LA | 56,607,515 | 93,843,660 | 37,236,145 |
| Agrico Chemical Co. | Uncle Sam | LA | 36,213,512 | 49,187,528 | 12,974,016 |
| Du Pont | Louisville | KY | 10,392,468 | 23,065,526 | 12,673,058 |
| BASF Corp. | Geismar | LA | 1,448,614 | 12,998,098 | 11,549,484 |
| Magma Copper Co. | San Manuel | AZ | 13,021,566 | 24,077,899 | 11,056,333 |
| Du Pont Johnsonville Plant | New Johnsonville | TN | 50,003,965 | 59,217,900 | 9,213,935 |
| Du Pont Delisle | Pass Christian | MS | 38,893,130 | 47,158,833 | 8,265,703 |
| Wheeling-Pittsburgh Steel Co. | Mingo Junction | OH | 123,482 | 7,770,134 | 7,646,652 |
| Arcadian Fertilizer L.P. | Geismar | LA | 16,041,525 | 23,563,341 | 7,521,816 |
| Cabot Corp. | Tuscola | IL | 11,370,029 | 18,770,176 | 7,400,147 |
| Zinc Corp. of America | Bartlesville | OK | 89,817 | 6,893,726 | 6,803,909 |
| General Motors Corporation | Defiance | OH | 2,352,874 | 7,275,915 | 4,923,041 |
| Kennecott Utah Copper | Magna | UT | 9,694,735 | 14,234,230 | 4,539,495 |
| ICI Americas Inc. | Mount Pleasant | TN | 13,212,807 | 17,740,017 | 4,527,210 |
| Glaval Corp. | Bremen | IN | 124,488 | 4,589,616 | 4,465,128 |
| Sterling Chemicals Inc. | Texas City | TX | 32,344,470 | 36,717,615 | 4,373,145 |
| Climax Chemical Co. | Grantsville | UT | 122,350 | 3,787,109 | 3,664,759 |
| Molycorp Inc. | Mountain Pass | CA | 2,987,870 | 6,388,368 | 3,400,498 |
| Marine Shale Processors Inc. | Amelia | LA | 178,140 | 3,569,059 | 3,390,919 |
| BP Chemicals Inc. | Lima | OH | 24,282,015 | 27,561,750 | 3,279,735 |
| Du Pont La Porte Plant | La Porte | TX | 5,225,749 | 8,349,396 | 3,123,647 |
| Alumax Inc. of South Carolina | Goose Creek | SC | 79,967 | 2,657,885 | 2,577,918 |
| Northwestern Steel & Wire Co. | Sterling | IL | 9,480,846 | 11,975,640 | 2,494,794 |
| Herculaneum Smelter | Herculaneum | MO | 14,091,132 | 16,521,479 | 2,430,347 |
| Georgia-Pacific Corp. | Woodland | ME | 0 | 2,286,671 | 2,286,671 |
| Sid Richardson Carbon & Gasoline Co. | Big Spring | TX | 508,644 | 2,655,111 | 2,146,467 |
| Elkem Metals Co. | Marietta | OH | 15,388,660 | 17,483,274 | 2,094,614 |
| Du Pont | Memphis | TN | 4,172,833 | 6,080,969 | 1,908,136 |
| Laroche Industries Inc. | Cherokee | AL | 514,270 | 2,316,250 | 1,801,980 |
| Occidental Chemical Corp. | Castle Hayne | NC | 7,450,774 | 9,231,900 | 1,781,126 |
| ADM Corn Processing | Clinton | IA | 93,260 | 1,852,410 | 1,759,150 |
| Nitrogen Products Inc. | Helena | AR | 0 | 1,716,048 | 1,716,048 |
| Zinc Corp. of America | Monaca | PA | 1,586,000 | 3,298,005 | 1,712,005 |
| Phillips 66 Co. | Borger | TX | 2,465,209 | 4,175,699 | 1,710,490 |
| Coastal Chem Inc. | Cheyenne | WY | 7,908,661 | 9,617,192 | 1,708,531 |
| ICI Americas Inc. | Bucks | AL | 6,337,013 | 8,038,781 | 1,701,768 |
| PPG Industries Inc. | Oak Creek | WI | 127,439 | 1,744,422 | 1,616,983 |
| Mor-Flo Industries Inc. | Johnson City | TN | 233,000 | 1,836,686 | 1,603,686 |
| Inion Camp Corp. | Franklin | VA | 1,371,894 | 2,959,169 | 1,587,275 |
| Asarco Inc. | Hayden | AZ | 24,938,397 | 26,483,591 | 1,545,194 |
| Gaylord Container Corp. | Bogalusa | LA | 137,360 | 1,678,500 | 1,541,140 |
| American Chrome & Chemicals | Corpus Christi | TX | 8,699,860 | 10,177,510 | 1,477,650 |
| Ford Motor Co. | Louisville | KY | 374,324 | 1,844,990 | 1,470,666 |
| Procter & Gamble Co. | Perry | FL | 1,672,062 | 3,047,669 | 1,375,607 |
| Starcraft Automotive Corp. | Goshen | IN | 146,800 | 1,516,787 | 1,369,987 |
| Scott Paper Co. | Mobile | AL | 1,873,855 | 3,240,205 | 1,366,350 |
| Hoechst Celanese Chemical | Bay City | TX | 2,355,975 | 3,683,812 | 1,327,837 |
| Georgia-Pacific Corp. | Zachary | LA | 1,061,505 | 2,385,110 | 1,323,605 |
| Griffin Wheel Co. | Keokuk | IA | 2,925 | 1,306,015 | 1,303,090 |
| Bowater Carolina Co. | Catawba | SC | 1,172,777 | 2,461,883 | 1,289,106 |
| Total | | | 438,976,563 | 661,033,559 | 222,056,996 |

amount removed to the landfill, which, for the 1990 reporting year, happened to be none. In 1991, they reported both the quantity sent to the settling basin and sent to landfill (without double counting).

## Reasons Facilities Report One Year but Not Another

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.

Sometimes this results from new facilities starting operations and other facilities shutting down either temporarily or permanently. Sometimes it is a matter of a facility meeting or failing to meet the reporting criteria for the first time. For example, a facility may meet the chemical manufacturing, processing or use thresholds one year but not another, or it may have ten or more employees one year and fewer than ten another year.

A facility may shift the majority of its industrial activities from a covered SIC code (e.g., primary metals) to a non-covered SIC code (e.g., mineral mining), eliminating its reporting obligation. In some cases, a change in a facility's SIC code determination reflects not a change in industrial activities, but a change in the facility's understanding or interpretation of the SIC code requirements.

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.

## 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. 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. For example, Ashland Chemical of Plaquemine, LA, decreased air emissions of methanol by 65,000 pounds from 1990 to 1991 by replacing a methanol tank vent scrubber with internal floating roofs in two storage tanks and making some process modifications.

Another example of source reduction is Eastman Kodak Company's Kodak Park Division in Rochester, NY, reducing dichloromethane air releases by 1.06 million pounds from 1990 to 1991. Since 1988, their dichloromethane air releases have been reduced 48%, or by 4.25 million pounds. These reductions are due to process and procedure modifications in their cellulose triacetate film base manufacturing.

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. For example, Borden Chemicals and Plastics (Geismar, LA) reduced air emissions of zinc and chromium compounds from 17,411 pounds in 1990 to zero by substituting a different cooling water tower treatment material. In another example, Grumman Corp. Allied Operations in Montgomery, PA, reduced their air emissions of 1,1,1-trichloroethane from 66,310 pounds in 1990 to 24,750 pounds in 1990. Like many facilities, this facility discontinued use of 1,1,1-trichloroethane in cleaning operations and replaced it with a lower VOC alternative.

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. As an example, the decrease in the amount of TRI air emissions between 1990 and 1991 from Anitec Image Corporation in Binghamton, NY, was due primarily to the shutdown of the company's film base manufacturing operation. Its fugitive air releases of dichloromethane decreased from 1,800,000 to 640,000 pounds. Releases/transfers are likely to increase when production increases and decrease when production decreases, although the relationship is not necessarily linear. This year, for the first time, 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. For example, Occidental Chemical of Addis, LA, reported an 8,000 pound increase of vinyl chloride air emissions from 1990 to 1991 that was partly due to an emergency release of vinyl chloride. 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 new TRI data for this year provide estimates for these one-time, non-production related releases/transfers.

Installation of pollution control equipment may also lead to real reductions in TRI releases/transfers. As an example, Geneva Steel in Vineyard, UT, decreased ammonia releases to water from 239,302 pounds in 1990 to 27,023 pounds in 1991 due to installation of a treatment plant with micro-organisms that consume the ammonia. However, it is important to note that some types of pollution control 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. For example, Lake Erie Screw Corp. in Lakewood, OH, transferred 180,000 pounds of sulfuric acid off-site for disposal in 1990, but in 1991, the facility sold sulfuric acid to waste water treatment plants for reuse. The converse also occurs. In EPA's investigation of top release increasers, several facilities' increases in releases from 1990 to 1991 were due to market changes that prevented them from continuing to sell their acid waste for other uses.

## "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. For example, the General Motors Harrison Radiator Division's (Lockport, NY) discharge of 63,000 pounds of acetone to water in 1991, the result of a process reaction in the company's wastewater treatment plant, was discovered after the facility analyzed its 1991 waste water. Because such data were not available to make estimates for the previous year, the discharges had not been reported before.

Reported releases/transfers 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.

## Assessing the Comparative Impact of Various Reasons for Change

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. While similar data are not available for the 1991 reporting year, the findings of this study are expected to be generally relevant to the 1991 changes. Release and transfer quantities and percentages here will not match exactly amounts presented elsewhere in this chapter, because quantities calculated for this survey were based on a data set that is no longer current.

Production change was the most frequently cited reason for reported emissions changes between 1989 and 1990. Nearly 70% of facilities contacted cited production change as responsible for at least part of their reported release/transfer change. Production change was cited as a reason for change for about 45% of the forms. However, because production change was cited as a reason for almost as great a quantity of increase as of decrease, the net effect of production change on the change in TRI releases and transfers from 1989 to 1990 was only about 5%. Production change accounted for about 19% of the 1990 increase (by weight), 13% of the decrease, and 5% of the net decrease between 1989 and 1990 (about 41 million pounds).

Twenty-four percent of facilities cited estimation technique changes as a reason for at least part of their reported release/transfer changes. Estimation technique changes were cited as a reason for change for about 15% of forms. As with production changes, estimation technique changes largely cancelled each other out, causing little net effect. Estimation technique changes accounted for 7% of the 1990 increase, 5% of the decrease, and only about 3% of the net change (about 22 million pounds).

Source reduction was cited as a reason for change by 40% of facilities for about 18% of forms. Because source reduction accounted for about 20% of the decrease and only 2% of the increase, it had a large effect on the net change from 1989 to 1990. Source reduction accounted for about 45% of the net change, a decrease of about 387 million pounds.

The study 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. The study found that "other factors" accounted for 73% of the 1990 increase, 62% of the decrease, and 48% of the net change (about 416 million pounds).

This study was able to develop estimates for only a few of the various reasons within this "other" category. Beginning with the 1990 reporting year, facilities were given the option of reporting ammonium sulfate as ammonia. The effect of facilities' exercising this option was estimated to have accounted for about 250 million pounds of decrease, a little less than half of the total decrease and more than half of the net decrease attributable to this category. Because by far the greatest effect of this optional reporting occurred in 1990, and change attributable to it will be much lower in the future, it seems likely that this "other" category would be substantially smaller in other years. It is important to note that a substantial portion of the change assigned to this category was so assigned because many facilities, although aware that the changes in their releases were due to source reduction, production variability, or measurement changes, were nevertheless unable to make quantitative allocations among these factors.

## TRI Releases and Transfers Compared to Value of Shipments Data

One approach to understanding better how TRI releases and transfers have changed in relation to economic activity is to compute, and track over time, a ratio of the value of economic activity relative to releases and transfers for treatment and disposal. Changes in this ratio over time will indicate whether more or less value of economic activity is being obtained for each unit of TRI releases and transfers for treatment and disposal. This will give some indication of whether industry is improving its performance in managing TRI chemicals.

The specific measure used in the following analysis is the ratio of **real**—that is, inflation-adjusted—value of shipments to the sum of TRI releases and transfers. The ratio of real value of shipments to TRI releases and transfers is effectively an indicator of industry's productivity in the use and disposal of TRI chemicals as part of the manufacturing process.

Increases over time in the ratio would indicate that, for a given inflation-adjusted value of goods produced and shipped, manufacturers are releasing a lower quantity of TRI chemicals to the environment, and might thus be judged to be more productive in managing the use and disposal of TRI chemicals. Conversely, a declining ratio would suggest that a lower value of goods was being produced and shipped for each unit of TRI releases and transfers, and might be indicative of less effective management of the use and disposal of TRI chemicals in the manufacturing process.

The results of this analysis show that there has been an overall increase in the dollar value of shipments per ton of TRI releases and transfers in the period 1988 to 1991. The ratio of value of shipments to releases and transfers has increased from 0.87 to 1.19, representing an increase in value of shipments of more than $320,000 per ton of TRI releases and transfers. In other words, reported TRI releases and transfers have declined with respect to production as measured by value of shipments.

For the period 1988-1991, the ratio improved for 18 of 20 two-digit SIC code major groups. The chemical industry, which accounts for the largest share of TRI releases and transfers of any industry grouping, showed an improvement of about 50%. The two industry groups (food and apparel) that did not show an improvement together account for only about 2% of total TRI releases and transfers from all industries.

From 1990 to 1991, the ratio of value of shipments to releases and transfers increased from 1.09 to 1.19, an increase of 9.2%. The ratio of value of shipments to releases and transfers improved for 18 of the 20 SIC code groupings. Only apparel and stone/clay/glass showed declines between 1990 and 1991. The chemical industry, which showed a 30% improvement between 1989 and 1990, showed an improvement of 3% between 1990 and 1991.

Table 3-5 shows, for each year for each industry group, the value of shipments, tons of TRI releases and transfers, and the ratio of value of shipments to TRI releases and transfers. Table 3-6 shows growth rates for value of shipments, TRI releases and transfers, and their ratio. Rounding of numbers in the tables may cause the appearance of inconsistent results in a few cases.

It should be noted that, while value of shipments data constitute the best data readily available to represent production for this analysis, they are an imperfect measure of production. Value of shipments data do not cover all elements of production, such as unsold production or production of intermediates not sold. Also, while the value of shipments is adjusted for the rate of inflation in the economy, certain price changes that differ from the general rate of inflation may mean that changes in the value of shipments actually reflect changes in the price of products in addition to changes in production. Still, value of shipments is a reasonable proxy for production and constitutes the best data available to approximate production for this analysis.

**Table 3-5. Ratio of Shipments to TRI Releases and Transfers for Manufacturing Industries, 1988 - 1991(d).**

| SIC Code | Industry | Value of Shipments $ Millions, 1987 | | | | TRI Releases and Transfers Tons | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1988 | 1989 | 1990 | 1991 | 1988 | 1989 | 1990 | 1991 |
| 20 | Food | 328,212 | 324,780 | 330,472 | 332,705 | 34,793 | 38,977 | 41,766 | 41,272 |
| 21 | Tobacco | 16,807 | 15,987 | 16,333 | 15,437 | 1,468 | 904 | 1,264 | 1,160 |
| 22 | Textiles | 60,644 | 61,593 | 59,096 | 58,405 | 28,215 | 23,437 | 19,375 | 17,097 |
| 23 | Apparel | 60,664 | 57,530 | 56,852 | 56,332 | 857 | 1,030 | 823 | 922 |
| 24 | Lumber | 65,994 | 64,465 | 63,493 | 59,103 | 18,718 | 19,102 | 18,143 | 15,903 |
| 25 | Furniture | 35,212 | 35,599 | 34,997 | 32,917 | 36,445 | 35,053 | 32,919 | 28,997 |
| 26 | Paper | 107,789 | 108,747 | 107,830 | 106,378 | 168,955 | 164,862 | 157,442 | 149,156 |
| 27 | Printing | 121,749 | 120,218 | 120,352 | 114,871 | 34,739 | 31,198 | 27,337 | 23,578 |
| 28 | Chemicals | 229,822 | 232,512 | 238,168 | 234,989 | 1,504,035 | 1,363,668 | 1,070,615 | 1,025,717 |
| 29 | Petroleum | 194,113 | 189,831 | 188,828 | 190,224 | 55,409 | 56,669 | 47,617 | 42,830 |
| 30 | Rubber/Plastics | 88,285 | 89,307 | 91,104 | 88,538 | 99,319 | 105,789 | 101,423 | 83,100 |
| 31 | Leather | 8,522 | 8,349 | 8,065 | 7,325 | 14,061 | 12,889 | 11,609 | 8,660 |
| 32 | Stone/Clay | 59,602 | 58,903 | 57,698 | 53,082 | 30,255 | 26,239 | 20,908 | 22,671 |
| 33 | Primary Metals | 131,929 | 128,761 | 125,367 | 117,451 | 438,632 | 392,209 | 403,295 | 296,984 |
| 34 | Fabr. Metals | 147,890 | 144,033 | 141,662 | 134,715 | 115,337 | 109,474 | 98,436 | 79,030 |
| 35 | Machinery | 228,720 | 229,126 | 225,061 | 209,175 | 41,670 | 39,267 | 32,011 | 24,781 |
| 36 | Electrical | 178,729 | 179,545 | 178,924 | 179,727 | 94,043 | 75,661 | 63,833 | 52,956 |
| 37 | Transportation | 328,430 | 326,477 | 318,276 | 303,867 | 138,361 | 127,530 | 110,461 | 90,398 |
| 38 | Measure./Photo. | 107,036 | 106,937 | 108,008 | 108,870 | 40,228 | 33,448 | 27,471 | 23,336 |
| 39 | Miscellaneous | 32,437 | 32,059 | 32,381 | 31,601 | 20,262 | 21,409 | 15,842 | 11,166 |
| | Total | 2,532,586 | 2,514,760 | 2,502,966 | 2,435,711 | 2,915,800 | 2,678,816 | 2,302,590 | 2,039,715 |

| SIC Code | Industry | Ratio of Shipments to Releases and Transfers $ Millions/Ton 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|
| 20 | Food | 9.43 | 8.33 | 7.91 | 8.06 |
| 21 | Tobacco | 11.45 | 17.68 | 12.92 | 13.31 |
| 22 | Textiles | 2.15 | 2.63 | 3.05 | 3.42 |
| 23 | Apparel | 70.77 | 55.86 | 69.11 | 61.10 |
| 24 | Lumber | 3.53 | 3.37 | 3.50 | 3.72 |
| 25 | Furniture | 0.97 | 1.02 | 1.06 | 1.14 |
| 26 | Paper | 0.64 | 0.66 | 0.68 | 0.71 |
| 27 | Printing | 3.50 | 3.85 | 4.40 | 4.87 |
| 28 | Chemicals | 0.15 | 0.17 | 0.22 | 0.23 |
| 29 | Petroleum | 3.50 | 3.35 | 3.97 | 4.44 |
| 30 | Rubber/Plastics | 0.89 | 0.84 | 0.90 | 1.07 |
| 31 | Leather | 0.61 | 0.65 | 0.69 | 0.85 |
| 32 | Stone/Clay | 1.97 | 2.24 | 2.76 | 2.34 |
| 33 | Primary Metals | 0.30 | 0.33 | 0.31 | 0.40 |
| 34 | Fabr. Metals | 1.28 | 1.32 | 1.44 | 1.70 |
| 35 | Machinery | 5.49 | 5.84 | 7.03 | 8.44 |
| 36 | Electrical | 1.90 | 2.37 | 2.80 | 3.39 |
| 37 | Transportation | 2.37 | 2.56 | 2.88 | 3.36 |
| 38 | Measure./Photo. | 2.66 | 3.20 | 3.93 | 4.67 |
| 39 | Miscellaneous | 1.60 | 1.50 | 2.04 | 2.83 |
| | Total | 0.87 | 0.94 | 1.09 | 1.19 |

**Table 3-6. Growth Rates in Ratio of Shipments to Releases and Transfers for Manufacturing Industries, 1988 - 1991(e).**

| SIC Code | Industry | Percent Change in Real Value of Shipments 1988-91 Percent | 1988-89 Percent | 1989-90 Percent | 1990-91 Percent | Percent Change in TRI Releases and Transfers 1988-91 Percent | 1988-89 Percent | 1989-90 Percent | 1990-91 Percent |
|---|---|---|---|---|---|---|---|---|---|
| 20 | Food | 1.4 | -1.0 | 1.8 | 0.7 | 18.6 | 12.0 | 7.2 | -1.2 |
| 21 | Tobacco | -8.1 | -4.9 | 2.2 | -5.5 | -21.0 | -38.4 | 39.8 | -8.3 |
| 22 | Textiles | -3.7 | 1.6 | -4.1 | -1.2 | -39.4 | -16.9 | -17.3 | -11.8 |
| 23 | Apparel | -7.1 | -5.2 | -1.2 | -0.9 | 7.5 | 20.1 | -20.1 | 12.1 |
| 24 | Lumber | -10.4 | -2.3 | -1.5 | -6.9 | -15.0 | 2.1 | -5.0 | -12.3 |
| 25 | Furniture | -6.5 | 1.1 | -1.7 | -5.9 | -20.4 | -3.8 | -6.1 | -11.9 |
| 26 | Paper | -1.3 | 0.9 | -0.8 | -1.3 | -11.7 | -2.4 | -4.5 | -5.3 |
| 27 | Printing | -5.6 | -1.3 | 0.1 | -4.6 | -32.1 | -10.2 | -12.4 | -13.8 |
| 28 | Chemicals | 2.2 | 1.2 | 2.4 | -1.3 | -31.8 | -9.3 | -21.5 | -4.2 |
| 29 | Petroleum | -2.0 | -2.2 | -0.5 | 0.7 | -22.7 | 2.3 | -16.0 | -10.1 |
| 30 | Rubber/Plastics | 0.3 | 1.2 | 2.0 | -2.8 | -16.3 | 6.5 | -4.1 | -18.1 |
| 31 | Leather | -14.0 | -2.0 | -3.4 | -9.2 | -38.4 | -8.3 | -9.9 | -25.4 |
| 32 | Stone/Clay | -10.9 | -1.2 | -2.0 | -8.0 | -25.1 | -13.3 | -20.3 | 8.4 |
| 33 | Primary Metals | -11.0 | -2.4 | -2.6 | -6.3 | -32.3 | -10.6 | 2.8 | -26.4 |
| 34 | Fabr. Metals | -8.9 | -2.6 | -1.6 | -4.9 | -31.5 | -5.1 | -10.1 | -19.7 |
| 35 | Machinery | -8.5 | 0.2 | -1.8 | -7.1 | -40.5 | -5.8 | -18.5 | -22.6 |
| 36 | Electrical | 0.6 | 0.5 | -0.3 | 0.4 | -43.7 | -19.5 | -15.6 | -17.0 |
| 37 | Transportation | -7.5 | -0.6 | -2.5 | -4.5 | -34.7 | -7.8 | -13.4 | -18.2 |
| 38 | Measure./Photo. | 1.7 | -0.1 | 1.0 | 0.8 | -42.0 | -16.9 | -17.9 | -15.0 |
| 39 | Miscellaneous | -2.6 | -1.2 | 1.0 | -2.4 | -44.9 | 5.7 | -26.0 | -29.5 |
| | Total | -3.8 | -0.7 | -0.5 | -2.7 | -30.0 | -8.1 | -14.0 | -11.4 |

| SIC Code | Industry | Percent Change in Ratio of Shipments to Releases and Transfers 1988-91 Percent | 1988-89 Percent | 1989-90 Percent | 1990-91 Percent |
|---|---|---|---|---|---|
| 20 | Food | -14.5 | -11.7 | -5.0 | 1.9 |
| 21 | Tobacco | 16.3 | 54.4 | -26.9 | 3.0 |
| 22 | Textiles | 58.9 | 22.3 | 16.1 | 12.0 |
| 23 | Apparel | -13.7 | -21.1 | 23.7 | -11.6 |
| 24 | Lumber | 5.4 | -4.3 | 3.7 | 6.2 |
| 25 | Furniture | 17.5 | 5.1 | 4.7 | 6.8 |
| 26 | Paper | 11.8 | 3.4 | 3.8 | 4.1 |
| 27 | Printing | 39.0 | 9.9 | 14.3 | 10.7 |
| 28 | Chemicals | 49.9 | 11.6 | 30.5 | 3.0 |
| 29 | Petroleum | 26.8 | -4.4 | 18.4 | 12.0 |
| 30 | Rubber/Plastics | 19.9 | -5.0 | 6.4 | 18.6 |
| 31 | Leather | 39.6 | 6.9 | 7.2 | 21.8 |
| 32 | Stone/Clay | 18.9 | 13.9 | 22.9 | -15.2 |
| 33 | Primary Metals | 31.5 | 9.2 | -5.3 | 27.2 |
| 34 | Fabr. Metals | 32.9 | 2.6 | 9.4 | 18.4 |
| 35 | Machinery | 53.8 | 6.3 | 20.5 | 20.1 |
| 36 | Electrical | 78.6 | 24.9 | 18.1 | 21.1 |
| 37 | Transportation | 41.6 | 7.8 | 12.6 | 16.7 |
| 38 | Measure./Photo. | 75.3 | 20.2 | 23.0 | 18.7 |
| 39 | Miscellaneous | 76.8 | -6.5 | 36.5 | 38.5 |
| | Total | 37.5 | 8.1 | 15.8 | 9.9 |

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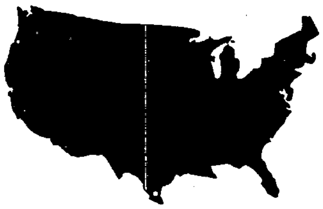


# THE 1991 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE

***1988 - 1991***
***Releases and Transfers***
***by State***

**Table 3-7. TRI Releases and Transfers by State, 1988-1991 (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 | 91 | 16,368,289 | 82,103,616 | 4,264,093 | 7,988,920 | 6,661,627 | 117,386,545 |
| | 90 | 18,320,908 | 84,916,282 | 3,135,411 | 6,317,242 | 3,195,836 | 115,885,679 |
| | 89 | 18,079,034 | 87,787,672 | 7,525,742 | 7,602,901 | 5,180,111 | 126,175,460 |
| | 88 | 19,150,455 | 86,046,018 | 7,074,182 | 6,139,021 | 4,615,038 | 123,024,714 |
| Alaska | 91 | 582,728 | 12,643,715 | 4,795,953 | 150 | 4,132 | 18,026,678 |
| | 90 | 530,608 | 15,437,766 | 4,949,477 | 20 | 29,076 | 20,946,947 |
| | 89 | 490,074 | 20,459,326 | 4,662,650 | 1,000 | 10,415 | 25,623,465 |
| | 88 | 516,975 | 22,528,589 | 4,466,815 | 1,018 | 1,720 | 27,515,117 |
| American Samoa | 91 | 22,000 | 0 | 0 | 0 | 0 | 22,000 |
| | 90 | 19,300 | 0 | 5 | 0 | 0 | 19,305 |
| | 89 | 27,750 | 0 | 0 | 0 | 0 | 27,750 |
| | 88 | 29,500 | 0 | 0 | 0 | 0 | 29,500 |
| Arizona | 91 | 4,478,871 | 4,975,644 | 32,960 | 0 | 53,310,818 | 62,798,293 |
| | 90 | 4,230,486 | 8,472,811 | 158 | 30 | 58,044,481 | 70,747,966 |
| | 89 | 4,622,879 | 8,146,644 | 2,260 | 10 | 32,321,670 | 45,093,463 |
| | 88 | 7,086,609 | 9,211,534 | 9,855 | 505 | 53,667,725 | 69,976,228 |
| Arkansas | 91 | 8,741,793 | 22,151,811 | 2,420,296 | 14,031,499 | 1,692,683 | 49,038,082 |
| | 90 | 9,381,848 | 24,392,266 | 2,570,380 | 17,891,695 | 3,477,930 | 57,714,119 |
| | 89 | 9,858,564 | 33,927,044 | 9,088,006 | 21,926,895 | 2,308,944 | 77,109,453 |
| | 88 | 11,314,082 | 37,375,807 | 7,448,161 | 10,521,284 | 1,938,900 | 68,598,234 |
| California | 91 | 29,577,235 | 35,408,428 | 10,232,311 | 1,944,661 | 8,527,943 | 85,690,578 |
| | 90 | 33,375,380 | 48,173,601 | 10,096,012 | 1,763,292 | 5,123,011 | 98,531,296 |
| | 89 | 33,769,697 | 49,672,284 | 10,673,054 | 1,728,376 | 6,483,650 | 102,327,061 |
| | 88 | 36,553,122 | 54,672,976 | 10,861,727 | 1,586,653 | 8,412,685 | 112,087,163 |
| Colorado | 91 | 2,645,593 | 3,197,551 | 195,424 | 500 | 514,305 | 6,553,373 |
| | 90 | 3,181,250 | 4,049,975 | 209,072 | 280 | 533,776 | 7,974,353 |
| | 89 | 5,007,980 | 5,816,656 | 146,933 | 1,250 | 897,140 | 11,869,959 |
| | 88 | 5,807,053 | 6,212,209 | 115,968 | 1,750 | 2,802,039 | 14,939,019 |
| Connecticut | 91 | 6,862,043 | 8,890,669 | 3,902,424 | 50 | 3,345 | 19,658,531 |
| | 90 | 8,342,768 | 9,115,472 | 4,012,129 | 0 | 166,742 | 21,637,111 |
| | 89 | 10,929,971 | 10,637,369 | 4,753,850 | 0 | 337,525 | 26,658,715 |
| | 88 | 13,362,605 | 12,341,550 | 6,080,615 | 250 | 1,687,641 | 33,472,661 |
| Delaware | 91 | 1,494,629 | 4,338,630 | 349,040 | 0 | 155,180 | 6,337,479 |
| | 90 | 1,762,968 | 4,257,781 | 431,584 | 0 | 183,028 | 6,635,361 |
| | 89 | 2,229,156 | 6,410,239 | 649,993 | 0 | 152,911 | 9,442,299 |
| | 88 | 1,743,401 | 5,821,194 | 574,601 | 0 | 240,117 | 8,379,313 |
| District of Columbia | 89 | 0 | 0 | 250 | 0 | 0 | 250 |
| | 88 | 250 | 0 | 250 | 0 | 0 | 500 |
| Florida | 91 | 14,711,961 | 23,219,594 | 3,147,409 | 13,728,636 | 32,737,051 | 87,544,651 |
| | 90 | 23,455,869 | 23,637,128 | 2,782,382 | 21,536,061 | 41,317,990 | 112,729,430 |
| | 89 | 31,485,605 | 29,787,475 | 6,604,133 | 28,338,638 | 40,211,477 | 136,427,328 |
| | 88 | 22,607,530 | 28,907,269 | 6,955,412 | 34,651,616 | 36,890,073 | 130,011,900 |
| Georgia | 91 | 13,329,545 | 44,204,008 | 4,728,063 | 0 | 1,154,944 | 63,416,560 |
| | 90 | 17,028,772 | 57,790,626 | 4,311,630 | 810 | 1,169,663 | 80,301,501 |
| | 89 | 19,809,417 | 56,645,512 | 5,804,031 | 0 | 2,789,333 | 85,048,293 |
| | 88 | 19,680,258 | 64,548,977 | 3,018,325 | 59,467 | 9,284,086 | 96,591,113 |

| State | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Alabama | 91 | 945,010 | 15,280,508 | 16,225,518 |
| | 90 | 975,636 | 17,497,440 | 18,473,076 |
| | 89 | 1,367,341 | 19,110,587 | 20,477,928 |
| | 88 | 1,154,834 | 15,743,098 | 16,897,932 |
| Alaska | 91 | 0 | 1,056 | 1,056 |
| | 90 | 4 | 90 | 94 |
| | 89 | 750 | 5,750 | 6,500 |
| | 88 | 1,000 | 1,750 | 2,750 |
| American Samoa | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Arizona | 91 | 475,907 | 1,261,669 | 1,737,576 |
| | 90 | 1,196,735 | 1,195,125 | 2,391,860 |
| | 89 | 4,042,150 | 1,673,171 | 5,715,321 |
| | 88 | 4,535,978 | 1,803,608 | 6,339,586 |
| Arkansas | 91 | 576,886 | 4,422,417 | 4,999,303 |
| | 90 | 2,170,702 | 7,853,372 | 10,024,074 |
| | 89 | 1,021,930 | 11,145,689 | 12,167,619 |
| | 88 | 1,274,323 | 7,966,981 | 9,241,304 |
| California | 91 | 28,091,113 | 15,310,606 | 43,401,719 |
| | 90 | 31,844,973 | 23,013,359 | 54,858,332 |
| | 89 | 47,412,133 | 21,900,287 | 69,312,420 |
| | 88 | 49,942,234 | 41,447,725 | 91,389,959 |
| Colorado | 91 | 460,081 | 3,013,857 | 3,473,938 |
| | 90 | 684,808 | 3,271,664 | 3,956,472 |
| | 89 | 764,168 | 5,092,503 | 5,856,671 |
| | 88 | 631,601 | 5,260,474 | 5,892,075 |
| Connecticut | 91 | 1,566,744 | 7,530,337 | 9,097,081 |
| | 90 | 2,329,976 | 11,228,129 | 13,558,105 |
| | 89 | 2,569,369 | 15,183,276 | 17,752,645 |
| | 88 | 3,312,079 | 18,527,596 | 21,839,675 |
| Delaware | 91 | 2,344,905 | 834,453 | 3,179,358 |
| | 90 | 4,008,334 | 1,707,658 | 5,715,992 |
| | 89 | 3,278,847 | 2,698,570 | 5,977,417 |
| | 88 | 3,276,713 | 4,172,497 | 7,449,210 |
| District of Columbia | 89 | 250 | 500 | 750 |
| | 88 | 250 | 250 | 500 |
| Florida | 91 | 13,856,151 | 9,721,842 | 23,577,993 |
| | 90 | 18,831,240 | 7,367,793 | 26,199,033 |
| | 89 | 17,883,556 | 16,419,697 | 34,303,253 |
| | 88 | 16,229,362 | 13,163,767 | 29,393,129 |
| Georgia | 91 | 8,327,521 | 12,268,719 | 20,596,240 |
| | 90 | 7,894,619 | 14,991,015 | 22,885,634 |
| | 89 | 9,580,271 | 25,513,195 | 35,093,466 |
| | 88 | 8,329,234 | 28,874,897 | 37,204,131 |

**Table 3-7. TRI Releases and Transfers by State, 1988-1991 (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 | 91 | 438,180 | 141,478 | 17,029 | 235,199 | 81,200 | 913,086 |
| | 90 | 550,617 | 138,744 | 15,990 | 111,500 | 34,009 | 850,860 |
| | 89 | 514,209 | 170,804 | 9,500 | 1,196,672 | 211,372 | 2,102,557 |
| | 88 | 535,305 | 338,840 | 10,000 | 1,051,509 | 205,745 | 2,141,399 |
| Idaho | 91 | 964,270 | 5,151,603 | 119,934 | 0 | 3,880,780 | 10,116,587 |
| | 90 | 1,942,666 | 3,743,919 | 474,398 | 0 | 5,434,670 | 11,595,653 |
| | 89 | 2,463,603 | 2,892,084 | 308,667 | 0 | 11,775,840 | 17,440,194 |
| | 88 | 2,458,912 | 2,907,771 | 296,220 | 0 | 11,850,374 | 17,513,277 |
| Illinois | 91 | 26,843,981 | 53,255,672 | 6,438,278 | 16,199,440 | 18,582,646 | 121,320,017 |
| | 90 | 32,506,784 | 56,945,646 | 6,335,164 | 9,449,685 | 15,326,504 | 120,563,783 |
| | 89 | 38,276,286 | 64,696,498 | 16,762,680 | 10,712,556 | 11,689,068 | 142,137,088 |
| | 88 | 43,897,320 | 65,495,032 | 14,170,412 | 7,340,184 | 11,527,542 | 142,430,490 |
| Indiana | 91 | 37,548,747 | 57,524,688 | 1,722,928 | 2,360,830 | 36,009,003 | 135,166,196 |
| | 90 | 41,277,512 | 65,372,470 | 2,848,499 | 9,192,188 | 46,769,327 | 165,459,996 |
| | 89 | 46,023,670 | 68,383,679 | 5,418,401 | 32,703,116 | 50,467,727 | 202,996,593 |
| | 88 | 42,671,026 | 68,283,408 | 4,913,927 | 34,820,400 | 63,075,385 | 213,764,146 |
| Iowa | 91 | 6,319,613 | 28,604,960 | 2,001,525 | 0 | 1,789,203 | 38,715,301 |
| | 90 | 7,077,459 | 32,126,250 | 2,448,455 | 25 | 279,801 | 41,931,990 |
| | 89 | 9,313,610 | 35,903,349 | 1,223,605 | 250 | 188,843 | 46,629,657 |
| | 88 | 9,635,817 | 35,076,431 | 1,383,577 | 5 | 636,535 | 46,732,365 |
| Kansas | 91 | 7,828,061 | 19,130,166 | 920,768 | 44,921,511 | 1,235,203 | 74,035,709 |
| | 90 | 9,595,423 | 20,612,925 | 1,044,876 | 58,706,062 | 1,323,496 | 91,282,782 |
| | 89 | 10,522,936 | 22,392,654 | 652,181 | 91,160,915 | 374,262 | 125,102,948 |
| | 88 | 10,513,947 | 22,058,000 | 853,044 | 90,207,460 | 485,074 | 124,117,525 |
| Kentucky | 91 | 10,399,713 | 26,585,266 | 681,839 | 22,000,000 | 1,638,959 | 61,305,777 |
| | 90 | 11,478,193 | 30,223,048 | 683,815 | 9,447,874 | 1,422,105 | 53,255,035 |
| | 89 | 12,974,837 | 32,276,175 | 773,051 | 39,000,000 | 1,059,367 | 86,083,430 |
| | 88 | 15,413,368 | 33,102,252 | 1,700,777 | 30,000,250 | 5,765,095 | 85,981,742 |
| Louisiana | 91 | 20,401,044 | 76,122,777 | 161,282,510 | 196,547,237 | 1,850,432 | 456,204,000 |
| | 90 | 23,575,674 | 86,153,219 | 101,050,157 | 226,922,147 | 2,105,590 | 439,806,787 |
| | 89 | 27,759,629 | 107,084,486 | 46,355,307 | 291,435,814 | 2,552,318 | 475,187,554 |
| | 88 | 28,981,207 | 109,336,425 | 159,575,724 | 423,893,540 | 7,588,195 | 729,375,091 |
| Maine | 91 | 2,447,932 | 11,301,527 | 813,197 | 0 | 876,354 | 15,439,010 |
| | 90 | 2,348,615 | 11,313,002 | 899,866 | 0 | 504,946 | 15,066,429 |
| | 89 | 3,090,042 | 12,465,281 | 366,329 | 0 | 444,789 | 16,366,441 |
| | 88 | 3,338,266 | 13,737,850 | 437,488 | 0 | 960,950 | 18,474,554 |
| Maryland | 91 | 4,468,885 | 7,042,773 | 682,953 | 0 | 1,293,351 | 13,487,962 |
| | 90 | 5,742,869 | 7,394,884 | 1,282,351 | 55 | 1,868,993 | 16,289,152 |
| | 89 | 5,747,622 | 12,724,189 | 2,448,229 | 0 | 1,946,146 | 22,866,186 |
| | 88 | 5,290,205 | 12,723,448 | 3,955,551 | 2 | 2,668,375 | 24,637,581 |
| Massachusetts | 91 | 6,325,056 | 9,918,972 | 396,842 | 0 | 167,019 | 16,807,889 |
| | 90 | 8,750,286 | 12,442,558 | 264,196 | 45 | 53,000 | 21,510,085 |
| | 89 | 9,592,557 | 15,344,297 | 837,906 | 0 | 80,176 | 25,854,936 |
| | 88 | 10,329,152 | 17,502,015 | 674,490 | 4,000 | 918,766 | 29,428,423 |
| Michigan | 91 | 18,295,834 | 51,569,368 | 944,588 | 6,699,997 | 13,943,437 | 91,453,224 |
| | 90 | 23,419,837 | 62,722,736 | 818,783 | 8,323,247 | 25,655,939 | 120,940,542 |
| | 89 | 23,715,290 | 83,108,244 | 739,582 | 8,278,831 | 23,492,744 | 139,334,691 |
| | 88 | 27,603,509 | 72,085,327 | 1,153,087 | 6,326,978 | 18,532,668 | 125,701,569 |

| State | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Hawaii | 91 | 26,253 | 12,408 | 38,661 |
| | 90 | 388,060 | 8,459 | 396,519 |
| | 89 | 1,287,450 | 12,358 | 1,299,808 |
| | 88 | 835,250 | 13,682 | 848,932 |
| Idaho | 91 | 1,246,330 | 66,566 | 1,312,896 |
| | 90 | 2,863,797 | 209,897 | 3,073,694 |
| | 89 | 1,722,366 | 377,831 | 2,100,197 |
| | 88 | 484,374 | 122,215 | 606,589 |
| Illinois | 91 | 59,449,924 | 35,652,428 | 95,102,352 |
| | 90 | 76,200,740 | 54,014,520 | 130,215,260 |
| | 89 | 59,534,639 | 57,144,888 | 116,679,527 |
| | 88 | 60,061,811 | 54,853,179 | 114,914,990 |
| Indiana | 91 | 5,759,441 | 46,850,720 | 52,610,161 |
| | 90 | 7,116,838 | 51,480,443 | 58,597,281 |
| | 89 | 15,598,603 | 46,252,325 | 61,850,928 |
| | 88 | 14,015,833 | 58,255,280 | 72,271,113 |
| Iowa | 91 | 8,313,207 | 4,390,959 | 12,704,166 |
| | 90 | 7,293,705 | 3,921,405 | 11,215,110 |
| | 89 | 7,175,323 | 4,852,277 | 12,027,600 |
| | 88 | 6,569,558 | 7,297,474 | 13,867,032 |
| Kansas | 91 | 1,951,405 | 46,587,973 | 48,539,378 |
| | 90 | 2,767,122 | 11,246,276 | 14,013,398 |
| | 89 | 3,585,185 | 6,731,425 | 10,316,610 |
| | 88 | 3,114,358 | 4,285,528 | 7,399,886 |
| Kentucky | 91 | 1,942,900 | 14,496,038 | 16,438,938 |
| | 90 | 2,353,523 | 22,756,601 | 25,110,124 |
| | 89 | 2,147,974 | 25,271,554 | 27,419,528 |
| | 88 | 2,802,249 | 33,675,587 | 36,477,836 |
| Louisiana | 91 | 109,452 | 13,367,857 | 13,477,309 |
| | 90 | 49,964 | 15,008,696 | 15,058,660 |
| | 89 | 59,301 | 20,256,097 | 20,315,398 |
| | 88 | 3,533,503 | 13,708,868 | 17,242,371 |
| Maine | 91 | 794,917 | 1,565,481 | 2,360,398 |
| | 90 | 898,677 | 1,367,804 | 2,266,481 |
| | 89 | 1,449,600 | 1,479,325 | 2,928,925 |
| | 88 | 2,755,230 | 1,322,107 | 4,077,337 |
| Maryland | 91 | 4,589,080 | 2,787,870 | 7,376,950 |
| | 90 | 4,450,476 | 3,250,404 | 7,700,880 |
| | 89 | 3,291,391 | 3,964,388 | 7,255,779 |
| | 88 | 3,992,911 | 5,424,732 | 9,417,643 |
| Massachusetts | 91 | 5,702,276 | 7,505,270 | 13,207,546 |
| | 90 | 6,195,155 | 13,036,581 | 19,231,736 |
| | 89 | 11,116,773 | 17,599,739 | 28,716,512 |
| | 88 | 17,688,766 | 20,809,642 | 38,498,408 |
| Michigan | 91 | 14,691,959 | 45,734,338 | 60,426,297 |
| | 90 | 13,984,528 | 61,707,808 | 75,692,336 |
| | 89 | 15,342,787 | 78,067,382 | 93,410,169 |
| | 88 | 15,907,775 | 88,218,943 | 104,126,718 |

**Table 3-7. TRI Releases and Transfers by State, 1988-1991 (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 | 91 | 7,051,229 | 31,918,919 | 838,399 | 0 | 1,432,241 | 41,240,788 |
| | 90 | 7,905,188 | 42,943,495 | 852,479 | 147 | 1,685,250 | 53,386,559 |
| | 89 | 8,315,805 | 54,169,910 | 1,379,110 | 0 | 1,484,535 | 65,349,360 |
| | 88 | 9,387,548 | 45,528,058 | 2,735,819 | 0 | 3,138,268 | 60,789,693 |
| Mississippi | 91 | 12,735,123 | 41,855,523 | 2,173,830 | 48,371,556 | 5,607,296 | 110,743,328 |
| | 90 | 14,462,873 | 43,614,541 | 2,326,808 | 40,396,040 | 5,240,230 | 106,040,492 |
| | 89 | 18,828,885 | 41,713,504 | 3,159,711 | 43,303,000 | 8,555,481 | 115,560,581 |
| | 88 | 16,621,878 | 43,550,309 | 2,340,307 | 46,806,563 | 9,001,495 | 118,320,552 |
| Missouri | 91 | 10,316,288 | 24,375,043 | 1,230,337 | 0 | 23,819,521 | 59,741,189 |
| | 90 | 11,854,739 | 33,790,546 | 1,518,922 | 20 | 22,709,602 | 69,873,829 |
| | 89 | 12,009,212 | 36,630,432 | 1,262,363 | 0 | 27,561,492 | 77,463,499 |
| | 88 | 11,197,572 | 39,261,607 | 1,941,032 | 500 | 39,489,639 | 91,890,350 |
| Montana | 91 | 1,552,443 | 808,406 | 147,484 | 0 | 38,533,803 | 41,042,136 |
| | 90 | 1,694,587 | 757,644 | 105,448 | 0 | 40,095,720 | 42,653,399 |
| | 89 | 1,838,742 | 667,933 | 106,325 | 0 | 36,448,609 | 39,061,609 |
| | 88 | 1,808,908 | 591,749 | 125,124 | 0 | 32,910,857 | 35,436,638 |
| Nebraska | 91 | 3,744,287 | 11,008,508 | 385,629 | 0 | 395,026 | 15,533,450 |
| | 90 | 4,608,313 | 12,293,897 | 492,995 | 0 | 70,168 | 17,465,373 |
| | 89 | 4,504,996 | 12,167,973 | 265,960 | 0 | 131,070 | 17,069,999 |
| | 88 | 4,670,955 | 14,028,262 | 309,718 | 0 | 56,737 | 19,065,672 |
| Nevada | 91 | 404,931 | 536,444 | 250 | 0 | 2,435,160 | 3,376,785 |
| | 90 | 385,232 | 360,351 | 251 | 0 | 2,547,192 | 3,293,026 |
| | 89 | 332,916 | 353,870 | 1,150 | 0 | 2,284,722 | 2,972,658 |
| | 88 | 358,734 | 345,442 | 250 | 0 | 1,841,221 | 2,545,647 |
| New Hampshire | 91 | 1,861,617 | 3,406,944 | 44,361 | 0 | 38,328 | 5,351,250 |
| | 90 | 2,420,051 | 5,711,057 | 254,248 | 35 | 106,210 | 8,491,601 |
| | 89 | 2,511,430 | 8,479,423 | 153,016 | 0 | 61,882 | 11,205,751 |
| | 88 | 3,591,076 | 8,739,349 | 522,963 | 0 | 429,118 | 13,282,506 |
| New Jersey | 91 | 7,757,472 | 12,939,113 | 493,103 | 1 | 547,020 | 21,736,709 |
| | 90 | 9,210,146 | 15,870,002 | 468,982 | 105 | 1,008,967 | 26,558,202 |
| | 89 | 10,441,871 | 20,750,187 | 859,772 | 0 | 3,107,032 | 35,158,862 |
| | 88 | 13,752,749 | 25,312,116 | 1,417,400 | 2,950 | 2,871,740 | 43,356,955 |
| New Mexico | 91 | 577,264 | 1,575,004 | 9,992 | 750 | 37,670,985 | 39,833,995 |
| | 90 | 645,716 | 1,914,747 | 14 | 20 | 37,621,753 | 40,182,250 |
| | 89 | 933,707 | 1,888,845 | 5 | 5 | 31,011,089 | 33,833,651 |
| | 88 | 748,852 | 1,384,496 | 505 | 5 | 28,830,402 | 30,964,260 |
| New York | 91 | 20,603,109 | 43,244,474 | 1,656,018 | 38 | 1,742,280 | 67,245,919 |
| | 90 | 24,799,315 | 50,498,537 | 1,615,704 | 150 | 1,752,836 | 78,666,542 |
| | 89 | 30,169,571 | 56,627,563 | 1,775,014 | 250 | 2,137,908 | 90,710,306 |
| | 88 | 38,988,964 | 62,239,393 | 2,072,805 | 251 | 3,036,560 | 106,337,973 |
| North Carolina | 91 | 19,539,386 | 62,511,217 | 781,249 | 0 | 23,599,855 | 106,431,707 |
| | 90 | 23,961,815 | 65,771,123 | 1,358,581 | 75 | 33,049,152 | 124,140,746 |
| | 89 | 26,630,539 | 68,578,811 | 905,313 | 0 | 25,801,567 | 121,916,230 |
| | 88 | 27,210,198 | 71,976,237 | 700,561 | 0 | 16,838,821 | 116,725,817 |
| North Dakota | 91 | 582,348 | 1,214,279 | 79,557 | 0 | 22,750 | 1,898,934 |
| | 90 | 480,226 | 991,151 | 4,349 | 0 | 87,307 | 1,563,033 |
| | 89 | 498,782 | 843,185 | 6,006 | 0 | 77,395 | 1,425,368 |
| | 88 | 414,998 | 857,891 | 4,903 | 0 | 35,312 | 1,313,104 |

| State | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Minnesota | 91 | 4,834,426 | 3,106,783 | 7,941,209 |
| | 90 | 5,899,016 | 4,357,752 | 10,256,768 |
| | 89 | 4,974,000 | 13,694,748 | 18,668,748 |
| | 88 | 6,069,834 | 6,237,589 | 12,307,423 |
| Mississippi | 91 | 1,199,161 | 2,540,590 | 3,739,751 |
| | 90 | 1,325,737 | 3,735,222 | 5,060,959 |
| | 89 | 1,313,343 | 4,339,003 | 5,652,346 |
| | 88 | 1,504,135 | 8,205,384 | 9,709,519 |
| Missouri | 91 | 26,110,492 | 8,402,227 | 34,512,719 |
| | 90 | 30,335,005 | 9,503,171 | 39,838,176 |
| | 89 | 76,495,021 | 11,594,712 | 88,089,733 |
| | 88 | 67,045,211 | 14,444,283 | 81,489,494 |
| Montana | 91 | 10,650 | 235,041 | 245,691 |
| | 90 | 30,042 | 343,162 | 373,204 |
| | 89 | 29,646 | 18,456 | 48,102 |
| | 88 | 1,312 | 50,510 | 51,822 |
| Nebraska | 91 | 1,295,342 | 7,980,958 | 9,276,300 |
| | 90 | 1,366,041 | 7,116,088 | 8,482,129 |
| | 89 | 1,000,112 | 4,848,821 | 5,848,933 |
| | 88 | 901,304 | 4,342,939 | 5,244,243 |
| Nevada | 91 | 8,612 | 57,617 | 66,229 |
| | 90 | 15,417 | 141,776 | 157,193 |
| | 89 | 14,919 | 311,640 | 326,559 |
| | 88 | 20,611 | 639,906 | 660,517 |
| New Hampshire | 91 | 451,079 | 2,031,830 | 2,482,909 |
| | 90 | 398,540 | 1,356,748 | 1,755,288 |
| | 89 | 736,185 | 2,312,043 | 3,048,228 |
| | 88 | 496,102 | 2,205,161 | 2,701,263 |
| New Jersey | 91 | 44,198,915 | 19,887,817 | 64,086,732 |
| | 90 | 56,729,052 | 31,875,627 | 88,604,679 |
| | 89 | 61,603,003 | 30,376,618 | 91,979,621 |
| | 88 | 55,340,497 | 69,611,609 | 124,952,106 |
| New Mexico | 91 | 90,891 | 118,140 | 209,031 |
| | 90 | 69,185 | 271,641 | 340,826 |
| | 89 | 119,352 | 220,449 | 339,801 |
| | 88 | 35,871 | 262,045 | 297,916 |
| New York | 91 | 11,311,327 | 14,952,194 | 26,263,521 |
| | 90 | 12,912,681 | 24,315,020 | 37,227,701 |
| | 89 | 15,094,632 | 27,225,796 | 42,320,428 |
| | 88 | 23,071,486 | 49,336,133 | 72,407,619 |
| North Carolina | 91 | 5,460,747 | 11,631,278 | 17,092,025 |
| | 90 | 5,853,543 | 10,968,098 | 16,821,641 |
| | 89 | 5,629,794 | 13,438,470 | 19,068,264 |
| | 88 | 6,814,934 | 19,431,809 | 26,246,743 |
| North Dakota | 91 | 108,820 | 44,329 | 153,149 |
| | 90 | 308,242 | 43,027 | 351,269 |
| | 89 | 67,154 | 78,854 | 146,008 |
| | 88 | 52,832 | 157,287 | 210,119 |

**Table 3-7. TRI Releases and Transfers by State, 1988-1991 (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 | 91 | 32,048,213 | 65,601,743 | 6,055,535 | 29,417,995 | 35,448,960 | 168,572,446 |
| | 90 | 37,360,146 | 78,449,441 | 5,945,668 | 25,426,030 | 22,710,761 | 169,892,046 |
| | 89 | 45,228,891 | 95,333,274 | 6,124,992 | 58,995,955 | 30,467,215 | 236,150,327 |
| | 88 | 43,610,363 | 99,024,143 | 5,822,706 | 56,920,298 | 30,478,708 | 235,856,218 |
| Oklahoma | 91 | 5,311,446 | 18,428,237 | 509,137 | 2,597,370 | 8,366,323 | 35,212,513 |
| | 90 | 6,295,032 | 22,145,030 | 543,298 | 4,171,682 | 1,256,911 | 34,411,953 |
| | 89 | 7,527,234 | 22,131,281 | 388,269 | 6,157,083 | 933,114 | 37,136,981 |
| | 88 | 9,621,157 | 26,695,946 | 367,955 | 6,354,214 | 1,794,414 | 44,833,686 |
| Oregon | 91 | 4,903,260 | 12,516,261 | 386,156 | 0 | 1,329,909 | 19,135,586 |
| | 90 | 5,040,206 | 13,623,171 | 561,591 | 40 | 3,714,610 | 22,939,618 |
| | 89 | 5,809,042 | 14,156,455 | 382,447 | 15 | 2,420,361 | 22,768,320 |
| | 88 | 7,411,661 | 14,265,749 | 349,446 | 1 | 1,360,882 | 23,387,739 |
| Pennsylvania | 91 | 27,962,670 | 37,664,471 | 1,225,774 | 0 | 7,832,148 | 74,685,063 |
| | 90 | 33,079,306 | 43,356,200 | 1,626,101 | 110 | 15,158,101 | 93,219,818 |
| | 89 | 34,292,931 | 47,515,796 | 2,192,697 | 269 | 19,264,278 | 103,265,971 |
| | 88 | 39,858,771 | 51,809,692 | 4,200,272 | 750 | 16,882,576 | 112,752,061 |
| Puerto Rico | 91 | 8,559,550 | 7,400,753 | 119,408 | 250 | 130,650 | 16,210,611 |
| | 90 | 8,430,074 | 8,148,574 | 118,089 | 738 | 25,457 | 16,722,932 |
| | 89 | 7,628,455 | 6,176,890 | 22,435 | 250 | 44,960 | 13,872,990 |
| | 88 | 8,426,837 | 5,819,108 | 123,110 | 0 | 110,825 | 14,479,880 |
| Rhode Island | 91 | 2,668,378 | 1,681,973 | 121,277 | 0 | 24,147 | 4,495,775 |
| | 90 | 2,962,669 | 2,256,827 | 61,683 | 0 | 1,272 | 5,282,451 |
| | 89 | 3,587,518 | 2,711,612 | 60,678 | 0 | 0 | 6,359,808 |
| | 88 | 4,084,786 | 3,695,659 | 586,245 | 0 | 115,048 | 8,481,738 |
| South Carolina | 91 | 17,174,418 | 44,345,732 | 1,210,671 | 0 | 1,036,801 | 63,767,622 |
| | 90 | 19,380,892 | 48,638,175 | 1,112,528 | 42 | 1,498,701 | 70,630,338 |
| | 89 | 23,538,701 | 48,875,207 | 1,204,616 | 0 | 1,388,459 | 75,006,983 |
| | 88 | 19,392,489 | 48,451,049 | 1,396,249 | 5 | 1,299,422 | 70,539,214 |
| South Dakota | 91 | 376,644 | 2,254,629 | 9,038 | 0 | 32,790 | 2,673,101 |
| | 90 | 491,662 | 2,417,558 | 44,867 | 0 | 5,350 | 2,959,437 |
| | 89 | 485,310 | 2,745,664 | 55,115 | 0 | 26 | 3,286,115 |
| | 88 | 699,139 | 1,830,288 | 2,400 | 0 | 1 | 2,531,828 |
| Tennessee | 91 | 53,077,465 | 85,429,953 | 3,622,533 | 69,568,902 | 2,417,820 | 214,116,673 |
| | 90 | 54,785,580 | 92,795,323 | 5,014,150 | 54,068,501 | 9,154,372 | 215,817,926 |
| | 89 | 57,108,168 | 102,962,628 | 5,964,926 | 54,996,665 | 10,711,528 | 231,743,915 |
| | 88 | 55,380,750 | 91,468,661 | 6,317,715 | 49,906,115 | 13,593,370 | 216,666,611 |
| Texas | 91 | 77,667,764 | 88,785,079 | 2,889,746 | 224,980,390 | 13,767,951 | 408,090,930 |
| | 90 | 84,727,274 | 90,970,588 | 4,528,451 | 244,868,295 | 18,371,129 | 443,465,737 |
| | 89 | 98,179,772 | 98,324,250 | 6,032,735 | 463,917,038 | 21,945,761 | 688,399,556 |
| | 88 | 98,751,942 | 108,570,165 | 5,551,496 | 509,920,742 | 35,425,065 | 758,219,410 |
| Utah | 91 | 4,930,336 | 69,417,654 | 120,656 | 0 | 23,722,951 | 98,191,597 |
| | 90 | 5,357,893 | 100,807,690 | 278,735 | 45 | 15,815,951 | 122,260,314 |
| | 89 | 5,283,385 | 125,118,661 | 255,590 | 0 | 16,088,398 | 146,746,034 |
| | 88 | 4,808,210 | 116,784,200 | 330,471 | 0 | 13,802,757 | 135,725,638 |
| Vermont | 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 |
| | 89 | 335,440 | 854,656 | 136,713 | 0 | 40,203 | 1,367,012 |
| | 88 | 436,225 | 1,130,896 | 113,308 | 0 | 24,341 | 1,704,770 |

| State | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Ohio | 91 | 44,948,858 | 67,326,457 | 112,275,315 |
| | 90 | 24,759,146 | 78,539,531 | 103,298,677 |
| | 89 | 29,848,071 | 111,430,006 | 141,278,077 |
| | 88 | 25,040,364 | 121,368,194 | 146,408,558 |
| Oklahoma | 91 | 156,243 | 14,966,735 | 15,122,978 |
| | 90 | 142,875 | 14,000,529 | 14,143,404 |
| | 89 | 405,705 | 11,021,701 | 11,427,406 |
| | 88 | 503,489 | 11,831,845 | 12,335,334 |
| Oregon | 91 | 4,133,808 | 4,993,912 | 9,127,720 |
| | 90 | 7,606,210 | 2,615,141 | 10,221,351 |
| | 89 | 7,662,785 | 3,129,585 | 10,792,370 |
| | 88 | 7,106,157 | 5,457,647 | 12,563,804 |
| Pennsylvania | 91 | 15,504,584 | 50,945,109 | 66,449,693 |
| | 90 | 17,611,357 | 72,603,108 | 90,214,465 |
| | 89 | 16,322,242 | 68,748,987 | 85,071,229 |
| | 88 | 15,725,217 | 88,878,277 | 104,603,494 |
| Puerto Rico | 91 | 6,206,477 | 8,439,487 | 14,645,964 |
| | 90 | 9,130,814 | 6,255,357 | 15,386,171 |
| | 89 | 6,537,852 | 7,039,214 | 13,577,066 |
| | 88 | 8,025,455 | 5,119,728 | 13,145,183 |
| Rhode Island | 91 | 678,929 | 1,086,849 | 1,765,778 |
| | 90 | 1,222,579 | 1,823,709 | 3,046,288 |
| | 89 | 1,420,338 | 2,873,105 | 4,293,443 |
| | 88 | 1,938,667 | 4,582,828 | 6,521,495 |
| South Carolina | 91 | 3,646,646 | 10,139,585 | 13,786,231 |
| | 90 | 3,068,690 | 20,065,970 | 23,134,660 |
| | 89 | 3,440,173 | 21,964,554 | 25,404,727 |
| | 88 | 2,705,342 | 18,660,474 | 21,365,816 |
| South Dakota | 91 | 199,789 | 95,547 | 295,336 |
| | 90 | 211,813 | 403,526 | 615,339 |
| | 89 | 99,655 | 596,307 | 695,962 |
| | 88 | 156,884 | 402,034 | 558,918 |
| Tennessee | 91 | 17,489,150 | 24,587,394 | 42,076,544 |
| | 90 | 18,141,981 | 16,136,042 | 34,278,023 |
| | 89 | 21,138,111 | 22,248,318 | 43,386,429 |
| | 88 | 25,890,881 | 18,631,735 | 44,522,616 |
| Texas | 91 | 29,966,874 | 78,446,924 | 108,413,798 |
| | 90 | 38,953,083 | 78,475,263 | 117,428,346 |
| | 89 | 37,205,646 | 86,130,766 | 123,336,412 |
| | 88 | 40,404,206 | 82,437,497 | 122,841,703 |
| Utah | 91 | 572,267 | 3,243,279 | 3,815,546 |
| | 90 | 895,732 | 88,114,454 | 89,010,186 |
| | 89 | 785,013 | 2,030,474 | 2,815,487 |
| | 88 | 959,543 | 2,113,261 | 3,072,804 |
| Vermont | 91 | 35,707 | 707,198 | 742,905 |
| | 90 | 43,208 | 442,042 | 485,250 |
| | 89 | 77,588 | 576,764 | 654,352 |
| | 88 | 72,761 | 811,150 | 883,911 |

**Table 3-7. TRI Releases and Transfers by State, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|
| Virgin Islands | 91 | 794,692 | 315,396 | 394,318 | 0 | 15,610 | 1,520,016 |
| | 90 | 831,913 | 380,552 | 195,751 | 0 | 75,224 | 1,483,440 |
| | 89 | 502,680 | 656,722 | 1,190 | 0 | 113,643 | 1,274,235 |
| | 88 | 748,330 | 742,462 | 2,500 | 0 | 140,342 | 1,633,634 |
| Virginia | 91 | 17,022,639 | 49,265,438 | 2,248,100 | 0 | 2,022,165 | 70,558,342 |
| | 90 | 22,182,500 | 55,634,531 | 2,156,157 | 854 | 2,542,483 | 82,516,525 |
| | 89 | 23,297,587 | 58,656,245 | 10,589,918 | 0 | 2,952,502 | 95,496,252 |
| | 88 | 23,035,001 | 102,160,981 | 19,991,274 | 1,373 | 6,280,413 | 151,469,042 |
| Washington | 91 | 10,280,094 | 15,642,749 | 4,355,670 | 5 | 155,576 | 30,434,094 |
| | 90 | 11,755,397 | 16,695,661 | 12,171,507 | 35 | 614,068 | 41,236,668 |
| | 89 | 12,563,087 | 16,049,022 | 15,652,467 | 0 | 420,913 | 44,685,489 |
| | 88 | 11,125,544 | 18,576,430 | 13,605,780 | 0 | 914,274 | 44,222,028 |
| West Virginia | 91 | 9,957,591 | 16,556,035 | 1,436,221 | 0 | 354,546 | 28,304,393 |
| | 90 | 12,017,866 | 18,774,469 | 2,103,173 | 5 | 7,922,628 | 40,818,141 |
| | 89 | 12,413,553 | 22,034,923 | 2,894,032 | 0 | 10,183,610 | 47,526,118 |
| | 88 | 15,028,571 | 21,911,772 | 3,860,049 | 0 | 895,363 | 41,695,755 |
| Wisconsin | 91 | 7,994,142 | 28,834,891 | 712,079 | 25 | 2,323,987 | 39,865,124 |
| | 90 | 10,529,127 | 32,481,623 | 496,185 | 103 | 3,445,949 | 46,952,987 |
| | 89 | 11,747,181 | 31,778,426 | 304,155 | 250 | 4,222,721 | 48,052,733 |
| | 88 | 12,901,793 | 33,559,227 | 505,970 | 250 | 6,919,656 | 53,886,896 |
| Wyoming | 91 | 927,092 | 1,950,915 | 106,175 | 8,652,092 | 166,710 | 11,802,984 |
| | 90 | 929,939 | 3,757,882 | 120,097 | 6,818,227 | 328,087 | 11,954,232 |
| | 89 | 747,972 | 2,911,530 | 82,173 | 14,125,832 | 192,699 | 18,060,206 |
| | 88 | 1,144,667 | 1,746,397 | 42,050 | 27,113,559 | 15,274,367 | 45,321,040 |
| Total | 91 | 609,765,664 | 1,369,580,314 | 243,497,317 | 710,248,004 | 421,160,113 | 3,354,251,412 |
| | 90 | 706,748,307 | 1,575,954,848 | 196,832,760 | 745,413,562 | 462,679,392 | 3,687,628,869 |
| | 89 | 793,597,781 | 1,768,596,839 | 188,025,233 | 1,175,583,836 | 455,029,001 | 4,380,832,690 |
| | 88 | 823,738,542 | 1,842,370,656 | 311,070,591 | 1,343,633,468 | 527,546,722 | 4,848,359,979 |

| State | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Virgin Islands | 91 | 0 | 173 | 173 |
| | 90 | 0 | 13,200 | 13,200 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Virginia | 91 | 20,831,063 | 4,815,575 | 25,646,638 |
| | 90 | 17,333,177 | 8,253,784 | 25,586,961 |
| | 89 | 35,089,054 | 11,413,171 | 46,502,225 |
| | 88 | 37,856,487 | 13,390,977 | 51,247,464 |
| Washington | 91 | 383,111 | 2,577,085 | 2,960,196 |
| | 90 | 1,386,880 | 3,656,990 | 5,043,870 |
| | 89 | 805,063 | 4,909,330 | 5,714,393 |
| | 88 | 978,070 | 7,497,559 | 8,475,629 |
| West Virginia | 91 | 1,840,047 | 5,297,316 | 7,137,363 |
| | 90 | 3,074,249 | 12,350,080 | 15,424,329 |
| | 89 | 3,423,255 | 11,660,135 | 15,083,390 |
| | 88 | 3,536,369 | 19,873,750 | 23,410,119 |
| Wisconsin | 91 | 7,528,295 | 16,989,630 | 24,517,925 |
| | 90 | 12,794,507 | 18,515,015 | 31,309,522 |
| | 89 | 17,005,039 | 35,353,799 | 52,358,838 |
| | 88 | 21,331,783 | 27,051,531 | 48,383,314 |
| Wyoming | 91 | 173,115 | 3,552 | 176,667 |
| | 90 | 4,670 | 26,222 | 30,892 |
| | 89 | 250 | 17,418 | 17,668 |
| | 88 | 10,350 | 128,583 | 138,933 |
| Total | 91 | 410,596,887 | 654,313,983 | 1,064,910,870 |
| | 90 | 466,123,084 | 842,451,834 | 1,308,574,918 |
| | 89 | 558,575,158 | 890,356,058 | 1,448,931,216 |
| | 88 | 574,045,380 | 1,028,111,605 | 1,602,156,985 |

# THE 1991 TOXICS RELEASE INVENTORY
# PUBLIC DATA RELEASE

***1988 - 1991***
***Releases and Transfers***
***by Chemical***

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 | 91 | 2,323,247 | 4,757,670 | 75,314 | 2,328,187 | 37,904 | 9,522,322 |
| | | 90 | 2,389,070 | 4,801,983 | 83,040 | 1,963,498 | 29,665 | 9,267,256 |
| | | 89 | 2,504,288 | 5,347,859 | 69,472 | 1,924,529 | 30,764 | 9,876,912 |
| | | 88 | 2,530,858 | 4,119,010 | 84,236 | 2,219,105 | 194,951 | 9,148,160 |
| 60-35-5 | Acetamide | 91 | 10 | 25 | 5 | 0 | 0 | 40 |
| | | 90 | 12 | 23 | 5 | 0 | 0 | 40 |
| | | 89 | 0 | 0 | 250 | 0 | 0 | 250 |
| | | 88 | 0 | 0 | 0 | 0 | 0 | 0 |
| 67-64-1 | Acetone | 91 | 84,674,684 | 75,522,340 | 1,206,217 | 3,463,348 | 466,862 | 165,333,451 |
| | | 90 | 93,785,012 | 96,529,032 | 1,288,958 | 4,688,469 | 215,992 | 196,507,463 |
| | | 89 | 103,989,300 | 103,499,813 | 1,021,694 | 4,526,483 | 264,044 | 213,301,334 |
| | | 88 | 98,810,786 | 110,328,285 | 1,149,331 | 3,117,741 | 376,439 | 213,782,582 |
| 75-05-8 | Acetonitrile | 91 | 743,749 | 623,983 | 20,396 | 19,090,831 | 5,620 | 20,484,579 |
| | | 90 | 866,270 | 868,372 | 10,726 | 19,445,260 | 248 | 21,190,876 |
| | | 89 | 707,629 | 811,057 | 91,616 | 18,033,180 | 1,250 | 19,644,732 |
| | | 88 | 1,340,588 | 786,151 | 42,223 | 16,739,010 | 1,790 | 18,909,762 |
| 107-02-8 | Acrolein | 91 | 8,179 | 20,321 | 7 | 205,898 | 0 | 234,405 |
| | | 90 | 5,816 | 16,213 | 5 | 103,059 | 5 | 125,098 |
| | | 89 | 7,582 | 12,743 | 0 | 67,637 | 80 | 88,042 |
| | | 88 | 17,352 | 16,300 | 0 | 68,950 | 500 | 103,102 |
| 79-06-1 | Acrylamide | 91 | 60,668 | 3,496 | 4,635 | 4,594,900 | 1,500 | 4,665,199 |
| | | 90 | 42,156 | 6,959 | 3,814 | 4,214,305 | 545 | 4,267,779 |
| | | 89 | 18,685 | 6,811 | 7,379 | 4,430,980 | 992 | 4,464,847 |
| | | 88 | 17,298 | 8,721 | 3,124 | 2,198,000 | 756 | 2,227,899 |
| 79-10-7 | Acrylic acid | 91 | 232,485 | 178,113 | 712 | 18,923,000 | 94 | 19,334,404 |
| | | 90 | 228,335 | 203,144 | 43,888 | 21,525,000 | 94,334 | 22,094,701 |
| | | 89 | 165,533 | 192,740 | 10,701 | 18,728,000 | 2,009 | 19,098,983 |
| | | 88 | 585,041 | 215,005 | 16,646 | 22,262,010 | 15,950 | 23,094,652 |
| 107-13-1 | Acrylonitrile | 91 | 520,853 | 1,668,036 | 1,959 | 4,732,983 | 13,293 | 6,937,124 |
| | | 90 | 642,530 | 2,507,222 | 3,892 | 4,925,276 | 268 | 8,079,188 |
| | | 89 | 794,799 | 3,592,668 | 4,242 | 5,790,548 | 4,712 | 10,186,969 |
| | | 88 | 995,505 | 3,200,760 | 5,874 | 4,562,713 | 2,150 | 8,767,002 |
| 107-05-1 | Allyl chloride | 91 | 155,176 | 24,977 | 5 | 145 | 0 | 180,303 |
| | | 90 | 169,368 | 36,656 | 135 | 1,200 | 0 | 207,359 |
| | | 89 | 98,802 | 76,801 | 364 | 1,250 | 250 | 177,467 |
| | | 88 | 93,911 | 55,558 | 430 | 250 | 200 | 150,349 |
| 7429-90-5 | Aluminum (fume or dust) | 91 | 523,990 | 4,210,547 | 56,841 | 0 | 1,420,310 | 6,211,688 |
| | | 90 | 613,958 | 1,700,290 | 56,805 | 10 | 1,314,181 | 3,685,244 |
| | | 89 | 1,088,106 | 1,986,345 | 78,857 | 0 | 3,568,818 | 6,722,126 |
| | | 88 | 1,225,523 | 2,454,256 | 91,518 | 250 | 3,177,625 | 6,949,172 |
| 60-09-3 | 4-Aminoazobenzene | 91 | 0 | 1 | 0 | 440 | 0 | 441 |
| | | 90 | 0 | 1 | 0 | 510 | 0 | 511 |
| | | 89 | 0 | 0 | 0 | 353 | 0 | 353 |
| | | 88 | 0 | 0 | 0 | 537 | 0 | 537 |
| 92-67-1 | 4-Aminobiphenyl | 91 | 0 | 0 | 0 | 4 | 0 | 4 |
| | | 90 | 0 | 0 | 0 | 11 | 0 | 11 |
| | | 89 | 0 | 1 | 0 | 9 | 0 | 10 |
| | | 88 | 0 | 10 | 0 | 4 | 0 | 14 |
| 7664-41-7 | Ammonia | 91 | 46,929,186 | 141,696,062 | 41,137,132 | 240,682,883 | 14,763,305 | 485,208,568 |
| | | 90 | 53,879,029 | 156,281,750 | 44,053,651 | 265,671,125 | 17,868,381 | 537,753,936 |
| | | 89 | 62,003,124 | 191,187,502 | 24,343,822 | 84,456,152 | 8,267,968 | 370,258,568 |
| | | 88 | 54,089,229 | 199,433,416 | 24,769,396 | 55,697,844 | 14,204,960 | 348,194,845 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Acetaldehyde | 91 | 153,583 | 251,760 | 405,343 |
| | 90 | 155,435 | 170,664 | 326,099 |
| | 89 | 323,000 | 204,884 | 527,884 |
| | 88 | 160,438 | 187,173 | 347,611 |
| Acetamide | 91 | 29,000 | 2,638 | 31,638 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 250 | 250 |
| Acetone | 91 | 14,475,090 | 13,946,649 | 28,421,739 |
| | 90 | 12,625,027 | 22,690,149 | 35,315,176 |
| | 89 | 13,281,813 | 36,561,102 | 49,842,915 |
| | 88 | 14,103,287 | 34,135,494 | 48,238,781 |
| Acetonitrile | 91 | 581,095 | 2,690,832 | 3,271,927 |
| | 90 | 825,013 | 1,726,365 | 2,551,378 |
| | 89 | 950,278 | 4,859,899 | 5,810,177 |
| | 88 | 600,450 | 4,402,814 | 5,003,264 |
| Acrolein | 91 | 0 | 16 | 16 |
| | 90 | 5 | 108 | 113 |
| | 89 | 250 | 51 | 301 |
| | 88 | 250 | 250 | 500 |
| Acrylamide | 91 | 95,578 | 44,405 | 139,983 |
| | 90 | 37,105 | 67,306 | 104,411 |
| | 89 | 33,136 | 137,799 | 170,935 |
| | 88 | 13,540 | 112,040 | 125,580 |
| Acrylic acid | 91 | 47,439 | 413,182 | 460,621 |
| | 90 | 128,172 | 270,667 | 398,839 |
| | 89 | 31,441 | 214,619 | 246,060 |
| | 88 | 23,262 | 243,053 | 266,315 |
| Acrylonitrile | 91 | 297,197 | 2,056,077 | 2,353,274 |
| | 90 | 342,107 | 862,489 | 1,204,596 |
| | 89 | 787,803 | 1,310,242 | 2,098,045 |
| | 88 | 955,739 | 1,097,960 | 2,053,699 |
| Allyl chloride | 91 | 11,754 | 302,628 | 314,382 |
| | 90 | 6,459 | 234,000 | 240,459 |
| | 89 | 11,144 | 168,476 | 179,620 |
| | 88 | 14,900 | 209,075 | 223,975 |
| Aluminum (fume or dust) | 91 | 13,271 | 6,182,302 | 6,195,573 |
| | 90 | 28,531 | 14,814,721 | 14,843,252 |
| | 89 | 20,990 | 16,862,508 | 16,883,498 |
| | 88 | 15,424 | 22,516,087 | 22,531,511 |
| 4-Aminoazobenzene | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| 4-Aminobiphenyl | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Ammonia | 91 | 96,492,357 | 12,012,520 | 108,504,877 |
| | 90 | 82,739,725 | 10,361,731 | 93,101,456 |
| | 89 | 31,325,498 | 7,505,719 | 38,831,217 |
| | 88 | 25,729,688 | 6,272,720 | 32,002,408 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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) | 91 | 55,453 | 1,978,009 | 7,808,136 | 32,736,428 | 8,426,270 | 51,004,296 |
| | | 90 | 381,632 | 2,352,022 | 7,625,032 | 39,757,210 | 4,168,730 | 54,284,626 |
| | | 89 | 897,324 | 2,503,543 | 8,853,857 | 44,738,000 | 7,550,275 | 64,542,999 |
| | | 88 | 419,038 | 2,527,869 | 8,436,598 | 67,941,000 | 15,902,204 | 95,226,709 |
| 7783-20-2 | Ammonium sulfate (solution) | 91 | 19,639 | 265,457 | 7,592,647 | 7,523,816 | 2,106,747 | 17,508,306 |
| | | 90 | 18,868 | 355,717 | 9,186,613 | 5,221,976 | 2,939,819 | 17,722,993 |
| | | 89 | 53,284 | 839,427 | 68,551,944 | 461,238,592 | 15,529,173 | 546,212,420 |
| | | 88 | 313,237 | 482,350 | 71,838,665 | 520,144,631 | 13,422,824 | 606,201,707 |
| 62-53-3 | Aniline | 91 | 130,452 | 496,579 | 26,801 | 1,603,259 | 1,068 | 2,258,159 |
| | | 90 | 214,274 | 266,511 | 36,008 | 2,471,752 | 3,099 | 2,991,644 |
| | | 89 | 231,107 | 257,433 | 14,844 | 3,243,543 | 11,655 | 3,758,582 |
| | | 88 | 323,900 | 388,869 | 16,105 | 3,582,975 | 12,822 | 4,324,671 |
| 90-04-0 | o-Anisidine | 91 | 765 | 260 | 187 | 0 | 3,800 | 5,012 |
| | | 90 | 500 | 1,341 | 141 | 0 | 250 | 2,232 |
| | | 89 | 750 | 1,298 | 4,949 | 0 | 2,570 | 9,567 |
| | | 88 | 501 | 1,792 | 285 | 0 | 250 | 2,828 |
| 104-94-9 | p-Anisidine | 91 | 5 | 8 | 5 | 0 | 0 | 18 |
| | | 90 | 5 | 10 | 5 | 0 | 0 | 20 |
| | | 89 | 0 | 4 | 250 | 0 | 0 | 254 |
| | | 88 | 0 | 10 | 250 | 0 | 250 | 510 |
| 120-12-7 | Anthracene | 91 | 25,778 | 29,716 | 1,158 | 0 | 2,433 | 59,085 |
| | | 90 | 27,320 | 38,745 | 1,360 | 0 | 4,806 | 72,231 |
| | | 89 | 41,501 | 53,449 | 2,316 | 0 | 17,342 | 114,608 |
| | | 88 | 146,428 | 55,935 | 4,382 | 0 | 11,106 | 217,851 |
| 7440-36-0 | Antimony | 91 | 3,964 | 17,300 | 1,223 | 120 | 5,745 | 28,352 |
| | | 90 | 6,819 | 45,242 | 5,219 | 165 | 182,272 | 239,717 |
| | | 89 | 14,113 | 84,391 | 3,533 | 440 | 557,336 | 659,813 |
| | | 88 | 11,039 | 59,377 | 11,178 | 2,100 | 903,916 | 987,610 |
| 7440-38-2 | Arsenic | 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 |
| | | 89 | 5,257 | 52,643 | 1,754 | 0 | 147,616 | 207,270 |
| | | 88 | 2,858 | 5,329 | 1,282 | 0 | 181,267 | 190,736 |
| 1332-21-4 | Asbestos (friable) | 91 | 5,610 | 6,952 | 252 | 0 | 585,676 | 598,490 |
| | | 90 | 6,626 | 12,645 | 515 | 5 | 437,282 | 457,073 |
| | | 89 | 11,300 | 29,449 | 1,050 | 0 | 1,073,901 | 1,115,700 |
| | | 88 | 11,038 | 38,422 | 10,699 | 0 | 2,111,880 | 2,172,039 |
| 7440-39-3 | Barium | 91 | 94,605 | 21,806 | 5,093 | 0 | 261,262 | 382,766 |
| | | 90 | 49,824 | 32,008 | 54,102 | 10 | 362,509 | 498,453 |
| | | 89 | 198,349 | 94,577 | 26,048 | 0 | 2,762,027 | 3,081,001 |
| | | 88 | 174,401 | 92,410 | 18,650 | 0 | 6,721,686 | 7,007,147 |
| 98-87-3 | Benzal chloride | 91 | 1,550 | 11 | 0 | 0 | 0 | 1,561 |
| | | 90 | 1,744 | 11 | 0 | 0 | 0 | 1,755 |
| | | 89 | 5,450 | 6 | 0 | 0 | 0 | 5,456 |
| | | 88 | 5,252 | 6 | 0 | 0 | 0 | 5,258 |
| 55-21-0 | Benzamide | 89 | 250 | 250 | 250 | 250 | 0 | 1,000 |
| | | 88 | 250 | 250 | 250 | 250 | 0 | 1,000 |
| 71-43-2 | Benzene | 91 | 9,971,308 | 7,503,182 | 26,896 | 834,242 | 111,928 | 18,447,556 |
| | | 90 | 14,516,266 | 10,686,871 | 24,524 | 689,066 | 722,486 | 26,639,213 |
| | | 89 | 15,045,660 | 11,694,181 | 169,274 | 668,610 | 120,355 | 27,698,080 |
| | | 88 | 20,235,191 | 11,027,298 | 46,998 | 825,035 | 127,920 | 32,262,442 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Ammonium nitrate (solution) | 91 | 5,984,399 | 39,795,235 | 45,779,634 |
| | 90 | 7,441,267 | 1,582,930 | 9,024,197 |
| | 89 | 6,924,275 | 1,597,638 | 8,521,913 |
| | 88 | 7,678,062 | 2,211,859 | 9,889,921 |
| Ammonium sulfate (solution) | 91 | 42,154,207 | 7,110,010 | 49,264,217 |
| | 90 | 62,664,033 | 4,111,471 | 66,775,504 |
| | 89 | 201,593,642 | 3,400,733 | 204,994,375 |
| | 88 | 187,982,629 | 4,667,266 | 192,649,895 |
| Aniline | 91 | 1,306,755 | 457,152 | 1,763,907 |
| | 90 | 1,706,763 | 702,812 | 2,409,575 |
| | 89 | 1,811,082 | 1,381,047 | 3,192,129 |
| | 88 | 2,106,510 | 830,567 | 2,937,077 |
| o-Anisidine | 91 | 3,395 | 81 | 3,476 |
| | 90 | 5,610 | 99 | 5,709 |
| | 89 | 3,038 | 1,250 | 4,288 |
| | 88 | 768 | 3 | 771 |
| p-Anisidine | 91 | 8 | 0 | 8 |
| | 90 | 5 | 0 | 5 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Anthracene | 91 | 597 | 149,632 | 150,229 |
| | 90 | 18,427 | 860,733 | 879,160 |
| | 89 | 20,111 | 255,089 | 275,200 |
| | 88 | 20,419 | 279,187 | 299,606 |
| Antimony | 91 | 3,228 | 531,980 | 535,208 |
| | 90 | 10,587 | 397,133 | 407,720 |
| | 89 | 35,284 | 389,195 | 424,479 |
| | 88 | 40,228 | 551,858 | 592,086 |
| Arsenic | 91 | 566 | 624,613 | 625,179 |
| | 90 | 1,034 | 371,410 | 372,444 |
| | 89 | 2,051 | 237,091 | 239,142 |
| | 88 | 1,928 | 63,969 | 65,897 |
| Asbestos (friable) | 91 | 1,707 | 5,567,813 | 5,569,520 |
| | 90 | 4,652 | 9,035,967 | 9,040,619 |
| | 89 | 41,252 | 7,050,377 | 7,091,629 |
| | 88 | 68,148 | 13,186,642 | 13,254,790 |
| Barium | 91 | 84,381 | 628,569 | 712,950 |
| | 90 | 13,083 | 496,508 | 509,591 |
| | 89 | 26,301 | 1,356,109 | 1,382,410 |
| | 88 | 205,209 | 1,765,596 | 1,970,805 |
| Benzal chloride | 91 | 0 | 0 | 0 |
| | 90 | 5 | 37,000 | 37,005 |
| | 89 | 0 | 280,000 | 280,000 |
| | 88 | 0 | 103,186 | 103,186 |
| Benzamide | 89 | 0 | 750 | 750 |
| | 88 | 0 | 750 | 750 |
| Benzene | 91 | 613,449 | 1,799,039 | 2,412,488 |
| | 90 | 634,025 | 2,221,216 | 2,855,241 |
| | 89 | 1,107,975 | 1,839,858 | 2,947,833 |
| | 88 | 1,135,172 | 2,295,959 | 3,431,131 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 98-07-7 | Benzoic trichloride | 91 | 7,686 | 261 | 0 | 0 | 0 | 7,947 |
| | | 90 | 8,310 | 25 | 0 | 0 | 0 | 8,335 |
| | | 89 | 24,833 | 442 | 0 | 0 | 0 | 25,275 |
| | | 88 | 24,542 | 421 | 0 | 0 | 0 | 24,963 |
| 98-88-4 | Benzoyl chloride | 91 | 23,446 | 3,420 | 5 | 0 | 250 | 27,121 |
| | | 90 | 17,667 | 5,657 | 0 | 67,501 | 260 | 91,085 |
| | | 89 | 31,243 | 3,830 | 0 | 168,200 | 550 | 203,823 |
| | | 88 | 28,295 | 4,719 | 0 | 130,000 | 250 | 163,264 |
| 94-36-0 | Benzoyl peroxide | 91 | 648 | 1,656 | 5 | 0 | 13,205 | 15,514 |
| | | 90 | 12,922 | 1,708 | 5 | 5 | 16,025 | 30,665 |
| | | 89 | 3,277 | 1,547 | 1,000 | 0 | 19,500 | 25,324 |
| | | 88 | 4,063 | 2,231 | 0 | 5,350 | 36,050 | 47,694 |
| 100-44-7 | Benzyl chloride | 91 | 18,189 | 8,934 | 15 | 20 | 0 | 27,158 |
| | | 90 | 26,024 | 7,521 | 265 | 315 | 270 | 34,395 |
| | | 89 | 18,777 | 8,841 | 251 | 400 | 500 | 28,769 |
| | | 88 | 30,689 | 12,640 | 640 | 0 | 500 | 44,469 |
| 7440-41-7 | Beryllium | 91 | 6 | 1,372 | 101 | 0 | 29,023 | 30,502 |
| | | 90 | 9 | 1,366 | 42 | 0 | 6,517 | 7,934 |
| | | 89 | 253 | 1,642 | 122 | 0 | 31,522 | 33,539 |
| | | 88 | 550 | 2,213 | 74 | 0 | 37,000 | 39,837 |
| 92-52-4 | Biphenyl | 91 | 677,182 | 183,323 | 18,700 | 47,318 | 30,162 | 956,685 |
| | | 90 | 764,465 | 369,678 | 21,394 | 63,214 | 35,552 | 1,254,303 |
| | | 89 | 763,227 | 330,168 | 42,685 | 72,993 | 44,115 | 1,253,188 |
| | | 88 | 628,891 | 579,696 | 68,493 | 82,760 | 222,297 | 1,582,137 |
| 111-44-4 | Bis(2-chloroethyl) ether | 91 | 2,950 | 594 | 0 | 0 | 0 | 3,544 |
| | | 90 | 3,206 | 573 | 83 | 0 | 0 | 3,862 |
| | | 89 | 3,637 | 1,251 | 1,552 | 0 | 0 | 6,440 |
| | | 88 | 4,322 | 600 | 1,351 | 0 | 0 | 6,273 |
| 542-88-1 | Bis(chloromethyl) ether | 91 | 2 | 572 | 0 | 0 | 0 | 574 |
| | | 90 | 3 | 360 | 0 | 0 | 0 | 363 |
| | | 89 | 1 | 2 | 0 | 0 | 0 | 3 |
| | | 88 | 1 | 0 | 0 | 0 | 0 | 1 |
| 108-60-1 | Bis(2-chloro-1-methyl-ethyl)ether | 91 | 2,090 | 1,520 | 1,800 | 0 | 0 | 5,410 |
| | | 90 | 3,800 | 2,430 | 12,000 | 0 | 0 | 18,230 |
| | | 89 | 751 | 2,608 | 12,000 | 0 | 0 | 15,359 |
| | | 88 | 340 | 809 | 30,000 | 0 | 0 | 31,149 |
| 103-23-1 | Bis(2-ethylhexyl) adipate | 91 | 69,541 | 73,183 | 50 | 0 | 81,715 | 224,489 |
| | | 90 | 42,123 | 92,831 | 6,919 | 0 | 19,798 | 161,671 |
| | | 89 | 36,862 | 50,034 | 2,453 | 0 | 65,765 | 155,114 |
| | | 88 | 25,789 | 66,788 | 10,440 | 0 | 1,200 | 104,217 |
| 75-25-2 | Bromoform | 91 | 150 | 0 | 0 | 1,900 | 0 | 2,050 |
| | | 90 | 48,205 | 0 | 0 | 0 | 72,000 | 120,205 |
| | | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 88 | 0 | 0 | 8,600 | 0 | 0 | 8,600 |
| 74-83-9 | Bromomethane | 91 | 404,146 | 2,041,449 | 0 | 1,000 | 0 | 2,446,595 |
| | | 90 | 404,981 | 2,093,262 | 0 | 28,000 | 0 | 2,526,243 |
| | | 89 | 339,603 | 2,583,261 | 0 | 66,525 | 0 | 2,989,389 |
| | | 88 | 513,244 | 1,726,918 | 0 | 1,546 | 0 | 2,241,708 |
| 106-99-0 | 1,3-Butadiene | 91 | 2,050,374 | 1,900,003 | 5,049 | 0 | 8,881 | 3,964,307 |
| | | 90 | 3,094,370 | 2,068,264 | 111,234 | 1,605 | 6,428 | 5,281,901 |
| | | 89 | 3,553,473 | 2,277,299 | 143,434 | 1,500 | 14,823 | 5,990,529 |
| | | 88 | 3,929,376 | 2,953,834 | 522,504 | 1,500 | 7,817 | 7,415,031 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Benzoic trichloride | 91 | 0 | 0 | 0 |
| | 90 | 5 | 90 | 95 |
| | 89 | 0 | 4,117 | 4,117 |
| | 88 | 0 | 22,572 | 22,572 |
| Benzoyl chloride | 91 | 230 | 493,270 | 493,500 |
| | 90 | 1,353 | 640,743 | 642,096 |
| | 89 | 200 | 434,542 | 434,742 |
| | 88 | 180 | 360,969 | 361,149 |
| Benzoyl peroxide | 91 | 17,192 | 68,052 | 85,244 |
| | 90 | 48,028 | 16,527 | 64,555 |
| | 89 | 73,463 | 151,766 | 225,229 |
| | 88 | 69,946 | 62,554 | 132,500 |
| Benzyl chloride | 91 | 28,749 | 73,256 | 102,005 |
| | 90 | 45,550 | 280,212 | 325,762 |
| | 89 | 52,101 | 19,527 | 71,628 |
| | 88 | 41,553 | 98,847 | 140,400 |
| Beryllium | 91 | 0 | 117,827 | 117,827 |
| | 90 | 0 | 1,371 | 1,371 |
| | 89 | 0 | 1,209 | 1,209 |
| | 88 | 4 | 3,158 | 3,162 |
| Biphenyl | 91 | 782,600 | 224,197 | 1,006,797 |
| | 90 | 1,085,443 | 407,609 | 1,493,052 |
| | 89 | 890,702 | 366,521 | 1,257,223 |
| | 88 | 1,446,610 | 478,363 | 1,924,973 |
| Bis(2-chloroethyl) ether | 91 | 15,841 | 447,600 | 463,441 |
| | 90 | 31,791 | 20,697 | 52,488 |
| | 89 | 24,829 | 22,024 | 46,853 |
| | 88 | 9,621 | 27,265 | 36,886 |
| Bis(chloromethyl) ether | 91 | 0 | 2 | 2 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Bis(2-chloro-1-methyl-ethyl)ether | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Bis(2-ethylhexyl) adipate | 91 | 20,155 | 247,685 | 267,840 |
| | 90 | 32,437 | 208,932 | 241,369 |
| | 89 | 58,338 | 269,107 | 327,445 |
| | 88 | 49,659 | 206,706 | 256,365 |
| Bromoform | 91 | 0 | 99,550 | 99,550 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Bromomethane | 91 | 0 | 335 | 335 |
| | 90 | 552,160 | 2,821 | 554,981 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| 1,3-Butadiene | 91 | 11,650 | 137,747 | 149,397 |
| | 90 | 14,383 | 161,844 | 176,227 |
| | 89 | 29,072 | 410,419 | 439,491 |
| | 88 | 44,874 | 366,187 | 411,061 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 141-32-2 | Butyl acrylate | 91 | 151,355 | 141,386 | 1,273 | 0 | 55 | 294,069 |
| | | 90 | 138,216 | 167,165 | 29,071 | 0 | 68 | 334,520 |
| | | 89 | 121,041 | 191,540 | 6,400 | 2 | 462 | 319,445 |
| | | 88 | 165,197 | 246,676 | 3,528 | 10 | 602 | 416,013 |
| 71-36-3 | n-Butyl alcohol | 91 | 6,977,261 | 22,741,844 | 257,497 | 4,382,276 | 107,321 | 34,466,199 |
| | | 90 | 6,889,955 | 26,383,892 | 323,550 | 3,529,441 | 97,838 | 37,224,676 |
| | | 89 | 7,912,542 | 28,995,065 | 943,657 | 1,414,104 | 109,200 | 39,374,568 |
| | | 88 | 8,487,649 | 28,956,465 | 127,610 | 3,006,660 | 175,791 | 40,754,175 |
| 78-92-2 | sec-Butyl alcohol | 91 | 228,025 | 409,563 | 4,486 | 170,000 | 14 | 812,088 |
| | | 90 | 206,618 | 492,363 | 4,315 | 171,484 | 51 | 874,831 |
| | | 89 | 359,589 | 622,727 | 6,411 | 0 | 307 | 989,034 |
| | | 88 | 394,501 | 695,295 | 122,291 | 0 | 2,600 | 1,214,687 |
| 75-65-0 | tert-Butyl alcohol | 91 | 760,910 | 424,781 | 129,510 | 827,562 | 497 | 2,143,260 |
| | | 90 | 1,275,366 | 341,050 | 271,265 | 995,382 | 24,962 | 2,908,025 |
| | | 89 | 1,030,715 | 428,456 | 221,906 | 724,537 | 23,110 | 2,428,724 |
| | | 88 | 1,206,290 | 366,697 | 14,989 | 674,798 | 818 | 2,263,592 |
| 85-68-7 | Butyl benzyl phthalate | 91 | 109,517 | 192,762 | 1,177 | 0 | 75,866 | 379,322 |
| | | 90 | 41,458 | 185,209 | 925 | 260 | 9,774 | 237,626 |
| | | 89 | 54,204 | 219,732 | 1,028 | 250 | 8,324 | 283,538 |
| | | 88 | 45,407 | 245,853 | 802 | 480 | 16,682 | 309,224 |
| 106-88-7 | 1,2-Butylene oxide | 91 | 48,928 | 10,836 | 3,490 | 0 | 5 | 63,259 |
| | | 90 | 54,696 | 24,769 | 4,625 | 0 | 5 | 84,095 |
| | | 89 | 68,234 | 51,445 | 4,139 | 0 | 0 | 123,818 |
| | | 88 | 34,973 | 64,958 | 3,500 | 0 | 250 | 103,681 |
| 123-72-8 | Butyraldehyde | 91 | 165,671 | 267,829 | 575 | 144,427 | 28 | 578,530 |
| | | 90 | 211,784 | 350,687 | 3,423 | 1,937 | 371 | 568,202 |
| | | 89 | 412,448 | 1,195,898 | 4,297 | 7,562 | 278 | 1,620,483 |
| | | 88 | 767,404 | 2,241,388 | 3,812 | 1,997 | 31 | 3,014,632 |
| 569-64-2 | C.I. Basic Green 4 | 91 | 6 | 6 | 14 | 0 | 0 | 26 |
| | | 90 | 9 | 7 | 250 | 0 | 0 | 266 |
| | | 89 | 500 | 250 | 250 | 0 | 250 | 1,250 |
| | | 88 | 500 | 250 | 0 | 0 | 0 | 750 |
| 989-38-8 | C.I. Basic Red 1 | 91 | 0 | 0 | 0 | 0 | 375 | 375 |
| | | 90 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 89 | 250 | 0 | 0 | 0 | 0 | 250 |
| 1937-37-7 | C.I. Direct Black 38 | 89 | 250 | 250 | 0 | 0 | 0 | 500 |
| 2832-40-8 | C.I. Disperse Yellow 3 | 91 | 336 | 0 | 26 | 0 | 782 | 1,144 |
| | | 90 | 364 | 0 | 26 | 0 | 843 | 1,233 |
| | | 89 | 359 | 0 | 24 | 0 | 846 | 1,229 |
| | | 88 | 398 | 0 | 302 | 0 | 0 | 700 |
| 81-88-9 | C.I. Food Red 15 | 91 | 0 | 1 | 0 | 0 | 0 | 1 |
| | | 90 | 0 | 2 | 0 | 0 | 0 | 2 |
| | | 89 | 250 | 0 | 0 | 0 | 0 | 250 |
| | | 88 | 250 | 0 | 0 | 0 | 0 | 250 |
| 3118-97-6 | C.I. Solvent Orange 7 | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| 97-56-3 | C.I. Solvent Yellow 3 | 91 | 0 | 5 | 0 | 0 | 0 | 5 |
| | | 90 | 0 | 0 | 5 | 0 | 0 | 5 |
| | | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 88 | 250 | 0 | 0 | 0 | 0 | 250 |
| 842-07-9 | C.I. Solvent Yellow 14 | 90 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 89 | 250 | 250 | 0 | 0 | 0 | 500 |
| | | 88 | 0 | 0 | 0 | 0 | 0 | 0 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Butyl acrylate | 91 | 138,351 | 53,834 | 192,185 |
| | 90 | 127,398 | 130,325 | 257,723 |
| | 89 | 20,536 | 664,022 | 684,558 |
| | 88 | 34,604 | 604,685 | 639,289 |
| n-Butyl alcohol | 91 | 2,208,281 | 3,673,535 | 5,881,816 |
| | 90 | 4,239,917 | 6,070,691 | 10,310,608 |
| | 89 | 5,694,054 | 5,437,997 | 11,132,051 |
| | 88 | 4,524,863 | 8,180,445 | 12,705,308 |
| sec-Butyl alcohol | 91 | 14,464 | 28,939 | 43,403 |
| | 90 | 9,991 | 73,105 | 83,096 |
| | 89 | 14,563 | 129,700 | 144,263 |
| | 88 | 41,108 | 230,727 | 271,835 |
| tert-Butyl alcohol | 91 | 1,339,777 | 1,113,558 | 2,453,335 |
| | 90 | 1,792,590 | 472,509 | 2,265,099 |
| | 89 | 1,513,361 | 488,133 | 2,001,494 |
| | 88 | 1,539,726 | 495,275 | 2,035,001 |
| Butyl benzyl phthalate | 91 | 40,364 | 457,747 | 498,111 |
| | 90 | 87,592 | 876,604 | 964,196 |
| | 89 | 56,782 | 914,323 | 971,105 |
| | 88 | 44,235 | 1,066,747 | 1,110,982 |
| 1,2-Butylene oxide | 91 | 5 | 907 | 912 |
| | 90 | 250 | 8,185 | 8,435 |
| | 89 | 250 | 585 | 835 |
| | 88 | 0 | 1,148 | 1,148 |
| Butyraldehyde | 91 | 260,475 | 2,471 | 262,946 |
| | 90 | 350,893 | 4,082 | 354,975 |
| | 89 | 392,052 | 220,498 | 612,550 |
| | 88 | 371,633 | 123,938 | 495,571 |
| C.I. Basic Green 4 | 91 | 18,132 | 2,494 | 20,626 |
| | 90 | 1,006 | 500 | 1,506 |
| | 89 | 1,492 | 1 | 1,493 |
| | 88 | 1,320 | 250 | 1,570 |
| C.I. Basic Red 1 | 91 | 0 | 375 | 375 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| C.I. Direct Black 38 | 89 | 0 | 250 | 250 |
| C.I. Disperse Yellow 3 | 91 | 0 | 125 | 125 |
| | 90 | 250 | 219 | 469 |
| | 89 | 250 | 63 | 313 |
| | 88 | 0 | 899 | 899 |
| C.I. Food Red 15 | 91 | 1,400 | 0 | 1,400 |
| | 90 | 270 | 0 | 270 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| C.I. Solvent Orange 7 | 89 | 0 | 0 | 0 |
| C.I. Solvent Yellow 3 | 91 | 0 | 10 | 10 |
| | 90 | 5 | 0 | 5 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| C.I. Solvent Yellow 14 | 90 | 0 | 0 | 0 |
| | 89 | 750 | 250 | 1,000 |
| | 88 | 0 | 0 | 0 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 7440-43-9 | Cadmium | 91 | 1,857 | 3,091 | 661 | 0 | 2,753 | 8,362 |
| | | 90 | 5,371 | 12,434 | 1,380 | 10 | 91,792 | 110,987 |
| | | 89 | 12,336 | 23,436 | 2,746 | 0 | 103,163 | 141,681 |
| | | 88 | 9,300 | 13,130 | 2,598 | 0 | 94,602 | 119,630 |
| 156-62-7 | Calcium cyanamide | 91 | 12,000 | 625 | 0 | 0 | 40,005 | 52,630 |
| | | 90 | 12,000 | 620 | 0 | 0 | 40,000 | 52,620 |
| | | 89 | 12,000 | 620 | 0 | 0 | 3,600 | 16,220 |
| | | 88 | 12,000 | 600 | 0 | 0 | 66,000 | 78,600 |
| 133-06-2 | Captan | 91 | 1,883 | 5,233 | 260 | 4,500 | 260 | 12,136 |
| | | 90 | 1,783 | 17,469 | 505 | 5,500 | 505 | 25,762 |
| | | 89 | 3,762 | 21,460 | 500 | 5,000 | 500 | 31,222 |
| | | 88 | 4,066 | 10,803 | 750 | 5,100 | 1,000 | 21,719 |
| 63-25-2 | Carbaryl | 91 | 2,022 | 4,825 | 260 | 0 | 1,170 | 8,277 |
| | | 90 | 2,292 | 6,166 | 505 | 0 | 48,755 | 57,718 |
| | | 89 | 3,303 | 6,778 | 750 | 0 | 33,952 | 44,783 |
| | | 88 | 2,515 | 5,408 | 877 | 0 | 500 | 9,300 |
| 75-15-0 | Carbon disulfide | 91 | 2,626,842 | 86,712,281 | 58,634 | 2,835 | 260 | 89,400,852 |
| | | 90 | 3,333,871 | 95,092,808 | 40,579 | 3,900 | 505 | 98,471,663 |
| | | 89 | 3,233,664 | 96,955,438 | 33,105 | 16,600 | 508 | 100,239,315 |
| | | 88 | 3,139,255 | 120,974,449 | 39,501 | 13,400 | 43,436 | 124,210,041 |
| 56-23-5 | Carbon tetrachloride | 91 | 528,100 | 1,018,701 | 2,844 | 42,470 | 2,152 | 1,594,267 |
| | | 90 | 419,001 | 1,320,225 | 4,718 | 31,557 | 1,005 | 1,776,506 |
| | | 89 | 943,133 | 2,507,116 | 15,656 | 122,043 | 1,616 | 3,589,564 |
| | | 88 | 1,081,552 | 2,695,101 | 15,627 | 98,054 | 14,759 | 3,905,093 |
| 463-58-1 | Carbonyl sulfide | 91 | 5,627 | 16,719,541 | 0 | 0 | 0 | 16,725,168 |
| | | 90 | 12,249 | 18,622,615 | 0 | 0 | 0 | 18,634,864 |
| | | 89 | 9,023 | 18,417,583 | 772 | 0 | 0 | 18,427,378 |
| | | 88 | 7,643 | 20,175,429 | 750 | 0 | 0 | 20,183,822 |
| 120-80-9 | Catechol | 91 | 4,035 | 1,751 | 254,267 | 0 | 86,600 | 346,653 |
| | | 90 | 2,772 | 25,260 | 232,760 | 0 | 84,216 | 345,008 |
| | | 89 | 2,748 | 1,214 | 312,295 | 0 | 84,538 | 400,795 |
| | | 88 | 2,388 | 1,201 | 400,760 | 0 | 84,283 | 488,632 |
| 133-90-4 | Chloramben | 90 | 5 | 5 | 0 | 0 | 0 | 10 |
| | | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 88 | 250 | 1,168 | 250 | 0 | 0 | 1,668 |
| 57-74-9 | Chlordane | 91 | 1,248 | 179 | 1 | 0 | 0 | 1,428 |
| | | 90 | 4,244 | 178 | 1 | 0 | 0 | 4,423 |
| | | 89 | 3,617 | 136 | 4 | 0 | 0 | 3,757 |
| | | 88 | 2,695 | 3 | 4 | 4,262 | 0 | 6,964 |
| 7782-50-5 | Chlorine | 91 | 1,715,251 | 75,894,219 | 696,282 | 72,552 | 119,630 | 78,497,934 |
| | | 90 | 2,064,481 | 102,786,953 | 1,272,770 | 73,894 | 250,591 | 106,448,689 |
| | | 89 | 2,258,461 | 130,521,336 | 2,400,165 | 469,857 | 291,386 | 135,941,205 |
| | | 88 | 4,706,728 | 129,402,266 | 6,615,485 | 107,624 | 428,097 | 141,260,200 |
| 10049-04-4 | Chlorine dioxide | 91 | 146,153 | 3,816,182 | 13,760 | 0 | 120 | 3,976,215 |
| | | 90 | 134,215 | 5,136,299 | 785 | 15 | 20 | 5,271,334 |
| | | 89 | 139,311 | 6,885,697 | 1,250 | 0 | 0 | 7,026,258 |
| | | 88 | 1,277,546 | 12,076,241 | 2,350 | 0 | 41,000 | 13,397,137 |
| 79-11-8 | Chloroacetic acid | 91 | 66,762 | 446,920 | 1,696 | 0 | 123,675 | 639,053 |
| | | 90 | 20,650 | 4,754 | 1,691 | 0 | 0 | 27,095 |
| | | 89 | 20,616 | 4,229 | 1,524 | 10 | 0 | 26,379 |
| | | 88 | 21,660 | 5,159 | 850 | 10 | 0 | 27,679 |
| 532-27-4 | 2-Chloroacetophenone | 91 | 1 | 1 | 0 | 0 | 0 | 2 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Cadmium | 91 | 260,309 | 738,486 | 998,795 |
| | 90 | 4,815 | 235,276 | 240,091 |
| | 89 | 8,489 | 279,274 | 287,763 |
| | 88 | 7,894 | 219,670 | 227,564 |
| Calcium cyanamide | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Captan | 91 | 255 | 16,503 | 16,758 |
| | 90 | 255 | 16,771 | 17,026 |
| | 89 | 350 | 16,695 | 17,045 |
| | 88 | 250 | 13,695 | 13,945 |
| Carbaryl | 91 | 0 | 15,969 | 15,969 |
| | 90 | 0 | 15,448 | 15,448 |
| | 89 | 14 | 14,610 | 14,624 |
| | 88 | 171 | 33,780 | 33,951 |
| Carbon disulfide | 91 | 193,658 | 335,374 | 529,032 |
| | 90 | 121,882 | 244,231 | 366,113 |
| | 89 | 132,535 | 173,493 | 306,028 |
| | 88 | 159,369 | 212,788 | 372,157 |
| Carbon tetrachloride | 91 | 621 | 980,569 | 981,190 |
| | 90 | 42,050 | 1,082,188 | 1,124,238 |
| | 89 | 3,841 | 1,716,813 | 1,720,654 |
| | 88 | 5,014 | 1,350,511 | 1,355,525 |
| Carbonyl sulfide | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Catechol | 91 | 237,081 | 114,297 | 351,378 |
| | 90 | 336,096 | 246,537 | 582,633 |
| | 89 | 270,614 | 238,233 | 508,847 |
| | 88 | 245,399 | 105,088 | 350,487 |
| Chloramben | 90 | 0 | 15,591 | 15,591 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 1,159 | 1,159 |
| Chlordane | 91 | 69 | 292 | 361 |
| | 90 | 99 | 523 | 622 |
| | 89 | 37 | 3,099 | 3,136 |
| | 88 | 23 | 80,809 | 80,832 |
| Chlorine | 91 | 964,055 | 499,024 | 1,463,079 |
| | 90 | 1,213,113 | 675,573 | 1,888,686 |
| | 89 | 2,713,363 | 3,147,885 | 5,861,248 |
| | 88 | 3,169,020 | 3,999,038 | 7,168,058 |
| Chlorine dioxide | 91 | 14,783 | 0 | 14,783 |
| | 90 | 1,586 | 5 | 1,591 |
| | 89 | 2,250 | 750 | 3,000 |
| | 88 | 2,650 | 41,750 | 44,400 |
| Chloroacetic acid | 91 | 3,279 | 6,381 | 9,660 |
| | 90 | 1,785 | 6,768 | 8,553 |
| | 89 | 9,717 | 4,096 | 13,813 |
| | 88 | 10,727 | 9,406 | 20,133 |
| 2-Chloroacetophenone | 91 | 0 | 0 | 0 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 108-90-7 | Chlorobenzene | 91 | 1,228,868 | 1,167,233 | 5,165 | 177,032 | 1,534 | 2,579,832 |
| | | 90 | 1,845,339 | 2,205,033 | 72,893 | 49,406 | 4,267 | 4,176,938 |
| | | 89 | 1,523,319 | 2,523,230 | 62,551 | 82,969 | 6,609 | 4,198,678 |
| | | 88 | 2,032,791 | 2,533,096 | 98,354 | 84,457 | 4,127 | 4,752,825 |
| 75-00-3 | Chloroethane | 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 |
| | | 89 | 2,196,786 | 2,693,306 | 71,749 | 150 | 0 | 4,961,991 |
| | | 88 | 2,060,779 | 2,962,563 | 27,448 | 1,510 | 0 | 5,052,300 |
| 67-66-3 | Chloroform | 91 | 7,660,997 | 11,421,891 | 769,569 | 65,089 | 22,150 | 19,939,696 |
| | | 90 | 8,388,150 | 14,138,445 | 1,005,860 | 89,560 | 57,924 | 23,679,939 |
| | | 89 | 8,872,690 | 16,841,084 | 1,177,743 | 64,338 | 70,265 | 27,026,120 |
| | | 88 | 7,566,776 | 17,469,790 | 1,126,484 | 36,002 | 68,546 | 26,267,598 |
| 74-87-3 | Chloromethane | 91 | 1,431,983 | 4,266,748 | 101,838 | 192,600 | 0 | 5,993,169 |
| | | 90 | 1,992,361 | 5,847,270 | 144,397 | 199,605 | 92,260 | 8,275,893 |
| | | 89 | 2,945,506 | 6,883,819 | 108,639 | 180,250 | 0 | 10,118,214 |
| | | 88 | 3,431,488 | 8,904,962 | 115,985 | 165,250 | 0 | 12,617,685 |
| 107-30-2 | Chloromethyl methyl ether | 91 | 30 | 3,305 | 0 | 0 | 0 | 3,335 |
| | | 90 | 35 | 3,300 | 0 | 0 | 0 | 3,335 |
| | | 89 | 34 | 3,202 | 0 | 0 | 0 | 3,236 |
| | | 88 | 33 | 3,000 | 0 | 0 | 0 | 3,033 |
| 126-99-8 | Chloroprene | 91 | 103,489 | 1,367,033 | 2 | 71,000 | 137,011 | 1,678,535 |
| | | 90 | 159,397 | 1,401,702 | 756 | 140,000 | 750 | 1,702,605 |
| | | 89 | 211,913 | 1,576,948 | 9 | 158,183 | 0 | 1,947,053 |
| | | 88 | 234,228 | 1,713,780 | 287 | 68,792 | 0 | 2,017,087 |
| 1897-45-6 | Chlorothalonil | 91 | 1,921 | 1,330 | 13 | 0 | 0 | 3,264 |
| | | 90 | 2,786 | 9,668 | 9 | 0 | 0 | 12,463 |
| | | 89 | 19,715 | 9,782 | 252 | 0 | 1 | 29,750 |
| | | 88 | 19,455 | 9,021 | 250 | 0 | 0 | 28,726 |
| 7440-47-3 | Chromium | 91 | 450,919 | 105,487 | 17,289 | 531 | 1,155,527 | 1,729,753 |
| | | 90 | 255,076 | 166,519 | 40,249 | 85 | 2,726,042 | 3,187,971 |
| | | 89 | 778,978 | 164,040 | 68,638 | 693 | 3,366,458 | 4,378,807 |
| | | 88 | 357,706 | 201,802 | 74,810 | 2,249 | 9,295,079 | 9,931,646 |
| 7440-48-4 | Cobalt | 91 | 29,787 | 42,134 | 4,289 | 0 | 13,706 | 89,916 |
| | | 90 | 16,823 | 21,113 | 8,858 | 0 | 35,008 | 81,802 |
| | | 89 | 32,755 | 18,643 | 14,165 | 0 | 237,431 | 302,994 |
| | | 88 | 18,776 | 17,552 | 16,743 | 0 | 213,204 | 266,275 |
| 7440-50-8 | Copper | 91 | 408,618 | 864,627 | 56,040 | 14,011 | 15,439,598 | 16,782,894 |
| | | 90 | 444,458 | 830,345 | 56,907 | 22,351 | 11,421,385 | 12,775,446 |
| | | 89 | 867,587 | 772,122 | 99,820 | 31,894 | 10,047,157 | 11,818,580 |
| | | 88 | 317,559 | 1,197,902 | 115,509 | 15,651 | 10,468,235 | 12,114,856 |
| 120-71-8 | p-Cresidine | 91 | 160 | 68 | 5 | 0 | 250 | 483 |
| | | 90 | 2,607 | 83 | 0 | 0 | 250 | 2,940 |
| | | 89 | 977 | 1,233 | 250 | 0 | 250 | 2,710 |
| | | 88 | 5,400 | 1,680 | 250 | 0 | 750 | 8,080 |
| 1319-77-3 | Cresol (mixed isomers) | 91 | 349,690 | 391,758 | 3,661 | 749,531 | 2,528 | 1,497,168 |
| | | 90 | 388,918 | 354,051 | 2,390 | 1,724,529 | 3,946 | 2,473,834 |
| | | 89 | 419,031 | 478,713 | 7,601 | 2,069,891 | 2,415 | 2,977,651 |
| | | 88 | 400,427 | 378,672 | 6,500 | 1,804,060 | 4,762 | 2,594,421 |
| 108-39-4 | m-Cresol | 91 | 66,736 | 11,098 | 445 | 560,000 | 10 | 638,289 |
| | | 90 | 4,193 | 3,915 | 0 | 0 | 0 | 8,108 |
| | | 89 | 4,825 | 7,776 | 45 | 0 | 0 | 12,646 |
| | | 88 | 5,860 | 12,572 | 283 | 0 | 455 | 19,170 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Chlorobenzene | 91 | 15,346 | 3,874,516 | 3,889,862 |
| | 90 | 148,728 | 3,747,131 | 3,895,859 |
| | 89 | 312,398 | 4,074,606 | 4,387,004 |
| | 88 | 578,774 | 5,043,055 | 5,621,829 |
| Chloroethane | 91 | 5 | 310,731 | 310,736 |
| | 90 | 21,010 | 438,611 | 459,621 |
| | 89 | 250 | 397,113 | 397,363 |
| | 88 | 0 | 460,559 | 460,559 |
| Chloroform | 91 | 809,427 | 1,827,299 | 2,636,726 |
| | 90 | 802,260 | 1,321,726 | 2,123,986 |
| | 89 | 1,101,731 | 865,533 | 1,967,264 |
| | 88 | 1,226,573 | 1,369,922 | 2,596,495 |
| Chloromethane | 91 | 73,961 | 2,811,031 | 2,884,992 |
| | 90 | 47,316 | 130,668 | 177,984 |
| | 89 | 159,077 | 94,868 | 253,945 |
| | 88 | 54,223 | 104,432 | 158,655 |
| Chloromethyl methyl ether | 91 | 0 | 35 | 35 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Chloroprene | 91 | 35,000 | 171,586 | 206,586 |
| | 90 | 60,194 | 177,765 | 237,959 |
| | 89 | 41,000 | 35,455 | 76,455 |
| | 88 | 62,000 | 18,749 | 80,749 |
| Chlorothalonil | 91 | 293 | 210,950 | 211,243 |
| | 90 | 755 | 204,127 | 204,882 |
| | 89 | 1,004 | 316,841 | 317,845 |
| | 88 | 541 | 399,934 | 400,475 |
| Chromium | 91 | 396,151 | 6,587,976 | 6,984,127 |
| | 90 | 163,429 | 19,735,291 | 19,898,720 |
| | 89 | 320,980 | 14,213,624 | 14,534,604 |
| | 88 | 417,722 | 17,250,258 | 17,667,980 |
| Cobalt | 91 | 9,878 | 596,216 | 606,094 |
| | 90 | 8,175 | 270,801 | 278,976 |
| | 89 | 12,106 | 273,439 | 285,545 |
| | 88 | 8,843 | 232,016 | 240,859 |
| Copper | 91 | 414,699 | 15,594,827 | 16,009,526 |
| | 90 | 156,443 | 14,514,304 | 14,670,747 |
| | 89 | 197,288 | 14,940,599 | 15,137,887 |
| | 88 | 311,247 | 19,351,474 | 19,662,721 |
| p-Cresidine | 91 | 18,368 | 2,681 | 21,049 |
| | 90 | 18,750 | 0 | 18,750 |
| | 89 | 25,750 | 10,300 | 36,050 |
| | 88 | 37,750 | 4,700 | 42,450 |
| Cresol (mixed isomers) | 91 | 18,356 | 259,436 | 277,792 |
| | 90 | 57,073 | 651,295 | 708,368 |
| | 89 | 78,305 | 728,393 | 806,698 |
| | 88 | 358,242 | 1,339,779 | 1,698,021 |
| m-Cresol | 91 | 11,918 | 62,909 | 74,827 |
| | 90 | 7,439 | 14,746 | 22,185 |
| | 89 | 15,588 | 55,715 | 71,303 |
| | 88 | 7,165 | 139,240 | 146,405 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 95-48-7 | o-Cresol | 91 | 29,463 | 31,802 | 11 | 550,000 | 4,860 | 616,136 |
| | | 90 | 20,824 | 18,322 | 36 | 0 | 255 | 39,437 |
| | | 89 | 38,015 | 21,653 | 311 | 2 | 3,345 | 63,326 |
| | | 88 | 45,563 | 44,236 | 448 | 1 | 1,667 | 91,915 |
| 106-44-5 | p-Cresol | 91 | 45,348 | 90,329 | 2,046 | 252,200 | 3,259 | 393,182 |
| | | 90 | 8,262 | 230,743 | 1,955 | 1,997 | 2,873 | 245,830 |
| | | 89 | 8,969 | 246,515 | 3,421 | 1,800 | 10,000 | 270,705 |
| | | 88 | 6,286 | 634,417 | 1,143 | 152,000 | 62,291 | 856,137 |
| 98-82-8 | Cumene | 91 | 1,080,084 | 2,197,610 | 2,011 | 9,189 | 21,757 | 3,310,651 |
| | | 90 | 1,535,052 | 2,696,457 | 1,878 | 13,402 | 19,167 | 4,265,956 |
| | | 89 | 1,333,580 | 3,066,836 | 10,085 | 27,620 | 3,784 | 4,441,905 |
| | | 88 | 2,152,089 | 2,895,731 | 3,201 | 30,165 | 8,591 | 5,089,777 |
| 80-15-9 | Cumene hydroperoxide | 91 | 83,935 | 13,922 | 242 | 422,600 | 240 | 520,939 |
| | | 90 | 97,285 | 12,886 | 427 | 45,518 | 6,665 | 162,781 |
| | | 89 | 101,457 | 14,164 | 3,411 | 134,316 | 250 | 253,598 |
| | | 88 | 178,787 | 13,736 | 1,784 | 371,000 | 250 | 565,557 |
| 135-20-6 | Cupferron | 91 | 0 | 1,200 | 0 | 0 | 0 | 1,200 |
| | | 90 | 5 | 480 | 34 | 0 | 0 | 519 |
| | | 89 | 0 | 1,500 | 34 | 0 | 0 | 1,534 |
| | | 88 | 140 | 780 | 0 | 0 | 0 | 920 |
| 110-82-7 | Cyclohexane | 91 | 6,605,946 | 10,577,659 | 12,606 | 591,703 | 27,757 | 17,815,671 |
| | | 90 | 6,220,010 | 11,283,985 | 26,062 | 327,259 | 33,376 | 17,890,692 |
| | | 89 | 5,993,515 | 12,123,474 | 20,219 | 355,243 | 48,559 | 18,541,010 |
| | | 88 | 4,988,813 | 8,820,135 | 20,273 | 334,471 | 38,190 | 14,201,882 |
| 94-75-7 | 2,4-D (acetic acid) | 91 | 10,049 | 6,161 | 262 | 1,291 | 13,260 | 31,023 |
| | | 90 | 4,030 | 4,212 | 259 | 2,100 | 10,662 | 21,263 |
| | | 89 | 3,755 | 3,451 | 1,422 | 2,660 | 0 | 11,288 |
| | | 88 | 3,539 | 3,981 | 549 | 3,789 | 38,000 | 49,858 |
| 1163-19-5 | Decabromodiphenyl oxide | 91 | 21,697 | 26,043 | 3,817 | 38 | 220,075 | 271,670 |
| | | 90 | 15,608 | 48,495 | 2,577 | 43 | 24,844 | 91,567 |
| | | 89 | 19,241 | 30,716 | 3,450 | 52 | 9,394 | 62,853 |
| | | 88 | 7,500 | 22,104 | 500 | 292 | 21,450 | 51,846 |
| 615-05-4 | 2,4-Diaminoanisole | 91 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 90 | 21 | 5 | 0 | 0 | 0 | 26 |
| | | 89 | 250 | 0 | 0 | 0 | 0 | 250 |
| | | 88 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39156-41-7 | 2,4-Diaminoanisole sulfate | 91 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 90 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 88 | 0 | 0 | 0 | 0 | 0 | 0 |
| 101-80-4 | 4,4'-Diaminodiphenyl ether | 91 | 7 | 697 | 337 | 0 | 0 | 1,041 |
| | | 90 | 5 | 900 | 413 | 0 | 0 | 1,318 |
| | | 89 | 250 | 380 | 595 | 0 | 0 | 1,225 |
| | | 88 | 0 | 216 | 585 | 0 | 0 | 801 |
| 25376-45-8 | Diaminotoluene (mixed isomers) | 91 | 17,963 | 2,620 | 1,110 | 24,000 | 10 | 45,703 |
| | | 90 | 19,595 | 6,119 | 955 | 89,000 | 265 | 115,934 |
| | | 89 | 15,707 | 4,016 | 2,068 | 95,000 | 480 | 117,271 |
| | | 88 | 15,202 | 5,895 | 3,288 | 174,000 | 295 | 198,680 |
| 95-80-7 | 2,4-Diaminotoluene | 91 | 3,800 | 10 | 250 | 0 | 0 | 4,060 |
| | | 90 | 3,801 | 127 | 250 | 0 | 0 | 4,178 |
| | | 89 | 4,050 | 376 | 250 | 0 | 0 | 4,676 |
| | | 88 | 2,900 | 88 | 250 | 0 | 0 | 3,238 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| o-Cresol | 91 | 55,341 | 30,681 | 86,022 |
| | 90 | 53,066 | 66,247 | 119,313 |
| | 89 | 123,923 | 73,192 | 197,115 |
| | 88 | 40,703 | 90,523 | 131,226 |
| p-Cresol | 91 | 1,062,305 | 40,355 | 1,102,660 |
| | 90 | 879,959 | 80,741 | 960,700 |
| | 89 | 1,507,037 | 745,156 | 2,252,193 |
| | 88 | 744,568 | 27,270 | 771,838 |
| Cumene | 91 | 163,552 | 71,674 | 235,226 |
| | 90 | 254,062 | 416,465 | 670,527 |
| | 89 | 185,473 | 197,808 | 383,281 |
| | 88 | 203,279 | 206,457 | 409,736 |
| Cumene hydroperoxide | 91 | 265 | 32,888 | 33,153 |
| | 90 | 3,755 | 190,086 | 193,841 |
| | 89 | 3,051 | 343,913 | 346,964 |
| | 88 | 5,250 | 25,516 | 30,766 |
| Cupferron | 91 | 1,200 | 0 | 1,200 |
| | 90 | 530 | 0 | 530 |
| | 89 | 1,600 | 0 | 1,600 |
| | 88 | 780 | 4,275 | 5,055 |
| Cyclohexane | 91 | 26,599 | 1,230,808 | 1,257,407 |
| | 90 | 33,146 | 1,331,377 | 1,364,523 |
| | 89 | 30,129 | 2,367,576 | 2,397,705 |
| | 88 | 145,067 | 2,940,861 | 3,085,928 |
| 2,4-D (acetic acid) | 91 | 350 | 119,217 | 119,567 |
| | 90 | 5,581 | 59,214 | 64,795 |
| | 89 | 10,015 | 352,644 | 362,659 |
| | 88 | 27,952 | 283,232 | 311,184 |
| Decabromodiphenyl oxide | 91 | 43,538 | 787,514 | 831,052 |
| | 90 | 37,100 | 811,425 | 848,525 |
| | 89 | 48,868 | 834,242 | 883,110 |
| | 88 | 19,090 | 629,067 | 648,157 |
| 2,4-Diaminoanisole | 91 | 85 | 0 | 85 |
| | 90 | 0 | 0 | 0 |
| | 89 | 250 | 0 | 250 |
| | 88 | 250 | 0 | 250 |
| 2,4-Diaminoanisole sulfate | 91 | 250 | 0 | 250 |
| | 90 | 250 | 0 | 250 |
| | 89 | 250 | 0 | 250 |
| | 88 | 250 | 0 | 250 |
| 4,4'-Diaminodiphenyl ether | 91 | 5 | 4,082 | 4,087 |
| | 90 | 250 | 5,857 | 6,107 |
| | 89 | 250 | 4,754 | 5,004 |
| | 88 | 179 | 142 | 321 |
| Diaminotoluene (mixed isomers) | 91 | 54,369 | 566,564 | 620,933 |
| | 90 | 80,350 | 1,168,065 | 1,248,415 |
| | 89 | 7,523 | 1,106,968 | 1,114,491 |
| | 88 | 2,951 | 745,955 | 748,906 |
| 2,4-Diaminotoluene | 91 | 620 | 11,770 | 12,390 |
| | 90 | 1,501 | 0 | 1,501 |
| | 89 | 1,250 | 0 | 1,250 |
| | 88 | 1,200 | 0 | 1,200 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 132-64-9 | Dibenzofuran | 91 | 18,439 | 21,608 | 505 | 0 | 1,882 | 42,434 |
| | | 90 | 21,207 | 9,018 | 532 | 0 | 897 | 31,654 |
| | | 89 | 31,588 | 32,922 | 447 | 0 | 8,536 | 73,493 |
| | | 88 | 46,648 | 24,406 | 1,510 | 0 | 9,929 | 82,493 |
| 96-12-8 | 1,2-Dibromo-3-chloropropane | 91 | 290 | 0 | 0 | 0 | 0 | 290 |
| 106-93-4 | 1,2-Dibromoethane | 91 | 8,642 | 29,560 | 73 | 240 | 2 | 38,517 |
| | | 90 | 22,383 | 35,537 | 0 | 495 | 125 | 58,540 |
| | | 89 | 22,880 | 36,287 | 250 | 4,914 | 322 | 64,653 |
| | | 88 | 34,119 | 29,208 | 1,011 | 6,882 | 259 | 71,479 |
| 84-74-2 | Dibutyl phthalate | 91 | 58,761 | 91,271 | 8,907 | 160,000 | 5,069 | 324,008 |
| | | 90 | 46,209 | 68,676 | 558 | 110,000 | 167 | 225,610 |
| | | 89 | 114,975 | 117,408 | 2,400 | 310,000 | 13,022 | 557,805 |
| | | 88 | 171,136 | 34,070 | 14,339 | 350,000 | 11,695 | 581,240 |
| 25321-22-6 | Dichlorobenzene (mixed isomers) | 91 | 4,446 | 73,649 | 2 | 0 | 9 | 78,106 |
| | | 90 | 29,606 | 59,918 | 1 | 11 | 22 | 89,558 |
| | | 89 | 11,564 | 126,348 | 185 | 0 | 0 | 138,097 |
| | | 88 | 20,169 | 143,515 | 40 | 0 | 0 | 163,724 |
| 95-50-1 | 1,2-Dichlorobenzene | 91 | 175,806 | 242,646 | 3,962 | 19,000 | 21,153 | 462,567 |
| | | 90 | 167,220 | 275,524 | 12,395 | 15,313 | 32,588 | 503,040 |
| | | 89 | 208,921 | 248,344 | 16,146 | 18,680 | 75,863 | 567,954 |
| | | 88 | 206,238 | 324,463 | 11,624 | 20,115 | 13,354 | 575,794 |
| 541-73-1 | 1,3-Dichlorobenzene | 91 | 878 | 3,941 | 779 | 0 | 0 | 5,598 |
| | | 90 | 3,104 | 5,578 | 785 | 0 | 0 | 9,467 |
| | | 89 | 3,554 | 7,844 | 22 | 0 | 0 | 11,420 |
| | | 88 | 5,782 | 9,500 | 1,281 | 0 | 0 | 16,563 |
| 106-46-7 | 1,4-Dichlorobenzene | 91 | 47,159 | 289,005 | 2,146 | 2,000 | 420 | 340,730 |
| | | 90 | 96,238 | 721,895 | 3,912 | 255 | 38 | 822,338 |
| | | 89 | 115,581 | 1,476,648 | 6,621 | 250 | 250 | 1,599,350 |
| | | 88 | 103,870 | 1,787,549 | 6,153 | 4,000 | 1,300 | 1,902,872 |
| 91-94-1 | 3,3'-Dichlorobenzidine | 91 | 5 | 5 | 0 | 0 | 0 | 10 |
| | | 90 | 10 | 15 | 1 | 0 | 0 | 26 |
| | | 89 | 250 | 4 | 241 | 0 | 0 | 495 |
| | | 88 | 250 | 5 | 752 | 0 | 0 | 1,007 |
| 75-27-4 | Dichlorobromomethane | 91 | 200 | 0 | 0 | 0 | 0 | 200 |
| | | 90 | 632 | 0 | 0 | 0 | 0 | 632 |
| 107-06-2 | 1,2-Dichloroethane | 91 | 812,464 | 3,182,959 | 23,564 | 6,334 | 7,051 | 4,032,372 |
| | | 90 | 1,167,609 | 4,436,475 | 48,763 | 826,672 | 7,351 | 6,486,870 |
| | | 89 | 1,326,461 | 2,966,105 | 225,814 | 1,046,661 | 714 | 5,565,755 |
| | | 88 | 1,572,325 | 2,963,854 | 40,527 | 1,452,084 | 2,166 | 6,030,956 |
| 540-59-0 | 1,2-Dichloroethylene | 91 | 14,925 | 29,857 | 12 | 0 | 0 | 44,794 |
| | | 90 | 81,311 | 46,588 | 54 | 360 | 118 | 128,431 |
| | | 89 | 109,604 | 90,888 | 728 | 55 | 0 | 201,275 |
| | | 88 | 16,552 | 108,896 | 95 | 0 | 1 | 125,544 |
| 75-09-2 | Dichloromethane | 91 | 31,726,830 | 47,611,641 | 98,877 | 1,317,706 | 117,788 | 80,872,842 |
| | | 90 | 37,744,015 | 62,532,366 | 190,500 | 850,018 | 21,024 | 101,337,923 |
| | | 89 | 42,295,554 | 81,864,100 | 226,823 | 1,937,469 | 15,894 | 126,339,840 |
| | | 88 | 48,751,550 | 79,242,388 | 350,050 | 1,478,834 | 157,211 | 129,980,033 |
| 120-83-2 | 2,4-Dichlorophenol | 91 | 885 | 547 | 1 | 42,800 | 1 | 44,234 |
| | | 90 | 264 | 565 | 95 | 20,400 | 0 | 21,324 |
| | | 89 | 554 | 999 | 78 | 6,589 | 0 | 8,220 |
| | | 88 | 535 | 868 | 107 | 17,700 | 2 | 19,212 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Dibenzofuran | 91 | 500 | 125,545 | 126,045 |
| | 90 | 40,052 | 90,125 | 130,177 |
| | 89 | 47,572 | 170,179 | 217,751 |
| | 88 | 47,726 | 234,034 | 281,760 |
| 1,2-Dibromo-3-chloropropane | 91 | 0 | 0 | 0 |
| 1,2-Dibromoethane | 91 | 2 | 1,588 | 1,590 |
| | 90 | 255 | 86,864 | 87,119 |
| | 89 | 310 | 122,348 | 122,658 |
| | 88 | 253 | 33,861 | 34,114 |
| Dibutyl phthalate | 91 | 14,535 | 190,611 | 205,146 |
| | 90 | 19,812 | 217,738 | 237,550 |
| | 89 | 25,994 | 283,549 | 309,543 |
| | 88 | 36,523 | 271,592 | 308,115 |
| Dichlorobenzene (mixed isomers) | 91 | 7,410 | 111,348 | 118,758 |
| | 90 | 26,769 | 212,700 | 239,469 |
| | 89 | 44,813 | 500,636 | 545,449 |
| | 88 | 182,663 | 124,378 | 307,041 |
| 1,2-Dichlorobenzene | 91 | 84,218 | 2,840,057 | 2,924,275 |
| | 90 | 76,763 | 2,864,394 | 2,941,157 |
| | 89 | 208,084 | 2,519,915 | 2,727,999 |
| | 88 | 64,118 | 2,039,805 | 2,103,923 |
| 1,3-Dichlorobenzene | 91 | 160 | 3,988 | 4,148 |
| | 90 | 30 | 1,464 | 1,494 |
| | 89 | 40 | 260 | 300 |
| | 88 | 40 | 540 | 580 |
| 1,4-Dichlorobenzene | 91 | 11,068 | 111,789 | 122,857 |
| | 90 | 12,921 | 180,756 | 193,677 |
| | 89 | 33,941 | 104,091 | 138,032 |
| | 88 | 37,997 | 138,882 | 176,879 |
| 3,3'-Dichlorobenzidine | 91 | 15 | 23,766 | 23,781 |
| | 90 | 505 | 16,751 | 17,256 |
| | 89 | 342 | 22,195 | 22,537 |
| | 88 | 617 | 224,205 | 224,822 |
| Dichlorobromomethane | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| 1,2-Dichloroethane | 91 | 26,294 | 5,728,673 | 5,754,967 |
| | 90 | 81,514 | 3,562,224 | 3,643,738 |
| | 89 | 1,399,826 | 2,623,097 | 4,022,923 |
| | 88 | 1,477,242 | 2,013,386 | 3,490,628 |
| 1,2-Dichloroethylene | 91 | 0 | 359 | 359 |
| | 90 | 0 | 4,001 | 4,001 |
| | 89 | 0 | 22,210 | 22,210 |
| | 88 | 0 | 213,358 | 213,358 |
| Dichloromethane | 91 | 1,308,202 | 12,605,336 | 13,913,538 |
| | 90 | 1,281,832 | 9,163,437 | 10,445,269 |
| | 89 | 921,911 | 12,813,000 | 13,734,911 |
| | 88 | 1,830,832 | 22,688,907 | 24,519,739 |
| 2,4-Dichlorophenol | 91 | 0 | 0 | 0 |
| | 90 | 0 | 60,800 | 60,800 |
| | 89 | 0 | 117,721 | 117,721 |
| | 88 | 6 | 12,909 | 12,915 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 91 | 227,847 | 545,596 | 6,570 | 0 | 0 | 780,013 |
| | | 90 | 199,002 | 838,712 | 4,253 | 0 | 300 | 1,042,267 |
| | | 89 | 311,906 | 1,064,664 | 14,977 | 0 | 5 | 1,391,552 |
| | | 88 | 316,478 | 1,079,826 | 23,785 | 0 | 3,400 | 1,423,489 |
| 542-75-6 | 1,3-Dichloropropylene | 91 | 11,895 | 8,510 | 0 | 0 | 0 | 20,405 |
| | | 90 | 46,570 | 12,903 | 310 | 0 | 0 | 59,783 |
| | | 89 | 35,469 | 15,448 | 340 | 0 | 0 | 51,257 |
| | | 88 | 39,790 | 14,800 | 250 | 0 | 0 | 54,840 |
| 62-73-7 | Dichlorvos | 91 | 326 | 318 | 0 | 0 | 0 | 644 |
| | | 90 | 800 | 510 | 0 | 0 | 0 | 1,310 |
| | | 89 | 1,111 | 214 | 0 | 0 | 0 | 1,325 |
| | | 88 | 1,050 | 0 | 0 | 0 | 0 | 1,050 |
| 115-32-2 | Dicofol | 91 | 5 | 1 | 0 | 0 | 0 | 6 |
| | | 90 | 13 | 255 | 5 | 0 | 0 | 273 |
| | | 89 | 829 | 500 | 250 | 0 | 0 | 1,579 |
| | | 88 | 593 | 750 | 0 | 0 | 0 | 1,343 |
| 1464-53-5 | Diepoxybutane | 91 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111-42-2 | Diethanolamine | 91 | 187,534 | 83,573 | 434,060 | 60,000 | 132,585 | 897,752 |
| | | 90 | 289,889 | 99,448 | 360,137 | 157,015 | 120,866 | 1,027,355 |
| | | 89 | 365,348 | 119,726 | 591,555 | 162,459 | 134,797 | 1,373,885 |
| | | 88 | 440,057 | 198,081 | 438,213 | 238,317 | 133,456 | 1,448,124 |
| 117-81-7 | Di-(2-ethylhexyl) phthalate | 91 | 95,409 | 948,011 | 3,842 | 370 | 155,773 | 1,203,405 |
| | | 90 | 125,451 | 1,172,663 | 2,393 | 265 | 19,551 | 1,320,323 |
| | | 89 | 288,097 | 789,274 | 2,983 | 600 | 25,937 | 1,106,891 |
| | | 88 | 175,342 | 948,104 | 2,792 | 3,091 | 20,778 | 1,150,107 |
| 84-66-2 | Diethyl phthalate | 91 | 11,032 | 99,649 | 678 | 0 | 2,977 | 114,336 |
| | | 90 | 12,839 | 83,578 | 2,697 | 0 | 37 | 99,151 |
| | | 89 | 10,742 | 81,868 | 9,163 | 0 | 250 | 102,023 |
| | | 88 | 9,139 | 82,488 | 11,272 | 0 | 0 | 102,899 |
| 64-67-5 | Diethyl sulfate | 91 | 3,610 | 408 | 5 | 0 | 10 | 4,033 |
| | | 90 | 5,058 | 435 | 10 | 5 | 280 | 5,788 |
| | | 89 | 7,345 | 1,372 | 0 | 0 | 250 | 8,967 |
| | | 88 | 8,436 | 2,191 | 0 | 0 | 250 | 10,877 |
| 119-90-4 | 3,3'-Dimethoxybenzidine | 91 | 0 | 0 | 4 | 0 | 0 | 4 |
| | | 90 | 3 | 1 | 4 | 0 | 0 | 8 |
| | | 89 | 250 | 250 | 3 | 0 | 0 | 503 |
| 119-93-7 | 3,3'-Dimethylbenzidine | 90 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57-14-7 | 1,1-Dimethyl hydrazine | 91 | 111 | 378 | 0 | 0 | 0 | 489 |
| | | 90 | 100 | 363 | 250 | 0 | 0 | 713 |
| | | 89 | 467 | 337 | 250 | 0 | 0 | 1,054 |
| | | 88 | 2,206 | 2,117 | 10 | 0 | 0 | 4,333 |
| 105-67-9 | 2,4-Dimethylphenol | 91 | 18,008 | 15,686 | 8 | 101,000 | 26 | 134,728 |
| | | 90 | 2,453 | 5,433 | 13 | 56,900 | 302 | 65,101 |
| | | 89 | 1,336 | 1,164 | 219 | 55,869 | 85 | 58,673 |
| | | 88 | 1,661 | 9,927 | 484 | 24,703 | 649 | 37,424 |
| 131-11-3 | Dimethyl phthalate | 91 | 14,147 | 51,690 | 1,198 | 865 | 811 | 68,711 |
| | | 90 | 76,787 | 268,476 | 1,528 | 750 | 433 | 347,974 |
| | | 89 | 101,739 | 263,181 | 1,260 | 500 | 415 | 367,095 |
| | | 88 | 113,841 | 420,965 | 4,335 | 390 | 504 | 540,035 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| 1,2-Dichloropropane | 91 | 7,100 | 2,075 | 9,175 |
| | 90 | 8,596 | 6,209 | 14,805 |
| | 89 | 10,802 | 6,744 | 17,546 |
| | 88 | 136,775 | 4,913 | 141,688 |
| 1,3-Dichloropropylene | 91 | 0 | 920 | 920 |
| | 90 | 0 | 1,268 | 1,268 |
| | 89 | 0 | 4,604 | 4,604 |
| | 88 | 0 | 2,738 | 2,738 |
| Dichlorvos | 91 | 0 | 3,610 | 3,610 |
| | 90 | 5 | 3,991 | 3,996 |
| | 89 | 1 | 4,441 | 4,442 |
| | 88 | 0 | 1,516 | 1,516 |
| Dicofol | 91 | 0 | 7,909 | 7,909 |
| | 90 | 0 | 286 | 286 |
| | 89 | 0 | 14,045 | 14,045 |
| | 88 | 0 | 25,166 | 25,166 |
| Diepoxybutane | 91 | 0 | 0 | 0 |
| Diethanolamine | 91 | 1,311,723 | 589,000 | 1,900,723 |
| | 90 | 3,474,117 | 611,164 | 4,085,281 |
| | 89 | 1,505,535 | 1,279,160 | 2,784,695 |
| | 88 | 1,927,247 | 1,328,142 | 3,255,389 |
| Di-(2-ethylhexyl) phthalate | 91 | 50,531 | 1,154,094 | 1,204,625 |
| | 90 | 93,541 | 1,560,679 | 1,654,220 |
| | 89 | 199,176 | 2,281,404 | 2,480,580 |
| | 88 | 168,891 | 2,340,803 | 2,509,694 |
| Diethyl phthalate | 91 | 313,332 | 126,706 | 440,038 |
| | 90 | 440,616 | 85,527 | 526,143 |
| | 89 | 276,553 | 102,354 | 378,907 |
| | 88 | 37,600 | 105,924 | 143,524 |
| Diethyl sulfate | 91 | 633 | 805 | 1,438 |
| | 90 | 1,170 | 2,826 | 3,996 |
| | 89 | 1,500 | 0 | 1,500 |
| | 88 | 890 | 0 | 890 |
| 3,3'-Dimethoxybenzidine | 91 | 0 | 0 | 0 |
| | 90 | 37 | 0 | 37 |
| | 89 | 259 | 0 | 259 |
| 3,3'-Dimethylbenzidine | 90 | 5 | 0 | 5 |
| | 89 | 0 | 0 | 0 |
| 1,1-Dimethyl hydrazine | 91 | 0 | 6,386 | 6,386 |
| | 90 | 0 | 8,507 | 8,507 |
| | 89 | 0 | 8,997 | 8,997 |
| | 88 | 0 | 8,855 | 8,855 |
| 2,4-Dimethylphenol | 91 | 2,675 | 4,959 | 7,634 |
| | 90 | 4,030 | 15,092 | 19,122 |
| | 89 | 5,190 | 10,780 | 15,970 |
| | 88 | 7,964 | 3,000 | 10,964 |
| Dimethyl phthalate | 91 | 82,565 | 76,057 | 158,622 |
| | 90 | 88,719 | 57,146 | 145,865 |
| | 89 | 339,024 | 114,413 | 453,437 |
| | 88 | 508,821 | 135,710 | 644,531 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 | 91 | 9,670 | 427 | 293 | 0 | 0 | 10,390 |
| | | 90 | 9,303 | 436 | 375 | 0 | 0 | 10,114 |
| | | 89 | 11,912 | 1,905 | 500 | 0 | 50 | 14,367 |
| | | 88 | 9,171 | 1,625 | 610 | 0 | 50 | 11,456 |
| 534-52-1 | 4,6-Dinitro-o-cresol | 91 | 7 | 43 | 33 | 0 | 0 | 83 |
| | | 90 | 8 | 39 | 131 | 0 | 0 | 178 |
| | | 89 | 258 | 13 | 25 | 0 | 1 | 297 |
| | | 88 | 259 | 15 | 266 | 0 | 2 | 542 |
| 51-28-5 | 2,4-Dinitrophenol | 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 |
| | | 89 | 10,568 | 3,084 | 160,672 | 301,070 | 3,242 | 478,636 |
| | | 88 | 12,386 | 8,439 | 98,692 | 86,200 | 257 | 205,974 |
| 121-14-2 | 2,4-Dinitrotoluene | 91 | 5,103 | 312 | 2,682 | 0 | 1,424 | 9,521 |
| | | 90 | 6,312 | 51,271 | 3,735 | 74,000 | 2,153 | 137,471 |
| | | 89 | 9,500 | 77,793 | 12,657 | 69,000 | 341 | 169,291 |
| | | 88 | 15,533 | 77,724 | 12,055 | 106,400 | 14,961 | 226,673 |
| 606-20-2 | 2,6-Dinitrotoluene | 91 | 1,197 | 751 | 702 | 0 | 0 | 2,650 |
| | | 90 | 1,486 | 16,251 | 416 | 19,000 | 0 | 37,153 |
| | | 89 | 2,268 | 81,646 | 1,083 | 18,000 | 0 | 102,997 |
| | | 88 | 6,074 | 81,523 | 957 | 27,000 | 0 | 115,554 |
| 117-84-0 | n-Dioctyl phthalate | 91 | 16,139 | 15,691 | 557 | 0 | 255 | 32,642 |
| | | 90 | 17,556 | 13,282 | 1,843 | 5 | 261 | 32,947 |
| | | 89 | 20,165 | 503,124 | 1,196 | 0 | 1,748 | 526,233 |
| | | 88 | 25,946 | 43,565 | 1,523 | 0 | 1,000 | 72,034 |
| 123-91-1 | 1,4-Dioxane | 91 | 365,544 | 352,960 | 318,133 | 0 | 15,952 | 1,052,589 |
| | | 90 | 307,216 | 346,400 | 204,856 | 0 | 12,549 | 871,021 |
| | | 89 | 418,688 | 412,672 | 273,523 | 0 | 33,723 | 1,138,606 |
| | | 88 | 361,259 | 251,374 | 203,320 | 0 | 11,702 | 827,655 |
| 106-89-8 | Epichlorohydrin | 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 |
| | | 89 | 283,573 | 188,854 | 4,585 | 197,200 | 2,511 | 676,723 |
| | | 88 | 264,142 | 200,965 | 4,917 | 68,750 | 2,524 | 541,298 |
| 110-80-5 | 2-Ethoxyethanol | 91 | 224,795 | 447,143 | 5,022 | 0 | 0 | 676,960 |
| | | 90 | 352,731 | 673,531 | 42,015 | 0 | 0 | 1,068,277 |
| | | 89 | 290,296 | 1,453,368 | 96,042 | 0 | 78 | 1,839,784 |
| | | 88 | 290,053 | 2,152,887 | 120,164 | 0 | 52 | 2,563,156 |
| 140-88-5 | Ethyl acrylate | 91 | 108,970 | 122,991 | 423 | 947 | 939 | 234,270 |
| | | 90 | 121,530 | 92,682 | 1,161 | 10 | 498 | 215,881 |
| | | 89 | 103,084 | 92,591 | 1,188 | 0 | 3,281 | 200,144 |
| | | 88 | 125,227 | 119,276 | 1,211 | 0 | 265 | 245,979 |
| 100-41-4 | Ethylbenzene | 91 | 2,876,381 | 5,764,613 | 16,608 | 94,637 | 53,124 | 8,805,363 |
| | | 90 | 3,057,578 | 6,095,906 | 13,037 | 213,620 | 61,934 | 9,442,075 |
| | | 89 | 3,272,129 | 6,214,867 | 16,945 | 60,475 | 88,912 | 9,653,328 |
| | | 88 | 3,046,169 | 4,359,431 | 15,775 | 72,914 | 202,364 | 7,696,653 |
| 541-41-3 | Ethyl chloroformate | 91 | 1,254 | 576 | 0 | 0 | 0 | 1,830 |
| | | 90 | 1,307 | 525 | 0 | 0 | 0 | 1,832 |
| | | 89 | 7,950 | 692 | 0 | 0 | 0 | 8,642 |
| | | 88 | 11,880 | 2,023 | 0 | 0 | 0 | 13,903 |
| 74-85-1 | Ethylene | 91 | 16,137,889 | 22,133,970 | 17,015 | 0 | 0 | 38,288,874 |
| | | 90 | 16,528,900 | 22,945,931 | 11,488 | 27,500 | 11,005 | 39,524,824 |
| | | 89 | 18,966,417 | 25,250,027 | 14,902 | 18,618 | 16,200 | 44,266,164 |
| | | 88 | 21,154,105 | 26,142,065 | 15,214 | 17,203 | 13,250 | 47,341,837 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Dimethyl sulfate | 91 | 260 | 0 | 260 |
| | 90 | 30 | 33 | 63 |
| | 89 | 1,250 | 0 | 1,250 |
| | 88 | 1,000 | 0 | 1,000 |
| 4,6-Dinitro-o-cresol | 91 | 26,255 | 17,370 | 43,625 |
| | 90 | 44,756 | 204,573 | 249,329 |
| | 89 | 61,206 | 87,809 | 149,015 |
| | 88 | 19 | 306,096 | 306,115 |
| 2,4-Dinitrophenol | 91 | 255 | 1,205 | 1,460 |
| | 90 | 261 | 3,923 | 4,184 |
| | 89 | 0 | 2,385 | 2,385 |
| | 88 | 1,000 | 677,650 | 678,650 |
| 2,4-Dinitrotoluene | 91 | 0 | 53,307 | 53,307 |
| | 90 | 12 | 37,020 | 37,032 |
| | 89 | 600,000 | 243,455 | 843,455 |
| | 88 | 700,000 | 126,336 | 826,336 |
| 2,6-Dinitrotoluene | 91 | 0 | 250 | 250 |
| | 90 | 0 | 30,230 | 30,230 |
| | 89 | 140,000 | 70,630 | 210,630 |
| | 88 | 170,000 | 31,585 | 201,585 |
| n-Dioctyl phthalate | 91 | 3,175 | 154,348 | 157,523 |
| | 90 | 6,198 | 208,317 | 214,515 |
| | 89 | 12,810 | 176,791 | 189,601 |
| | 88 | 7,277 | 215,900 | 223,177 |
| 1,4-Dioxane | 91 | 254,304 | 602,897 | 857,201 |
| | 90 | 210,938 | 104,580 | 315,518 |
| | 89 | 281,002 | 220,515 | 501,517 |
| | 88 | 203,103 | 211,281 | 414,384 |
| Epichlorohydrin | 91 | 12,703 | 919,829 | 932,532 |
| | 90 | 57,931 | 669,716 | 727,647 |
| | 89 | 30,742 | 784,801 | 815,543 |
| | 88 | 73,385 | 690,564 | 763,949 |
| 2-Ethoxyethanol | 91 | 217,923 | 159,990 | 377,913 |
| | 90 | 111,872 | 198,211 | 310,083 |
| | 89 | 162,581 | 330,511 | 493,092 |
| | 88 | 196,286 | 438,371 | 634,657 |
| Ethyl acrylate | 91 | 19,855 | 192,206 | 212,061 |
| | 90 | 12,985 | 101,995 | 114,980 |
| | 89 | 9,219 | 121,040 | 130,259 |
| | 88 | 27,656 | 108,663 | 136,319 |
| Ethylbenzene | 91 | 101,944 | 1,509,030 | 1,610,974 |
| | 90 | 116,775 | 2,214,120 | 2,330,895 |
| | 89 | 538,180 | 3,974,198 | 4,512,378 |
| | 88 | 511,530 | 2,913,769 | 3,425,299 |
| Ethyl chloroformate | 91 | 0 | 390 | 390 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 69,600 | 69,600 |
| Ethylene | 91 | 17 | 898,258 | 898,275 |
| | 90 | 11 | 194,412 | 194,423 |
| | 89 | 200 | 605 | 805 |
| | 88 | 250 | 41,319 | 41,569 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 107-21-1 | Ethylene glycol | 91 | 4,467,944 | 6,192,193 | 2,299,613 | 3,654,273 | 908,167 | 17,522,190 |
| | | 90 | 4,103,701 | 6,952,871 | 2,741,607 | 5,809,302 | 987,630 | 20,595,111 |
| | | 89 | 4,179,951 | 8,709,354 | 3,905,474 | 8,971,967 | 957,398 | 26,724,144 |
| | | 88 | 4,055,642 | 9,217,264 | 3,727,220 | 7,927,570 | 736,344 | 25,664,040 |
| 151-56-4 | Ethyleneimine | 89 | 250 | 250 | 0 | 0 | 0 | 500 |
| | | 88 | 250 | 250 | 0 | 0 | 0 | 500 |
| 75-21-8 | Ethylene oxide | 91 | 805,152 | 987,896 | 2,260 | 25,416 | 50,336 | 1,871,060 |
| | | 90 | 784,241 | 1,663,975 | 8,911 | 49,280 | 24,042 | 2,530,449 |
| | | 89 | 832,144 | 2,319,279 | 5,217 | 16,219 | 37,962 | 3,210,821 |
| | | 88 | 975,532 | 3,717,979 | 44,851 | 11,125 | 54,700 | 4,804,187 |
| 96-45-7 | Ethylene thiourea | 91 | 24 | 558 | 0 | 0 | 0 | 582 |
| | | 90 | 255 | 30 | 0 | 0 | 0 | 285 |
| | | 89 | 1 | 763 | 0 | 0 | 0 | 764 |
| | | 88 | 0 | 500 | 0 | 0 | 0 | 500 |
| 2164-17-2 | Fluometuron | 91 | 104 | 113 | 10 | 0 | 5 | 232 |
| | | 90 | 26 | 19 | 0 | 0 | 0 | 45 |
| | | 89 | 273 | 267 | 0 | 0 | 0 | 540 |
| | | 88 | 250 | 250 | 0 | 0 | 0 | 500 |
| 50-00-0 | Formaldehyde | 91 | 1,780,780 | 8,437,687 | 616,001 | 5,220,067 | 242,466 | 16,297,001 |
| | | 90 | 2,267,883 | 10,125,225 | 761,927 | 8,025,876 | 188,552 | 21,369,463 |
| | | 89 | 2,687,565 | 10,324,007 | 807,163 | 8,215,905 | 240,248 | 22,274,888 |
| | | 88 | 3,006,120 | 8,886,393 | 902,888 | 9,608,524 | 494,111 | 22,898,036 |
| 76-13-1 | Freon 113 | 91 | 23,983,423 | 11,874,228 | 3,264 | 558 | 89,780 | 35,951,253 |
| | | 90 | 31,802,084 | 15,508,786 | 12,170 | 1,820 | 35,477 | 47,360,337 |
| | | 89 | 42,655,738 | 22,784,569 | 14,588 | 2,057 | 25,185 | 65,482,137 |
| | | 88 | 46,684,519 | 23,283,604 | 32,894 | 5,965 | 27,799 | 70,034,781 |
| 76-44-8 | Heptachlor | 91 | 5 | 0 | 0 | 0 | 0 | 5 |
| | | 90 | 3,797 | 0 | 1 | 0 | 0 | 3,798 |
| | | 89 | 3,403 | 8 | 2 | 0 | 0 | 3,413 |
| | | 88 | 54,292 | 3 | 2 | 0 | 0 | 54,297 |
| 118-74-1 | Hexachlorobenzene | 91 | 549 | 292 | 111 | 60 | 1 | 1,013 |
| | | 90 | 1,258 | 210 | 124 | 220 | 0 | 1,812 |
| | | 89 | 3,669 | 944 | 338 | 710 | 0 | 5,661 |
| | | 88 | 3,602 | 497 | 4 | 410 | 0 | 4,513 |
| 87-68-3 | Hexachloro-1,3-butadiene | 91 | 2,420 | 990 | 681 | 200 | 2 | 4,293 |
| | | 90 | 3,364 | 1,542 | 715 | 330 | 0 | 5,951 |
| | | 89 | 3,919 | 709 | 622 | 330 | 1 | 5,581 |
| | | 88 | 2,043 | 513 | 153 | 220 | 0 | 2,929 |
| 77-47-4 | Hexachlorocyclo--pentadiene | 91 | 24,744 | 717 | 23 | 5 | 0 | 25,489 |
| | | 90 | 83,812 | 773 | 10 | 5 | 0 | 84,600 |
| | | 89 | 88,061 | 1,185 | 6 | 250 | 0 | 89,502 |
| | | 88 | 77,902 | 415 | 6 | 2,131 | 0 | 80,454 |
| 67-72-1 | Hexachloroethane | 91 | 1,783 | 20,926 | 0 | 160 | 2 | 22,871 |
| | | 90 | 1,885 | 6,156 | 1 | 1,500 | 334 | 9,876 |
| | | 89 | 3,413 | 19,245 | 421 | 770 | 1 | 23,850 |
| | | 88 | 2,949 | 16,238 | 11 | 520 | 1 | 19,719 |
| 302-01-2 | Hydrazine | 91 | 22,354 | 6,079 | 1,520 | 0 | 5 | 29,958 |
| | | 90 | 22,457 | 4,726 | 1,414 | 423 | 5 | 29,025 |
| | | 89 | 20,627 | 11,042 | 2,291 | 0 | 71 | 34,031 |
| | | 88 | 24,368 | 7,689 | 2,149 | 0 | 29 | 34,235 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Ethylene glycol | 91 | 18,602,841 | 7,251,803 | 25,854,644 |
| | 90 | 15,968,632 | 11,671,041 | 27,639,673 |
| | 89 | 17,436,120 | 15,887,479 | 33,323,599 |
| | 88 | 17,259,152 | 17,588,484 | 34,847,636 |
| Ethyleneimine | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Ethylene oxide | 91 | 114,004 | 2,619 | 116,623 |
| | 90 | 266,214 | 2,729 | 268,943 |
| | 89 | 351,993 | 26,622 | 378,615 |
| | 88 | 363,065 | 21,913 | 384,978 |
| Ethylene thiourea | 91 | 15 | 19,117 | 19,132 |
| | 90 | 255 | 16,609 | 16,864 |
| | 89 | 261 | 22,451 | 22,712 |
| | 88 | 500 | 2,500 | 3,000 |
| Fluometuron | 91 | 1,012 | 28,635 | 29,647 |
| | 90 | 81,085 | 3,393 | 84,478 |
| | 89 | 126,214 | 15,569 | 141,783 |
| | 88 | 2,300 | 22,800 | 25,100 |
| Formaldehyde | 91 | 5,482,598 | 1,434,655 | 6,917,253 |
| | 90 | 6,290,198 | 1,920,921 | 8,211,119 |
| | 89 | 6,257,127 | 2,112,242 | 8,369,369 |
| | 88 | 4,382,254 | 2,724,992 | 7,107,246 |
| Freon 113 | 91 | 38,402 | 1,394,403 | 1,432,805 |
| | 90 | 50,520 | 2,709,239 | 2,759,759 |
| | 89 | 60,288 | 4,589,922 | 4,650,210 |
| | 88 | 104,193 | 6,284,293 | 6,388,486 |
| Heptachlor | 91 | 0 | 5 | 5 |
| | 90 | 58 | 85,306 | 85,364 |
| | 89 | 51 | 73,292 | 73,343 |
| | 88 | 37 | 51,935 | 51,972 |
| Hexachlorobenzene | 91 | 5 | 1,191,936 | 1,191,941 |
| | 90 | 23 | 53,010 | 53,033 |
| | 89 | 30 | 1,453,803 | 1,453,833 |
| | 88 | 160 | 965,099 | 965,259 |
| Hexachloro-1,3-butadiene | 91 | 4 | 1,713,642 | 1,713,646 |
| | 90 | 958 | 84,345 | 85,303 |
| | 89 | 100 | 4,213,617 | 4,213,717 |
| | 88 | 300 | 3,532,641 | 3,532,941 |
| Hexachlorocyclo--pentadiene | 91 | 624 | 30,803 | 31,427 |
| | 90 | 904 | 44,109 | 45,013 |
| | 89 | 1,096 | 17,468 | 18,564 |
| | 88 | 852 | 619,315 | 620,167 |
| Hexachloroethane | 91 | 0 | 171,024 | 171,024 |
| | 90 | 0 | 128,241 | 128,241 |
| | 89 | 250 | 486,536 | 486,786 |
| | 88 | 260 | 660,856 | 661,116 |
| Hydrazine | 91 | 6,368 | 15,978 | 22,346 |
| | 90 | 11,367 | 25,474 | 36,841 |
| | 89 | 3,354 | 68,818 | 72,172 |
| | 88 | 1,468 | 43,123 | 44,591 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 | 91 | 0 | 2 | 0 | 150,000 | 0 | 150,002 |
| | | 90 | 5 | 252 | 0 | 138,941 | 0 | 139,198 |
| | | 89 | 0 | 1 | 0 | 76,957 | 0 | 76,958 |
| | | 88 | 290 | 882 | 0 | 355,000 | 0 | 356,172 |
| 7647-01-0 | Hydrochloric acid | 91 | 4,634,850 | 78,286,624 | 2,143,954 | 190,422,615 | 12,193,916 | 287,681,959 |
| | | 90 | 5,641,346 | 80,489,419 | 2,770,080 | 158,217,391 | 8,669,227 | 255,787,463 |
| | | 89 | 5,287,364 | 76,089,642 | 3,052,768 | 273,272,293 | 5,710,354 | 363,412,421 |
| | | 88 | 6,224,677 | 67,707,146 | 3,948,499 | 396,089,339 | 5,509,273 | 479,478,934 |
| 74-90-8 | Hydrogen cyanide | 91 | 64,031 | 1,190,762 | 8,839 | 945,926 | 17 | 2,209,575 |
| | | 90 | 56,825 | 663,250 | 3,824 | 1,597,552 | 48 | 2,321,499 |
| | | 89 | 92,667 | 678,920 | 5,610 | 3,534,070 | 328 | 4,311,595 |
| | | 88 | 131,604 | 980,673 | 2,300 | 1,737,850 | 1,761 | 2,854,188 |
| 7664-39-3 | Hydrogen fluoride | 91 | 3,565,926 | 5,615,266 | 5,464 | 1 | 25,259 | 9,211,916 |
| | | 90 | 3,401,719 | 5,903,243 | 13,868 | 20 | 8,309 | 9,327,159 |
| | | 89 | 3,552,367 | 7,367,441 | 35,918 | 0 | 10,943 | 10,966,669 |
| | | 88 | 3,784,342 | 9,181,080 | 189,928 | 250 | 13,002 | 13,168,602 |
| 123-31-9 | Hydroquinone | 91 | 6,434 | 4,367 | 4,388 | 255,705 | 6 | 270,900 |
| | | 90 | 6,261 | 5,736 | 4,525 | 284,020 | 295 | 300,837 |
| | | 89 | 6,774 | 6,286 | 4,884 | 353,022 | 504 | 371,470 |
| | | 88 | 3,601 | 6,733 | 7,211 | 375,400 | 530 | 393,475 |
| 78-84-2 | Isobutyraldehyde | 91 | 118,100 | 272,124 | 91 | 6,810 | 262 | 397,387 |
| | | 90 | 148,031 | 337,247 | 80 | 864 | 1 | 486,223 |
| | | 89 | 178,072 | 406,035 | 751 | 1,042 | 1 | 585,901 |
| | | 88 | 178,740 | 503,878 | 773 | 60 | 1 | 683,452 |
| 67-63-0 | Isopropyl alcohol (manufacturing) | 91 | 471,421 | 977,470 | 21,735 | 200 | 2,077 | 1,472,903 |
| | | 90 | 1,124,772 | 1,551,306 | 11,131 | 15 | 50 | 2,687,274 |
| | | 89 | 2,137,392 | 2,994,557 | 11,008 | 18,441 | 1,657 | 5,163,055 |
| | | 88 | 790,232 | 1,196,100 | 1,900 | 0 | 14 | 1,988,246 |
| 80-05-7 | 4,4'-Isopropylidene--diphenol | 91 | 116,488 | 191,370 | 4,492 | 43,000 | 374,926 | 730,276 |
| | | 90 | 93,380 | 91,098 | 2,412 | 23,000 | 555,917 | 765,807 |
| | | 89 | 114,927 | 113,322 | 6,879 | 0 | 779,533 | 1,014,661 |
| | | 88 | 119,620 | 106,806 | 126,385 | 0 | 424,117 | 776,928 |
| 7439-92-1 | Lead | 91 | 205,524 | 226,253 | 20,457 | 0 | 3,323,695 | 3,775,929 |
| | | 90 | 502,758 | 360,799 | 25,414 | 40 | 4,822,504 | 5,711,515 |
| | | 89 | 306,465 | 554,011 | 33,329 | 5 | 5,846,148 | 6,739,958 |
| | | 88 | 500,958 | 645,279 | 61,130 | 5 | 6,633,330 | 7,840,702 |
| 58-89-9 | Lindane | 91 | 271 | 291 | 0 | 0 | 5 | 567 |
| | | 90 | 1,011 | 538 | 250 | 0 | 5 | 1,804 |
| | | 89 | 751 | 36 | 0 | 0 | 250 | 1,037 |
| | | 88 | 251 | 7 | 0 | 0 | 0 | 258 |
| 108-31-6 | Maleic anhydride | 91 | 77,182 | 381,807 | 460 | 255 | 1,155 | 460,859 |
| | | 90 | 90,604 | 402,465 | 1,378 | 10 | 120,816 | 615,273 |
| | | 89 | 94,114 | 357,450 | 2,824 | 0 | 750 | 455,138 |
| | | 88 | 111,458 | 550,373 | 12,580 | 240,000 | 0 | 914,411 |
| 12427-38-2 | Maneb | 91 | 10 | 19 | 0 | 0 | 0 | 29 |
| | | 90 | 270 | 521 | 5 | 0 | 0 | 796 |
| | | 89 | 1,000 | 1,031 | 0 | 0 | 0 | 2,031 |
| | | 88 | 1,000 | 1,265 | 250 | 0 | 0 | 2,515 |
| 7439-96-5 | Manganese | 91 | 687,932 | 409,038 | 144,676 | 522 | 9,848,116 | 11,090,284 |
| | | 90 | 503,716 | 665,754 | 139,876 | 874 | 9,031,122 | 10,341,342 |
| | | 89 | 2,115,142 | 479,588 | 150,322 | 556 | 7,985,972 | 10,731,580 |
| | | 88 | 1,038,920 | 761,590 | 321,894 | 250 | 20,464,605 | 22,587,259 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Hydrazine sulfate | 91 | 0 | 0 | 0 |
| | 90 | 250 | 250 | 500 |
| | 89 | 0 | 250 | 250 |
| | 88 | 0 | 0 | 0 |
| Hydrochloric acid | 91 | 16,566,697 | 48,453,002 | 65,019,699 |
| | 90 | 39,305,472 | 41,027,703 | 80,333,175 |
| | 89 | 28,420,423 | 44,200,651 | 72,621,074 |
| | 88 | 35,554,163 | 74,453,882 | 110,008,045 |
| Hydrogen cyanide | 91 | 271 | 435 | 706 |
| | 90 | 290 | 4,127 | 4,417 |
| | 89 | 294 | 24,282 | 24,576 |
| | 88 | 337 | 22,451 | 22,788 |
| Hydrogen fluoride | 91 | 356,983 | 3,594,308 | 3,951,291 |
| | 90 | 70,956 | 4,031,896 | 4,102,852 |
| | 89 | 196,554 | 3,877,404 | 4,073,958 |
| | 88 | 696,139 | 6,328,884 | 7,025,023 |
| Hydroquinone | 91 | 168,069 | 237,806 | 405,875 |
| | 90 | 277,533 | 141,090 | 418,623 |
| | 89 | 595,068 | 170,387 | 765,455 |
| | 88 | 512,180 | 309,941 | 822,121 |
| Isobutyraldehyde | 91 | 37,444 | 47,587 | 85,031 |
| | 90 | 35,728 | 41,987 | 77,715 |
| | 89 | 36,055 | 37,130 | 73,185 |
| | 88 | 713 | 30,260 | 30,973 |
| Isopropyl alcohol (manufacturing) | 91 | 141,364 | 157,259 | 298,623 |
| | 90 | 88,399 | 784,598 | 872,997 |
| | 89 | 681,397 | 1,400,169 | 2,081,566 |
| | 88 | 154,651 | 688,989 | 843,640 |
| 4,4'-Isopropylidene--diphenol | 91 | 32,776 | 253,490 | 286,266 |
| | 90 | 42,334 | 477,272 | 519,606 |
| | 89 | 35,368 | 492,569 | 527,937 |
| | 88 | 31,135 | 1,434,170 | 1,465,305 |
| Lead | 91 | 306,444 | 7,255,084 | 7,561,528 |
| | 90 | 33,260 | 12,300,630 | 12,333,890 |
| | 89 | 50,052 | 14,656,648 | 14,706,700 |
| | 88 | 122,220 | 13,684,082 | 13,806,302 |
| Lindane | 91 | 5 | 7,324 | 7,329 |
| | 90 | 5 | 3,052 | 3,057 |
| | 89 | 250 | 1,053 | 1,303 |
| | 88 | 0 | 186 | 186 |
| Maleic anhydride | 91 | 6,073 | 719,016 | 725,089 |
| | 90 | 643,337 | 738,472 | 1,381,809 |
| | 89 | 578,073 | 882,229 | 1,460,302 |
| | 88 | 556,373 | 978,535 | 1,534,908 |
| Maneb | 91 | 0 | 2,625 | 2,625 |
| | 90 | 0 | 5,850 | 5,850 |
| | 89 | 250 | 16,489 | 16,739 |
| | 88 | 1,470 | 7,362 | 8,832 |
| Manganese | 91 | 161,114 | 13,610,853 | 13,771,967 |
| | 90 | 60,448 | 16,085,106 | 16,145,554 |
| | 89 | 84,604 | 26,208,163 | 26,292,767 |
| | 88 | 132,384 | 24,133,354 | 24,265,738 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 7439-97-6 | Mercury | 91 | 10,557 | 6,355 | 624 | 0 | 5,287 | 22,823 |
| | | 90 | 14,015 | 8,384 | 751 | 0 | 4,184 | 27,334 |
| | | 89 | 16,063 | 9,522 | 1,555 | 0 | 4,942 | 32,082 |
| | | 88 | 16,036 | 7,359 | 1,397 | 0 | 13,279 | 38,071 |
| 67-56-1 | Methanol | 91 | 35,913,043 | 163,769,926 | 20,064,023 | 28,877,462 | 3,634,255 | 252,258,709 |
| | | 90 | 39,312,330 | 162,089,503 | 17,810,136 | 27,970,817 | 5,527,527 | 252,710,313 |
| | | 89 | 43,627,434 | 168,156,968 | 16,444,366 | 25,142,977 | 7,776,702 | 261,148,447 |
| | | 88 | 46,761,506 | 181,504,818 | 16,833,614 | 26,555,436 | 11,674,236 | 283,329,610 |
| 72-43-5 | Methoxychlor | 91 | 251 | 314 | 10 | 0 | 5 | 580 |
| | | 90 | 756 | 846 | 505 | 0 | 255 | 2,362 |
| | | 89 | 250 | 286 | 250 | 0 | 250 | 1,036 |
| | | 88 | 47,971 | 224,910 | 252 | 0 | 258 | 273,391 |
| 109-86-4 | 2-Methoxyethanol | 91 | 1,105,988 | 712,351 | 364,059 | 0 | 20 | 2,182,418 |
| | | 90 | 1,298,049 | 1,293,167 | 40,340 | 4,540 | 3,233 | 2,639,329 |
| | | 89 | 988,479 | 1,710,422 | 46,428 | 4,000 | 112 | 2,749,441 |
| | | 88 | 1,148,256 | 4,751,413 | 40,520 | 750 | 7 | 5,940,946 |
| 96-33-3 | Methyl acrylate | 91 | 65,781 | 169,686 | 919 | 161 | 0 | 236,547 |
| | | 90 | 79,309 | 170,377 | 470 | 99 | 4 | 250,259 |
| | | 89 | 77,236 | 116,965 | 1,167 | 200 | 250 | 195,818 |
| | | 88 | 319,897 | 109,438 | 1,358 | 200 | 30,260 | 461,153 |
| 1634-04-4 | Methyl tert-butyl ether | 91 | 788,244 | 2,249,807 | 30,901 | 81,690 | 2,903 | 3,153,545 |
| | | 90 | 652,252 | 2,244,097 | 42,667 | 112,400 | 1,501 | 3,052,917 |
| | | 89 | 534,455 | 2,593,718 | 37,439 | 19,300 | 1,290 | 3,186,202 |
| | | 88 | 617,340 | 1,882,897 | 21,499 | 14,400 | 370 | 2,536,506 |
| 101-14-4 | 4,4'-Methylenebis (2-chloroaniline) | 91 | 1,015 | 347 | 0 | 0 | 0 | 1,362 |
| | | 90 | 761 | 1,005 | 0 | 0 | 0 | 1,766 |
| | | 89 | 501 | 511 | 0 | 0 | 0 | 1,012 |
| | | 88 | 500 | 250 | 0 | 0 | 0 | 750 |
| 101-61-1 | 4,4'-Methylenebis- (N,N-dimethyl) | 88 | 250 | 0 | 0 | 0 | 7,000 | 7,250 |
| 101-68-8 | Methylenebis (phenylisocyanate) | 91 | 391,550 | 234,784 | 10 | 0 | 125,989 | 752,333 |
| | | 90 | 370,019 | 239,950 | 50 | 20 | 226,671 | 836,710 |
| | | 89 | 205,704 | 118,218 | 506 | 0 | 149,262 | 473,690 |
| | | 88 | 154,905 | 90,892 | 1,022 | 0 | 87,415 | 334,234 |
| 74-95-3 | Methylene bromide | 91 | 38,277 | 13,010 | 0 | 0 | 0 | 51,287 |
| | | 90 | 51,164 | 13,630 | 0 | 0 | 0 | 64,794 |
| | | 89 | 31,584 | 4,780 | 0 | 0 | 0 | 36,364 |
| | | 88 | 34,468 | 23,255 | 0 | 0 | 0 | 57,723 |
| 101-77-9 | 4,4'-Methylenedianiline | 91 | 9,013 | 4,155 | 1,486 | 22,062 | 3 | 36,719 |
| | | 90 | 14,250 | 5,273 | 1,201 | 57,250 | 6 | 77,980 |
| | | 89 | 33,140 | 14,620 | 1,305 | 96,000 | 0 | 145,065 |
| | | 88 | 36,804 | 93,347 | 2,599 | 460,250 | 1,140 | 594,140 |
| 78-93-3 | Methyl ethyl ketone | 91 | 33,149,766 | 70,271,889 | 141,354 | 355,736 | 180,492 | 104,099,237 |
| | | 90 | 42,863,784 | 85,627,333 | 77,514 | 146,199 | 50,423 | 128,765,253 |
| | | 89 | 41,693,966 | 94,365,489 | 71,781 | 200,703 | 171,347 | 136,503,286 |
| | | 88 | 38,687,923 | 97,348,615 | 91,344 | 253,762 | 166,458 | 136,548,102 |
| 60-34-4 | Methyl hydrazine | 91 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 90 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | 89 | 0 | 73 | 0 | 0 | 0 | 73 |
| | | 88 | 2,774 | 153 | 1 | 0 | 0 | 2,928 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Mercury | 91 | 42 | 157,951 | 157,993 |
| | 90 | 42 | 177,279 | 177,321 |
| | 89 | 1,024 | 125,563 | 126,587 |
| | 88 | 1,613 | 257,378 | 258,991 |
| Methanol | 91 | 113,854,683 | 44,074,165 | 157,928,848 |
| | 90 | 127,561,836 | 48,879,725 | 176,441,561 |
| | 89 | 111,677,647 | 62,572,988 | 174,250,635 |
| | 88 | 112,776,950 | 58,537,919 | 171,314,869 |
| Methoxychlor | 91 | 0 | 164 | 164 |
| | 90 | 0 | 1,487 | 1,487 |
| | 89 | 0 | 440 | 440 |
| | 88 | 0 | 24,759 | 24,759 |
| 2-Methoxyethanol | 91 | 399,241 | 393,736 | 792,977 |
| | 90 | 531,570 | 891,880 | 1,423,450 |
| | 89 | 480,845 | 1,306,586 | 1,787,431 |
| | 88 | 622,102 | 884,230 | 1,506,332 |
| Methyl acrylate | 91 | 5,311 | 39,501 | 44,812 |
| | 90 | 9,377 | 743,953 | 753,330 |
| | 89 | 13,131 | 80,591 | 93,722 |
| | 88 | 14,886 | 18,784 | 33,670 |
| Methyl tert-butyl ether | 91 | 129,131 | 26,381 | 155,512 |
| | 90 | 123,291 | 55,580 | 178,871 |
| | 89 | 78,535 | 104,933 | 183,468 |
| | 88 | 7,713 | 98,177 | 105,890 |
| 4,4'-Methylenebis (2-chloroaniline) | 91 | 5 | 4,228 | 4,233 |
| | 90 | 0 | 2,105 | 2,105 |
| | 89 | 0 | 4,541 | 4,541 |
| | 88 | 0 | 6,250 | 6,250 |
| 4,4'-Methylenebis-(N,N-dimethyl) | 88 | 0 | 1,150 | 1,150 |
| Methylenebis (phenylisocyanate) | 91 | 911 | 1,617,192 | 1,618,103 |
| | 90 | 5,171 | 1,706,143 | 1,711,314 |
| | 89 | 1,875 | 2,320,548 | 2,322,423 |
| | 88 | 1,250 | 2,612,974 | 2,614,224 |
| Methylene bromide | 91 | 5,417 | 0 | 5,417 |
| | 90 | 8,579 | 49,085 | 57,664 |
| | 89 | 5,440 | 51,082 | 56,522 |
| | 88 | 6,097 | 0 | 6,097 |
| 4,4'-Methylenedianiline | 91 | 1,759 | 61,131 | 62,890 |
| | 90 | 2,434 | 106,306 | 108,740 |
| | 89 | 3,088 | 306,171 | 309,259 |
| | 88 | 7,399 | 280,887 | 288,286 |
| Methyl ethyl ketone | 91 | 772,861 | 9,998,866 | 10,771,727 |
| | 90 | 867,891 | 20,323,777 | 21,191,668 |
| | 89 | 886,502 | 28,506,748 | 29,393,250 |
| | 88 | 962,868 | 28,620,683 | 29,583,551 |
| Methyl hydrazine | 91 | 1 | 2 | 3 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 500 | 500 |
| | 88 | 0 | 2,700 | 2,700 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 74-88-4 | Methyl iodide | 91 | 22,544 | 2,870 | 13 | 740 | 0 | 26,167 |
| | | 90 | 29,443 | 373 | 1 | 5,085 | 0 | 34,902 |
| | | 89 | 17,178 | 8,294 | 1 | 5,085 | 0 | 30,558 |
| | | 88 | 5,691 | 3,253 | 5 | 250 | 0 | 9,199 |
| 108-10-1 | Methyl isobutyl ketone | 91 | 8,411,877 | 18,786,642 | 167,405 | 161,600 | 177,939 | 27,705,463 |
| | | 90 | 9,688,471 | 18,021,527 | 53,798 | 52,221 | 24,733 | 27,840,750 |
| | | 89 | 10,850,259 | 20,673,502 | 449,407 | 81,850 | 20,891 | 32,075,909 |
| | | 88 | 13,015,362 | 18,610,414 | 762,108 | 116,650 | 31,770 | 32,536,304 |
| 624-83-9 | Methyl isocyanate | 91 | 6,987 | 798 | 0 | 0 | 0 | 7,785 |
| | | 90 | 13,033 | 1,640 | 0 | 0 | 750 | 15,423 |
| | | 89 | 13,702 | 1,246 | 0 | 0 | 314 | 15,262 |
| | | 88 | 9,649 | 586 | 0 | 0 | 64 | 10,299 |
| 80-62-6 | Methyl methacrylate | 91 | 587,732 | 1,969,763 | 6,373 | 270,000 | 4,305 | 2,838,173 |
| | | 90 | 672,236 | 1,963,918 | 27,181 | 210,015 | 593 | 2,873,943 |
| | | 89 | 1,295,353 | 1,855,670 | 28,802 | 197,013 | 4,801 | 3,381,639 |
| | | 88 | 1,178,598 | 2,259,240 | 28,084 | 327,221 | 8,119 | 3,801,262 |
| 90-94-8 | Michler's ketone | 91 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 90 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 89 | 78 | 66 | 0 | 0 | 0 | 144 |
| | | 88 | 450 | 650 | 0 | 0 | 0 | 1,100 |
| 1313-27-5 | Molybdenum trioxide | 91 | 46,026 | 47,911 | 78,785 | 134,965 | 23,415 | 331,102 |
| | | 90 | 21,846 | 42,671 | 102,840 | 170,650 | 49,120 | 387,127 |
| | | 89 | 34,336 | 66,333 | 124,535 | 173,270 | 108,264 | 506,738 |
| | | 88 | 37,272 | 72,589 | 139,021 | 197,115 | 97,238 | 543,235 |
| 91-20-3 | Naphthalene | 91 | 1,391,603 | 1,280,285 | 31,484 | 39,112 | 54,343 | 2,796,827 |
| | | 90 | 2,050,725 | 1,724,919 | 36,113 | 28,135 | 143,191 | 3,983,083 |
| | | 89 | 1,848,065 | 1,577,969 | 146,749 | 39,552 | 118,187 | 3,730,522 |
| | | 88 | 3,370,519 | 1,704,275 | 22,568 | 50,946 | 123,706 | 5,272,014 |
| 134-32-7 | alpha-Naphthylamine | 91 | 5 | 5 | 0 | 0 | 0 | 10 |
| | | 90 | 250 | 250 | 0 | 0 | 0 | 500 |
| | | 89 | 336 | 336 | 0 | 0 | 0 | 672 |
| | | 88 | 336 | 254 | 101 | 0 | 0 | 691 |
| 7440-02-0 | Nickel | 91 | 408,694 | 140,609 | 53,883 | 4,418 | 393,775 | 1,001,379 |
| | | 90 | 224,811 | 211,532 | 57,322 | 9,136 | 3,007,213 | 3,510,014 |
| | | 89 | 668,213 | 190,875 | 87,752 | 18,946 | 1,293,227 | 2,259,013 |
| | | 88 | 260,551 | 176,000 | 89,206 | 14,295 | 1,225,677 | 1,765,729 |
| 7697-37-2 | Nitric acid | 91 | 685,940 | 2,594,202 | 167,773 | 21,128,099 | 585,053 | 25,161,067 |
| | | 90 | 756,949 | 3,113,497 | 152,174 | 31,912,657 | 383,313 | 36,318,590 |
| | | 89 | 873,122 | 4,154,846 | 737,142 | 31,017,845 | 489,065 | 37,272,020 |
| | | 88 | 1,143,693 | 7,182,275 | 1,448,540 | 25,485,680 | 1,330,695 | 36,590,883 |
| 139-13-9 | Nitrilotriacetic acid | 91 | 5 | 0 | 4,100 | 7,800 | 0 | 11,905 |
| | | 90 | 25 | 1,000 | 7,700 | 0 | 0 | 8,725 |
| | | 89 | 1,250 | 1,250 | 5,100 | 0 | 5,100 | 12,700 |
| | | 88 | 1,000 | 1,500 | 5,100 | 0 | 5,100 | 12,700 |
| 99-59-2 | 5-Nitro-o-anisidine | 91 | 5 | 10 | 0 | 0 | 0 | 15 |
| | | 90 | 5 | 5 | 0 | 0 | 0 | 10 |
| | | 89 | 250 | 250 | 0 | 0 | 0 | 500 |
| 98-95-3 | Nitrobenzene | 91 | 34,483 | 18,125 | 850 | 468,404 | 365 | 522,227 |
| | | 90 | 51,251 | 15,009 | 1,419 | 608,000 | 755 | 676,434 |
| | | 89 | 22,394 | 16,397 | 1,287 | 554,025 | 2,814 | 596,917 |
| | | 88 | 22,614 | 17,759 | 5,907 | 819,024 | 2,875 | 868,179 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Methyl iodide | 91 | 0 | 5 | 5 |
| | 90 | 0 | 228 | 228 |
| | 89 | 250 | 251 | 501 |
| | 88 | 0 | 250 | 250 |
| Methyl isobutyl ketone | 91 | 816,066 | 2,274,295 | 3,090,361 |
| | 90 | 1,258,294 | 4,548,341 | 5,806,635 |
| | 89 | 1,286,727 | 6,468,802 | 7,755,529 |
| | 88 | 1,509,030 | 10,323,972 | 11,833,002 |
| Methyl isocyanate | 91 | 0 | 15,067 | 15,067 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 23,000 | 23,000 |
| | 88 | 0 | 8,714 | 8,714 |
| Methyl methacrylate | 91 | 131,991 | 713,284 | 845,275 |
| | 90 | 166,245 | 1,139,639 | 1,305,884 |
| | 89 | 152,680 | 3,878,765 | 4,031,445 |
| | 88 | 191,071 | 3,099,097 | 3,290,168 |
| Michler's ketone | 91 | 3 | 0 | 3 |
| | 90 | 0 | 27,591 | 27,591 |
| | 89 | 0 | 26,703 | 26,703 |
| | 88 | 0 | 33,519 | 33,519 |
| Molybdenum trioxide | 91 | 80,682 | 670,693 | 751,375 |
| | 90 | 39,534 | 581,414 | 620,948 |
| | 89 | 22,024 | 885,998 | 908,022 |
| | 88 | 34,044 | 600,960 | 635,004 |
| Naphthalene | 91 | 63,546 | 1,883,797 | 1,947,343 |
| | 90 | 210,542 | 1,904,111 | 2,114,653 |
| | 89 | 964,706 | 1,644,330 | 2,609,036 |
| | 88 | 800,215 | 1,926,327 | 2,726,542 |
| alpha-Naphthylamine | 91 | 0 | 0 | 0 |
| | 90 | 0 | 534 | 534 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Nickel | 91 | 506,495 | 4,481,055 | 4,987,550 |
| | 90 | 114,444 | 8,083,538 | 8,197,982 |
| | 89 | 190,326 | 9,402,650 | 9,592,976 |
| | 88 | 252,272 | 9,954,420 | 10,206,692 |
| Nitric acid | 91 | 8,648,779 | 17,923,137 | 26,571,916 |
| | 90 | 13,105,320 | 21,120,370 | 34,225,690 |
| | 89 | 13,662,821 | 23,828,396 | 37,491,217 |
| | 88 | 22,890,969 | 26,354,766 | 49,245,735 |
| Nitrilotriacetic acid | 91 | 0 | 0 | 0 |
| | 90 | 3,300 | 0 | 3,300 |
| | 89 | 2,750 | 34,105 | 36,855 |
| | 88 | 264,609 | 191,003 | 455,612 |
| 5-Nitro-o-anisidine | 91 | 255 | 250 | 505 |
| | 90 | 5 | 0 | 5 |
| | 89 | 250 | 0 | 250 |
| Nitrobenzene | 91 | 100 | 339,420 | 339,520 |
| | 90 | 1,372 | 108,352 | 109,724 |
| | 89 | 4,750 | 108,436 | 113,186 |
| | 88 | 5,671 | 1,371,395 | 1,377,066 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 55-63-0 | Nitroglycerin | 91 | 1,790 | 26,657 | 12,399 | 0 | 9,550 | 50,396 |
| | | 90 | 1,053 | 29,550 | 11,580 | 0 | 17,150 | 59,333 |
| | | 89 | 8,638 | 27,169 | 9,198 | 0 | 21,500 | 66,505 |
| | | 88 | 2,280 | 50,103 | 2,746 | 0 | 11,640 | 66,769 |
| 88-75-5 | 2-Nitrophenol | 91 | 0 | 2 | 40 | 0 | 0 | 42 |
| | | 90 | 0 | 4 | 29 | 0 | 0 | 33 |
| | | 89 | 4,186 | 219 | 6 | 0 | 0 | 4,411 |
| | | 88 | 32,152 | 1,537 | 1 | 0 | 2 | 33,692 |
| 100-02-7 | 4-Nitrophenol | 91 | 9,406 | 127 | 600 | 0 | 0 | 10,133 |
| | | 90 | 7,570 | 83 | 31 | 1,200 | 0 | 8,884 |
| | | 89 | 7,614 | 140 | 0 | 1,800 | 0 | 9,554 |
| | | 88 | 7,642 | 213 | 0 | 6,300 | 7 | 14,162 |
| 79-46-9 | 2-Nitropropane | 91 | 31,052 | 74,695 | 380 | 139,342 | 0 | 245,469 |
| | | 90 | 62,836 | 21,422 | 1,100 | 87,000 | 0 | 172,358 |
| | | 89 | 111,947 | 63,675 | 2,700 | 237,000 | 0 | 415,322 |
| | | 88 | 208,303 | 181,082 | 4,300 | 257,000 | 0 | 650,685 |
| 156-10-5 | p-Nitrosodiphenylamine | 91 | 24 | 0 | 0 | 4,700 | 0 | 4,724 |
| | | 90 | 24 | 0 | 0 | 0 | 0 | 24 |
| | | 89 | 24 | 0 | 0 | 2,500 | 0 | 2,524 |
| | | 88 | 15 | 0 | 0 | 2,000 | 0 | 2,015 |
| 121-69-7 | N,N-Dimethylaniline | 91 | 24,751 | 26,605 | 30,430 | 0 | 0 | 81,786 |
| | | 90 | 17,802 | 33,500 | 16,030 | 0 | 0 | 67,332 |
| | | 89 | 6,957 | 84,802 | 14,437 | 0 | 0 | 106,196 |
| | | 88 | 18,448 | 80,457 | 19,967 | 0 | 250 | 119,122 |
| 62-75-9 | N-Nitrosodimethylamine | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 88 | 0 | 0 | 0 | 0 | 0 | 0 |
| 86-30-6 | N-Nitrosodiphenylamine | 91 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 90 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 89 | 0 | 0 | 9 | 40,000 | 9 | 40,018 |
| | | 88 | 0 | 0 | 27 | 34,000 | 0 | 34,027 |
| 56-38-2 | Parathion | 91 | 267 | 280 | 255 | 0 | 255 | 1,057 |
| | | 90 | 296 | 317 | 10 | 0 | 10 | 633 |
| | | 89 | 1,006 | 589 | 250 | 0 | 250 | 2,095 |
| | | 88 | 2,258 | 1,007 | 750 | 0 | 250 | 4,265 |
| 87-86-5 | Pentachlorophenol | 91 | 6,991 | 5,517 | 2,278 | 0 | 1,510 | 16,296 |
| | | 90 | 15,507 | 7,699 | 2,577 | 0 | 1,941 | 27,724 |
| | | 89 | 6,066 | 5,057 | 2,559 | 0 | 6,906 | 20,588 |
| | | 88 | 8,133 | 5,896 | 2,465 | 20,000 | 3,717 | 40,211 |
| 79-21-0 | Peracetic acid | 91 | 1,110 | 3,982 | 10 | 5 | 3,220 | 8,327 |
| | | 90 | 2,066 | 3,766 | 113 | 0 | 1,826 | 7,771 |
| | | 89 | 1,013 | 8,471 | 40 | 0 | 0 | 9,524 |
| | | 88 | 766 | 4,687 | 55 | 0 | 0 | 5,508 |
| 108-95-2 | Phenol | 91 | 2,498,507 | 3,832,788 | 163,915 | 3,192,210 | 324,921 | 10,012,341 |
| | | 90 | 3,154,808 | 4,498,361 | 271,865 | 4,421,439 | 293,643 | 12,640,116 |
| | | 89 | 3,402,750 | 5,662,497 | 267,134 | 4,282,511 | 372,156 | 13,987,048 |
| | | 88 | 4,521,892 | 5,893,524 | 258,950 | 4,659,319 | 1,882,255 | 17,215,940 |
| 106-50-3 | p-Phenylenediamine | 91 | 1,054 | 2,497 | 0 | 0 | 2 | 3,553 |
| | | 90 | 768 | 350 | 0 | 4,500 | 0 | 5,618 |
| | | 89 | 3,808 | 275 | 0 | 3,100 | 0 | 7,183 |
| | | 88 | 2,210 | 111,680 | 826 | 4,716 | 0 | 119,432 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Nitroglycerin | 91 | 86 | 87,122 | 87,208 |
| | 90 | 84 | 32,936 | 33,020 |
| | 89 | 211 | 24,501 | 24,712 |
| | 88 | 53 | 3,583 | 3,636 |
| 2-Nitrophenol | 91 | 140 | 11,662 | 11,802 |
| | 90 | 4,600 | 35,894 | 40,494 |
| | 89 | 14,638 | 24,819 | 39,457 |
| | 88 | 149,000 | 14,700 | 163,700 |
| 4-Nitrophenol | 91 | 21,067 | 561,290 | 582,357 |
| | 90 | 400,774 | 62,617 | 463,391 |
| | 89 | 630,059 | 36 | 630,095 |
| | 88 | 560,428 | 70 | 560,498 |
| 2-Nitropropane | 91 | 0 | 36,487 | 36,487 |
| | 90 | 0 | 6,100 | 6,100 |
| | 89 | 1,753 | 581 | 2,334 |
| | 88 | 3,000 | 13,695 | 16,695 |
| p-Nitrosodiphenylamine | 91 | 0 | 0 | 0 |
| | 90 | 0 | 1,300 | 1,300 |
| | 89 | 0 | 180 | 180 |
| | 88 | 0 | 180 | 180 |
| N,N-Dimethylaniline | 91 | 206,399 | 84,654 | 291,053 |
| | 90 | 198,535 | 108,870 | 307,405 |
| | 89 | 237,226 | 442,117 | 679,343 |
| | 88 | 287,483 | 466,169 | 753,652 |
| N-Nitrosodimethylamine | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| N-Nitrosodiphenylamine | 91 | 0 | 470,000 | 470,000 |
| | 90 | 0 | 1,853,445 | 1,853,445 |
| | 89 | 0 | 520,190 | 520,190 |
| | 88 | 0 | 300 | 300 |
| Parathion | 91 | 0 | 3,173 | 3,173 |
| | 90 | 0 | 26,566 | 26,566 |
| | 89 | 0 | 4,450 | 4,450 |
| | 88 | 0 | 5,280 | 5,280 |
| Pentachlorophenol | 91 | 834 | 252,812 | 253,646 |
| | 90 | 4,349 | 75,159 | 79,508 |
| | 89 | 8,013 | 87,417 | 95,430 |
| | 88 | 4,728 | 545,673 | 550,401 |
| Peracetic acid | 91 | 1,672 | 0 | 1,672 |
| | 90 | 2,000 | 1,821 | 3,821 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Phenol | 91 | 5,401,118 | 3,303,259 | 8,704,377 |
| | 90 | 5,061,347 | 6,295,548 | 11,356,895 |
| | 89 | 5,237,067 | 4,355,642 | 9,592,709 |
| | 88 | 6,041,090 | 6,308,966 | 12,350,056 |
| p-Phenylenediamine | 91 | 3,239 | 14,200 | 17,439 |
| | 90 | 23,509 | 41,586 | 65,095 |
| | 89 | 1,178 | 40,550 | 41,728 |
| | 88 | 6,277 | 117,923 | 124,200 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 90-43-7 | 2-Phenylphenol | 91 | 8,403 | 1,054 | 224 | 0 | 5 | 9,686 |
| | | 90 | 8,925 | 985 | 135 | 10 | 530 | 10,585 |
| | | 89 | 7,225 | 827 | 134 | 0 | 500 | 8,686 |
| | | 88 | 9,010 | 1,620 | 480 | 0 | 0 | 11,110 |
| 75-44-5 | Phosgene | 91 | 2,279 | 2,109 | 5 | 5 | 0 | 4,398 |
| | | 90 | 2,423 | 2,431 | 15 | 10 | 20 | 4,899 |
| | | 89 | 4,728 | 3,535 | 250 | 250 | 0 | 8,763 |
| | | 88 | 3,839 | 17,764 | 500 | 250 | 0 | 22,353 |
| 7664-38-2 | Phosphoric acid | 91 | 314,776 | 1,002,123 | 114,363,613 | 26,545 | 47,311,554 | 163,018,611 |
| | | 90 | 424,210 | 1,214,201 | 74,718,305 | 1,500,399 | 61,083,525 | 138,940,640 |
| | | 89 | 584,331 | 1,362,194 | 26,961,424 | 93,016 | 49,799,924 | 78,800,889 |
| | | 88 | 728,787 | 1,235,191 | 122,650,664 | 54,961 | 52,611,111 | 177,280,714 |
| 7723-14-0 | Phosphorus (yellow or white) | 91 | 19,662 | 3,847 | 2,273 | 0 | 339,229 | 365,011 |
| | | 90 | 19,423 | 4,913 | 2,345 | 0 | 2,196,153 | 2,222,834 |
| | | 89 | 10,435 | 5,489 | 3,033 | 0 | 3,291,402 | 3,310,359 |
| | | 88 | 7,594 | 11,559 | 11,322 | 0 | 3,893,674 | 3,924,149 |
| 85-44-9 | Phthalic anhydride | 91 | 112,154 | 519,670 | 13,164 | 0 | 944 | 645,932 |
| | | 90 | 147,799 | 541,789 | 374 | 0 | 9,605 | 699,567 |
| | | 89 | 117,544 | 532,607 | 2,120 | 0 | 3,080 | 655,351 |
| | | 88 | 126,406 | 422,573 | 1,040 | 0 | 1,015 | 551,034 |
| 88-89-1 | Picric acid | 91 | 2 | 1 | 2 | 1,634,494 | 19 | 1,634,518 |
| | | 90 | 1 | 1 | 2 | 1,249,930 | 2 | 1,249,936 |
| | | 89 | 251 | 1 | 250 | 1,265,460 | 250 | 1,266,212 |
| | | 88 | 251 | 1 | 251 | 1,362,180 | 250 | 1,362,933 |
| 1336-36-3 | Polychlorinated biphenyls (PCBs) | 91 | 0 | 0 | 0 | 0 | 10 | 10 |
| | | 90 | 5 | 0 | 0 | 0 | 71,366 | 71,371 |
| | | 89 | 0 | 0 | 264 | 0 | 998 | 1,262 |
| | | 88 | 0 | 0 | 10 | 0 | 752 | 762 |
| 1120-71-4 | Propane sultone | 88 | 0 | 0 | 0 | 0 | 0 | 0 |
| 123-38-6 | Propionaldehyde | 91 | 598,008 | 790,001 | 63 | 66,741 | 0 | 1,454,813 |
| | | 90 | 340,631 | 648,355 | 491 | 34,394 | 0 | 1,023,871 |
| | | 89 | 342,352 | 750,117 | 411 | 4,518 | 0 | 1,097,398 |
| | | 88 | 399,253 | 868,586 | 1,156 | 930 | 0 | 1,269,925 |
| 114-26-1 | Propoxur | 91 | 10 | 5 | 0 | 0 | 0 | 15 |
| | | 90 | 260 | 10 | 5 | 0 | 0 | 275 |
| | | 89 | 250 | 254 | 0 | 0 | 0 | 504 |
| | | 88 | 250 | 0 | 0 | 0 | 0 | 250 |
| 115-07-1 | Propylene | 91 | 13,422,010 | 9,418,860 | 4,685 | 0 | 114,000 | 22,959,555 |
| | | 90 | 13,514,810 | 10,088,533 | 867 | 0 | 296 | 23,604,506 |
| | | 89 | 15,123,782 | 11,539,074 | 953 | 0 | 250 | 26,664,059 |
| | | 88 | 17,656,964 | 11,455,525 | 10,003 | 0 | 0 | 29,122,492 |
| 75-55-8 | Propyleneimine | 91 | 50 | 350 | 0 | 0 | 0 | 400 |
| | | 90 | 293 | 318 | 0 | 0 | 0 | 611 |
| | | 89 | 287 | 253 | 0 | 0 | 0 | 540 |
| | | 88 | 250 | 250 | 0 | 0 | 0 | 500 |
| 75-56-9 | Propylene oxide | 91 | 450,934 | 615,690 | 10,181 | 20,710 | 2,450 | 1,099,965 |
| | | 90 | 494,937 | 910,286 | 70,780 | 120,005 | 3,893 | 1,599,901 |
| | | 89 | 413,155 | 1,674,804 | 83,091 | 270,000 | 4,727 | 2,445,777 |
| | | 88 | 539,841 | 2,733,342 | 112,503 | 1,113,780 | 11,630 | 4,511,096 |
| 110-86-1 | Pyridine | 91 | 58,405 | 51,587 | 4,930 | 370,750 | 13 | 485,685 |
| | | 90 | 66,527 | 56,163 | 7,336 | 514,955 | 25 | 645,006 |
| | | 89 | 75,476 | 67,527 | 2,365 | 660,281 | 251 | 805,900 |
| | | 88 | 142,281 | 72,918 | 2,158 | 491,775 | 1,125 | 710,257 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| 2-Phenylphenol | 91 | 4,858 | 515 | 5,373 |
| | 90 | 5,447 | 1,000 | 6,447 |
| | 89 | 6,416 | 1,250 | 7,666 |
| | 88 | 6,400 | 250 | 6,650 |
| Phosgene | 91 | 0 | 2,430 | 2,430 |
| | 90 | 0 | 1,713 | 1,713 |
| | 89 | 0 | 1,236 | 1,236 |
| | 88 | 0 | 1,520 | 1,520 |
| Phosphoric acid | 91 | 5,498,173 | 4,529,607 | 10,027,780 |
| | 90 | 6,450,006 | 5,096,637 | 11,546,643 |
| | 89 | 11,511,560 | 8,109,947 | 19,621,507 |
| | 88 | 14,040,990 | 8,499,932 | 22,540,922 |
| Phosphorus (yellow or white) | 91 | 266 | 4,158 | 4,424 |
| | 90 | 1,302 | 14,529 | 15,831 |
| | 89 | 4,495 | 85,591 | 90,086 |
| | 88 | 646 | 210,033 | 210,679 |
| Phthalic anhydride | 91 | 3,281 | 715,854 | 719,135 |
| | 90 | 42,719 | 2,311,303 | 2,354,022 |
| | 89 | 243,292 | 3,547,530 | 3,790,822 |
| | 88 | 53,441 | 5,981,309 | 6,034,750 |
| Picric acid | 91 | 0 | 12,465 | 12,465 |
| | 90 | 1 | 1,044 | 1,045 |
| | 89 | 0 | 25 | 25 |
| | 88 | 0 | 14,000 | 14,000 |
| Polychlorinated biphenyls (PCBs) | 91 | 0 | 2,432,777 | 2,432,777 |
| | 90 | 0 | 2,605,734 | 2,605,734 |
| | 89 | 1 | 4,414,102 | 4,414,103 |
| | 88 | 250 | 5,824,807 | 5,825,057 |
| Propane sultone | 88 | 0 | 0 | 0 |
| Propionaldehyde | 91 | 12,922 | 5,225 | 18,147 |
| | 90 | 69 | 1,457 | 1,526 |
| | 89 | 26,553 | 0 | 26,553 |
| | 88 | 761 | 1,600 | 2,361 |
| Propoxur | 91 | 255 | 460 | 715 |
| | 90 | 260 | 796 | 1,056 |
| | 89 | 753 | 2,267 | 3,020 |
| | 88 | 0 | 250 | 250 |
| Propylene | 91 | 5 | 730,212 | 730,217 |
| | 90 | 1,340 | 4,907,543 | 4,908,883 |
| | 89 | 6,103 | 683,410 | 689,513 |
| | 88 | 500 | 1,524,389 | 1,524,889 |
| Propyleneimine | 91 | 0 | 0 | 0 |
| | 90 | 250 | 0 | 250 |
| | 89 | 250 | 0 | 250 |
| | 88 | 250 | 0 | 250 |
| Propylene oxide | 91 | 49,854 | 47,279 | 97,133 |
| | 90 | 251,413 | 12,256 | 263,669 |
| | 89 | 309,915 | 9,714 | 319,629 |
| | 88 | 386,355 | 17,752 | 404,107 |
| Pyridine | 91 | 264,235 | 207,325 | 471,560 |
| | 90 | 264,948 | 175,479 | 440,427 |
| | 89 | 354,602 | 259,117 | 613,719 |
| | 88 | 275,083 | 97,428 | 372,511 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 91-22-5 | Quinoline | 91 | 20,133 | 24,958 | 2,660 | 23,000 | 286 | 71,037 |
| | | 90 | 20,513 | 7,177 | 17 | 0 | 198 | 27,905 |
| | | 89 | 27,365 | 36,859 | 5 | 0 | 3,093 | 67,322 |
| | | 88 | 31,633 | 17,717 | 502 | 0 | 896 | 50,748 |
| 106-51-4 | Quinone | 91 | 2,205 | 1,807 | 0 | 5 | 0 | 4,017 |
| | | 90 | 711 | 891 | 5 | 0 | 0 | 1,607 |
| | | 89 | 860 | 900 | 12 | 0 | 0 | 1,772 |
| | | 88 | 4,600 | 6,700 | 140 | 0 | 0 | 11,440 |
| 82-68-8 | Quintozene | 91 | 20 | 286 | 0 | 0 | 0 | 306 |
| | | 90 | 260 | 21 | 0 | 0 | 0 | 281 |
| | | 89 | 1,250 | 790 | 0 | 0 | 250 | 2,290 |
| | | 88 | 750 | 314 | 0 | 0 | 0 | 1,064 |
| 81-07-2 | Saccharin (manufacturing) | 91 | 63 | 251 | 0 | 0 | 0 | 314 |
| | | 90 | 68 | 258 | 0 | 0 | 0 | 326 |
| | | 89 | 315 | 760 | 0 | 0 | 0 | 1,075 |
| | | 88 | 250 | 500 | 0 | 0 | 0 | 750 |
| 94-59-7 | Safrole | 90 | 5 | 0 | 0 | 0 | 0 | 5 |
| | | 89 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 88 | 250 | 250 | 0 | 0 | 0 | 500 |
| 7782-49-2 | Selenium | 91 | 525 | 511 | 188 | 0 | 260 | 1,484 |
| | | 90 | 1,260 | 799 | 452 | 0 | 171,283 | 173,794 |
| | | 89 | 2,508 | 11,442 | 750 | 0 | 236,714 | 251,414 |
| | | 88 | 2,251 | 14,031 | 1,168 | 0 | 127,508 | 144,958 |
| 7440-22-4 | Silver | 91 | 5,555 | 7,849 | 119 | 28 | 250 | 13,801 |
| | | 90 | 4,662 | 7,514 | 297 | 5 | 3,725 | 16,203 |
| | | 89 | 7,624 | 7,660 | 1,419 | 71 | 10,200 | 26,974 |
| | | 88 | 11,482 | 36,519 | 1,654 | 0 | 39,510 | 89,165 |
| 100-42-5 | Styrene | 91 | 10,161,049 | 18,315,297 | 25,609 | 22,080 | 389,929 | 28,913,964 |
| | | 90 | 12,774,403 | 18,305,231 | 37,376 | 29,040 | 161,048 | 31,307,098 |
| | | 89 | 15,971,500 | 18,798,591 | 51,082 | 0 | 184,716 | 35,005,889 |
| | | 88 | 12,411,252 | 20,211,285 | 59,069 | 165 | 242,941 | 32,924,712 |
| 96-09-3 | Styrene oxide | 91 | 1,628 | 47 | 0 | 0 | 0 | 1,675 |
| | | 90 | 1,535 | 888 | 0 | 0 | 0 | 2,423 |
| | | 89 | 511 | 1,514 | 0 | 0 | 0 | 2,025 |
| | | 88 | 511 | 1,803 | 0 | 0 | 0 | 2,314 |
| 7664-93-9 | Sulfuric acid | 91 | 1,577,640 | 20,099,089 | 37,243,237 | 94,720,218 | 7,678,646 | 161,318,830 |
| | | 90 | 1,615,390 | 22,523,306 | 25,804,925 | 112,116,427 | 2,213,250 | 164,273,298 |
| | | 89 | 2,388,897 | 23,176,433 | 19,763,132 | 149,583,139 | 6,997,898 | 201,909,499 |
| | | 88 | 2,260,222 | 15,535,829 | 36,534,517 | 138,707,333 | 4,930,211 | 197,968,112 |
| 79-34-5 | 1,1,2,2-Tetra--chloroethane | 91 | 40,927 | 23,324 | 2,102 | 0 | 0 | 66,353 |
| | | 90 | 38,513 | 6,283 | 3,529 | 80 | 495 | 48,900 |
| | | 89 | 26,259 | 9,352 | 5,429 | 283 | 18 | 41,341 |
| | | 88 | 25,904 | 17,961 | 814 | 0 | 29 | 44,708 |
| 127-18-4 | Tetrachloroethylene | 91 | 6,482,575 | 10,204,876 | 7,448 | 14,000 | 23,302 | 16,732,201 |
| | | 90 | 9,074,857 | 13,321,145 | 21,510 | 11,012 | 1,255 | 22,429,779 |
| | | 89 | 11,966,038 | 15,512,638 | 53,940 | 50,005 | 10,791 | 27,593,412 |
| | | 88 | 16,125,229 | 19,668,296 | 33,314 | 72,250 | 82,144 | 35,981,233 |
| 961-11-5 | Tetrachlorvinphos | 91 | 1 | 129 | 2 | 0 | 0 | 132 |
| | | 90 | 500 | 254 | 0 | 0 | 0 | 754 |
| | | 89 | 250 | 250 | 0 | 0 | 0 | 500 |
| | | 88 | 250 | 1 | 0 | 0 | 0 | 251 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Quinoline | 91 | 255 | 7,950 | 8,205 |
| | 90 | 4,893 | 16,533 | 21,426 |
| | 89 | 6,575 | 22,336 | 28,911 |
| | 88 | 6,406 | 11,187 | 17,593 |
| Quinone | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 250 | 120 | 370 |
| | 88 | 250 | 280 | 530 |
| Quintozene | 91 | 11 | 62,950 | 62,961 |
| | 90 | 10 | 1,087 | 1,097 |
| | 89 | 250 | 1,883 | 2,133 |
| | 88 | 250 | 12,625 | 12,875 |
| Saccharin (manufacturing) | 91 | 260 | 1,750 | 2,010 |
| | 90 | 681 | 4,043 | 4,724 |
| | 89 | 500 | 4,340 | 4,840 |
| | 88 | 7,900 | 750 | 8,650 |
| Safrole | 90 | 12 | 0 | 12 |
| | 89 | 13 | 0 | 13 |
| | 88 | 250 | 0 | 250 |
| Selenium | 91 | 265 | 6,372 | 6,637 |
| | 90 | 520 | 23,146 | 23,666 |
| | 89 | 762 | 13,990 | 14,752 |
| | 88 | 1,250 | 6,262 | 7,512 |
| Silver | 91 | 259,353 | 125,446 | 384,799 |
| | 90 | 3,077 | 3,890 | 6,967 |
| | 89 | 4,243 | 53,573 | 57,816 |
| | 88 | 3,624 | 27,138 | 30,762 |
| Styrene | 91 | 243,118 | 4,864,767 | 5,107,885 |
| | 90 | 254,836 | 10,382,640 | 10,637,476 |
| | 89 | 415,027 | 7,554,518 | 7,969,545 |
| | 88 | 471,273 | 9,278,019 | 9,749,292 |
| Styrene oxide | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 250 | 0 | 250 |
| | 88 | 250 | 750 | 1,000 |
| Sulfuric acid | 91 | 34,175,276 | 76,263,792 | 110,439,068 |
| | 90 | 29,443,189 | 73,465,888 | 102,909,077 |
| | 89 | 43,403,895 | 78,358,651 | 121,762,546 |
| | 88 | 55,970,375 | 108,840,212 | 164,810,587 |
| 1,1,2,2-Tetra- -chloroethane | 91 | 2,005 | 214,436 | 216,441 |
| | 90 | 124 | 150,527 | 150,651 |
| | 89 | 663 | 201,051 | 201,714 |
| | 88 | 400 | 203,732 | 204,132 |
| Tetrachloroethylene | 91 | 234,637 | 3,830,559 | 4,065,196 |
| | 90 | 450,787 | 4,433,734 | 4,884,521 |
| | 89 | 467,081 | 4,279,472 | 4,746,553 |
| | 88 | 586,288 | 5,511,471 | 6,097,759 |
| Tetrachlorvinphos | 91 | 9 | 33,269 | 33,278 |
| | 90 | 28 | 98,128 | 98,156 |
| | 89 | 0 | 13,189 | 13,189 |
| | 88 | 2 | 49,480 | 49,482 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 7440-28-0 | Thallium | 91 | 1 | 29 | 1 | 0 | 0 | 31 |
| | | 90 | 250 | 500 | 5 | 0 | 0 | 755 |
| | | 89 | 500 | 500 | 0 | 0 | 500 | 1,500 |
| 62-55-5 | Thioacetamide | 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 | 91 | 873 | 555 | 717 | 5,400 | 505 | 8,050 |
| | | 90 | 2,300 | 565 | 572 | 4,800 | 265 | 8,502 |
| | | 89 | 2,253 | 1,500 | 971 | 5,900 | 752 | 11,376 |
| | | 88 | 1,504 | 500 | 16,951 | 5,940 | 750 | 25,645 |
| 1314-20-1 | Thorium dioxide | 91 | 0 | 250 | 0 | 0 | 0 | 250 |
| | | 90 | 250 | 610 | 0 | 0 | 0 | 860 |
| | | 89 | 250 | 610 | 0 | 0 | 0 | 860 |
| | | 88 | 230 | 1,350 | 0 | 0 | 0 | 1,580 |
| 7550-45-0 | Titanium tetrachloride | 91 | 27,370 | 6,236 | 0 | 0 | 0 | 33,606 |
| | | 90 | 42,397 | 11,963 | 0 | 0 | 0 | 54,360 |
| | | 89 | 44,785 | 12,502 | 0 | 0 | 0 | 57,287 |
| | | 88 | 38,614 | 40,054 | 0 | 0 | 1,400 | 80,068 |
| 108-88-3 | Toluene | 91 | 73,620,294 | 124,944,414 | 104,645 | 1,373,207 | 185,012 | 200,227,572 |
| | | 90 | 84,413,528 | 157,264,379 | 198,500 | 1,432,918 | 383,904 | 243,693,229 |
| | | 89 | 93,193,936 | 176,358,467 | 182,297 | 620,403 | 427,055 | 270,782,158 |
| | | 88 | 102,808,393 | 189,388,805 | 197,820 | 1,473,666 | 741,301 | 294,609,985 |
| 584-84-9 | Toluene-2,4-diiso--cyanate | 91 | 12,148 | 1,311,804 | 0 | 0 | 250 | 1,324,202 |
| | | 90 | 18,862 | 38,529 | 0 | 0 | 5 | 57,396 |
| | | 89 | 45,110 | 48,710 | 0 | 0 | 3,570 | 97,390 |
| | | 88 | 47,184 | 118,928 | 0 | 0 | 1,040 | 167,152 |
| 91-08-7 | Toluene-2,6-diiso--cyanate | 91 | 303,581 | 28,507 | 0 | 0 | 250 | 332,338 |
| | | 90 | 6,023 | 19,438 | 5 | 0 | 5 | 25,471 |
| | | 89 | 24,664 | 26,693 | 0 | 0 | 12,180 | 63,537 |
| | | 88 | 153,253 | 338,939 | 0 | 0 | 510 | 492,702 |
| 95-53-4 | o-Toluidine | 91 | 8,904 | 1,925 | 260 | 21,100 | 8,111 | 40,300 |
| | | 90 | 5,367 | 2,075 | 252 | 250 | 8,486 | 16,430 |
| | | 89 | 22,222 | 3,627 | 1,252 | 250 | 3,563 | 30,914 |
| | | 88 | 19,196 | 27,726 | 1,902 | 250 | 5,024 | 54,098 |
| 8001-35-2 | Toxaphene | 90 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52-68-6 | Trichlorfon | 91 | 5 | 254 | 9 | 0 | 0 | 268 |
| | | 90 | 250 | 254 | 6 | 0 | 0 | 510 |
| | | 89 | 500 | 347 | 1 | 0 | 0 | 848 |
| | | 88 | 250 | 3 | 0 | 0 | 0 | 253 |
| 120-82-1 | 1,2,4-Trichlorobenzene | 91 | 127,598 | 282,051 | 1,669 | 3,134 | 4,573 | 419,025 |
| | | 90 | 106,656 | 270,210 | 7,417 | 3,479 | 725 | 388,487 |
| | | 89 | 239,949 | 905,984 | 4,729 | 12,223 | 259 | 1,163,144 |
| | | 88 | 438,009 | 1,094,904 | 31,628 | 7,408 | 3,073 | 1,575,022 |
| 71-55-6 | 1,1,1-Trichloroethane | 91 | 69,230,762 | 68,274,801 | 21,803 | 2,805 | 171,807 | 137,701,978 |
| | | 90 | 83,389,447 | 81,112,035 | 16,722 | 1,581 | 62,176 | 164,581,961 |
| | | 89 | 91,649,649 | 84,215,221 | 27,309 | 2,318 | 70,630 | 175,965,127 |
| | | 88 | 90,767,027 | 86,001,968 | 95,934 | 1,000 | 187,786 | 177,053,715 |
| 79-00-5 | 1,1,2-Trichloroethane | 91 | 94,329 | 433,437 | 1,382 | 2 | 256 | 529,406 |
| | | 90 | 107,637 | 497,437 | 1,351 | 1,091 | 265 | 607,781 |
| | | 89 | 144,746 | 642,442 | 8,095 | 2,090 | 130 | 797,503 |
| | | 88 | 618,608 | 1,122,734 | 5,303 | 0 | 89 | 1,746,734 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Thallium | 91 | 0 | 954 | 954 |
| | 90 | 0 | 916 | 916 |
| | 89 | 250 | 250 | 500 |
| Thioacetamide | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 88 | 0 | 250 | 250 |
| Thiourea | 91 | 15,906 | 5,768 | 21,674 |
| | 90 | 11,045 | 3,955 | 15,000 |
| | 89 | 9,263 | 7,586 | 16,849 |
| | 88 | 26,634 | 4,814 | 31,448 |
| Thorium dioxide | 91 | 250 | 102,249 | 102,499 |
| | 90 | 660 | 533,147 | 533,807 |
| | 89 | 1,277 | 447,030 | 448,307 |
| | 88 | 250 | 677,549 | 677,799 |
| Titanium tetrachloride | 91 | 5 | 2,368,098 | 2,368,103 |
| | 90 | 5 | 1,975,893 | 1,975,898 |
| | 89 | 0 | 2,354,006 | 2,354,006 |
| | 88 | 0 | 1,667,045 | 1,667,045 |
| Toluene | 91 | 1,266,355 | 22,006,245 | 23,272,600 |
| | 90 | 1,724,465 | 39,898,984 | 41,623,449 |
| | 89 | 3,001,993 | 63,484,088 | 66,486,081 |
| | 88 | 3,549,792 | 61,614,018 | 65,163,810 |
| Toluene-2,4-diiso- -cyanate | 91 | 0 | 49,809 | 49,809 |
| | 90 | 0 | 90,950 | 90,950 |
| | 89 | 501 | 270,921 | 271,422 |
| | 88 | 500 | 229,620 | 230,120 |
| Toluene-2,6-diiso- -cyanate | 91 | 0 | 14,423 | 14,423 |
| | 90 | 2,005 | 18,505 | 20,510 |
| | 89 | 250 | 105,440 | 105,690 |
| | 88 | 250 | 54,731 | 54,981 |
| o-Toluidine | 91 | 8,250 | 103,316 | 111,566 |
| | 90 | 28,312 | 12,391 | 40,703 |
| | 89 | 24,900 | 20,016 | 44,916 |
| | 88 | 15,172 | 32,170 | 47,342 |
| Toxaphene | 90 | 0 | 2,200 | 2,200 |
| Trichlorfon | 91 | 0 | 1,192 | 1,192 |
| | 90 | 125 | 1,007 | 1,132 |
| | 89 | 86 | 1,713 | 1,799 |
| | 88 | 215 | 1,566 | 1,781 |
| 1,2,4-Trichlorobenzene | 91 | 136,769 | 374,812 | 511,581 |
| | 90 | 229,363 | 683,172 | 912,535 |
| | 89 | 248,011 | 1,121,514 | 1,369,525 |
| | 88 | 262,676 | 898,387 | 1,161,063 |
| 1,1,1-Trichloroethane | 91 | 293,508 | 8,000,615 | 8,294,123 |
| | 90 | 169,540 | 12,472,740 | 12,642,280 |
| | 89 | 312,010 | 16,662,054 | 16,974,064 |
| | 88 | 304,103 | 19,513,105 | 19,817,208 |
| 1,1,2-Trichloroethane | 91 | 819 | 5,004,017 | 5,004,836 |
| | 90 | 855 | 2,019,792 | 2,020,647 |
| | 89 | 780 | 494,719 | 495,499 |
| | 88 | 750 | 259,842 | 260,592 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 79-01-6 | Trichloroethylene | 91 | 16,642,065 | 18,416,403 | 12,750 | 800 | 62,991 | 35,135,009 |
| | | 90 | 18,565,243 | 20,358,601 | 14,210 | 805 | 12,554 | 38,951,413 |
| | | 89 | 22,579,951 | 26,769,836 | 15,849 | 390 | 8,686 | 49,374,712 |
| | | 88 | 25,879,146 | 27,900,517 | 13,802 | 390 | 21,186 | 53,815,041 |
| 95-95-4 | 2,4,5-Trichlorophenol | 91 | 0 | 0 | 0 | 28,000 | 0 | 28,000 |
| | | 89 | 250 | 0 | 0 | 0 | 0 | 250 |
| | | 88 | 1 | 90 | 0 | 0 | 0 | 91 |
| 88-06-2 | 2,4,6-Trichlorophenol | 91 | 1 | 79 | 1 | 0 | 1 | 82 |
| | | 90 | 0 | 78 | 79 | 0 | 0 | 157 |
| | | 89 | 2 | 114 | 3,515 | 0 | 250 | 3,881 |
| | | 88 | 0 | 250 | 50 | 12,000 | 0 | 12,300 |
| 1582-09-8 | Trifluralin | 91 | 8,449 | 2,711 | 80 | 0 | 31,835 | 43,075 |
| | | 90 | 12,992 | 2,616 | 12 | 0 | 5 | 15,625 |
| | | 89 | 2,079 | 1,853 | 322 | 0 | 970 | 5,224 |
| | | 88 | 2,020 | 1,257 | 601 | 0 | 0 | 3,878 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 91 | 2,723,947 | 2,618,627 | 15,756 | 16,898 | 17,732 | 5,392,960 |
| | | 90 | 3,217,095 | 2,319,873 | 5,905 | 28,574 | 12,862 | 5,584,309 |
| | | 89 | 2,274,143 | 2,641,573 | 10,608 | 7,651 | 38,136 | 4,972,111 |
| | | 88 | 1,960,642 | 2,293,501 | 10,353 | 7,964 | 62,083 | 4,334,543 |
| 51-79-6 | Urethane | 91 | 0 | 2,050 | 0 | 0 | 0 | 2,050 |
| | | 90 | 760 | 3,310 | 0 | 5 | 270 | 4,345 |
| | | 89 | 250 | 3,700 | 0 | 0 | 0 | 3,950 |
| | | 88 | 140,500 | 4,873 | 0 | 0 | 0 | 145,373 |
| 7440-62-2 | Vanadium (fume or dust) | 91 | 1,739 | 14,664 | 685 | 0 | 74,730 | 91,818 |
| | | 90 | 2,623 | 12,683 | 670 | 0 | 63,952 | 79,928 |
| | | 89 | 3,377 | 5,970 | 1,004 | 0 | 10,702 | 21,053 |
| | | 88 | 3,135 | 14,029 | 4,704 | 0 | 87,296 | 109,164 |
| 108-05-4 | Vinyl acetate | 91 | 1,102,871 | 4,383,624 | 9,900 | 3,088,362 | 7,237 | 8,591,994 |
| | | 90 | 1,204,869 | 4,352,276 | 5,558 | 1,360,901 | 14,151 | 6,937,755 |
| | | 89 | 1,438,370 | 4,066,033 | 5,339 | 1,296,265 | 22,599 | 6,828,606 |
| | | 88 | 1,470,177 | 4,450,214 | 10,021 | 2,109,859 | 18,889 | 8,059,160 |
| 593-60-2 | Vinyl bromide | 91 | 260 | 3,300 | 0 | 0 | 0 | 3,560 |
| | | 90 | 9,190 | 915 | 270 | 0 | 0 | 10,375 |
| | | 89 | 150 | 620 | 270 | 0 | 0 | 1,040 |
| | | 88 | 4,000 | 950 | 400 | 0 | 0 | 5,350 |
| 75-01-4 | Vinyl chloride | 91 | 390,119 | 657,366 | 4,625 | 4 | 251 | 1,052,365 |
| | | 90 | 313,596 | 821,994 | 7,291 | 593 | 2,535 | 1,146,009 |
| | | 89 | 399,883 | 869,149 | 2,969 | 391 | 3,899 | 1,276,291 |
| | | 88 | 421,880 | 1,016,047 | 2,051 | 53 | 4,409 | 1,444,440 |
| 75-35-4 | Vinylidene chloride | 91 | 71,772 | 213,418 | 832 | 0 | 15 | 286,037 |
| | | 90 | 69,583 | 234,130 | 251 | 155 | 483 | 304,602 |
| | | 89 | 81,686 | 138,946 | 2,691 | 720 | 540 | 224,583 |
| | | 88 | 104,552 | 191,801 | 3,462 | 170 | 429 | 300,414 |
| 1330-20-7 | Xylene (mixed isomers) | 91 | 27,683,616 | 87,869,367 | 50,801 | 139,948 | 335,613 | 116,079,345 |
| | | 90 | 31,720,382 | 104,476,607 | 42,617 | 105,394 | 429,763 | 136,774,763 |
| | | 89 | 36,211,016 | 119,500,710 | 185,702 | 70,161 | 474,831 | 156,442,420 |
| | | 88 | 33,675,278 | 120,715,961 | 203,346 | 144,728 | 561,857 | 155,301,170 |
| 108-38-3 | m-Xylene | 91 | 926,807 | 509,426 | 2,260 | 5 | 3,186 | 1,441,684 |
| | | 90 | 883,439 | 679,158 | 1,086 | 0 | 1,130 | 1,564,813 |
| | | 89 | 912,956 | 565,350 | 2,643 | 0 | 5,730 | 1,486,679 |
| | | 88 | 1,406,104 | 1,010,939 | 2,566 | 0 | 18,045 | 2,437,654 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Trichloroethylene | 91 | 72,845 | 2,793,368 | 2,866,213 |
| | 90 | 11,353 | 3,690,232 | 3,701,585 |
| | 89 | 31,269 | 4,966,856 | 4,998,125 |
| | 88 | 79,252 | 6,401,817 | 6,481,069 |
| 2,4,5-Trichlorophenol | 91 | 0 | 0 | 0 |
| | 89 | 0 | 250 | 250 |
| | 88 | 0 | 20 | 20 |
| 2,4,6-Trichlorophenol | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 10 | 10 |
| Trifluralin | 91 | 141 | 76,617 | 76,758 |
| | 90 | 93 | 82,201 | 82,294 |
| | 89 | 79 | 71,092 | 71,171 |
| | 88 | 371 | 190,546 | 190,917 |
| 1,2,4-Trimethylbenzene | 91 | 238,993 | 368,967 | 607,960 |
| | 90 | 140,928 | 575,978 | 716,906 |
| | 89 | 701,180 | 607,889 | 1,309,069 |
| | 88 | 501,717 | 569,529 | 1,071,246 |
| Urethane | 91 | 0 | 19,800 | 19,800 |
| | 90 | 750 | 3,028 | 3,778 |
| | 89 | 758 | 12,128 | 12,886 |
| | 88 | 1,010 | 4,908 | 5,918 |
| Vanadium (fume or dust) | 91 | 270 | 428,217 | 428,487 |
| | 90 | 260 | 41,132 | 41,392 |
| | 89 | 751 | 38,924 | 39,675 |
| | 88 | 0 | 93,417 | 93,417 |
| Vinyl acetate | 91 | 153,451 | 174,747 | 328,198 |
| | 90 | 221,756 | 2,087,819 | 2,309,575 |
| | 89 | 178,538 | 244,501 | 423,039 |
| | 88 | 2,319,733 | 396,204 | 2,715,937 |
| Vinyl bromide | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Vinyl chloride | 91 | 252 | 76,089 | 76,341 |
| | 90 | 1,897 | 130,859 | 132,756 |
| | 89 | 7,925 | 105,396 | 113,321 |
| | 88 | 17,104 | 675,787 | 692,891 |
| Vinylidene chloride | 91 | 94 | 74,527 | 74,621 |
| | 90 | 1,000 | 134,773 | 135,773 |
| | 89 | 1,172 | 169,048 | 170,220 |
| | 88 | 3,303 | 405,239 | 408,542 |
| Xylene (mixed isomers) | 91 | 1,437,628 | 20,142,051 | 21,579,679 |
| | 90 | 1,892,057 | 23,744,311 | 25,636,368 |
| | 89 | 3,835,043 | 33,149,576 | 36,984,619 |
| | 88 | 4,159,721 | 37,416,803 | 41,576,524 |
| m-Xylene | 91 | 19,178 | 151,337 | 170,515 |
| | 90 | 1,013 | 174,020 | 175,033 |
| | 89 | 2,051 | 288,112 | 290,163 |
| | 88 | 19,708 | 221,172 | 240,880 |

Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (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 |
|---|---|---|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 91 | 1,153,483 | 576,448 | 6,507 | 5 | 1,618 | 1,738,061 |
| | | 90 | 1,551,323 | 584,787 | 2,541 | 0 | 1,842 | 2,140,493 |
| | | 89 | 1,357,510 | 633,011 | 3,135 | 0 | 3,480 | 1,997,136 |
| | | 88 | 1,548,792 | 641,522 | 2,786 | 250 | 22,461 | 2,215,811 |
| 106-42-3 | p-Xylene | 91 | 1,343,694 | 3,934,677 | 1,076 | 5 | 3,635 | 5,283,087 |
| | | 90 | 1,333,708 | 3,517,838 | 676 | 0 | 1,510 | 4,853,732 |
| | | 89 | 1,224,377 | 3,878,564 | 2,017 | 0 | 2,285 | 5,107,243 |
| | | 88 | 1,672,827 | 4,352,922 | 3,200 | 0 | 49,226 | 6,078,175 |
| 87-62-7 | 2,6-Xylidine | 91 | 5 | 16 | 0 | 0 | 0 | 21 |
| | | 90 | 0 | 17 | 1,906 | 0 | 0 | 1,923 |
| | | 89 | 0 | 44 | 1,906 | 0 | 0 | 1,950 |
| | | 88 | 0 | 337 | 1,537 | 0 | 0 | 1,874 |
| 7440-66-6 | Zinc (fume or dust) | 91 | 765,614 | 1,168,410 | 28,080 | 115 | 9,216,574 | 11,178,793 |
| | | 90 | 845,335 | 1,323,621 | 40,885 | 280 | 11,332,911 | 13,543,032 |
| | | 89 | 1,942,398 | 1,458,370 | 134,950 | 2,720 | 20,523,162 | 24,061,600 |
| | | 88 | 1,934,992 | 1,483,841 | 849,544 | 140,010 | 25,617,115 | 30,025,502 |
| 12122-67-7 | Zineb | 91 | 5 | 0 | 0 | 0 | 0 | 5 |
| | | 90 | 10 | 250 | 0 | 0 | 0 | 260 |
| | | 89 | 250 | 250 | 0 | 0 | 0 | 500 |
| | | 88 | 250 | 1,000 | 0 | 0 | 0 | 1,250 |
| | Antimony compounds | 91 | 30,395 | 55,746 | 45,593 | 6,509 | 1,522,871 | 1,661,114 |
| | | 90 | 42,567 | 105,850 | 32,488 | 6,868 | 1,818,526 | 2,006,299 |
| | | 89 | 74,035 | 94,909 | 45,624 | 3,900 | 1,011,439 | 1,229,907 |
| | | 88 | 58,941 | 106,587 | 31,178 | 9,200 | 1,935,018 | 2,140,924 |
| | Arsenic compounds | 91 | 25,007 | 165,308 | 4,496 | 23,000 | 2,738,853 | 2,956,664 |
| | | 90 | 51,004 | 114,826 | 4,103 | 23,276 | 2,640,888 | 2,834,097 |
| | | 89 | 34,286 | 141,572 | 14,237 | 33,865 | 4,005,229 | 4,229,189 |
| | | 88 | 43,461 | 223,791 | 6,243 | 27,400 | 4,946,434 | 5,247,329 |
| | Barium compounds | 91 | 248,569 | 614,578 | 100,702 | 408 | 4,005,169 | 4,969,426 |
| | | 90 | 290,134 | 916,865 | 70,929 | 298 | 8,151,047 | 9,429,273 |
| | | 89 | 230,300 | 513,338 | 83,568 | 850 | 5,278,783 | 6,106,839 |
| | | 88 | 152,646 | 848,120 | 99,428 | 2,773 | 5,651,655 | 6,754,622 |
| | Beryllium compounds | 91 | 1 | 241 | 9 | 0 | 30,000 | 30,251 |
| | | 90 | 1 | 211 | 88 | 0 | 40,000 | 40,300 |
| | | 89 | 501 | 461 | 25 | 0 | 36,000 | 36,987 |
| | | 88 | 1 | 861 | 17 | 0 | 12,000 | 12,879 |
| | Cadmium compounds | 91 | 17,066 | 52,427 | 3,580 | 1,540 | 248,374 | 322,987 |
| | | 90 | 25,878 | 66,386 | 1,959 | 1,565 | 312,631 | 408,419 |
| | | 89 | 29,235 | 55,900 | 1,985 | 1,772 | 247,340 | 336,232 |
| | | 88 | 23,349 | 77,163 | 1,799 | 2,409 | 295,127 | 399,847 |
| | Chlorophenols | 91 | 3,368 | 968 | 782 | 229,798 | 56 | 234,972 |
| | | 90 | 3,909 | 1,022 | 551 | 174,100 | 2 | 179,584 |
| | | 89 | 3,655 | 909 | 294 | 137,624 | 0 | 142,482 |
| | | 88 | 2,154 | 419 | 272 | 71,554 | 0 | 74,399 |
| | Chromium compounds | 91 | 134,838 | 427,257 | 335,233 | 34,619 | 24,761,345 | 25,693,292 |
| | | 90 | 327,000 | 430,382 | 407,827 | 83,137 | 25,531,086 | 26,779,432 |
| | | 89 | 845,596 | 573,710 | 477,774 | 59,110 | 31,110,567 | 33,066,757 |
| | | 88 | 258,132 | 511,508 | 326,027 | 52,653 | 30,933,660 | 32,081,980 |
| | Cobalt compounds | 91 | 7,857 | 25,946 | 78,593 | 19,949 | 142,152 | 274,497 |
| | | 90 | 10,148 | 42,657 | 90,869 | 19,308 | 195,173 | 358,155 |
| | | 89 | 14,334 | 65,103 | 70,468 | 15,562 | 92,902 | 258,369 |
| | | 88 | 11,330 | 45,329 | 63,662 | 18,500 | 37,794 | 176,615 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| o-Xylene | 91 | 117,628 | 186,490 | 304,118 |
| | 90 | 55,154 | 453,667 | 508,821 |
| | 89 | 132,761 | 304,269 | 437,030 |
| | 88 | 44,023 | 161,509 | 205,532 |
| p-Xylene | 91 | 18,748 | 62,543 | 81,291 |
| | 90 | 256 | 55,446 | 55,702 |
| | 89 | 500 | 86,462 | 86,962 |
| | 88 | 752 | 79,428 | 80,180 |
| 2,6-Xylidine | 91 | 0 | 0 | 0 |
| | 90 | 0 | 0 | 0 |
| | 89 | 0 | 0 | 0 |
| | 88 | 0 | 0 | 0 |
| Zinc (fume or dust) | 91 | 40,658 | 5,353,413 | 5,394,071 |
| | 90 | 45,611 | 13,316,592 | 13,362,203 |
| | 89 | 131,830 | 37,486,804 | 37,618,634 |
| | 88 | 836,930 | 38,748,702 | 39,585,632 |
| Zineb | 91 | 0 | 5 | 5 |
| | 90 | 0 | 750 | 750 |
| | 89 | 0 | 500 | 500 |
| | 88 | 0 | 2,850 | 2,850 |
| Antimony compounds | 91 | 88,027 | 1,946,490 | 2,034,517 |
| | 90 | 37,606 | 2,708,419 | 2,746,025 |
| | 89 | 58,126 | 2,139,585 | 2,197,711 |
| | 88 | 66,858 | 2,304,110 | 2,370,968 |
| Arsenic compounds | 91 | 1,384 | 1,565,230 | 1,566,614 |
| | 90 | 1,961 | 16,751,074 | 16,753,035 |
| | 89 | 1,200 | 2,808,664 | 2,809,864 |
| | 88 | 3,126 | 1,424,000 | 1,427,126 |
| Barium compounds | 91 | 2,045,102 | 19,128,019 | 21,173,121 |
| | 90 | 3,009,291 | 20,084,029 | 23,093,320 |
| | 89 | 1,202,037 | 15,470,392 | 16,672,429 |
| | 88 | 823,073 | 17,141,635 | 17,964,708 |
| Beryllium compounds | 91 | 0 | 2,881 | 2,881 |
| | 90 | 1 | 1,121 | 1,122 |
| | 89 | 1 | 5,254 | 5,255 |
| | 88 | 3 | 8,541 | 8,544 |
| Cadmium compounds | 91 | 5,462 | 711,377 | 716,839 |
| | 90 | 9,463 | 1,090,524 | 1,099,987 |
| | 89 | 11,075 | 469,684 | 480,759 |
| | 88 | 13,719 | 1,069,452 | 1,083,171 |
| Chlorophenols | 91 | 1,330 | 104,388 | 105,718 |
| | 90 | 1,128 | 806,406 | 807,534 |
| | 89 | 2,350 | 1,610,640 | 1,612,990 |
| | 88 | 2,650 | 1,970,912 | 1,973,562 |
| Chromium compounds | 91 | 791,952 | 13,677,921 | 14,469,873 |
| | 90 | 949,648 | 15,887,785 | 16,837,433 |
| | 89 | 1,009,686 | 18,560,750 | 19,570,436 |
| | 88 | 1,707,344 | 14,414,623 | 16,121,967 |
| Cobalt compounds | 91 | 15,242 | 332,123 | 347,365 |
| | 90 | 16,748 | 427,846 | 444,594 |
| | 89 | 24,570 | 447,814 | 472,384 |
| | 88 | 28,364 | 331,546 | 359,910 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (Alphabetically Ordered), Continued.**

| 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 |
|---|---|---|---|---|---|---|---|
| Copper compounds | 91 | 2,378,725 | 1,870,707 | 158,621 | 225,310 | 42,424,235 | 47,057,598 |
| | 90 | 2,074,560 | 1,838,608 | 72,224 | 192,434 | 55,751,749 | 59,929,575 |
| | 89 | 2,179,085 | 1,637,721 | 141,114 | 167,982 | 40,749,934 | 44,875,836 |
| | 88 | 3,066,746 | 1,301,171 | 185,613 | 165,957 | 42,531,528 | 47,251,015 |
| Cyanide compounds | 91 | 61,839 | 708,282 | 111,021 | 3,781,837 | 26,768 | 4,689,747 |
| | 90 | 183,863 | 957,080 | 125,265 | 3,383,660 | 24,272 | 4,674,140 |
| | 89 | 220,927 | 806,968 | 154,576 | 4,491,053 | 29,171 | 5,702,695 |
| | 88 | 525,618 | 625,725 | 194,901 | 3,707,326 | 107,208 | 5,160,778 |
| Glycol ethers | 91 | 10,235,089 | 33,678,910 | 507,487 | 176,033 | 711,313 | 45,308,832 |
| | 90 | 10,010,915 | 38,847,154 | 433,969 | 207,037 | 273,732 | 49,772,807 |
| | 89 | 10,692,285 | 37,785,105 | 177,101 | 364,850 | 142,233 | 49,161,574 |
| | 88 | 10,330,586 | 38,081,876 | 292,686 | 362,198 | 105,185 | 49,172,531 |
| Lead compounds | 91 | 348,258 | 1,059,351 | 117,976 | 928 | 13,699,094 | 15,225,607 |
| | 90 | 414,831 | 1,208,632 | 107,242 | 1,608 | 14,246,771 | 15,979,084 |
| | 89 | 451,239 | 1,110,843 | 115,906 | 1,559 | 14,229,166 | 15,908,713 |
| | 88 | 357,677 | 1,176,104 | 180,113 | 2,755 | 20,329,467 | 22,046,116 |
| Manganese compounds | 91 | 490,885 | 755,529 | 698,968 | 15,327 | 68,528,067 | 70,488,776 |
| | 90 | 1,349,772 | 916,722 | 722,041 | 2,842 | 83,550,389 | 86,541,766 |
| | 89 | 905,441 | 938,440 | 908,046 | 1,006,301 | 85,186,132 | 88,944,360 |
| | 88 | 575,222 | 1,241,182 | 681,463 | 6,816,070 | 84,222,474 | 93,536,411 |
| Mercury compounds | 91 | 1,355 | 1,475 | 47 | 9 | 28 | 2,914 |
| | 90 | 783 | 375 | 58 | 21 | 15 | 1,252 |
| | 89 | 2,049 | 1,960 | 13 | 36 | 260 | 4,318 |
| | 88 | 1,001 | 1,365 | 259 | 27 | 500 | 3,152 |
| Nickel compounds | 91 | 60,804 | 182,380 | 73,071 | 366,530 | 1,278,693 | 1,961,478 |
| | 90 | 151,019 | 104,304 | 89,134 | 259,822 | 3,053,612 | 3,657,891 |
| | 89 | 151,087 | 129,084 | 119,061 | 269,266 | 3,119,841 | 3,788,339 |
| | 88 | 154,362 | 109,076 | 130,574 | 224,968 | 2,404,132 | 3,023,112 |
| Polybrominated biphenyls | 88 | 250 | 0 | 0 | 0 | 0 | 250 |
| Selenium compounds | 91 | 2,381 | 34,679 | 722 | 4,100 | 80,295 | 122,177 |
| | 90 | 5,287 | 28,925 | 1,145 | 5,000 | 148,861 | 189,218 |
| | 89 | 5,756 | 14,966 | 1,511 | 4,500 | 1,560 | 28,293 |
| | 88 | 2,251 | 12,255 | 250 | 3,400 | 46,000 | 64,156 |
| Silver compounds | 91 | 6,590 | 18,238 | 8,309 | 25 | 16,993 | 50,155 |
| | 90 | 7,584 | 13,537 | 1,635 | 265 | 21,406 | 44,427 |
| | 89 | 6,826 | 14,403 | 12,096 | 250 | 19,990 | 53,565 |
| | 88 | 5,991 | 9,415 | 8,934 | 250 | 11,550 | 36,140 |
| Thallium compounds | 91 | 5 | 250 | 0 | 0 | 255 | 510 |
| | 90 | 5 | 250 | 0 | 0 | 255 | 510 |
| | 89 | 2 | 254 | 0 | 0 | 250 | 506 |
| | 88 | 1 | 252 | 750 | 0 | 250 | 1,253 |
| Zinc compounds | 91 | 1,517,384 | 2,710,343 | 1,325,812 | 228,007 | 114,062,672 | 119,844,218 |
| | 90 | 1,908,640 | 2,856,360 | 1,139,374 | 312,151 | 110,520,809 | 116,737,334 |
| | 89 | 1,910,215 | 2,903,813 | 886,632 | 162,221 | 100,301,281 | 106,164,162 |
| | 88 | 3,253,805 | 3,995,798 | 1,196,059 | 110,555 | 114,065,328 | 122,621,545 |
| Mixtures and other trade name products | 91 | 189,755 | 680,261 | 6,063 | 1,540 | 50,384 | 928,003 |
| | 90 | 199,240 | 953,377 | 61,849 | 1,350,015 | 22,285 | 2,586,766 |
| | 89 | 800,542 | 5,141,289 | 2,001 | 750 | 178,230 | 6,122,812 |
| | 88 | 735,457 | 2,742,785 | 58,960 | 0 | 26,958 | 3,564,160 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Copper compounds | 91 | 197,460 | 8,775,057 | 8,972,517 |
| | 90 | 204,072 | 45,183,143 | 45,387,215 |
| | 89 | 375,564 | 9,602,037 | 9,977,601 |
| | 88 | 431,978 | 14,478,353 | 14,910,331 |
| Cyanide compounds | 91 | 121,457 | 824,559 | 946,016 |
| | 90 | 119,001 | 1,585,823 | 1,704,824 |
| | 89 | 149,168 | 2,412,619 | 2,561,787 |
| | 88 | 1,152,244 | 2,696,674 | 3,848,918 |
| Glycol ethers | 91 | 9,286,863 | 4,165,811 | 13,452,674 |
| | 90 | 10,266,603 | 7,600,432 | 17,867,035 |
| | 89 | 9,417,876 | 8,967,219 | 18,385,095 |
| | 88 | 8,988,363 | 7,819,411 | 16,807,774 |
| Lead compounds | 91 | 286,082 | 12,901,597 | 13,187,679 |
| | 90 | 158,017 | 43,742,871 | 43,900,888 |
| | 89 | 102,264 | 16,384,625 | 16,486,889 |
| | 88 | 89,731 | 17,023,928 | 17,113,659 |
| Manganese compounds | 91 | 3,341,541 | 25,771,961 | 29,113,502 |
| | 90 | 6,550,187 | 30,724,316 | 37,274,503 |
| | 89 | 6,568,596 | 27,961,977 | 34,530,573 |
| | 88 | 1,842,909 | 21,326,757 | 23,169,666 |
| Mercury compounds | 91 | 22 | 36,022 | 36,044 |
| | 90 | 274 | 36,026 | 36,300 |
| | 89 | 1,034 | 62,581 | 63,615 |
| | 88 | 528 | 17,639 | 18,167 |
| Nickel compounds | 91 | 132,553 | 4,858,598 | 4,991,151 |
| | 90 | 200,277 | 6,437,522 | 6,637,799 |
| | 89 | 259,114 | 9,191,207 | 9,450,321 |
| | 88 | 650,232 | 5,881,547 | 6,531,779 |
| Polybrominated biphenyls | 88 | 0 | 0 | 0 |
| Selenium compounds | 91 | 160 | 53,286 | 53,446 |
| | 90 | 478 | 59,210 | 59,688 |
| | 89 | 1,618 | 40,637 | 42,255 |
| | 88 | 1,860 | 62,997 | 64,857 |
| Silver compounds | 91 | 3,308 | 4,729 | 8,037 |
| | 90 | 4,317 | 79,659 | 83,976 |
| | 89 | 6,009 | 7,367 | 13,376 |
| | 88 | 8,078 | 14,955 | 23,033 |
| Thallium compounds | 91 | 5 | 0 | 5 |
| | 90 | 5 | 0 | 5 |
| | 89 | 4 | 500 | 504 |
| | 88 | 6 | 1,250 | 1,256 |
| Zinc compounds | 91 | 623,374 | 51,839,649 | 52,463,023 |
| | 90 | 1,166,425 | 79,350,809 | 80,517,234 |
| | 89 | 2,049,705 | 59,864,014 | 61,913,719 |
| | 88 | 1,524,278 | 82,794,896 | 84,319,174 |
| Mixtures and other trade name products | 91 | 19,463 | 501,126 | 520,589 |
| | 90 | 196,253 | 1,543,545 | 1,739,798 |
| | 89 | 130,218 | 4,165,623 | 4,295,841 |
| | 88 | 186,938 | 11,611,254 | 11,798,192 |

**Table 3-8. Releases and Transfers of All TRI Chemicals, 1988-1991 (Alphabetically Ordered), Continued.**

| 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 |
|---|---|---|---|---|---|---|---|
| Trade Secrets | 91 | 56 | 893 | 1,400 | 0 | 0 | 2,349 |
| | 90 | 0 | 0 | 530 | 0 | 0 | 530 |
| | 89 | 0 | 0 | 3,600 | 0 | 0 | 3,600 |
| | 88 | 0 | 0 | 19,700 | 0 | 0 | 19,700 |
| Total | 91 | 609,765,664 | 1,369,580,314 | 243,497,317 | 710,248,004 | 421,160,113 | 3,354,251,412 |
| | 90 | 706,748,307 | 1,575,954,848 | 196,832,760 | 745,413,562 | 462,679,392 | 3,687,628,869 |
| | 89 | 793,597,781 | 1,768,596,839 | 188,025,233 | 1,175,583,836 | 455,029,001 | 4,380,832,690 |
| | 88 | 823,738,542 | 1,842,370,656 | 311,070,591 | 1,343,633,468 | 527,546,722 | 4,848,359,979 |

| Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment/ Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Trade Secrets | 91 | 0 | 33,553 | 33,553 |
| | 90 | 0 | 9,500 | 9,500 |
| | 89 | 0 | 30,500 | 30,500 |
| | 88 | 0 | 20,650 | 20,650 |
| Total | 91 | 410,596,887 | 654,313,983 | 1,064,910,870 |
| | 90 | 466,123,084 | 842,451,834 | 1,308,574,918 |
| | 89 | 558,575,158 | 890,356,058 | 1,448,931,216 |
| | 88 | 574,045,380 | 1,028,111,605 | 1,602,156,985 |

# THE 1991 TOXICS RELEASE INVENTORY PUBLIC DATA RELEASE

*1988 - 1991*
*Releases and Transfers*
*by Industry*

**Table 3-9. TRI Releases and Transfers by Industry, 1988-1991.**

| 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 | 91 | 13,214,383 | 14,498,210 | 2,402,141 | 210,595 | 8,929,551 | 39,254,880 |
| | 90 | 15,095,422 | 11,131,425 | 3,835,523 | 35,258 | 8,488,084 | 38,585,712 |
| | 89 | 16,995,917 | 7,647,861 | 3,018,499 | 1,105,786 | 7,999,684 | 36,767,747 |
| | 88 | 13,522,683 | 4,387,037 | 3,649,698 | 1,026,719 | 5,507,009 | 28,093,146 |
| 21 Tobacco | 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 |
| | 89 | 49,752 | 1,656,796 | 45,092 | 0 | 1,511 | 1,753,151 |
| | 88 | 101,907 | 1,715,447 | 13,050 | 0 | 750 | 1,831,154 |
| 22 Textiles | 91 | 6,074,982 | 18,344,996 | 261,118 | 0 | 67,407 | 24,748,503 |
| | 90 | 7,330,722 | 19,002,932 | 479,227 | 25 | 35,817 | 26,848,723 |
| | 89 | 10,024,229 | 20,832,884 | 997,389 | 0 | 46,754 | 31,901,256 |
| | 88 | 10,803,918 | 26,130,334 | 1,004,717 | 0 | 150,350 | 38,089,319 |
| 23 Apparel | 91 | 420,788 | 953,006 | 182 | 0 | 14,710 | 1,388,686 |
| | 90 | 335,035 | 942,705 | 47,992 | 0 | 770 | 1,326,502 |
| | 89 | 521,777 | 833,584 | 250 | 0 | 500 | 1,356,111 |
| | 88 | 281,846 | 742,152 | 250 | 0 | 40,849 | 1,065,097 |
| 24 Lumber | 91 | 6,213,015 | 24,074,845 | 111,379 | 0 | 81,458 | 30,480,697 |
| | 90 | 6,037,576 | 27,418,114 | 90,715 | 90 | 110,044 | 33,656,539 |
| | 89 | 5,594,397 | 29,169,660 | 188,331 | 20 | 111,695 | 35,064,103 |
| | 88 | 6,606,486 | 25,630,153 | 230,979 | 0 | 55,230 | 32,522,848 |
| 25 Furniture | 91 | 7,861,528 | 46,930,697 | 625 | 0 | 261,748 | 55,054,598 |
| | 90 | 8,672,664 | 52,458,381 | 5,490 | 40 | 76,226 | 61,212,801 |
| | 89 | 10,653,478 | 54,039,309 | 2,780 | 0 | 19,621 | 64,715,188 |
| | 88 | 9,146,875 | 56,962,643 | 3,051 | 0 | 74,936 | 66,187,505 |
| 26 Paper | 91 | 28,926,396 | 179,322,026 | 29,662,182 | 5 | 4,088,377 | 241,998,986 |
| | 90 | 35,512,561 | 169,284,794 | 35,660,467 | 138 | 7,476,193 | 247,934,153 |
| | 89 | 37,243,312 | 168,115,957 | 41,099,562 | 1 | 10,006,745 | 256,465,577 |
| | 88 | 40,748,057 | 180,181,522 | 38,150,146 | 0 | 10,524,971 | 269,604,696 |
| 27 Printing | 91 | 26,016,422 | 18,792,301 | 406 | 1 | 23,486 | 44,832,616 |
| | 90 | 27,767,407 | 22,326,809 | 948 | 20 | 4,614 | 50,099,798 |
| | 89 | 31,235,969 | 25,768,255 | 4,716 | 0 | 1,064 | 57,010,004 |
| | 88 | 33,058,097 | 27,340,160 | 32,091 | 40,000 | 41,566 | 60,511,914 |
| 28 Chemicals | 91 | 181,846,326 | 422,313,803 | 187,972,463 | 656,037,120 | 89,868,300 | 1,538,038,012 |
| | 90 | 203,276,518 | 487,205,087 | 131,996,266 | 678,786,904 | 101,921,164 | 1,603,185,939 |
| | 89 | 226,881,662 | 551,191,553 | 110,199,155 | 1,085,475,393 | 106,565,503 | 2,080,313,266 |
| | 88 | 235,698,366 | 614,911,416 | 231,695,040 | 1,100,601,499 | 135,943,723 | 2,318,850,044 |
| 29 Petroleum | 91 | 34,355,051 | 21,946,740 | 3,330,517 | 14,271,606 | 981,862 | 74,885,776 |
| | 90 | 35,785,608 | 23,189,804 | 3,880,871 | 16,449,541 | 2,525,906 | 81,831,730 |
| | 89 | 38,410,870 | 25,942,665 | 3,823,642 | 25,116,365 | 2,553,649 | 95,847,191 |
| | 88 | 45,182,962 | 19,597,884 | 3,270,918 | 20,486,919 | 2,664,090 | 91,202,773 |
| 30 Plastics | 91 | 45,900,417 | 99,925,930 | 579,551 | 15,795 | 499,916 | 146,921,609 |
| | 90 | 57,583,965 | 119,505,091 | 446,651 | 14,254 | 187,171 | 177,737,132 |
| | 89 | 51,806,290 | 130,776,911 | 700,587 | 8,250 | 239,802 | 183,531,840 |
| | 88 | 50,055,680 | 118,854,513 | 630,660 | 2,754 | 173,799 | 169,717,406 |
| 31 Leather | 91 | 3,583,938 | 5,991,335 | 118,645 | 0 | 83,399 | 9,777,317 |
| | 90 | 3,633,858 | 8,556,494 | 409,397 | 0 | 20,603 | 12,620,352 |
| | 89 | 3,418,978 | 9,489,965 | 228,374 | 0 | 257,183 | 13,394,500 |
| | 88 | 3,889,304 | 10,882,876 | 680,755 | 0 | 353,215 | 15,806,150 |

| Industry | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Food | 91 | 38,232,701 | 5,057,184 | 43,289,885 |
| | 90 | 40,440,449 | 4,504,853 | 44,945,302 |
| | 89 | 37,728,023 | 3,457,333 | 41,185,356 |
| | 88 | 38,337,080 | 3,155,271 | 41,492,351 |
| Tobacco | 91 | 9,744 | 20,295 | 30,039 |
| | 90 | 8,841 | 36,881 | 45,722 |
| | 89 | 16,558 | 38,736 | 55,294 |
| | 88 | 791,940 | 312,982 | 1,104,922 |
| Textiles | 91 | 6,765,966 | 2,680,339 | 9,446,305 |
| | 90 | 7,862,298 | 4,038,495 | 11,900,793 |
| | 89 | 11,150,851 | 3,820,915 | 14,971,766 |
| | 88 | 14,633,468 | 3,707,196 | 18,340,664 |
| Apparel | 91 | 186,721 | 268,504 | 455,225 |
| | 90 | 149,494 | 169,267 | 318,761 |
| | 89 | 441,203 | 262,335 | 703,538 |
| | 88 | 471,546 | 177,859 | 649,405 |
| Lumber | 91 | 131,011 | 1,194,612 | 1,325,623 |
| | 90 | 83,770 | 2,546,353 | 2,630,123 |
| | 89 | 109,714 | 3,030,863 | 3,140,577 |
| | 88 | 213,016 | 4,700,189 | 4,913,205 |
| Furniture | 91 | 142,883 | 2,796,742 | 2,939,625 |
| | 90 | 329,322 | 4,295,876 | 4,625,198 |
| | 89 | 553,177 | 4,838,369 | 5,391,546 |
| | 88 | 435,981 | 6,266,674 | 6,702,655 |
| Paper | 91 | 44,900,773 | 11,412,552 | 56,313,325 |
| | 90 | 54,003,925 | 12,946,315 | 66,950,240 |
| | 89 | 48,056,487 | 25,201,019 | 73,257,506 |
| | 88 | 46,963,232 | 21,341,623 | 68,304,855 |
| Printing | 91 | 329,875 | 1,993,202 | 2,323,077 |
| | 90 | 344,849 | 4,229,713 | 4,574,562 |
| | 89 | 826,152 | 4,560,355 | 5,386,507 |
| | 88 | 3,512,661 | 5,452,679 | 8,965,340 |
| Chemicals | 91 | 236,340,097 | 277,056,688 | 513,396,785 |
| | 90 | 283,095,065 | 254,949,330 | 538,044,395 |
| | 89 | 351,580,824 | 295,441,941 | 647,022,765 |
| | 88 | 333,646,374 | 355,572,926 | 689,219,300 |
| Petroleum | 91 | 7,218,566 | 3,554,918 | 10,773,484 |
| | 90 | 6,948,800 | 6,454,420 | 13,403,220 |
| | 89 | 10,588,147 | 6,902,158 | 17,490,305 |
| | 88 | 10,827,012 | 8,788,815 | 19,615,827 |
| Plastics | 91 | 5,045,808 | 14,233,024 | 19,278,832 |
| | 90 | 4,538,025 | 20,569,948 | 25,107,973 |
| | 89 | 5,363,883 | 22,682,584 | 28,046,467 |
| | 88 | 4,837,035 | 24,083,550 | 28,920,585 |
| Leather | 91 | 5,685,248 | 1,857,892 | 7,543,140 |
| | 90 | 8,275,788 | 2,321,862 | 10,597,650 |
| | 89 | 9,545,379 | 2,839,019 | 12,384,398 |
| | 88 | 10,021,402 | 2,294,465 | 12,315,867 |

**Table 3-9. TRI Releases and Transfers by Industry, 1988-1991, Continued.**

| 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 | 91 | 3,928,496 | 16,960,732 | 155,562 | 7,464,305 | 2,338,965 | 30,848,060 |
| | 90 | 6,502,675 | 14,400,594 | 166,221 | 7,488,065 | 2,588,247 | 31,145,802 |
| | 89 | 8,541,594 | 17,916,019 | 215,095 | 6,570,250 | 3,387,246 | 36,630,204 |
| | 88 | 8,371,510 | 18,959,852 | 1,178,292 | 6,580,250 | 4,084,908 | 39,174,812 |
| 33 Primary Metals | 91 | 41,776,638 | 114,250,138 | 8,503,163 | 13,536,557 | 254,917,719 | 432,984,215 |
| | 90 | 55,673,464 | 154,185,968 | 10,760,069 | 15,644,290 | 272,284,055 | 508,547,846 |
| | 89 | 58,829,938 | 183,428,194 | 15,923,475 | 37,676,115 | 242,963,646 | 538,821,368 |
| | 88 | 65,906,531 | 174,278,428 | 17,681,379 | 41,607,936 | 279,733,162 | 579,207,436 |
| 34 Fabr. Metals | 91 | 43,321,289 | 64,267,970 | 278,576 | 824 | 1,340,552 | 109,209,211 |
| | 90 | 48,038,372 | 77,269,847 | 513,521 | 822 | 828,070 | 126,650,632 |
| | 89 | 54,936,756 | 79,238,434 | 313,585 | 338,958 | 1,048,671 | 135,876,404 |
| | 88 | 50,899,108 | 79,371,676 | 1,517,127 | 386,120 | 4,204,779 | 136,378,810 |
| 35 Machinery | 91 | 14,541,148 | 23,502,756 | 50,734 | 35 | 442,764 | 38,537,437 |
| | 90 | 20,008,688 | 28,633,617 | 206,719 | 518 | 94,825 | 48,944,367 |
| | 89 | 26,056,923 | 30,588,693 | 407,257 | 250 | 309,524 | 57,362,647 |
| | 88 | 25,293,240 | 34,393,125 | 375,682 | 0 | 215,868 | 60,277,915 |
| 36 Electrical | 91 | 21,221,222 | 41,929,111 | 389,086 | 2,224 | 1,545,301 | 65,086,944 |
| | 90 | 25,643,102 | 52,740,196 | 405,894 | 18,398 | 2,732,973 | 81,540,563 |
| | 89 | 31,987,770 | 65,897,051 | 474,104 | 48,410 | 1,386,432 | 99,793,767 |
| | 88 | 36,734,597 | 86,211,364 | 686,680 | 43,720 | 1,443,596 | 125,119,957 |
| 37 Transportation | 91 | 48,048,376 | 97,501,506 | 139,004 | 1,000 | 1,916,444 | 147,606,330 |
| | 90 | 63,121,403 | 109,531,950 | 193,621 | 320 | 1,694,619 | 174,541,913 |
| | 89 | 73,357,798 | 129,972,830 | 135,239 | 750 | 1,490,479 | 204,957,096 |
| | 88 | 76,252,942 | 135,212,887 | 370,208 | 81,850 | 2,454,763 | 214,372,650 |
| 38 Measure./Photo. | 91 | 11,766,487 | 26,654,797 | 736,288 | 0 | 55,622 | 39,213,194 |
| | 90 | 13,606,771 | 30,141,932 | 66,506 | 20 | 29,975 | 43,845,204 |
| | 89 | 16,730,006 | 35,027,606 | 431,041 | 0 | 45,263 | 52,233,916 |
| | 88 | 17,210,427 | 38,838,102 | 688,569 | 250 | 372,793 | 57,110,141 |
| 39 Miscellaneous | 91 | 6,188,764 | 12,113,431 | 5,608 | 0 | 51,074 | 18,358,877 |
| | 90 | 7,923,780 | 16,777,923 | 11,643 | 75 | 3,364 | 24,716,785 |
| | 89 | 9,391,214 | 19,144,204 | 34,603 | 0 | 55,694 | 28,625,715 |
| | 88 | 9,391,645 | 21,136,080 | 54,024 | 1 | 273,341 | 30,855,091 |
| Multiple codes 20-39 | 91 | 60,403,288 | 107,319,680 | 8,416,218 | 9,607,187 | 49,528,171 | 235,274,544 |
| | 90 | 61,610,187 | 140,286,168 | 7,458,816 | 25,932,047 | 61,195,423 | 296,482,641 |
| | 89 | 77,790,026 | 174,685,087 | 9,615,997 | 19,228,107 | 76,395,098 | 357,714,315 |
| | 88 | 80,473,590 | 157,526,181 | 8,863,376 | 172,774,638 | 76,680,347 | 496,318,132 |
| No codes 20-39 | 91 | 4,082,901 | 9,785,339 | 369,286 | 9,100,750 | 4,123,287 | 27,461,563 |
| | 90 | 3,413,648 | 8,681,959 | 173,311 | 1,042,737 | 379,749 | 13,691,404 |
| | 89 | 3,139,125 | 7,233,321 | 166,460 | 15,181 | 143,237 | 10,697,324 |
| | 88 | 4,108,771 | 9,106,824 | 293,899 | 812 | 2,552,677 | 16,062,983 |
| Total | 91 | 609,765,664 | 1,369,580,314 | 243,497,317 | 710,248,004 | 421,160,113 | 3,354,251,412 |
| | 90 | 706,748,307 | 1,575,954,848 | 196,832,760 | 745,413,562 | 462,679,392 | 3,687,628,869 |
| | 89 | 793,597,781 | 1,768,596,839 | 188,025,233 | 1,175,583,836 | 455,029,001 | 4,380,832,690 |
| | 88 | 823,738,542 | 1,842,370,656 | 311,070,591 | 1,343,633,468 | 527,546,722 | 4,848,359,979 |

| Industry | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|
| Stone/Clay | 91 | 1,687,253 | 12,806,930 | 14,494,183 |
| | 90 | 971,943 | 9,698,798 | 10,670,741 |
| | 89 | 1,116,905 | 14,731,796 | 15,848,701 |
| | 88 | 1,346,738 | 19,988,122 | 21,334,860 |
| Primary Metals | 91 | 21,554,649 | 139,428,651 | 160,983,300 |
| | 90 | 9,534,180 | 288,507,589 | 298,041,769 |
| | 89 | 17,117,474 | 228,479,368 | 245,596,842 |
| | 88 | 22,911,920 | 275,143,941 | 298,055,861 |
| Fabr. Metals | 91 | 6,450,876 | 42,399,952 | 48,850,828 |
| | 90 | 6,344,106 | 63,876,444 | 70,220,550 |
| | 89 | 8,427,744 | 74,644,264 | 83,072,008 |
| | 88 | 17,140,977 | 77,154,071 | 94,295,048 |
| Machinery | 91 | 2,429,416 | 8,595,284 | 11,024,700 |
| | 90 | 2,578,381 | 12,499,932 | 15,078,313 |
| | 89 | 2,877,472 | 18,294,772 | 21,172,244 |
| | 88 | 2,713,794 | 20,348,301 | 23,062,095 |
| Electrical | 91 | 7,438,837 | 33,385,972 | 40,824,809 |
| | 90 | 11,973,027 | 34,151,967 | 46,124,994 |
| | 89 | 14,621,694 | 36,905,657 | 51,527,351 |
| | 88 | 18,801,849 | 44,163,669 | 62,965,518 |
| Transportation | 91 | 7,422,111 | 25,768,023 | 33,190,134 |
| | 90 | 8,896,838 | 37,483,395 | 46,380,233 |
| | 89 | 7,975,439 | 42,126,874 | 50,102,313 |
| | 88 | 7,409,065 | 54,940,627 | 62,349,692 |
| Measure./Photo. | 91 | 1,591,070 | 5,868,391 | 7,459,461 |
| | 90 | 1,892,200 | 9,203,900 | 11,096,100 |
| | 89 | 2,410,607 | 12,252,110 | 14,662,717 |
| | 88 | 3,737,116 | 19,608,312 | 23,345,428 |
| Miscellaneous | 91 | 797,353 | 3,175,046 | 3,972,399 |
| | 90 | 625,502 | 6,342,221 | 6,967,723 |
| | 89 | 732,717 | 13,459,849 | 14,192,566 |
| | 88 | 454,054 | 9,213,991 | 9,668,045 |
| Multiple Codes | 91 | 15,214,158 | 55,655,718 | 70,869,876 |
| | 90 | 16,509,053 | 61,454,386 | 77,963,439 |
| | 89 | 25,709,651 | 69,367,626 | 95,077,277 |
| | 88 | 32,715,229 | 67,111,082 | 99,826,311 |
| No Codes | 91 | 1,021,771 | 5,104,064 | 6,125,835 |
| | 90 | 717,228 | 2,169,889 | 2,887,117 |
| | 89 | 1,625,057 | 7,018,115 | 8,643,172 |
| | 88 | 2,123,891 | 4,585,260 | 6,709,151 |
| Total | 91 | 410,596,887 | 654,313,983 | 1,064,910,870 |
| | 90 | 466,123,084 | 842,451,834 | 1,308,574,918 |
| | 89 | 558,575,158 | 890,356,058 | 1,448,931,216 |
| | 88 | 574,045,380 | 1,028,111,605 | 1,602,156,985 |

## Notes

(a) "Other Off-site Transfers" consists of off-site transfers reported without waste management codes. For 1988-1990, this category is believed to include off-site transfers for energy recovery and recycling that should not have been reported. For 1991, this category should contain few, if any, transfers for recycling and energy recovery. Because of this inconsistency, amounts in this "other" category cannot be compared across years (Table 3-2).

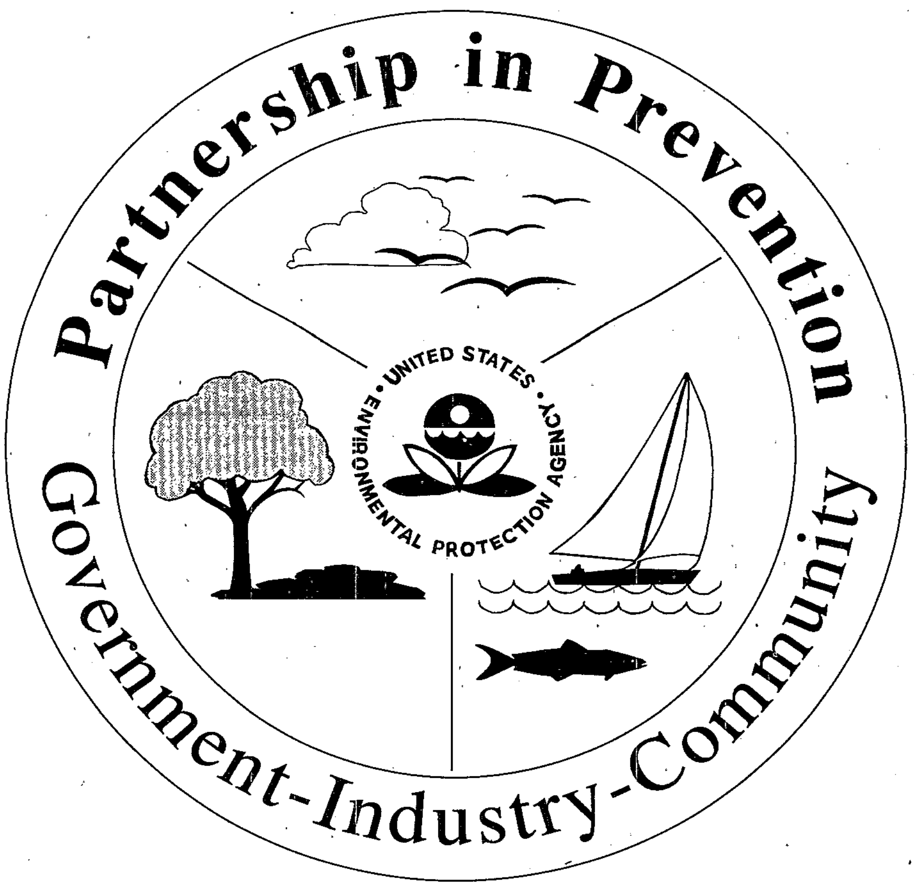
(b) "Other Off-site Transfers" consists of off-site transfers reported without valid waste management codes. For 1990, this category is believed to include about 24 million pounds of off-site transfers for energy recovery and recycling that should not have been reported. For 1991, the "other" category should contain few, if any, transfers for recycling and energy recovery. Because of this inconsistency, amounts in this "other" category cannot be compared across years (Table 3-1).

(c) Copper Range Co. in White Pine, Michigan, was the sixth largest decreaser between 1990 and 1991 with a total decrease in releases of -12,102,600 pounds. However, the facility is not included in the top 50 list because it indicated that it is not a covered facility (currently, only manufacturing facilities are required to report under EPCRA section 313) (Table 3-3).

(d) Source: Environmental Protection Agency/Department of Commerce. Release and transfer data include values for releases and transfers from one 2-digit SIC industry. When a facility reported more than one SIC code, its releases and transfers were not included in this data (Table 3-5).

(e) Source: Department of Commerce/Environmental Protection Agency (Table 3-6).

# Chapter 4
# The 33/50 Program



# 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 by 1992 and an ultimate goal of a 50% reduction by 1995 in emissions of 17 high-priority toxic chemicals (see Box 4-1), using 1988 TRI reporting as a baseline. 12,800 facilities reported that 1.474 billion pounds of 33/50 Program chemicals were either directly released to the environment or transferred off-site to waste management facilities during 1988. The aim of the 33/50 Program is to reduce this 1.474 billion pounds of pollution by at least 50% -- 737 million pounds -- by 1995, with an interim reduction target of more than 486 million pounds by 1992.

### 1992 Interim Goal of 33/50 Program Achieved One Year Early

One of the more noteworthy findings revealed in the 1991 TRI reporting data is that releases and transfers of 33/50 Program chemicals declined by 34% between 1988 and 1991, surpassing the Program's 1992 interim 33% national reduction goal a full year ahead of schedule (see Figure 4-1). Data reported by facilities to TRI for 1991 indicate that releases and transfers of 33/50 Program chemicals declined from 1.474 billion pounds in the Program's 1988 baseline year to 973 million pounds in 1991, when categories of reporting in 1991 that were not required for reporting in 1988 are excluded (see below). The 501 million pound reduction in reported emissions through 1991 exceeds by nearly 15 million pounds the amount required to achieve the Program's 1992 interim 33% reduction goal. The early achievement of the Program's 1992 reduction goal, together with an analysis of facilities' projected on-site releases and off-site transfers to treatment and disposal of the 17 target chemicals through 1993 (reported for the first time in 1991 and discussed later in this chapter), offers strong encouragement that the 33/50 Program's ultimate goal of a 50% reduction by 1995 will be achieved.

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.

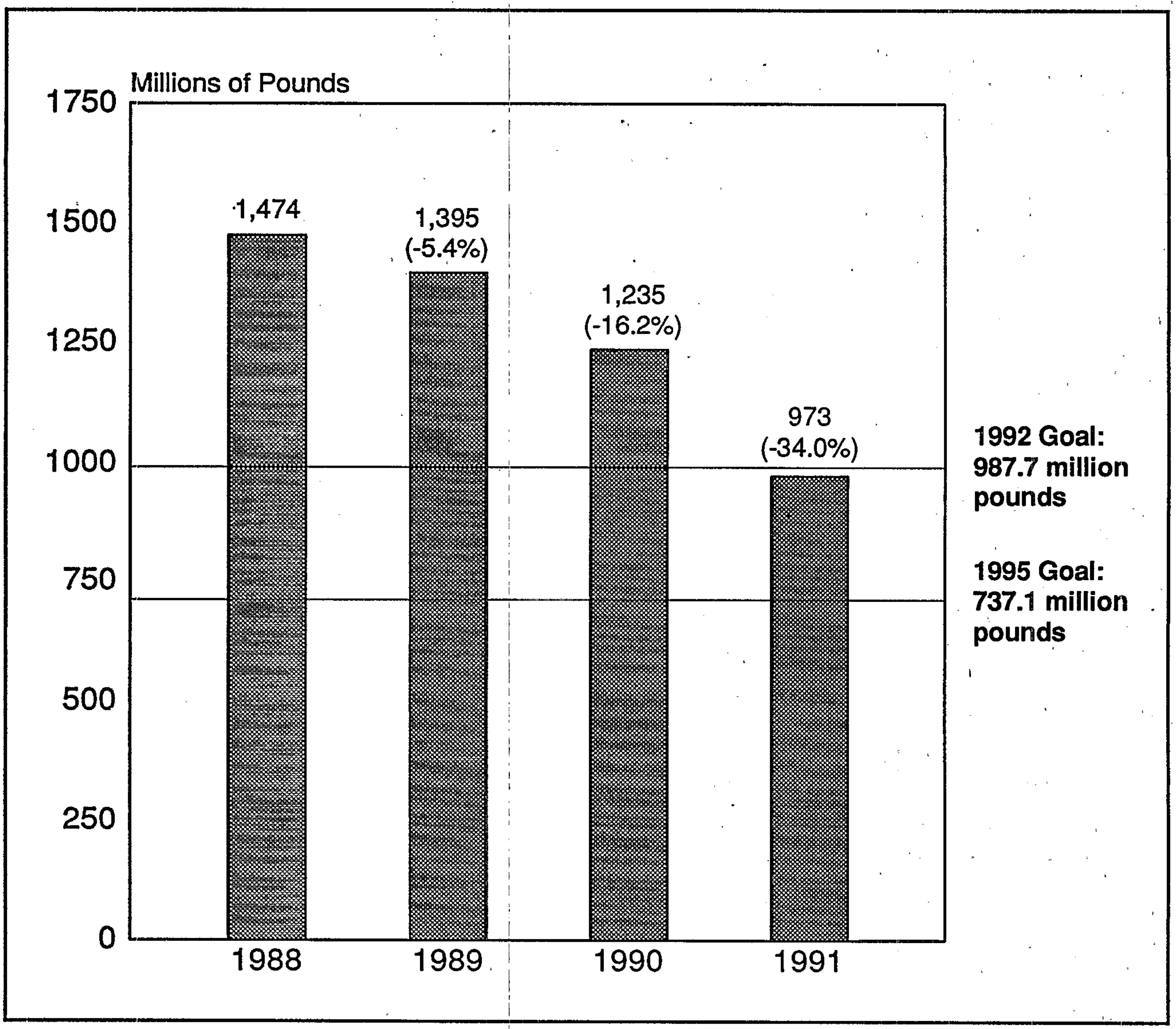



**Figure 4-1. TRI Releases and Transfers of 33/50 Program Chemicals, 1988 - 1991.**

## Exclusions of New TRI Reporting Data

As discussed in Chapter 2, TRI reporting requirements were significantly expanded for 1991 as a result of Congress' passage of the Pollution Prevention Act of 1990. However, analyses of the progress of the 33/50 Program consider only environmental releases reported in Section 5 of Form R and those off-site transfers reported in Section 6 that facilities were required to report under 1988 TRI reporting requirements: transfers to POTWs and other transfers for treatment and disposal (as well as "other," which includes reports with missing or invalid off-site transfer codes).

Accordingly, the following quantities of the 17 33/50 Program chemicals that are reported by facilities in Sections 6 and 8 of Form R are excluded when comparing 1991 and future years' TRI data to the Program's 1988 baseline:

- Off-site Transfers to Energy Recovery (Form R Section 6.2);
- Off-site Transfers to Recycling (Form R Section 6.2);
- All Quantities Reported for Items in the new Mandatory Source Reduction and Recycling Activities Section (Form R Section 8.1 - 8.10).

These new reporting categories do, however, provide valuable information to EPA, the public, and the reporting facilities themselves, and are discussed later in this chapter. These data will be used by the 33/50 Program extensively in the future to determine how facilities achieve reductions in environmental releases.

## Company Participation in the 33/50 Program

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. The 33/50 Program seeks to instill a pollution prevention ethic throughout the highest echelons of American businesses.

Initial communications about the 33/50 Program are directed to the Chief Executive Officers of the parent companies of the more than 16,400 industrial facilities that have reported to EPA's Toxics Release Inventory (TRI) emitting any of the Program's 17 target chemicals between 1988

### 17 Priority Chemicals Targeted by the 33/50 Program

| | |
|---|---|
| Benzene | Methyl Ethyl Ketone |
| Cadmium & Compounds | Methyl Isobutyl Ketone |
| Carbon Tetrachloride | Nickel & Compounds |
| Chloroform | Tetrachloroethylene |
| Chromium & Compounds | Toluene |
| Cyanides | Trichloroethane |
| Dichloromethane | Trichloroethylene |
| Lead & Compounds | Xylenes |
| Mercury & Compounds | |

**Box 4-1. 33/50 Program Chemicals.**

and 1990. To date, more than 7,600 companies have been invited to participate. The Program achieved a major milestone in November, 1992, when the 1,000th company committed to reducing its releases of toxic chemicals into the environment. In its March, 1993, Third Progress Update, the 33/50 Program reported that a total of 1,135 companies have elected to participate, pledging to reduce voluntarily nearly 354 million pounds of pollution (see Figure 4-2). Company participation in the 33/50 Program has risen steadily from its inception in early 1991, increasing twofold from July, 1991 to February, 1992 (publication dates for the Program's first two Progress Reports), and again by more than 50% in the Program's second year.

Reduction pledges continue to approach the Program's national goals, their slower growth rate reflecting the fact that companies with the greatest amounts of releases and transfers (the "Top 600") were the first to be contacted. Commitment outreach in recent months has focussed more on the smaller companies. In addition, the 354 million pounds of reductions pledged to date represents a lower bound, as numeric reduction targets are still being set by about a third of the participating companies, and companies appear to be achieving greater reductions than they initially anticipated.

Facilities owned by companies that have elected to participate in the 33/50 Program are reporting greater reductions in emissions of the 17 target chemicals than are other facilities associated with non-participating companies. Between 1988 and 1991, participating companies reported a nearly 40% decrease in releases and transfers of Program chemicals, compared to a 27% decline reported by non-participants. The difference between participants and non-participants is somewhat greater for on-site environmental releases: a 36% reduction in releases for participants versus a 20% reduction for non-participants. Participating companies, representing only 15% of the companies invited to participate, were responsible for 60% of the total releases and transfers of Program chemicals in the 1988 baseline year and 56% in 1991.

Assessing the success of our efforts to encourage companies to commit to the 33/50 Program yields two conclusions. EPA's outreach to the larger companies has proven highly successful, with nearly 60% choosing to enroll. However, getting the message across to the more numerous smaller companies has been decidedly more difficult; only one in ten have elected to participate. Accordingly, EPA is initiating new outreach approaches to encourage smaller companies to participate, such as calling facilities directly to discuss the benefits of the Program and to identify and address any barriers that prevent them from participating.

## 33/50 Program Releases and Transfers, 1988-1991

Figure 4-3 and Table 4-1 present facilities' reports of on-site releases and off-site transfers to treatment and disposal for 1988 through 1991. The data are aggregated for all TRI chemicals that have been included in TRI reporting requirements for each of the four years. In addition, 33/50 Program chemicals are broken out in aggregate for comparison to that of all other TRI chemicals.

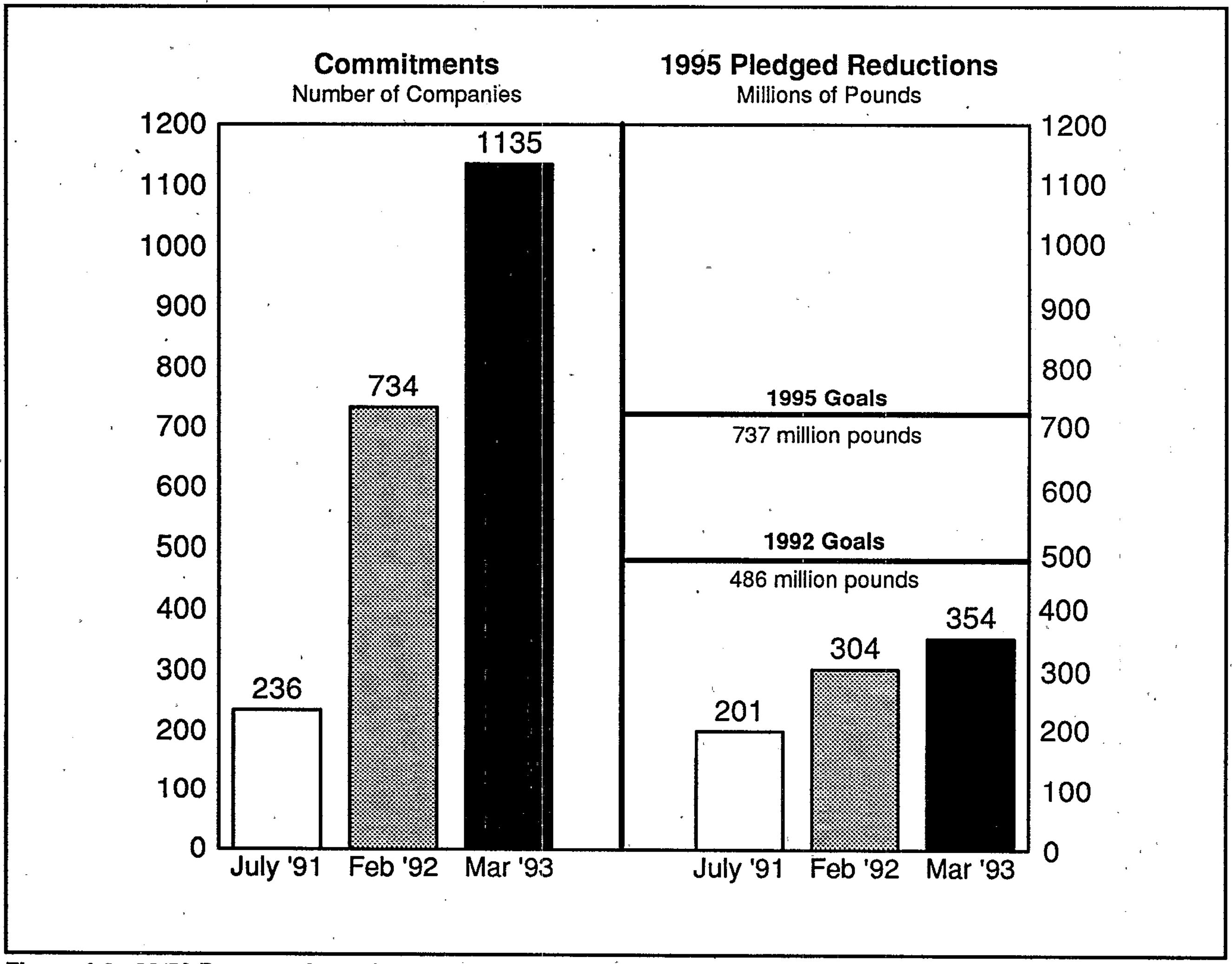



**Figure 4-2. 33/50 Program Commitment Status, March 1993.**

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

Facilities' 1991 TRI reports show that in the first year after formal announcement of the 33/50 Program, the 17 target chemicals experienced substantially greater proportional reductions (-21%) than all other TRI chemicals (-8%). (See Figure 4-3.) This represents a significant change in the reduction pattern from the two previous years. 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 23% from 1988 through 1990, from just under 5 billion pounds to 3.7 billion pounds. During that same period, emissions of the 17 targeted 33/50 Program chemicals were reduced by only 16%, from 1.47 billion pounds to 1.24 billion pounds (see Table 4-1).

At the time the 33/50 Program was being 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 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.

The 21.2% reduction in releases and transfers of the 17 target chemicals reported by facilities for 1990 - 1991 is nearly twice the amount of reductions reported in the previous year (11.5% between 1989 and 1990), and fully four times greater than the reductions observed between 1988 and 1989 (5.4%). 33/50 Program chemicals also contributed significantly to aggregate TRI release and transfer reductions observed between 1990 and 1991. While representing only 22% of the total volume of 1988-comparable TRI releases and transfers in 1991, 33/50 Program chemicals accounted for nearly half (45%) of the total TRI 1990 - 1991 reductions. Of the 577 million pounds in total TRI release/transfer reductions reported for 1991, 262 million are associated with the Program's 17 target chemicals.

Facilities' 1991 TRI reports on releases and off-site transfers of 33/50 Program chemicals, as well as updated reports for 1988 through 1990, are summarized by chemical and release medium/transfer management method in Table 4-2 (organics are listed first). Off-site transfers of 33/50 Program chemicals have declined at a much higher rate than have their on-site environmental releases. Transfers are down 50% from 1988, 39% in the last year alone. On-site releases, which accounted for 80% of the 33/50 Program 1988 release/transfer baseline, declined by 30% through 1991 and 17% in the last year (compared to 9% for all other TRI chemicals).

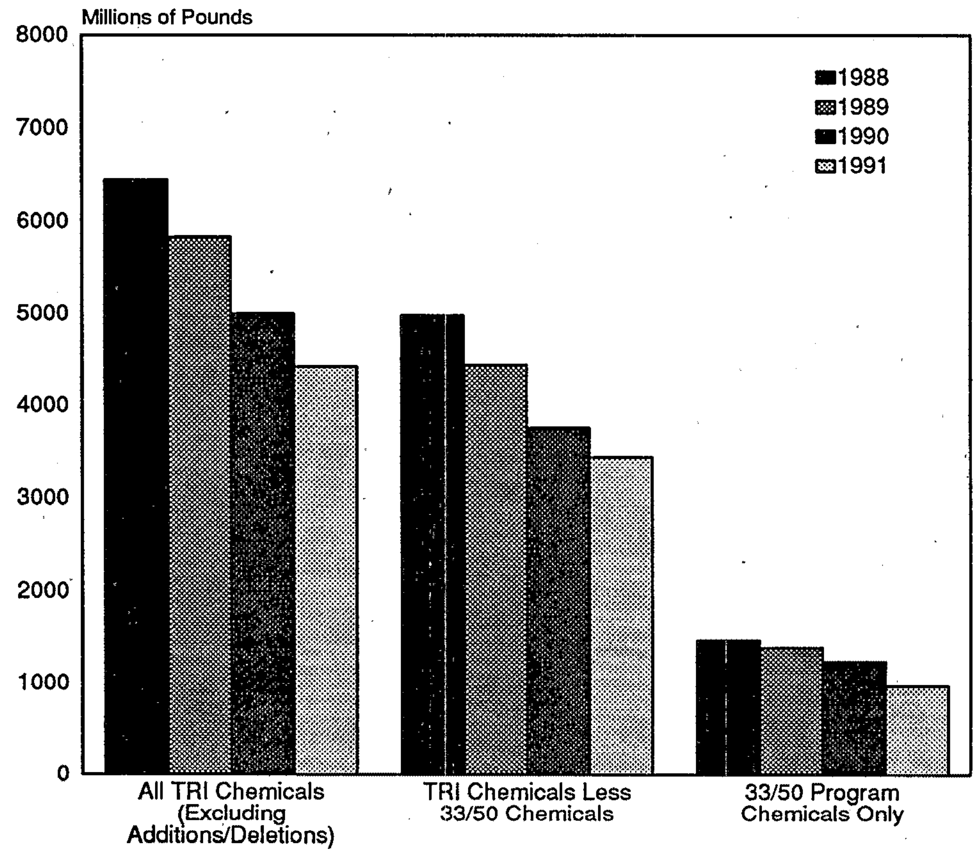



**Figure 4-3. Releases and Transfers of 33/50 Program Chemicals compared to other TRI Chemicals, 1988-1991.**

**Table 4-1. Releases and Transfers of 33/50 Program Chemicals compared to other TRI Chemicals, 1988-1991.**

| Year | All TRI Chemicals (excluding Additions/ Deletions) | TRI Chemicals Less 33/50 Chemicals | 33/50 Program Chemicals Only |
|---|---|---|---|
| | Pounds | Pounds | Pounds |
| 1988 | 6,450,516,964 | 4,976,369,274 | 1,474,147,690 |
| 1989 | 5,829,763,906 | 4,434,701,979 | 1,395,061,927 |
| 1990 | 4,996,203,787 | 3,760,960,034 | 1,235,243,753 |
| 1991 | 4,419,162,282 | 3,446,042,372 | 973,119,910 |
| | Percent Change | Percent Change | Percent Change |
| 1988-1991 | -31.4% | -30.7% | -33.9% |
| 1988-1990 | -22.5% | -24.4% | -16.2% |
| 1990-1991 | -11.5% | -8.3% | -21.2% |

**Table 4-2. TRI Releases and Transfers of 33/50 Chemicals, 1988-1991.**

| 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 | 91 | 9,971,308 | 7,503,182 | 26,896 | 834,242 | 111,928 | 18,447,556 |
| | | 90 | 14,516,266 | 10,686,871 | 24,524 | 689,066 | 722,486 | 26,639,213 |
| | | 89 | 15,045,660 | 11,694,181 | 169,274 | 668,610 | 120,355 | 27,698,080 |
| | | 88 | 20,235,191 | 11,027,298 | 46,998 | 825,035 | 127,920 | 32,262,442 |
| 56-23-5 | Carbon tetrachloride | 91 | 528,100 | 1,018,701 | 2,844 | 42,470 | 2,152 | 1,594,267 |
| | | 90 | 419,001 | 1,320,225 | 4,718 | 31,557 | 1,005 | 1,776,506 |
| | | 89 | 943,133 | 2,507,116 | 15,656 | 122,043 | 1,616 | 3,589,564 |
| | | 88 | 1,081,552 | 2,695,101 | 15,627 | 98,054 | 14,759 | 3,905,093 |
| 67-66-3 | Chloroform | 91 | 7,660,997 | 11,421,891 | 769,569 | 65,089 | 22,150 | 19,939,696 |
| | | 90 | 8,388,150 | 14,138,445 | 1,005,860 | 89,560 | 57,924 | 23,679,939 |
| | | 89 | 8,872,690 | 16,841,084 | 1,177,743 | 64,338 | 70,265 | 27,026,120 |
| | | 88 | 7,566,776 | 17,469,790 | 1,126,484 | 36,002 | 68,546 | 26,267,598 |
| 75-09-2 | Dichloromethane | 91 | 31,726,830 | 47,611,641 | 98,877 | 1,317,706 | 117,788 | 80,872,842 |
| | | 90 | 37,744,015 | 62,532,366 | 190,500 | 850,018 | 21,024 | 101,337,923 |
| | | 89 | 42,295,554 | 81,864,100 | 226,823 | 1,937,469 | 15,894 | 126,339,840 |
| | | 88 | 48,751,550 | 79,242,388 | 350,050 | 1,478,834 | 157,211 | 129,980,033 |
| 78-93-3 | Methyl ethyl ketone | 91 | 33,149,766 | 70,271,889 | 141,354 | 355,736 | 180,492 | 104,099,237 |
| | | 90 | 42,863,784 | 85,627,333 | 77,514 | 146,199 | 50,423 | 128,765,253 |
| | | 89 | 41,693,966 | 94,365,489 | 71,781 | 200,703 | 171,347 | 136,503,286 |
| | | 88 | 38,687,923 | 97,348,615 | 91,344 | 253,762 | 166,458 | 136,548,102 |
| 108-10-1 | Methyl isobutyl ketone | 91 | 8,411,877 | 18,786,642 | 167,405 | 161,600 | 177,939 | 27,705,463 |
| | | 90 | 9,688,471 | 18,021,527 | 53,798 | 52,221 | 24,733 | 27,840,750 |
| | | 89 | 10,850,259 | 20,673,502 | 449,407 | 81,850 | 20,891 | 32,075,909 |
| | | 88 | 13,015,362 | 18,610,414 | 762,108 | 116,650 | 31,770 | 32,536,304 |
| 127-18-4 | Tetrachloroethylene | 91 | 6,482,575 | 10,204,876 | 7,448 | 14,000 | 23,302 | 16,732,201 |
| | | 90 | 9,074,857 | 13,321,145 | 21,510 | 11,012 | 1,255 | 22,429,779 |
| | | 89 | 11,966,038 | 15,512,638 | 53,940 | 50,005 | 10,791 | 27,593,412 |
| | | 88 | 16,125,229 | 19,668,296 | 33,314 | 72,250 | 82,144 | 35,981,233 |
| 108-88-3 | Toluene | 91 | 73,620,294 | 124,944,414 | 104,645 | 1,373,207 | 185,012 | 200,227,572 |
| | | 90 | 84,413,528 | 157,264,379 | 198,500 | 1,432,918 | 383,904 | 243,693,229 |
| | | 89 | 93,193,936 | 176,358,467 | 182,297 | 620,403 | 427,055 | 270,782,158 |
| | | 88 | 102,808,393 | 189,388,805 | 197,820 | 1,473,666 | 741,301 | 294,609,985 |
| 71-55-6 | 1,1,1-Trichloroethane | 91 | 69,230,762 | 68,274,801 | 21,803 | 2,805 | 171,807 | 137,701,978 |
| | | 90 | 83,389,447 | 81,112,035 | 16,722 | 1,581 | 62,176 | 164,581,961 |
| | | 89 | 91,649,649 | 84,215,221 | 27,309 | 2,318 | 70,630 | 175,965,127 |
| | | 88 | 90,767,027 | 86,001,968 | 95,934 | 1,000 | 187,786 | 177,053,715 |
| 79-01-6 | Trichloroethylene | 91 | 16,642,065 | 18,416,403 | 12,750 | 800 | 62,991 | 35,135,009 |
| | | 90 | 18,565,243 | 20,358,601 | 14,210 | 805 | 12,554 | 38,951,413 |
| | | 89 | 22,579,951 | 26,769,836 | 15,849 | 390 | 8,686 | 49,374,712 |
| | | 88 | 25,879,146 | 27,900,517 | 13,802 | 390 | 21,186 | 53,815,041 |
| | Xylenes | 91 | 31,107,600 | 92,889,918 | 60,644 | 139,963 | 344,052 | 124,542,177 |
| | | 90 | 35,488,852 | 109,258,390 | 46,920 | 105,394 | 434,245 | 145,333,801 |
| | | 89 | 39,705,859 | 124,577,635 | 193,497 | 70,161 | 486,326 | 165,033,478 |
| | | 88 | 38,303,001 | 126,721,344 | 211,898 | 144,978 | 651,589 | 166,032,810 |
| | Cadmium and cadmium compounds | 91 | 18,923 | 55,518 | 4,241 | 1,540 | 251,127 | 331,349 |
| | | 90 | 31,249 | 78,820 | 3,339 | 1,575 | 404,423 | 519,406 |
| | | 89 | 41,571 | 79,336 | 4,731 | 1,772 | 350,503 | 477,913 |
| | | 88 | 32,649 | 90,293 | 4,397 | 2,409 | 389,729 | 519,477 |

| CAS Number | Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 91 | 613,449 | 1,799,039 | 2,412,488 |
| | | 90 | 634,025 | 2,221,216 | 2,855,241 |
| | | 89 | 1,107,975 | 1,839,858 | 2,947,833 |
| | | 88 | 1,135,172 | 2,295,959 | 3,431,131 |
| 56-23-5 | Carbon tetrachloride | 91 | 621 | 980,569 | 981,190 |
| | | 90 | 42,050 | 1,082,188 | 1,124,238 |
| | | 89 | 3,841 | 1,716,813 | 1,720,654 |
| | | 88 | 5,014 | 1,350,511 | 1,355,525 |
| 67-66-3 | Chloroform | 91 | 809,427 | 1,827,299 | 2,636,726 |
| | | 90 | 802,260 | 1,321,726 | 2,123,986 |
| | | 89 | 1,101,731 | 865,533 | 1,967,264 |
| | | 88 | 1,226,573 | 1,369,922 | 2,596,495 |
| 75-09-2 | Dichloromethane | 91 | 1,308,202 | 12,605,336 | 13,913,538 |
| | | 90 | 1,281,832 | 9,163,437 | 10,445,269 |
| | | 89 | 921,911 | 12,813,000 | 13,734,911 |
| | | 88 | 1,830,832 | 22,688,907 | 24,519,739 |
| 78-93-3 | Methyl ethyl ketone | 91 | 772,861 | 9,998,866 | 10,771,727 |
| | | 90 | 867,891 | 20,323,777 | 21,191,668 |
| | | 89 | 886,502 | 28,506,748 | 29,393,250 |
| | | 88 | 962,868 | 28,620,683 | 29,583,551 |
| 108-10-1 | Methyl isobutyl ketone | 91 | 816,066 | 2,274,295 | 3,090,361 |
| | | 90 | 1,258,294 | 4,548,341 | 5,806,635 |
| | | 89 | 1,286,727 | 6,468,802 | 7,755,529 |
| | | 88 | 1,509,030 | 10,323,972 | 11,833,002 |
| 127-18-4 | Tetrachloroethylene | 91 | 234,637 | 3,830,559 | 4,065,196 |
| | | 90 | 450,787 | 4,433,734 | 4,884,521 |
| | | 89 | 467,081 | 4,279,472 | 4,746,553 |
| | | 88 | 586,288 | 5,511,471 | 6,097,759 |
| 108-88-3 | Toluene | 91 | 1,266,355 | 22,006,245 | 23,272,600 |
| | | 90 | 1,724,465 | 39,898,984 | 41,623,449 |
| | | 89 | 3,001,993 | 63,484,088 | 66,486,081 |
| | | 88 | 3,549,792 | 61,614,018 | 65,163,810 |
| 71-55-6 | 1,1,1-Trichloroethane | 91 | 293,508 | 8,000,615 | 8,294,123 |
| | | 90 | 169,540 | 12,472,740 | 12,642,280 |
| | | 89 | 312,010 | 16,662,054 | 16,974,064 |
| | | 88 | 304,103 | 19,513,105 | 19,817,208 |
| 79-01-6 | Trichloroethylene | 91 | 72,845 | 2,793,368 | 2,866,213 |
| | | 90 | 11,353 | 3,690,232 | 3,701,585 |
| | | 89 | 31,269 | 4,966,856 | 4,998,125 |
| | | 88 | 79,252 | 6,401,817 | 6,481,069 |
| | Xylenes | 91 | 1,593,182 | 20,542,421 | 22,135,603 |
| | | 90 | 1,948,480 | 24,427,444 | 26,375,924 |
| | | 89 | 3,970,355 | 33,828,419 | 37,798,774 |
| | | 88 | 4,224,204 | 37,878,912 | 42,103,116 |
| | Cadmium and cadmium compounds | 91 | 265,771 | 1,449,863 | 1,715,634 |
| | | 90 | 14,278 | 1,325,800 | 1,340,078 |
| | | 89 | 19,564 | 748,958 | 768,522 |
| | | 88 | 21,613 | 1,289,122 | 1,310,735 |

Table 4-2. TRI Releases and Transfers of 33/50 Chemicals, 1988-1991, 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 | 91 | 585,757 | 532,744 | 352,522 | 35,150 | 25,916,872 | 27,423,045 |
| | | 90 | 582,076 | 596,901 | 448,076 | 83,222 | 28,257,128 | 29,967,403 |
| | | 89 | 1,624,574 | 737,750 | 546,412 | 59,803 | 34,477,025 | 37,445,564 |
| | | 88 | 615,838 | 713,310 | 400,837 | 54,902 | 40,228,739 | 42,013,626 |
| | Cyanide compounds | 91 | 125,870 | 1,899,044 | 119,860 | 4,727,763 | 26,785 | 6,899,322 |
| | | 90 | 240,688 | 1,620,330 | 129,089 | 4,981,212 | 24,320 | 6,995,639 |
| | | 89 | 313,594 | 1,485,888 | 160,186 | 8,025,123 | 29,499 | 10,014,290 |
| | | 88 | 657,222 | 1,606,398 | 197,201 | 5,445,176 | 108,969 | 8,014,966 |
| | Lead and lead compounds | 91 | 553,782 | 1,285,604 | 138,433 | 928 | 17,022,789 | 19,001,536 |
| | | 90 | 917,589 | 1,569,431 | 132,656 | 1,648 | 19,069,275 | 21,690,599 |
| | | 89 | 757,704 | 1,664,854 | 149,235 | 1,564 | 20,075,314 | 22,648,671 |
| | | 88 | 858,635 | 1,821,383 | 241,243 | 2,760 | 26,962,797 | 29,886,818 |
| | Mercury and mercury compounds | 91 | 11,912 | 7,830 | 671 | 9 | 5,315 | 25,737 |
| | | 90 | 14,798 | 8,759 | 809 | 21 | 4,199 | 28,586 |
| | | 89 | 18,112 | 11,482 | 1,568 | 36 | 5,202 | 36,400 |
| | | 88 | 17,037 | 8,724 | 1,656 | 27 | 13,779 | 41,223 |
| | Nickel and nickel compounds | 91 | 469,498 | 322,989 | 126,954 | 370,948 | 1,672,468 | 2,962,857 |
| | | 90 | 375,830 | 315,836 | 146,456 | 268,958 | 6,060,825 | 7,167,905 |
| | | 89 | 819,300 | 319,959 | 206,813 | 288,212 | 4,413,068 | 6,047,352 |
| | | 88 | 414,913 | 285,076 | 219,780 | 239,263 | 3,629,809 | 4,788,841 |
| | Total | 91 | 290,297,916 | 475,448,087 | 2,156,916 | 9,443,956 | 46,294,969 | 823,641,844 |
| | | 90 | 346,713,844 | 577,831,394 | 2,515,201 | 8,746,967 | 55,591,899 | 991,399,305 |
| | | 89 | 382,371,550 | 659,678,538 | 3,652,521 | 12,194,800 | 60,754,467 | 1,118,651,876 |
| | | 88 | 405,817,444 | 680,599,720 | 4,010,493 | 10,245,158 | 73,584,492 | 1,174,257,307 |
| | Total less 33/50 Chemicals | 91 | 319,467,748 | 894,132,227 | 241,340,401 | 700,804,048 | 374,865,144 | 2,530,609,568 |
| | | 90 | 360,034,463 | 998,123,454 | 194,317,559 | 736,666,595 | 407,087,493 | 2,696,229,564 |
| | | 89 | 411,226,231 | 1,108,918,301 | 184,372,712 | 1,163,389,036 | 394,274,534 | 3,262,180,814 |
| | | 88 | 417,921,098 | 1,161,770,936 | 307,060,098 | 1,333,388,310 | 453,962,230 | 3,674,102,672 |
| | Total for All TRI Chemicals | 91 | 609,765,664 | 1,369,580,314 | 243,497,317 | 710,248,004 | 421,160,113 | 3,354,251,412 |
| | | 90 | 706,748,307 | 1,575,954,848 | 196,832,760 | 745,413,562 | 462,679,392 | 3,687,628,869 |
| | | 89 | 793,597,781 | 1,768,596,839 | 188,025,233 | 1,175,583,836 | 455,029,001 | 4,380,832,690 |
| | | 88 | 823,738,542 | 1,842,370,656 | 311,070,591 | 1,343,633,468 | 527,546,722 | 4,848,359,979 |

| CAS Number | Chemical | Year | Transfers to POTWs Pounds | Transfers Off-site for Treatment Disposal/Other Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|
| | Chromium and chromium compounds | 91 | 1,188,103 | 20,265,897 | 21,454,000 |
| | | 90 | 1,113,077 | 35,623,076 | 36,736,153 |
| | | 89 | 1,330,666 | 32,774,374 | 34,105,040 |
| | | 88 | 2,125,066 | 31,664,881 | 33,789,947 |
| | Cyanide compounds | 91 | 121,728 | 824,994 | 946,722 |
| | | 90 | 119,291 | 1,589,950 | 1,709,241 |
| | | 89 | 149,462 | 2,436,901 | 2,586,363 |
| | | 88 | 1,152,581 | 2,719,125 | 3,871,706 |
| | Lead and lead compounds | 91 | 592,526 | 20,156,681 | 20,749,207 |
| | | 90 | 191,277 | 56,043,501 | 56,234,778 |
| | | 89 | 152,316 | 31,041,273 | 31,193,589 |
| | | 88 | 211,951 | 30,708,010 | 30,919,961 |
| | Mercury and mercury compounds | 91 | 64 | 193,973 | 194,037 |
| | | 90 | 316 | 213,305 | 213,621 |
| | | 89 | 2,058 | 188,144 | 190,202 |
| | | 88 | 2,141 | 275,017 | 277,158 |
| | Nickel and nickel compounds | 91 | 639,048 | 9,339,653 | 9,978,701 |
| | | 90 | 314,721 | 14,521,060 | 14,835,781 |
| | | 89 | 449,440 | 18,593,857 | 19,043,297 |
| | | 88 | 902,504 | 15,835,967 | 16,738,471 |
| | Total | 91 | 10,588,393 | 138,889,673 | 149,478,066 |
| | | 90 | 10,943,937 | 232,900,511 | 243,844,448 |
| | | 89 | 15,194,901 | 261,215,150 | 276,410,051 |
| | | 88 | 19,828,984 | 280,061,399 | 299,890,383 |
| | Total less 33/50 Chemicals | 91 | 400,008,494 | 515,424,310 | 915,432,804 |
| | | 90 | 455,179,147 | 609,551,323 | 1,064,730,470 |
| | | 89 | 543,380,257 | 629,140,908 | 1,172,521,165 |
| | | 88 | 554,216,396 | 748,050,206 | 1,302,266,602 |
| | Total for All TRI Chemicals | 91 | 410,596,887 | 654,313,983 | 1,064,910,870 |
| | | 90 | 466,123,084 | 842,451,834 | 1,308,574,918 |
| | | 89 | 558,575,158 | 890,356,058 | 1,448,931,216 |
| | | 88 | 574,045,380 | 1,028,111,605 | 1,602,156,985 |

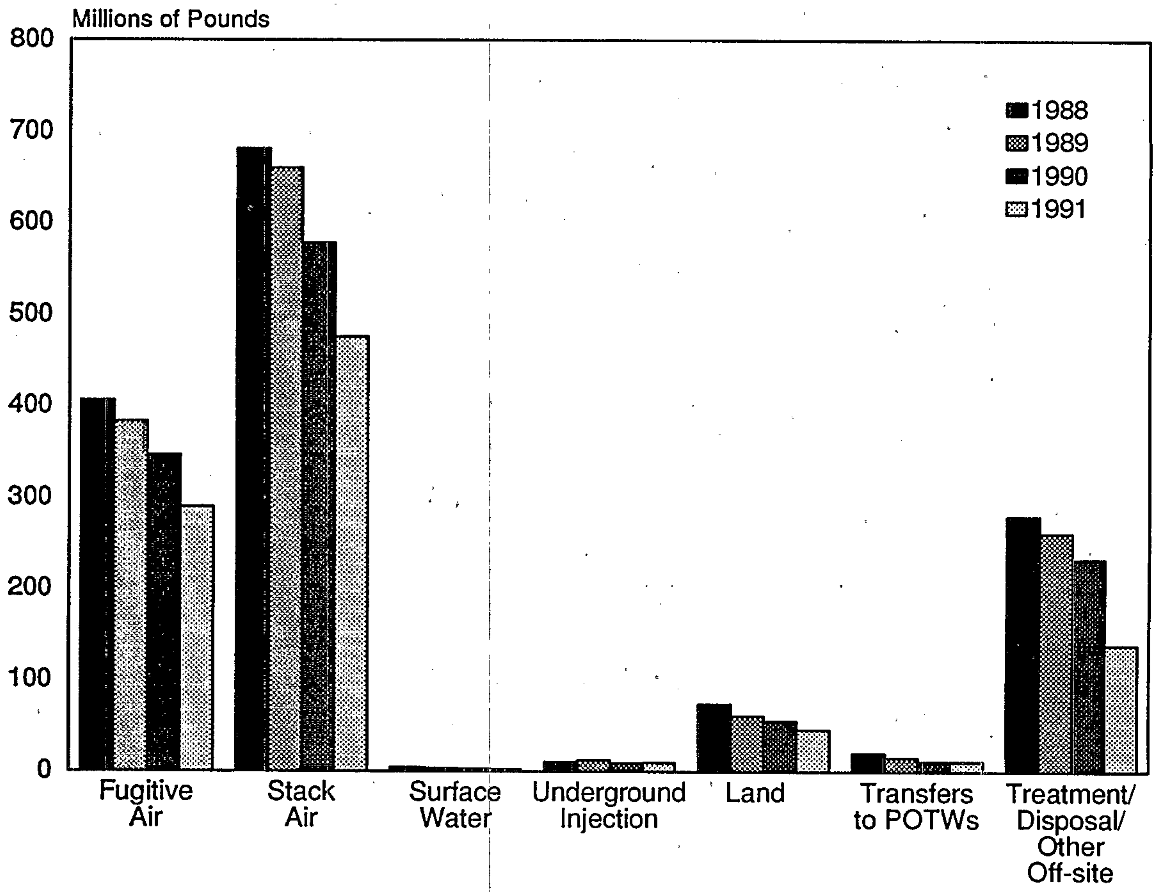



**Figure 4-4.** Total TRI Releases and Transfers of 33/50 Program Chemicals, by On-site Release Medium/Transfer Management Type, 1988 - 1991.

## 33/50 Program Chemical Releases and Transfers, by Medium and by Chemical

Figures 4-4 and 4-5 present reduction trends for 33/50 Program chemicals aggregated by on-site release medium/off-site transfer type, and by chemical, respectively. The figures are provided for illustrative purposes only. No attempt has been made at this time to extract conclusions or discern patterns in the 1991 reporting at these more detailed levels. These will be the subject of future 33/50 Program progress reports, in conjunction with updates on Program participation status.

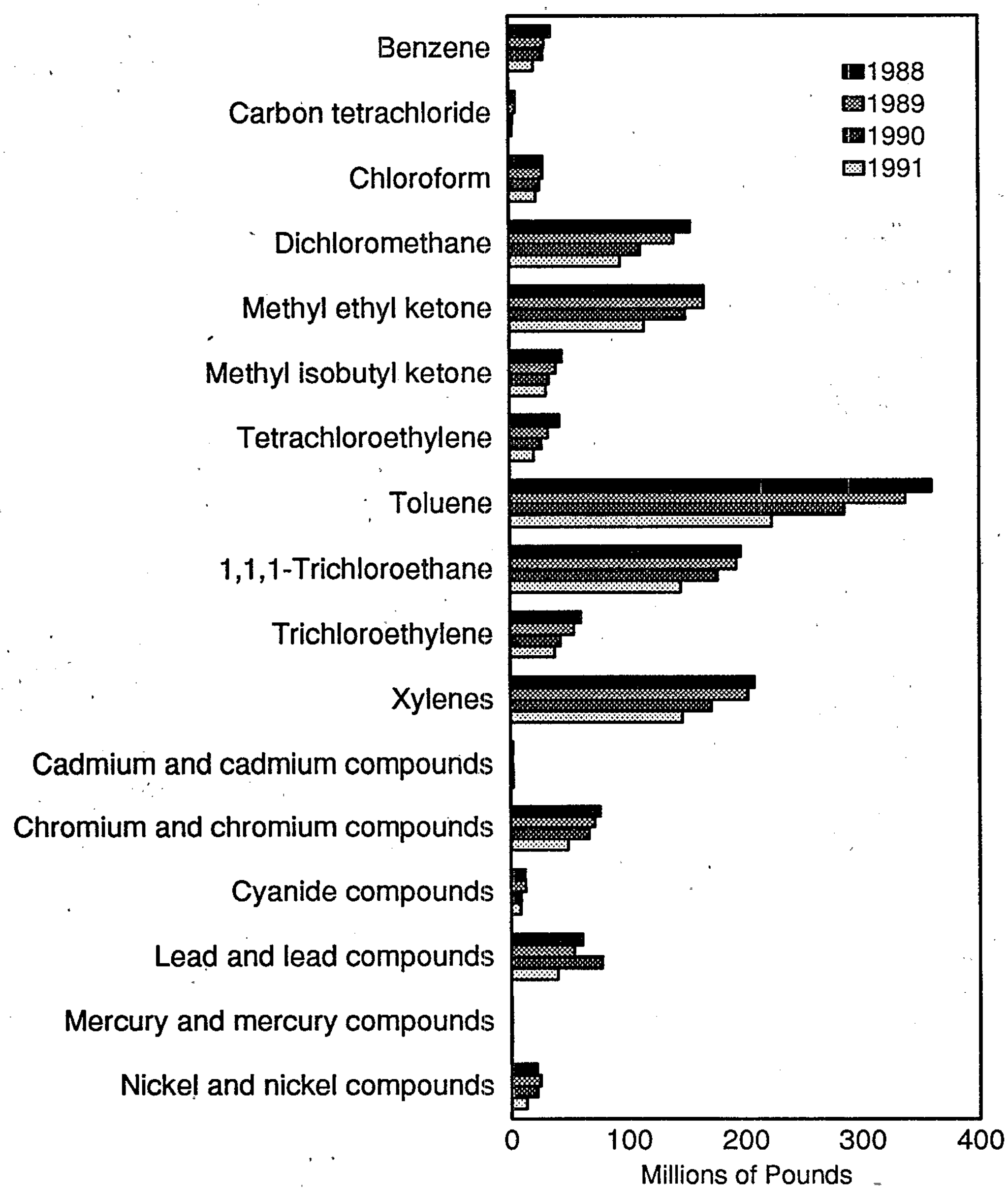



**Figure 4-5. Total TRI Releases and Transfers of 33/50 Program Chemicals, by Chemical, 1988 - 1991.**

**Table 4-3. TRI Releases of 33/50 Chemicals, 1991.**

| 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 |
|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 9,971,308 | 7,503,182 | 26,896 | 834,242 | 111,928 | 18,447,556 |
| 56-23-5 | Carbon tetrachloride | 528,100 | 1,018,701 | 2,844 | 42,470 | 2,152 | 1,594,267 |
| 67-66-3 | Chloroform | 7,660,997 | 11,421,891 | 769,569 | 65,089 | 22,150 | 19,939,696 |
| 75-09-2 | Dichloromethane | 31,726,830 | 47,611,641 | 98,877 | 1,317,706 | 117,788 | 80,872,842 |
| 78-93-3 | Methyl ethyl ketone | 33,149,766 | 70,271,889 | 141,354 | 355,736 | 180,492 | 104,099,237 |
| 108-10-1 | Methyl isobutyl ketone | 8,411,877 | 18,786,642 | 167,405 | 161,600 | 177,939 | 27,705,463 |
| 127-18-4 | Tetrachloroethylene | 6,482,575 | 10,204,876 | 7,448 | 14,000 | 23,302 | 16,732,201 |
| 108-88-3 | Toluene | 73,620,294 | 124,944,414 | 104,645 | 1,373,207 | 185,012 | 200,227,572 |
| 71-55-6 | 1,1,1-Trichloroethane | 69,230,762 | 68,274,801 | 21,803 | 2,805 | 171,807 | 137,701,978 |
| 79-01-6 | Trichloroethylene | 16,642,065 | 18,416,403 | 12,750 | 800 | 62,991 | 35,135,009 |
| | Xylenes | 31,107,600 | 92,889,918 | 60,644 | 139,963 | 344,052 | 124,542,177 |
| | Cadmium and cadmium compounds | 18,923 | 55,518 | 4,241 | 1,540 | 251,127 | 331,349 |
| | Chromium and chromium compounds | 585,757 | 532,744 | 352,522 | 35,150 | 25,916,872 | 27,423,045 |
| | Cyanide compounds | 125,870 | 1,899,044 | 119,860 | 4,727,763 | 26,785 | 6,899,322 |
| | Lead and lead compounds | 553,782 | 1,285,604 | 138,433 | 928 | 17,022,789 | 19,001,536 |
| | Mercury and mercury compounds | 11,912 | 7,830 | 671 | 9 | 5,315 | 25,737 |
| | Nickel and nickel compounds | 469,498 | 322,989 | 126,954 | 370,948 | 1,672,468 | 2,962,857 |
| | Total | 290,297,916 | 475,448,087 | 2,156,916 | 9,443,956 | 46,294,969 | 823,641,844 |
| | Total less 33/50 Chemicals | 336,081,480 | 908,726,582 | 241,356,856 | 700,933,181 | 375,133,175 | 2,562,231,274 |
| | Total for All TRI Chemicals | 626,379,396 | 1,384,174,669 | 243,513,772 | 710,377,137 | 421,428,144 | 3,385,873,118 |

## TRI Pollution Prevention Act Data for 33/50 Program Chemicals

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, in addition to amounts of toxic chemicals combusted for on-site energy recovery or recovered in on-site recycling processes. Section 8 also includes reporting on amounts of toxic chemicals destroyed in on-site treatment systems and amounts sent to off-site treatment facilities, as well as an aggregate of the amounts of each chemical the facility released to the environment as a result of on-site operations plus the amounts shipped off-site for disposal.

**Table 4-4. TRI Transfers of 33/50 Chemicals, 1991.**

| CAS Number | Chemical | Transfers to POTWs Pounds | Transfers to Treatment Pounds | Transfers to Disposal Pounds | Transfers to Energy Recovery Pounds | Transfers to Recycling Pounds | Other Off-site Transfers Pounds | Total Transfers Pounds |
|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 613,449 | 1,656,194 | 142,460 | 3,675,466 | 353,205 | 385 | 6,441,159 |
| 56-23-5 | Carbon tetrachloride | 621 | 939,774 | 39,111 | 11,061 | 390,625 | 1,684 | 1,382,876 |
| 67-66-3 | Chloroform | 809,427 | 1,755,778 | 71,518 | 255,288 | 2,077,870 | 3 | 4,969,884 |
| 75-09-2 | Dichloromethane | 1,308,202 | 11,956,118 | 495,762 | 3,717,385 | 29,163,629 | 153,456 | 46,794,552 |
| 78-93-3 | Methyl ethyl ketone | 772,861 | 9,365,077 | 512,746 | 35,111,556 | 26,033,673 | 121,043 | 71,916,956 |
| 108-10-1 | Methyl isobutyl ketone | 816,066 | 2,112,745 | 155,643 | 18,801,198 | 20,346,186 | 5,907 | 42,237,745 |
| 127-18-4 | Tetrachloroethylene | 234,637 | 3,580,303 | 112,237 | 1,232,887 | 10,694,611 | 138,019 | 15,992,694 |
| 108-88-3 | Toluene | 1,266,355 | 20,171,434 | 1,636,162 | 80,207,715 | 24,882,493 | 198,649 | 128,362,808 |
| 71-55-6 | 1,1,1-Trichloroethane | 293,508 | 6,743,974 | 969,200 | 3,212,938 | 27,237,545 | 287,441 | 38,744,606 |
| 79-01-6 | Trichloroethylene | 72,845 | 2,577,754 | 115,974 | 802,290 | 6,785,517 | 99,640 | 10,454,020 |
| | Xylenes | 1,593,182 | 19,283,497 | 1,001,342 | 69,220,174 | 38,913,506 | 257,582 | 130,269,283 |
| | Cadmium and cadmium compounds | 265,771 | 388,557 | 1,019,701 | 7,460 | 2,266,912 | 41,605 | 3,990,006 |
| | Chromium and chromium compounds | 1,188,103 | 3,969,938 | 15,972,793 | 69,423 | 68,437,500 | 323,166 | 89,960,923 |
| | Cyanide compounds | 121,728 | 447,295 | 365,309 | 500 | 82,660 | 12,390 | 1,029,882 |
| | Lead and lead compounds | 592,526 | 4,559,119 | 15,494,344 | 68,833 | 204,841,122 | 103,218 | 225,659,162 |
| | Mercury and mercury compounds | 64 | 65,531 | 128,442 | 5 | 445,451 | 0 | 639,493 |
| | Nickel and nickel compounds | 639,048 | 2,318,764 | 6,648,274 | 12,353 | 60,230,889 | 372,615 | 70,221,943 |
| | Total | 10,588,393 | 91,891,852 | 44,881,018 | 216,406,532 | 523,183,394 | 2,116,803 | 889,067,992 |
| | Total less 33/50 Chemicals | 401,318,705 | 260,541,316 | 254,161,433 | 221,818,810 | 1,830,940,192 | 7,433,076 | 2,976,213,532 |
| | Total for All TRI Chemicals | 411,907,098 | 352,433,168 | 299,042,451 | 438,225,342 | 2,354,123,586 | 9,549,879 | 3,865,281,524 |

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 other 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 (1991), the prior year (1990), and forecasted by facilities for the two successive years (1992 and 1993).

## 33/50 Transfers to Energy Recovery and Recycling

Tables 4-3 and 4-4 present a complete summary of 1991 on-site releases and off-site transfers reported by facilities in Sections 5 and 6 of Form R for each 33/50 Program chemical, by on-site release medium and off-site transfer type. Release reporting in Section 5, summing to 823.6 million pounds, is identical in nature to reporting in prior years. Reporting on off-site transfers, however, has been significantly affected by the new PPA requirement to include transfers to energy recovery (216.4 million pounds) and transfers to recycling (523.2 million pounds). Each of these new reporting categories on its own exceeds the total for all off-site transfers that were previously required to be reported (149.5 million pounds).

These new data indicate that the bulk of 33/50 Program metals and their associated compounds were shipped off-site for recycling. Some quantities of metals erroneously have been reported as sent off-site for energy recovery as metals do not contribute to the heating value of the wastes in which they are contained and are not destroyed in energy recovery processes. Off-site recycling of lead and its compounds alone accounted for nearly 40% of all such transfers of 33/50 Program chemicals. Greater quantities of the organic chemicals were also recycled than were burned for energy. Energy recovery was a more prevalent off-site management method than recycling only for benzene, methyl ethyl ketone, toluene, and xylenes.

## Management of 33/50 Program Chemicals in Wastes

Tables 4-5 through 4-9 present all four years of Section 8 reporting data for each 33/50 Program chemical, by waste management activity (non-production-related wastes are reported only for 1991). Again, the magnitude of the quantities associated with new reporting categories is overwhelming relative to the amounts for previously reported releases and transfers. On-site recycling (4.3 billion pounds) dominates the waste management picture for the 17 Program chemicals, more than quadrupling the 1988-comparable figures in 1991. As expected, quantities associated with on-site waste management activities are substantially greater than off-site transfers to similar management methods.

Analysts will note significant discrepancies between reported off-site transfers to energy recovery and recycling in Sections 6 and 8. Less significant discrepancies can also be observed in the reporting of off-site shipments to treatment. The causes and meaning of these discrepancies are discussed in Chapter 2. Figure 4-6 presents two profiles of 1991 reporting data for 33/50 Program chemicals to illustrate the impact of the expansions to TRI reporting brought about by the PPA. Two views are presented to accommodate the significant discrepancies in reporting for off-site energy recovery and recycling. In one profile (left), off-site energy recovery and recycling data are taken from Section 6. In the other profile (right), off-site energy recovery and recycling data are taken from Section 8. In both profiles, Section 8 data for off-site treatment (77 million pounds) are omitted, as their inclusion would duplicate off-site treatment quantities (102.5 million pounds) included in the 1988-comparable release/transfer amount reported in Section 6. Section 8.1 reporting for on-site releases and off-site transfers to disposal (846.3 million pounds) is also excluded in favor of their counterparts from Section 5 and 6 (823.6 million pounds of on-site releases plus 44.9 million pounds of transfers to disposal).

**Table 4-5. TRI Data Collected under the Pollution Prevention Act for 33/50 Chemicals, 1990 - 1993: Quantity Recycled(a).**

| CAS Number | Chemical | 1990 On-site Pounds | 1991 On-site Pounds | Projected Data 1992 On-site Pounds | Projected Data 1993 On-site Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 186,221,940 | 196,393,605 | 202,417,036 | 205,490,682 |
| 56-23-5 | Carbon tetrachloride | 13,809,422 | 10,238,966 | 14,299,143 | 14,824,425 |
| 67-66-3 | Chloroform | 4,120,879 | 4,125,901 | 4,149,851 | 4,189,401 |
| 75-09-2 | Dichloromethane | 153,704,577 | 182,108,296 | 171,887,424 | 175,443,735 |
| 78-93-3 | Methyl ethyl ketone | 860,316,285 | 864,307,237 | 873,842,445 | 877,203,944 |
| 108-10-1 | Methyl isobutyl ketone | 172,649,101 | 184,837,606 | 183,517,967 | 179,009,876 |
| 127-18-4 | Tetrachloroethylene | 141,398,774 | 118,584,078 | 100,085,824 | 100,707,105 |
| 108-88-3 | Toluene | 1,044,915,519 | 1,118,482,253 | 1,126,516,579 | 1,108,863,252 |
| 71-55-6 | 1,1,1-Trichloroethane | 188,056,560 | 204,077,933 | 170,420,702 | 104,844,395 |
| 79-01-6 | Trichloroethylene | 223,411,546 | 253,517,471 | 253,726,305 | 250,591,479 |
| | Xylenes | 176,416,278 | 207,081,028 | 173,057,124 | 176,307,518 |
| | Cadmium and cadmium compounds | 3,680,759 | 3,865,283 | 3,800,234 | 3,765,578 |
| | Chromium and chromium compounds | 66,854,044 | 91,951,101 | 84,412,237 | 86,717,179 |
| | Cyanides | 4,826,689 | 3,815,454 | 5,370,332 | 4,666,497 |
| | Lead and lead compounds | 722,419,745 | 774,086,405 | 843,333,074 | 896,477,272 |
| | Mercury and mercury compounds | 1,544,836 | 1,282,925 | 946,870 | 951,870 |
| | Nickel and nickel compounds | 40,416,570 | 48,601,735 | 44,418,955 | 46,024,696 |
| | Subtotal On-site for 33/50 Chemicals | 4,004,763,524 | 4,267,357,277 | 4,256,202,102 | 4,236,078,904 |
| | Subtotal On-site less 33/50 Chemicals | 10,447,403,204 | 12,111,751,405 | 11,643,298,317 | 11,765,547,167 |
| | Subtotal On-site for All TRI Chemicals | 14,452,166,728 | 16,379,108,682 | 15,899,500,419 | 16,001,626,071 |

| CAS Number | Chemical | 1990 Off-site Pounds | 1991 Off-site Pounds | Projected Data 1992 Off-site Pounds | Projected Data 1993 Off-site Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 825,048 | 1,414,752 | 1,314,877 | 814,678 |
| 56-23-5 | Carbon tetrachloride | 9,901 | 390,538 | 367,312 | 366,722 |
| 67-66-3 | Chloroform | 301,029 | 2,078,744 | 2,041,306 | 2,041,313 |
| 75-09-2 | Dichloromethane | 27,349,922 | 26,224,925 | 23,995,107 | 19,742,164 |
| 78-93-3 | Methyl ethyl ketone | 26,615,454 | 24,888,298 | 25,029,100 | 24,040,995 |
| 108-10-1 | Methyl isobutyl ketone | 12,259,999 | 17,952,566 | 17,722,322 | 18,119,834 |
| 127-18-4 | Tetrachloroethylene | 8,587,970 | 9,035,196 | 7,963,251 | 7,924,658 |
| 108-88-3 | Toluene | 19,940,589 | 24,557,245 | 24,863,740 | 23,355,561 |
| 71-55-6 | 1,1,1-Trichloroethane | 29,815,008 | 28,751,600 | 22,123,251 | 14,070,105 |
| 79-01-6 | Trichloroethylene | 7,142,607 | 7,446,327 | 6,052,720 | 4,984,824 |
| | Xylenes | 25,237,600 | 33,701,307 | 30,886,210 | 32,032,227 |
| | Cadmium and cadmium compounds | 2,536,773 | 2,039,641 | 2,060,981 | 2,081,824 |
| | Chromium and chromium compounds | 64,485,821 | 106,599,026 | 94,945,018 | 99,739,938 |
| | Cyanides | 62,415 | 38,280 | 44,074 | 8,465 |
| | Lead and lead compounds | 274,126,453 | 273,499,683 | 281,759,583 | 294,874,150 |
| | Mercury and mercury compounds | 111,001 | 274,247 | 336,080 | 336,334 |
| | Nickel and nickel compounds | 51,718,854 | 78,737,821 | 72,225,397 | 73,600,958 |
| | Subtotal Off-site for 33/50 Chemicals | 551,126,444 | 637,630,196 | 613,730,329 | 618,134,750 |
| | Subtotal Off-site less 33/50 Chemicals | 1,983,231,225 | 2,624,350,735 | 2,602,497,818 | 2,598,748,897 |
| | Subtotal Off-site for All TRI Chemicals | 2,534,357,669 | 3,261,980,931 | 3,216,228,147 | 3,216,883,647 |
| | Total for 33/50 Chemicals | 4,555,889,968 | 4,904,987,473 | 4,869,932,431 | 4,854,213,654 |
| | Total less 33/50 Chemicals | 12,430,634,429 | 14,736,102,140 | 14,245,796,135 | 14,364,296,064 |
| | Total for All TRI Chemicals | 16,986,524,397 | 19,641,089,613 | 19,115,728,566 | 19,218,509,718 |

**Table 4-6. TRI Data Collected under the Pollution Prevention Act for 33/50 Chemicals, 1990 - 1993: Quantity Used for Energy Recovery(a).**

| CAS Number | Chemical | 1990 On-site Pounds | 1991 On-site Pounds | Projected Data 1992 On-site Pounds | Projected Data 1993 On-site Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 21,176,508 | 33,714,288 | 28,812,538 | 26,158,418 |
| 56-23-5 | Carbon tetrachloride | 3,288,879 | 5,964,156 | 15,555,356 | 18,746,865 |
| 67-66-3 | Chloroform | 1,990,067 | 5,499,527 | 7,519,104 | 9,496,582 |
| 75-09-2 | Dichloromethane | 15,632,408 | 14,270,049 | 15,310,887 | 16,221,100 |
| 78-93-3 | Methyl ethyl ketone | 90,352,222 | 94,341,416 | 95,158,244 | 107,555,209 |
| 108-10-1 | Methyl isobutyl ketone | 42,654,440 | 36,906,508 | 37,823,204 | 42,955,740 |
| 127-18-4 | Tetrachloroethylene | 12,382,080 | 4,013,084 | 4,226,835 | 4,452,966 |
| 108-88-3 | Toluene | 250,558,252 | 254,980,246 | 262,443,091 | 288,619,559 |
| 71-55-6 | 1,1,1-Trichloroethane | 7,363,780 | 14,001,816 | 14,637,770 | 15,354,150 |
| 79-01-6 | Trichloroethylene | 6,083,419 | 6,188,130 | 6,212,991 | 6,581,666 |
| | Xylenes | 197,292,824 | 217,136,701 | 223,801,420 | 239,747,588 |
| | Cadmium and cadmium compounds | 0 | 0 | 0 | 0 |
| | Chromium and chromium compounds | 0 | 0 | 1 | 0 |
| | Cyanides | 42,279,210 | 22,849,436 | 20,922,422 | 21,279,382 |
| | Lead and lead compounds | 83,604 | 116,475 | 118,500 | 119,200 |
| | Mercury and mercury compounds | 0 | 0 | 0 | 0 |
| | Nickel and nickel compounds | 0 | 0 | 10 | 10 |
| | Subtotal On-site for 33/50 Chemicals | 691,137,693 | 709,981,832 | 732,542,373 | 797,288,435 |
| | Subtotal On-site less 33/50 Chemicals | 2,070,035,242 | 2,476,813,901 | 2,491,144,959 | 3,157,142,198 |
| | Subtotal On-site for All TRI Chemicals | 2,761,172,935 | 3,186,795,733 | 3,223,687,332 | 3,954,430,633 |

| CAS Number | Chemical | 1990 Off-site Pounds | 1991 Off-site Pounds | Projected Data 1992 Off-site Pounds | Projected Data 1993 Off-site Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 3,372,068 | 4,932,365 | 4,529,408 | 4,943,593 |
| 56-23-5 | Carbon tetrachloride | 1,835 | 10,849 | 5,281 | 291 |
| 67-66-3 | Chloroform | 346,140 | 720,671 | 621,330 | 546,922 |
| 75-09-2 | Dichloromethane | 5,746,239 | 6,066,234 | 5,319,225 | 4,906,635 |
| 78-93-3 | Methyl ethyl ketone | 36,653,958 | 38,424,594 | 36,077,565 | 34,365,357 |
| 108-10-1 | Methyl isobutyl ketone | 12,022,235 | 19,306,703 | 18,676,693 | 19,096,258 |
| 127-18-4 | Tetrachloroethylene | 909,105 | 1,504,622 | 1,080,036 | 893,510 |
| 108-88-3 | Toluene | 72,799,299 | 86,805,609 | 86,510,188 | 84,352,277 |
| 71-55-6 | 1,1,1-Trichloroethane | 3,493,538 | 3,913,519 | 3,033,116 | 2,131,378 |
| 79-01-6 | Trichloroethylene | 1,002,311 | 1,045,752 | 811,472 | 581,760 |
| | Xylenes | 64,803,135 | 78,056,842 | 75,318,262 | 71,066,260 |
| | Cadmium and cadmium compounds | 6,282 | 8,317 | 7,620 | 6,968 |
| | Chromium and chromium compounds | 53,683 | 74,993 | 74,344 | 66,578 |
| | Cyanides | 14 | 24 | 415 | 3,915 |
| | Lead and lead compounds | 32,312 | 69,831 | 66,704 | 64,264 |
| | Mercury and mercury compounds | 0 | 3,241 | 9,435 | 500 |
| | Nickel and nickel compounds | 13,875 | 9,629 | 4,701 | 4,694 |
| | Subtotal Off-site for 33/50 Chemicals | 201,256,029 | 240,953,795 | 232,145,795 | 223,031,160 |
| | Subtotal Off-site less 33/50 Chemicals | 225,699,366 | 256,803,676 | 253,747,321 | 249,733,225 |
| | Subtotal Off-site for All TRI Chemicals | 426,955,395 | 497,757,471 | 485,893,116 | 472,764,385 |
| | Total for 33/50 Chemicals | 892,393,722 | 950,935,627 | 964,688,168 | 1,020,319,595 |
| | Total less 33/50 Chemicals | 2,295,734,608 | 2,733,617,577 | 2,744,892,280 | 3,406,875,423 |
| | Total for All TRI Chemicals | 3,188,128,330 | 3,684,553,204 | 3,709,580,448 | 4,427,195,018 |

Table 4-7. TRI Data Collected under the Pollution Prevention Act for 33/50 Chemicals, 1990 - 1993: Quantity Treated(a).

| CAS Number | Chemical | 1990 On-site Pounds | 1991 On-site Pounds | Projected Data 1992 On-site Pounds | Projected Data 1993 On-site Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 21,865,259 | 31,256,769 | 30,799,920 | 31,517,292 |
| 56-23-5 | Carbon tetrachloride | 13,123,649 | 15,074,894 | 14,924,565 | 15,362,639 |
| 67-66-3 | Chloroform | 33,086,010 | 26,581,978 | 26,600,006 | 26,773,101 |
| 75-09-2 | Dichloromethane | 31,161,206 | 34,185,873 | 36,339,814 | 38,081,156 |
| 78-93-3 | Methyl ethyl ketone | 33,969,950 | 45,423,894 | 48,814,259 | 48,466,536 |
| 108-10-1 | Methyl isobutyl ketone | 9,079,196 | 11,765,185 | 11,945,634 | 12,198,975 |
| 127-18-4 | Tetrachloroethylene | 19,531,235 | 15,284,084 | 15,786,368 | 15,981,873 |
| 108-88-3 | Toluene | 99,851,002 | 128,268,450 | 142,527,931 | 163,838,919 |
| 71-55-6 | 1,1,1-Trichloroethane | 3,620,168 | 3,047,769 | 2,439,239 | 2,850,333 |
| 79-01-6 | Trichloroethylene | 1,798,181 | 4,886,629 | 4,698,415 | 4,790,711 |
| | Xylenes | 32,087,790 | 49,180,388 | 52,651,046 | 55,059,974 |
| | Cadmium and cadmium compounds | 962,670 | 712,333 | 705,249 | 612,729 |
| | Chromium and chromium compounds | 25,996,738 | 35,697,855 | 40,377,635 | 42,648,217 |
| | Cyanides | 49,102,212 | 50,527,548 | 51,209,641 | 52,074,846 |
| | Lead and lead compounds | 44,258,209 | 42,243,213 | 42,763,966 | 42,621,846 |
| | Mercury and mercury compounds | 35,157 | 35,853 | 37,450 | 99,321 |
| | Nickel and nickel compounds | 18,885,365 | 19,545,273 | 18,863,329 | 18,847,258 |
| | Subtotal On-site for 33/50 Chemicals | 438,413,997 | 513,717,988 | 541,484,467 | 571,825,726 |
| | Subtotal On-site less 33/50 Chemicals | 8,608,976,557 | 9,269,656,632 | 9,615,878,074 | 9,584,434,494 |
| | Subtotal On-site for All TRI Chemicals | 9,047,390,554 | 9,783,374,620 | 10,157,362,541 | 10,156,260,220 |

| CAS Number | Chemical | 1990 Off-site Pounds | 1991 Off-site Pounds | Projected Data 1992 Off-site Pounds | Projected Data 1993 Off-site Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 2,662,027 | 2,163,924 | 1,956,285 | 1,819,685 |
| 56-23-5 | Carbon tetrachloride | 971,935 | 840,933 | 1,020,048 | 658,157 |
| 67-66-3 | Chloroform | 1,935,098 | 2,007,797 | 2,090,584 | 1,485,414 |
| 75-09-2 | Dichloromethane | 8,345,059 | 10,528,620 | 11,176,243 | 11,040,959 |
| 78-93-3 | Methyl ethyl ketone | 7,708,590 | 7,757,468 | 6,933,344 | 5,865,304 |
| 108-10-1 | Methyl isobutyl ketone | 3,207,654 | 2,532,919 | 2,304,960 | 2,050,784 |
| 127-18-4 | Tetrachloroethylene | 2,841,310 | 3,305,286 | 2,458,500 | 858,165 |
| 108-88-3 | Toluene | 16,850,242 | 13,865,706 | 15,388,873 | 13,451,138 |
| 71-55-6 | 1,1,1-Trichloroethane | 4,633,476 | 5,253,041 | 4,008,457 | 2,752,287 |
| 79-01-6 | Trichloroethylene | 2,472,268 | 2,630,021 | 2,593,185 | 2,440,062 |
| | Xylenes | 11,536,274 | 11,994,985 | 8,251,526 | 7,538,476 |
| | Cadmium and cadmium compounds | 187,530 | 357,559 | 459,238 | 386,540 |
| | Chromium and chromium compounds | 5,481,567 | 4,972,054 | 3,903,276 | 3,205,968 |
| | Cyanides | 364,474 | 418,974 | 328,280 | 263,037 |
| | Lead and lead compounds | 6,759,380 | 5,719,036 | 5,763,383 | 5,232,153 |
| | Mercury and mercury compounds | 100,779 | 64,797 | 41,108 | 31,997 |
| | Nickel and nickel compounds | 4,391,217 | 2,593,065 | 1,625,926 | 1,555,650 |
| | Subtotal Off-site for 33/50 Chemicals | 80,448,880 | 77,006,185 | 70,303,216 | 60,635,776 |
| | Subtotal Off-site less 33/50 Chemicals | 773,451,024 | 797,279,247 | 702,432,610 | 675,556,541 |
| | Subtotal Off-site for All TRI Chemicals | 853,899,904 | 874,285,432 | 772,735,826 | 736,192,317 |
| | Total for 33/50 Chemicals | 518,862,877 | 590,724,173 | 611,787,683 | 632,461,502 |
| | Total less 33/50 Chemicals | 9,382,427,581 | 10,066,935,879 | 10,318,310,684 | 10,259,991,035 |
| | Total for All TRI Chemicals | 9,901,290,458 | 10,657,660,052 | 10,930,098,367 | 10,892,452,537 |

**Table 4-8. TRI Data Collected under the Pollution Prevention Act for 33/50 Chemicals, 1990 - 1993: Quantity Released (Includes Off-site Disposal)(a).**

| CAS Number | Chemical | 1990 Pounds | 1991 Pounds | Projected Data 1992 Pounds | Projected Data 1993 Pounds |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 22,777,071 | 18,760,658 | 14,341,727 | 12,669,477 |
| 56-23-5 | Carbon tetrachloride | 1,711,637 | 1,649,063 | 1,359,662 | 1,272,155 |
| 67-66-3 | Chloroform | 23,184,204 | 19,739,220 | 16,871,435 | 14,278,092 |
| 75-09-2 | Dichloromethane | 90,259,930 | 80,189,944 | 64,243,069 | 57,398,045 |
| 78-93-3 | Methyl ethyl ketone | 117,221,288 | 102,309,424 | 86,053,440 | 76,789,187 |
| 108-10-1 | Methyl isobutyl ketone | 26,480,175 | 28,194,835 | 27,164,097 | 25,506,386 |
| 127-18-4 | Tetrachloroethylene | 19,170,142 | 16,407,683 | 11,940,254 | 9,051,251 |
| 108-88-3 | Toluene | 215,032,891 | 196,784,903 | 171,886,924 | 156,803,806 |
| 71-55-6 | 1,1,1-Trichloroethane | 141,349,697 | 132,160,136 | 104,897,302 | 72,454,478 |
| 79-01-6 | Trichloroethylene | 38,020,135 | 34,532,204 | 29,156,169 | 23,989,725 |
| | Xylenes | 123,317,694 | 122,964,725 | 111,356,550 | 107,104,561 |
| | Cadmium and cadmium compounds | 1,319,468 | 1,235,362 | 1,256,353 | 1,179,702 |
| | Chromium and chromium compounds | 38,085,219 | 40,080,347 | 38,551,411 | 37,435,248 |
| | Cyanides | 8,810,822 | 7,055,445 | 7,068,939 | 6,716,208 |
| | Lead and lead compounds | 42,676,945 | 35,455,972 | 32,792,185 | 30,778,099 |
| | Mercury and mercury compounds | 133,963 | 98,786 | 205,295 | 54,531 |
| | Nickel and nickel compounds | 13,215,548 | 8,708,102 | 7,797,482 | 7,470,241 |
| | Total Released On-site/Disposed of Off-site for 33/50 Chemicals | 922,766,829 | 846,326,809 | 726,942,294 | 640,951,192 |
| | Total Released On-site/Disposed of Off-site less 33/50 Chemicals | 2,873,922,207 | 2,924,868,083 | 2,831,907,246 | 2,466,510,911 |
| | Total Released On-site/Disposed of Off-site for All TRI Chemicals | 3,796,689,036 | 3,771,194,892 | 3,558,849,540 | 3,107,462,103 |

**Table 4-9. TRI Data Collected under the Pollution Prevention Act for 33/50 Chemicals, 1990 - 1993: Total Wastes(a).**

| CAS Number | Chemical | 1990 Total Production Related Wastes Pounds | 1991 Total Production Related Wastes Pounds | Projected Data 1992 Total Production Related Wastes Pounds | Projected Data 1993 Total Production Related Wastes Pounds | 1991 Non-Production Related Wastes Pounds |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 258,899,921 | 288,636,361 | 284,171,791 | 283,413,825 | 108,722 |
| 56-23-5 | Carbon tetrachloride | 32,917,258 | 34,169,399 | 47,531,367 | 51,231,254 | 101,757 |
| 67-66-3 | Chloroform | 64,963,427 | 60,753,838 | 59,893,616 | 58,810,825 | 124,714 |
| 75-09-2 | Dichloromethane | 332,199,341 | 353,573,941 | 328,271,769 | 322,833,794 | 490,093 |
| 78-93-3 | Methyl ethyl ketone | 1,172,837,747 | 1,177,452,331 | 1,171,908,397 | 1,174,286,532 | 164,607 |
| 108-10-1 | Methyl isobutyl ketone | 278,352,800 | 301,496,322 | 299,154,877 | 298,937,853 | 57,244 |
| 127-18-4 | Tetrachloroethylene | 204,820,616 | 168,134,033 | 143,541,068 | 139,869,528 | 221,631 |
| 108-88-3 | Toluene | 1,719,947,794 | 1,823,744,412 | 1,830,137,326 | 1,839,284,512 | 666,612 |
| 71-55-6 | 1,1,1-Trichloroethane | 378,332,227 | 391,205,814 | 321,559,837 | 214,457,126 | 293,081 |
| 79-01-6 | Trichloroethylene | 279,930,467 | 310,246,534 | 303,251,257 | 293,960,227 | 161,449 |
| | Xylenes | 630,691,595 | 720,115,976 | 675,322,138 | 688,856,604 | 633,162 |
| | Cadmium and cadmium compounds | 8,693,482 | 8,218,495 | 8,289,675 | 8,033,341 | 115,133 |
| | Chromium and chromium compounds | 200,957,072 | 279,375,376 | 262,263,922 | 269,813,128 | 370,195 |
| | Cyanides | 105,445,836 | 84,705,161 | 84,944,103 | 85,012,350 | 3,508 |
| | Lead and lead compounds | 1,090,356,648 | 1,131,190,615 | 1,206,597,395 | 1,270,166,984 | 830,774 |
| | Mercury and mercury compounds | 1,925,736 | 1,759,849 | 1,576,238 | 1,474,553 | 5,299 |
| | Nickel and nickel compounds | 128,641,429 | 158,195,625 | 144,935,800 | 147,503,507 | 145,458 |
| | Total for 33/50 Chemicals | 6,889,913,396 | 7,292,974,082 | 7,131,955,496 | 7,147,945,943 | 4,493,439 |
| | Total less 33/50 Chemicals | 26,982,718,825 | 30,461,523,679 | 30,182,301,425 | 30,137,673,433 | 26,957,593 |
| | Total for All TRI Chemicals | 33,872,632,221 | 37,754,497,761 | 37,314,256,921 | 37,285,619,376 | 31,451,032 |

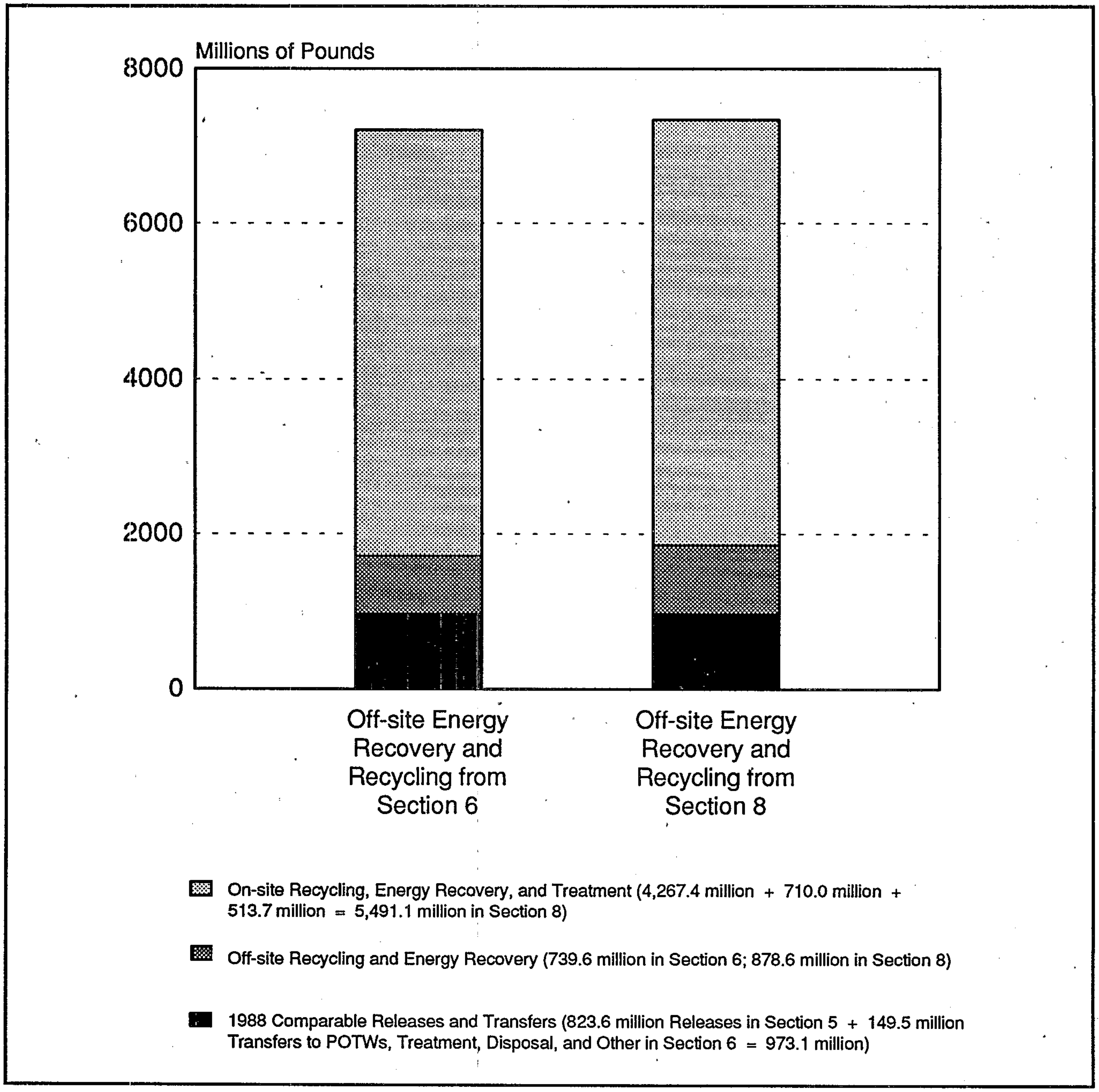



**Figure 4-6. New Reporting under the Pollution Prevention Act in 1991 for 33/50 Program Chemicals.**

As indicated in Figure 4-6, the 140 million pound discrepancy between Section 6 and Section 8 reporting for transfers to energy recovery and recycling, while nearly equal to the total for all other off-site transfers of 33/50 Program chemicals, is less significant in the context of total waste management for the 17 Program chemicals. More importantly, the figure illustrates that 1988-comparable releases and off-site transfers play a relatively small role in the management of 33/50 Program chemicals in wastes. When all quantities in Section 8.1 through 8.8 are summed, the total amount of 33/50 Program chemicals in wastes reported by facilities to TRI for 1991 is 7.3 billion pounds. (A similar total is developed, 50 million pounds greater, when summing the figures used from Sections 5, 6, and 8 in constructing the right bar of Figure 4-6.) The 973 million pounds of releases and transfers that are the focus of the 33/50 Program's reduction goals account for only 13% of this total.

Figures 4-7 and 4-8 present the data reported for 33/50 Program chemicals in Section 8 of Form R, aggregated by management method and chemical, respectively. The figures are provided for illustrative purposes only. No attempt has been made at this time to extract conclusions or discern patterns in the 1991 reporting at these more detailed levels. These will be the subject of future 33/50 Program progress reports, in conjunction with updates on Program participation status.

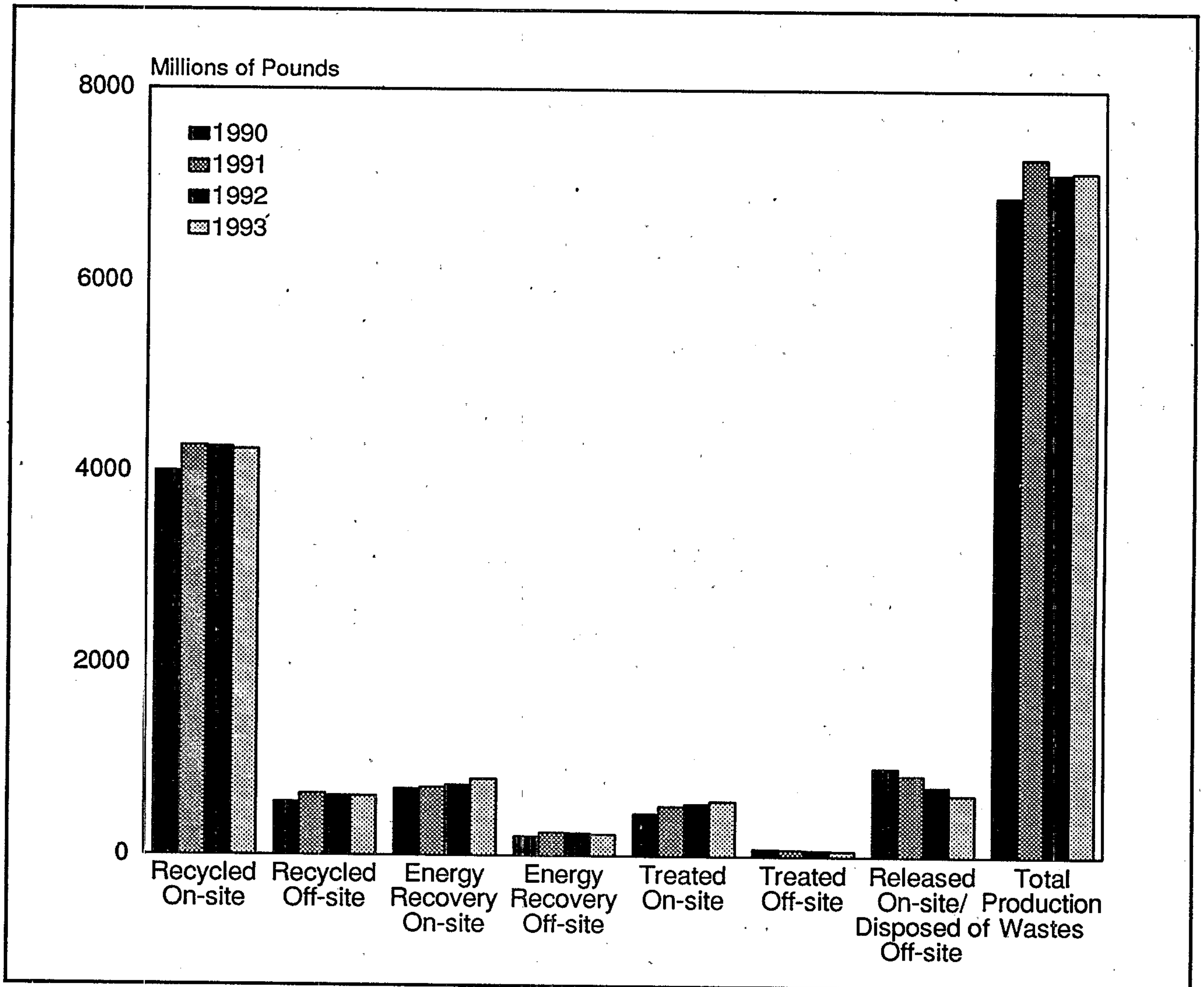



**Figure 4-7. TRI Data Collected under the Pollution Prevention Act for 33/50 Program Chemicals, by Management Option, 1990 - 1993.**

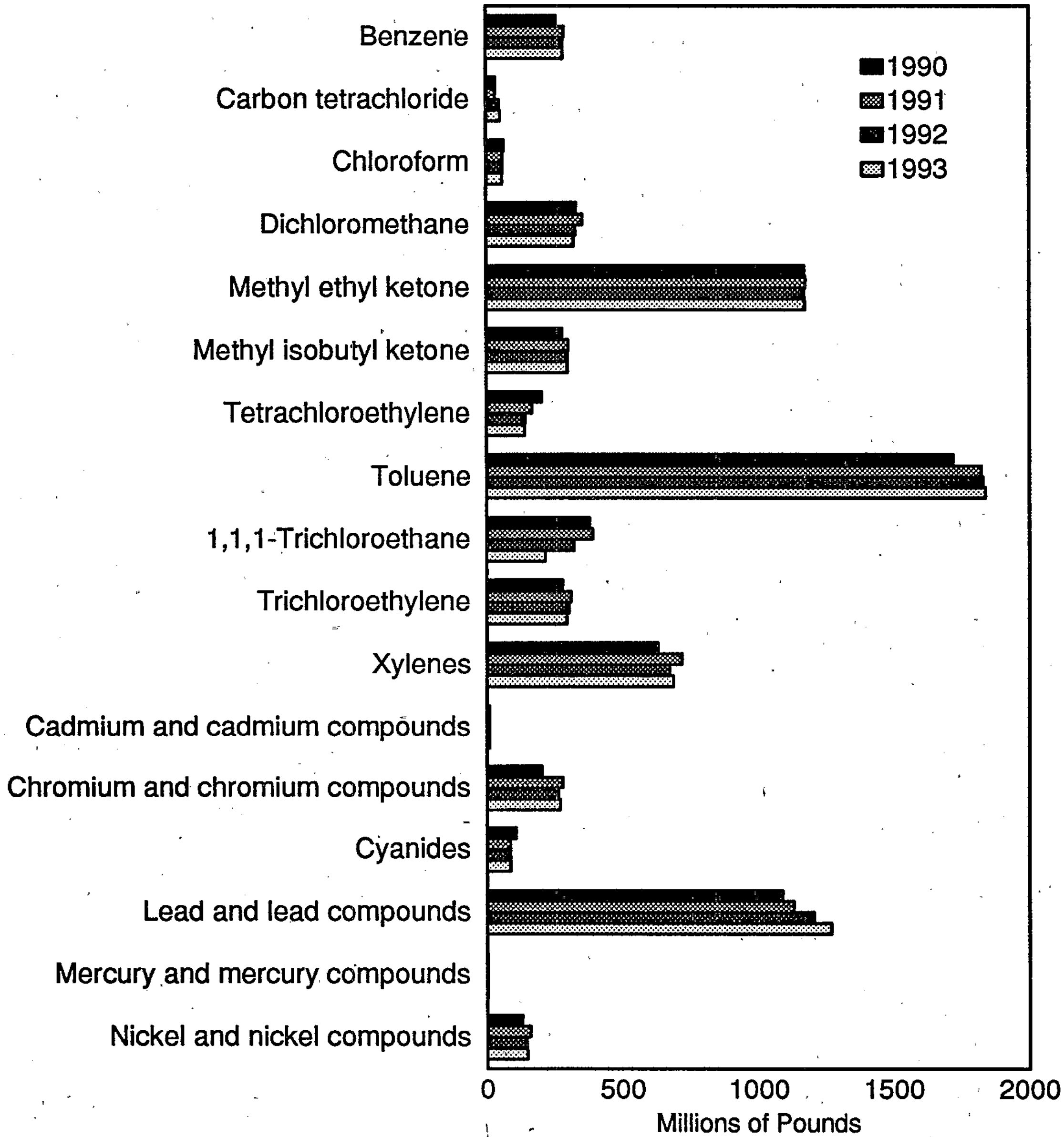



**Figure 4-8. Total Production Wastes for 33/50 Program Chemicals, by Chemical, 1990-1993.**

**Table 4-10. Number of Forms Reporting Source Reduction, by Source Reduction Category, by Chemical, 1991.**

| CAS Number | Chemical | Number of TRI Forms | Forms Reporting Source Reduction Activities | |
|---|---|---|---|---|
| | | | Number | Percent of All Forms |
| 71-43-2 | Benzene | 480 | 155 | 32.3 |
| 56-23-5 | Carbon tetrachloride | 99 | 28 | 28.3 |
| 67-66-3 | Chloroform | 183 | 67 | 36.6 |
| 75-09-2 | Dichloromethane | 1,258 | 517 | 41.1 |
| 78-93-3 | Methyl ethyl ketone | 2,499 | 958 | 38.3 |
| 108-10-1 | Methyl isobutyl ketone | 1,015 | 382 | 37.6 |
| 127-18-4 | Tetrachloroethylene | 558 | 210 | 37.6 |
| 108-88-3 | Toluene | 3,794 | 1,475 | 38.9 |
| 71-55-6 | 1,1,1-Trichloroethane | 3,563 | 1,590 | 44.6 |
| 79-01-6 | Trichloroethylene | 697 | 290 | 41.6 |
| | Xylenes | 3,639 | 1,341 | 36.9 |
| | Cadmium and cadmium compounds | 210 | 59 | 28.1 |
| | Chromium and chromium compounds | 2,867 | 578 | 20.2 |
| | Cyanide compounds | 308 | 91 | 29.5 |
| | Lead and lead compounds | 1,739 | 480 | 27.6 |
| | Mercury and mercury compounds | 54 | 12 | 22.2 |
| | Nickel and nickel compounds | 2,218 | 364 | 16.4 |
| | Total for 33/50 Chemicals | 25,181 | 8,597 | 34.1 |
| | Total less 33/50 Chemicals | 57,112 | 12,784 | 22.4 |
| | Total for All TRI Chemicals | 82,293 | 21,381 | 26.0 |

## 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. Table 4-10 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 of source reduction reporting than other TRI chemicals. Of the more than 21,000 Form R's reporting that a source reduction activity was implemented during 1991, fully 40% (8,609) were for the seventeen 33/50 Program chemicals, even though Program chemicals account for only 30% of total TRI Form R's. More than a third of the Form R's for 33/50 Program chemicals reported the occurrence of source reduction, compared to slightly more than a 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 R's reporting source reduction, and four of the top five, were 33/50 Program chemicals (1,1,1-trichloroethane, toluene, xylenes, and methyl ethyl ketone). 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 R's submitted, but they also evidenced some of the highest percentages of Form R submissions indicating source reduction.

| Chemical | Category of Source Reduction Activity (number of forms reporting) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Good Operating Practices | Inventory Control | Spill and Leak Prevention | Raw Material Modifications | Process Modifications | Cleaning and Degreasing | Surface Preparation and Finishing | Product Modifications |
| Benzene | 47 | 5 | 121 | 10 | 98 | 1 | 0 | 4 |
| Carbon tetrachloride | 17 | 0 | 17 | 2 | 14 | 0 | 1 | 0 |
| Chloroform | 21 | 0 | 13 | 30 | 53 | 2 | 0 | 3 |
| Dichloromethane | 202 | 31 | 109 | 138 | 153 | 152 | 22 | 51 |
| Methyl ethyl ketone | 433 | 184 | 187 | 265 | 267 | 134 | 296 | 106 |
| Methyl isobutyl ketone | 189 | 64 | 101 | 90 | 141 | 42 | 125 | 53 |
| Tetrachloroethylene | 117 | 17 | 61 | 25 | 45 | 88 | 4 | 7 |
| Toluene | 620 | 243 | 328 | 420 | 463 | 157 | 401 | 173 |
| 1,1,1-Trichloroethane | 678 | 106 | 192 | 304 | 302 | 812 | 119 | 138 |
| Trichloroethylene | 132 | 18 | 44 | 16 | 71 | 168 | 6 | 9 |
| Xylenes | 562 | 221 | 338 | 300 | 450 | 112 | 485 | 145 |
| Cadmium and cadmium compounds | 29 | 4 | 14 | 26 | 23 | 8 | 0 | 11 |
| Chromium and chromium compounds | 263 | 64 | 112 | 133 | 252 | 49 | 38 | 60 |
| Cyanide compounds | 30 | 11 | 21 | 16 | 51 | 14 | 2 | 2 |
| Lead and lead compounds | 222 | 41 | 91 | 156 | 199 | 12 | 16 | 79 |
| Mercury and mercury compounds | 3 | 0 | 1 | 2 | 7 | 0 | 0 | 2 |
| Nickel and nickel compounds | 192 | 39 | 86 | 48 | 195 | 42 | 9 | 30 |
| Total for 33/50 Chemicals | 3,757 | 1,048 | 1,836 | 1,981 | 2,784 | 1,793 | 1,524 | 873 |
| Total less 33/50 Chemicals | 6,209 | 1,562 | 4,235 | 2,113 | 5,246 | 1,300 | 787 | 925 |
| Total for All TRI Chemicals | 9,966 | 2,610 | 6,071 | 4,094 | 8,030 | 3,093 | 2,311 | 1,798 |

Sixteen 33/50 Program chemicals are among the top 35 TRI chemicals reporting source reduction. Of these, organic chemicals generally evidenced higher percentages of Form R's reporting source reduction than did the metals, ranging from 30% to 45% for the nine organic chemicals with the largest number of source reduction reports. Among the three 33/50 Program metals with large numbers of Form R's, lead came the closest to achieving a similarly high source reduction reporting rate (28%). Twenty percent of the reports for cadmium, the most frequently reported metal, indicated source reduction, as did 16.5% of the reports for nickel.

Facilities described the type of source reduction activity which they implemented for each chemical (see Table 4-10). 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. If, however, Form R source reduction activity categories for Cleaning and Degreasing and for Surface Preparation and Finishing are aggregated into another category, Process Modifications, Process Modifications would rank as the most frequently employed source reduction activity, particularly so for 33/50 Program chemicals.

Facilities also described the methods they employed in identifying source reduction opportunities. Table 4-11 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. For the most part, facilities are drawing on their own resources to investigate pollution

**Table 4-11. Methods Used to Identify Source Reduction Activity, by Chemical, 1991.**

| CAS Number | Chemical | Number of Forms Reporting Source Reduction Activities | Pollution Prevention Opportunity Audit | | Materials Balance Audit | Participative Team Management | Employee Recommendation | |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | Informal | Formal Program |
| 71-43-2 | Benzene | 155 | 71 | 16 | 14 | 37 | 19 | 14 |
| 56-23-5 | Carbon tetrachloride | 28 | 10 | 0 | 4 | 13 | 7 | 6 |
| 67-66-3 | Chloroform | 67 | 28 | 1 | 8 | 36 | 7 | 8 |
| 75-09-2 | Dichloromethane | 517 | 194 | 20 | 82 | 214 | 96 | 50 |
| 78-93-3 | Methyl ethyl ketone | 958 | 350 | 45 | 131 | 456 | 206 | 98 |
| 108-10-1 | Methyl isobutyl ketone | 382 | 149 | 19 | 53 | 183 | 76 | 45 |
| 127-18-4 | Tetrachloroethylene | 210 | 93 | 14 | 23 | 96 | 39 | 19 |
| 108-88-3 | Toluene | 1,475 | 512 | 76 | 178 | 650 | 289 | 143 |
| 71-55-6 | 1,1,1-Trichloroethane | 1,590 | 680 | 87 | 197 | 690 | 306 | 212 |
| 79-01-6 | Trichloroethylene | 290 | 120 | 9 | 37 | 120 | 68 | 28 |
| | Xylenes | 1,341 | 529 | 62 | 149 | 573 | 290 | 115 |
| | Cadmium and cadmium compounds | 59 | 21 | 3 | 9 | 29 | 15 | 9 |
| | Chromium and chromium compounds | 578 | 212 | 24 | 75 | 253 | 110 | 47 |
| | Cyanide compounds | 79 | 35 | 6 | 12 | 41 | 14 | 7 |
| | Lead and lead compounds | 480 | 183 | 31 | 54 | 223 | 101 | 50 |
| | Mercury and mercury compounds | 12 | 5 | 2 | 1 | 4 | 2 | 3 |
| | Nickel and nickel compounds | 364 | 138 | 13 | 57 | 169 | 85 | 30 |
| | Total for 33/50 Chemicals | 8,585 | 3,330 | 428 | 1,084 | 3,787 | 1,730 | 884 |
| | Total less 33/50 Chemicals | 12,796 | 4,878 | 556 | 1,549 | 5,793 | 2,590 | 1,288 |
| | Total for all TRI Chemicals | 21,381 | 8,208 | 984 | 2,633 | 9,580 | 4,320 | 2,172 |

prevention options, either by conducting formal audits (Pollution Prevention Opportunity Audits or Materials Balance Audits) or by developing ideas from management teams and employees. The 33/50 Program is built on the premise and promise of forging partnerships to achieve pollution prevention, and companies appear to be relying heavily on partnerships with their employees and managers in seeking source reduction opportunities.

Where facilities have sought outside assistance in identifying prevention opportunities, material/product/process vendors are the dominant choice. Facilities report little reliance on state and Federal programs for assistance in their source reduction endeavors. This may be a consequence of the fact that most government pollution prevention assistance programs are in their infancies. But the heavy reliance on internal resources suggests that familiarity with facility-specific conditions is critical to successful identification of source reduction opportunities.

| Chemical | State Program | Federal Program | Trade/ Industry Program | Vendor Assistance | Other | Number of Forms | Percent of Total Forms |
|---|---|---|---|---|---|---|---|
| Benzene | 3 | 1 | 7 | 17 | 57 | 256 | 0.7 |
| Carbon tetrachloride | 0 | 0 | 0 | 3 | 5 | 48 | 0.1 |
| Chloroform | 0 | 0 | 10 | 7 | 18 | 123 | 0.3 |
| Dichloromethane | 6 | 4 | 26 | 117 | 104 | 913 | 2.4 |
| Methyl ethyl ketone | 11 | 5 | 81 | 299 | 145 | 1,827 | 4.8 |
| Methyl isobutyl ketone | 11 | 3 | 35 | 107 | 68 | 749 | 1.9 |
| Tetrachloroethylene | 2 | 1 | 21 | 49 | 37 | 394 | 1.0 |
| Toluene | 23 | 8 | 110 | 466 | 271 | 2,726 | 7.1 |
| 1,1,1-Trichloroethane | 21 | 13 | 111 | 443 | 197 | 2,957 | 7.7 |
| Trichloroethylene | 6 | 1 | 11 | 76 | 51 | 527 | 1.4 |
| Xylenes | 21 | 4 | 99 | 458 | 243 | 2,543 | 6.6 |
| Cadmium and cadmium compounds | 1 | 0 | 3 | 17 | 10 | 117 | 0.3 |
| Chromium and chromium compounds | 7 | 4 | 45 | 132 | 110 | 1,019 | 2.7 |
| Cyanide compounds | 1 | 1 | 4 | 19 | 21 | 161 | 0.4 |
| Lead and lead compounds | 8 | 0 | 31 | 90 | 124 | 895 | 2.3 |
| Mercury amd mercury compounds | 0 | 0 | 1 | 2 | 3 | 23 | 0.1 |
| Nickel and nickel compounds | 5 | 0 | 21 | 77 | 62 | 657 | 1.7 |
| Total for 33/50 Chemicals | 126 | 45 | 616 | 2,379 | 1,526 | 15,935 | 41.5 |
| Total less 33/50 Chemicals | 124 | 45 | 775 | 2,532 | 2,349 | 22,479 | 58.5 |
| Total for all TRI Chemicals | 250 | 90 | 1,391 | 4,911 | 3,875 | 38,414 | 100.0 |

## Looking to the Future: An Agenda For Action

The 33/50 Program faces an ambitious agenda as it enters its third year. Despite the evidence that the Program's 1992 interim 33% reduction goal has been achieved a year early, efforts to expand company participation will continue. In addition to the reduction goals, the 33/50 Program strives to promote the benefits of pollution prevention as widely as possible throughout American industry. Accordingly, industry trade associations are being asked to assist EPA in convincing smaller companies to participate. The Program's communications with all companies include challenges to exceed their initial goals and stress the concept of continuous improvement.

Increasing attention is also being directed toward recognizing companies' environmental improvements. The Agency is examining options for following up on the Program's popular Certificates of Appreciation (sent to all Program participants) with a mechanism to recognize companies when they achieve their reduction goals. A 33/50 Awards Program is in development, which is intended to salute companies that excel in protecting the environment by preventing pollution at its source. EPA also is considering conducting a national 33/50 Program conference to show-case the accomplishments of the Program's company, state, and community partners.

Finally, preparations are underway to commence evaluating the Program's success formally by using the expanded pollution prevention data reported in facilities' 1991 and subsequent TRI reports. As detailed in the preceding pages, the 1991 TRI data suggest exciting developments to date. However, important issues remain that require in-depth analysis, including assessing the actual role played by 33/50 Program in bringing about reported reductions in facilities' releases and transfers of the target chemicals. The new TRI data provide profiles of facilities' waste management patterns that will be useful to government, the public, and the reporting industries themselves. They provide a mechanism to promote planning for reductions in pollution and bench marks against which to measure the success of prevention initiatives.

## For More Information

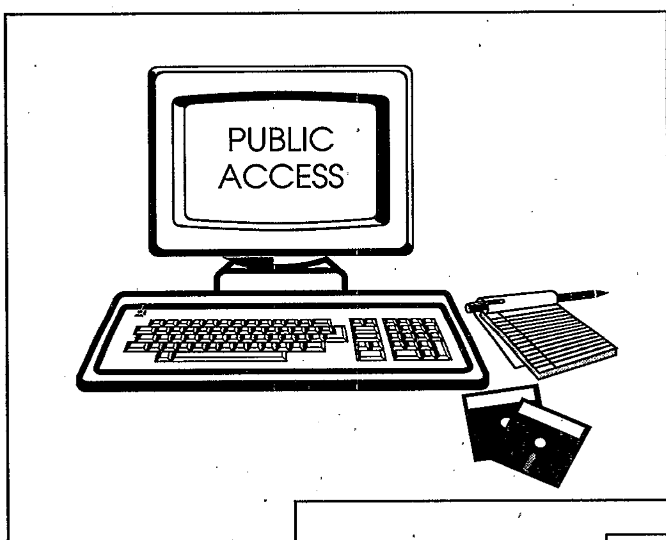
The 33/50 Program has issued three public Progress Reports to date, the most recent having been released in March, 1993. Anyone interested in obtaining additional information about the 33/50 Program can do so by contacting EPA at (202) 260-6907 or directing letters to Mail Code TS-799, Office of Pollution 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.

## Note

(a) Submission of prior year (1990) data was optional in this first year of reporting. Data for 1992 and 1993 were estimated projections by the facilities submitting Form Rs for the 1991 reporting year. They do not represent reported totals for the 1992 or 1993 reporting years (Tables 4-5 through 4-9).

# Appendices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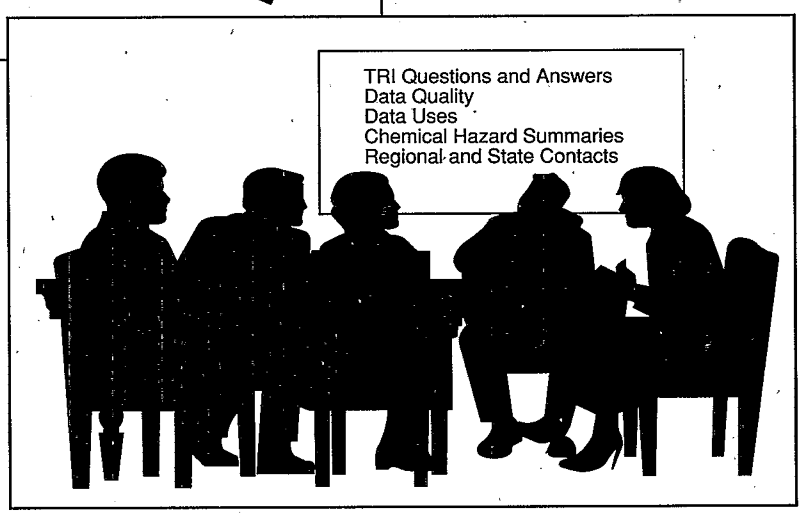
TRI Questions and Answers
Data Quality
Data Uses
Chemical Hazard Summaries
Regional and State Contacts

# QUESTIONS AND ANSWERS ABOUT THE 1991 TOXICS RELEASE INVENTORY (TRI) DATA

## GENERAL AND CROSS-MEDIA QUESTIONS AND ANSWERS

**Q 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 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 the U.S. Environmental Protection Agency (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 Toxics Release Inventory (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 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.

**Q 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. Government-owned and government-operated facilities (GOGOs) are not required to report by law, but some have reported voluntarily and others plan to report in the future. For example, the Department of Energy will voluntarily submit reports to EPA and the States for all their facilities starting on July 1, 1994.

On April 21, 1993, the President announced that he will issue an Executive Order requiring federal facilities (GOGOs) to comply with the federal Right-to-Know laws. He has also asked all federal facilities to set a voluntary goal of 50% reduction of their releases of toxic pollutants by 1999.

**Q Who must report?**

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 use more than 10,000 pounds of any reportable chemicals.

**Q What is the compliance rate with this reporting requirement?**

A EPA does not have any specific data on 1991 compliance with the law. However, a confidential survey of facilities conducted in the summer of 1989 estimated compliance for 1987 to be approximately 66%. That is, for every 100 facilities that should have filed a Form R, approximately 66 did file at least one report.

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.

**Q How was the list of chemicals subject to section 313 reporting created?**

A The list of chemicals subject to section 313 reporting was given to EPA by Congress. The Congressional 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 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 section 313 list that were not on the original state lists. Also, a number of chemicals have been deleted from the section 313 list of toxic chemicals because EPA determined that they did not meet any of the criteria for listing.

Under EPCRA section 313, anyone can petition EPA to add a chemical(s) to, or delete a chemical(s) from the list of chemicals.

EPA has developed criteria and is currently refining the process for reviewing the section 313 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 releases on chemicals that meet the intent of section 313.

**Q 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 section 313 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.

**Q What chemicals have been added to the section 313 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 are subject to reporting beginning with the 1991 reporting year. These chemicals were added because they are stratospheric ozone depleters. Depletion of the 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)

**Q What chemicals have been deleted from the EPCRA section 313 list?**

A The following chemicals have been deleted from the EPCRA section 313 list of toxic substances:

Titanium dioxide
Color Index (C.I.) Acid Blue 9 disodium salt
C.I. Acid Blue 9 diammonium salt
Terephthalic acid
C.I. Pigment Blue 15 (a copper compound)
Melamine
Sodium hydroxide (solution)
Sodium sulfate (solution)
C.I. Pigment Green 7 (a copper compound)
C.I. Pigment Green 36 (a copper compound)

EPA modified the listing for aluminum oxide to cover only fibrous forms of the chemical.

**Q Is EPA planning to expand the number of chemicals covered by EPCRA section 313?**

A EPA is reviewing information on various chemicals for addition to EPCRA section 313. EPA plans to initiate rulemaking by the end of 1993 to expand the EPCRA section 313 chemical list.

**Q 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

Status as of April 16, 1993

| Chemical | Action Requested | Status |
|---|---|---|
| Acetone | Delist | Pending |
| Aluminum oxide (non-fibrous) | Delist | Granted |
| Ammonium sulfate (solution) (1) | 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 (2) | List | Granted |
| CFC-114 | List | Granted |
| CFC-115 | List | Granted |
| CFC-12 | List | Granted |
| Chromium (III) compounds | Delist | Denied |
| C.I. Acid Blue 9 (3) | | |
| 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 | Pending |
| Cyclohexane | Delist | Denied |
| Chromium antimony titanium buff rutile | Delist | Denied |
| Decabromodiphenyl ether | Delist | Denied |
| Di-n-Octyl phthalate | Delist | Proposed |
| Diethyl phthalate | Delist | Withdrawn |
| Ethylene | Delist | Denied |
| Halon 1211 | List | Granted |
| Halon 1301 | List | Granted |
| Halon 2402 | List | Granted |
| Hydrochlorofluorocarbons | List | Proposed |
| Hydrochloric acid | Modify | Pending |
| Inorganic Fluorides | List | Denied |
| Iron Chromite | Delist | Withdrawn |
| Manganese and compounds | Delist | Denied |
| Melamine | Delist | Granted |
| Methyl ethyl ketone | Delist | Withdrawn |
| Methyl isobutyl ketone | Delist | Withdrawn |
| Molybdenum trioxide | Delist | Withdrawn |
| Nickel and compounds | Delist | Denied |
| ortho-Phenylphenol | Delist | Denied |
| Phosphoric acid | Delist | Withdrawn |
| Phosphoric acid | Delist | Pending |
| Phthalic anhydride | Delist | Withdrawn |
| 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 (4) | List | Proposed |

(1) 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.
(2) CFC = Chlorofluorocarbon
(3) C.I. = Color Index
(4) EPA is proposing to add either the 70 chemicals that meet the toxicity criteria or the 22 chemicals that meet the toxicity criteria and are produced in quantities greater than 25,000 pounds.

**Q 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. At this time, a phased expansion is expected, with additions to the list of toxic chemicals to be proposed first and additional facilities to follow.

**Q In addition to the Pollution Prevention Act (PPA) of 1990, has there been any other Congressional action taken regarding TRI?**

A In addition to the PPA, Congress has sought to modify the TRI in other ways as well. For example, in the 102nd Congress, a number of bills were introduced connected with RCRA reauthorization that would have added industries not currently covered (including Federal facilities), added additional chemicals, and required facilities to develop toxics use reduction plans. While none of the bills became law, new TRI provisions could be introduced separately in the 103rd Congress or could be attached to any of a number of legislative vehicles.

**Q Has the Agency received any petitions to modify the TRI in ways other than by adding or deleting chemicals?**

A Yes. For example, the Small Business Administration has requested EPA to exempt small source reports (i.e., an exemption for facilities that have low release/transfer amounts). The petition and request for public comments were published in the Federal Register in October of 1992. The Agency is currently reviewing the petition and the comments received.

**Q Can releases of these chemicals be prevented?**

A Much can be done to prevent the EPCRA section 313 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. Using the new TRI data as a tool, EPA will be tracking year-to-year trends in release and pollution prevention data. 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 1,000 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 EPCRA section 313 chemicals and a 50% reduction in 1995. 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 the "Pollution Prevention Act Data" and "33/50 Program" chapters in this document.

**Q What caused the big decrease in ammonium sulfate (solution) releases to water and discharges to POTWs from the 1989 reporting year?**

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 1989. 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.

**Q 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 and thresholds for reporting for manufacturers and processors has 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 under section 313. 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 section 313 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 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.

**Q Are the 1991 release data compared to the current 1990 release data or to the 1990 data presented last spring?**

A For purposes of comparison, EPA uses the current data for the 1990 reporting year, which differ from the data presented last spring because of late submissions, revisions, and withdrawals. Over time, the 1991 data will also change somewhat for the same reasons.

**Q How much do changes in estimation techniques used by facilities affect facilities' release and transfer estimates?**

A EPA conducted a study assessing the reasons for changes in estimates for approximately 1,200 facilities 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.

**Q 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 recycle 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.

**Q 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 year, 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 the TRI Data Use section contained in this information package.

**Q 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 with 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).

## POLLUTION PREVENTION QUESTIONS

**Q When will EPA publish the final Form R including the new PPA data elements?**

A The Form R data elements and reporting policy issues are currently under review 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 to EPA on environmental issues. EPA does not expect to issue a final rule covering integration of the source reduction and recycling data until September 1994. Industry will continue to use the Form R that was approved May 14, 1992 until a new form is issued.

**Q The Form R expiration date says 11/92. Is the Form R valid or will it be changed for reporting year 1992?**

A November 1992 was the expiration date given by OMB when they approved the form on May 19, 1992. However, due to the passage of the Pollution Prevention Act Implementation provisions of the 1993 Appropriations Act, the Agency can continue to use this Form R until revisions are promulgated by law. Therefore, even though the expiration date shown on the Form R has passed, this Form R is still valid and should be used for all 1992 submissions.

**Q 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 may be due to different interpretations on the part of the reporting facilities, that 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. EPA will build on the experience gained from the 1991 reports to develop final guidance for the facilities.

**Q How will EPA use the future year's estimates? What if actual estimates differ from the projected estimates?**

A EPA will use the future estimates data as an indicator of potential future trends in waste management. These projections are just that—projections. They do not represent a commitment or an enforceable quantity.

**Q How are the releases reported in the "Source Reduction and Recycling Activities" section of the Form R different from those reported in the "Releases of the Toxic Chemical to the Environment On-Site" section?**

A The first quantity can differ from the second release total in two basic ways. It includes any quantity sent off-site for disposal, whereas the second does not. The first should not include any quantity associated with catastrophic, remedial, or one-time events that are non-routine. Such quantities would be reported as part of the second if released into the environment at the facility.

**Q 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 due primarily to what the facility is likely to know. For example, a facility is likely to be able to estimate the amount of chemical recovered by on-site recycling processes because this is an activity under their control The facility is less likely to know this "recovered" amount for an activity occurring off-site and not under their control. What they will know, however, is how much of the chemical they sent off-site *for the purpose* of recycling. This same difference in knowledge and data characterization applies to on-site versus off-site treatment. The facility can estimate amounts destroyed by their treatment processes, but will only know the amount sent off-site for the purpose of treatment.

**Q Why are the quantities reported in the "Source Reduction and Recycling Activities" section mutually exclusive of one another?**

A These quantities are designed to be added up to a total amount of 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.

**Q Why are catastrophic releases reported separately?**

A The values reported in the "Source Reduction and Recycling Activities" section are intended to provide a window into what opportunities exist for the facility to apply pollution prevention. The catastrophic releases are reported separately because they cannot be predicted and are generally not amenable to pollution prevention efforts.

**Q Why are the recycling numbers so large?**

A The recycling numbers are certainly large in comparison with amounts of the toxic chemical reported on Form R reports prior to 1991. The size of these new amounts is not, however, unexpected. Quantities recycled are likely to be much larger than release quantities because the purpose of recycle is to recover/reuse the chemical for further economic benefit. Unlike the release amounts, which leave the process one time only, the recycled amounts may be estimated based on the total number of times an amount is recovered and put back into the process.

**Q What is the purpose of the production index?**

A The production index is intended to put the reported data in context so that the data user can better assess progress in pollution prevention. The index can help determine if decreases in reported releases are largely the result of changes in business activity or the result of source reduction efforts or other factors.

**Q How is a chemical that is treated and then disposed of reported in the "Source Reduction and Recycling Activities" section of the Form R?**

A The amount of a chemical treated on-site is reported as the amount destroyed by that treatment. Any amount not destroyed (the balance) is to be reported as an amount "released" (including transferred off-site for disposal).

**Q 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.

**Q Almost a million pounds of various metals and metal compounds have been reported as transferred to energy recovery. Can metal compounds be used for energy recovery?**

**A** No. These reports were made in error and will be the subject of future Notices of Technical Error to be issued by EPA. 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.

**Q About 80 million pounds of toluene were reported as burned off-site for energy recovery in 1991. 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 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.

**Q 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 whose primary purpose is destruction of the toxic chemical.

**Q How are the 1991 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 will be derived by EPA by adding up the individual quantities that were reported as released, used for energy recovery, treated, and recycled. This total number will be 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 treated or recycled quantity. 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.

**Q Will 1992 TRI reporting be different from 1991 TRI?**

**A** The 1992 TRI reporting will use essentially the same Form R and instructions as for the 1991 reporting.

**Q 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.

**Q 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 a specific explanation of the reason for changes in quantity. 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 recently completed study 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. The results of this study will be used to further develop methods to assess changes over time using the source reduction and recycling data from the 1991 reporting year.

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.

## Exposure and Health Effects Questions

**Q Where can I find out more about the toxic properties of the EPCRA section 313 chemicals and their potential to cause adverse human health and environmental effects?**

A EPA has prepared 319 fact sheets that will help the public understand the potential health and ecological effects of exposure to chemical releases identified in the Toxics Release Inventory. Fact Sheets for most of the section 313 chemicals are available from EPA Regional Offices, State Emergency Response Commissions, and state Section 313 Contacts. You should be aware that determining the health and ecological effects of chemicals is a very complicated process. Most chemicals have not been tested for toxicity in a comprehensive manner. As further scientific information is acquired, additional information will be made available. The fact sheets are also available on the National Library of Medicine's TOXNET system, CD-ROM, and computer diskette. PC TRIFACTS is available from USEPA, Cathy Cain, 26 W. Martin Luther King Drive, Cincinnati, OH 45242.

**Q 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.

**Q What are my chances of getting sick when I have been exposed to chemicals?**

A The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This 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.

**Q 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.

**Q 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.

**Q 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.

**Q 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.

**Q Don't all chemicals cause cancer?**

A No. Most chemicals tested by scientists do not cause cancer.

**Q 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.

**Q 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.

**Q 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.

**Q 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.

**Q 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.

**Q What is the risk to public health resulting from toxic emissions to the air?**

A While the EPCRA section 313 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, section 313 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.

**Q 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.

**Q Is my drinking water contaminated by this chemical?**

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.

**Q Are the plants with highest 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.

## Compliance and Enforcement Questions

**Q 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 3,263 inspections of facilities subject to EPCRA section 313 reporting requirements.

**Q How many civil complaints have been issued?**

A EPA has issued approximately 683 civil complaints (almost all of which are against non-reporters) since October 1988.

**Q 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 34 million dollars in the EPCRA section 313 program since October 1988.

**Q 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 we began to track cases with SEPs), EPA has closed 116 civil complaint cases containing one or more SEPs.

**Q 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. During fiscal year 1992, EPA conducted approximately 600 EPCRA inspections; of these, over 100 focused on data quality in addition to non-reporting violations.

**Q 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. In February of 1993, EPA issued Notices of Noncompliance (NON) to 86 facilities who did not use the revised Form R to submit their data. 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.

**Q How many states have enforcement authority for section 313 of EPCRA under state laws?**

**A** About sixteen state have TRI-like laws and thirteen states have enforcement authority for the TRI reports submitted to those states. For more information on TRI state activities, see the companion document to this document, entitled 1991 TRI Public Data Release, State Fact Sheets (EPA 745-F-93-002), May 1993.

## 33/50 Program Questions

**Q 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, "33/50 Program" in this document.

## AIR QUESTIONS

**Q How much of the 2 billion pounds of toxic chemicals emitted to the air is addressed by the air toxics section of the Clean Air Act Amendments?**

A The law addresses over 1.4 billion pounds of the 2.0 billion pounds of toxic chemicals reported to the TRI for 1991. The remaining 600 million pounds of toxic chemicals are subject to control as volatile organic compounds under the ambient air standard for ozone, or are subject to the particulate matter ambient air standard.

**Q 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 they are required 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.

**Q 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 proposed regulation for Hazardous Organic National Emission Standards for Hazardous Air Pollutants (HON) for the synthetic organic chemical manufacturing industry was published on December 31, 1992 (57 FR 62608). The HON will have far-reaching effects because it will require reductions of up to 110 hazardous air pollutants. The requirement will result in substantial reductions in emissions from the affected facilities. In addition, a provision of the new CAA allows an incentive for sources that choose to reduce their emissions by 90 percent before EPA proposed the new standards. Those entering into this "early reductions program," can obtain extensions from the time required to comply with the new standards. The EPA has worked closely with industry representatives to promote widespread participation in this program. The program encourages industry to come up with innovative, cost-effective control technologies and pollution prevention methods.

**Q Why are some of the 189 hazardous air pollutants listed in the amendments to the Clean Air Act not included in the TRI?**

**A** The following 16 chemicals are listed as hazardous air pollutants in the new CAA, but are not on the EPCRA section 313 list. EPA is reviewing these chemicals for possible addition to EPCRA section 313 list.

Acetophenone
Caprolactam
Coke Oven Emissions
p,p'-Dichlorodiphenyldichloroethylene (DDE)
Dimethyl formamide
Ethylidene dichloride (1,1-Dichloroethane)
Hexamethylene-1,6-diisocyanate
Hexane
Isophorone
Mineral fibers
Phosphine
Polycyclic Organic Matter
Radionuclides (including radon)
2,3,7,8-Tetrachlorodibenzo-p-dioxin
Triethylamine
2,2,4-Trimethylpentane

There are different reasons why these chemicals are not found in the TRI data. The EPCRA section 313 and CAA amendments lists were developed for different purposes; thus, differences in these lists of chemicals are not unexpected. For example, the TRI list would focus on the individual constituents of coke oven emissions, rather than list a process source. Polycyclic organic matter (POM) is a mixture of chemicals originating from the combustion of fossil fuel. Since electric utilities are source categories that are not subject to reporting under EPCRA section 313, it may not be appropriate to list POM on the TRI list. Where appropriate, CAA chemicals may be added to the EPCRA section 313 reporting requirements after further review.

## Q How will the TRI data be used in the future by the air office?

**A** The Office of Air and Radiation has used and plans to continue to use the TRI data for source identification and source category prioritization. The TRI data have been a valuable source of air emissions information and will continue to provide direction for further analyses of potential air toxics sources and associated public health risk. See the TRI Data Use section of this information package for more specific information on how the EPA program offices are using the TRI data.

## Q How will EPA regulate TRI chemicals with large quantities of air emissions?

**A** Listed below are the 15 chemicals with the greatest total reported air emissions in TRI for 1991 (see Table 1-11), 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) |
| Chlorine | Title III, section 112(b) and 112(r) |
| Dichloromethane | Title III, section 112(b) |
| Ethylene | Title I |
| Freon 113 | Title VI |
| Glycol ethers | 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) |
| Trichloroethylene | Title I 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. Eight of the fifteen 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. Eleven of the fifteen TRI chemicals listed above are considered to be CAA HAPs. EPA's approach will lead to the early regulation of source categories that emit one or more of the hazardous air pollutants. Therefore, significant reductions of all of the hazardous air pollutants emitted by an industrial plant will be achieved rather than reduction of just one specific pollutant. For example, the hazardous air pollutants (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. Chlorine and 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 regulations to help prevent accidental releases of 100 substances. Facilities producing, handling, or storing extremely hazardous substances, including chlorine and ammonia, will be required to take precautions to protect against accidental releases of these toxic chemicals.

In addition to the other air pollutant regulations, section 604 of Title VI mandates restrictions of ozone-depleting chemicals. EPA has proposed a rule that would phase-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 rule is expected to be finalized by the fall of 1993.

## WATER QUESTIONS

**Q Why did water releases increase so much since 1990?**

A Total releases of the EPCRA section 313 chemicals to water in 1991 increased by almost 47 million pounds, approximately 24%, compared to the 1990 releases. Almost all of the increase is attributable to increased sulfuric and phosphoric acid releases of 60 million pounds from four fertilizer plants in Louisiana. These releases were due to gypsum stack storm water runoff that could not be recycled by the facilities. If these particular increases are disregarded, then the total of all other TRI water releases dropped almost 7% from 1990 to 1991.

**Q How do the water releases compare from 1990 to 1991 for specific chemicals?**

A Among the top 15 chemicals released to water, which account for almost 98% of the total water releases, phosphoric acid, sulfuric acid, glycol ethers, zinc compounds, and methanol showed increases of 53%, 44%, 17%, 16%, and 13%, respectively. Increases of chemicals other than phosphoric acid and sulfuric acid could be due to a change in business activity (change in production) or more accurate discharge estimates by the reporting industries.

The following chemicals showed a decrease: chlorine (-45%), chloroform (-23%), hydrochloric acid (-23%), formaldehyde (-19%), ammonium sulfate (-17%), ethylene glycol (-16%), acetone (-6%), and ammonia (-7%). The decrease in ammonium sulfate releases to water may be primarily the result of facilities changing their reporting on this chemical and may not represent an actual decrease. Chromium compounds, listed as the chemical with the 15th largest total releases to water in 1990, decreased 18%. Chloroform and chromium compounds are both chemicals targeted for release reduction by EPA's 33/50 program.

**Q What are the basic facts concerning the eight chemicals accounting for 95% (by weight) of direct water discharges?**

**A** The Toxics Release Inventory 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.

For the two remaining chemicals, methanol and ethylene glycol:

> 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 all of the information, including 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.

**Q 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 EPCRA section 313 chemicals. States are in the process of adopting water quality standards for these 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 the top 10 EPCRA section 313 chemicals being discharged to water 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 EPCRA section 313 listed toxic chemicals for which there are no state water quality standards.

**Q Which of the EPCRA section 313 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 EPCRA section 313 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 EPCRA section 313 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 using a ranking method. 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.

**Q Are the EPCRA section 313 chemicals covered by the state water quality standards? If not, why not?**

A A number of the EPCRA section 313 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 EPCRA section 313 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 ensures 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.

**Q EPA has completed its review of the state assessments under Section 304(1) 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.**

**1. 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.

**2. Were the TRI data used in EPA's review of the states' lists?**

**A** Yes, to some degree. Under the Statutes, 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 Toxics Release Inventory as discharging significant amounts of priority pollutants.

**3. Will future state assessments of waters use TRI data?**

**A** Yes. EPA will continue to review updates to state lists against the current TRI submittals and against subsequent TRI submittals.

**4. What are the difficulties in resolving any differences between the lists submitted by the states and the TRI data?**

**A** Each facility on the EPCRA section 313 list that shows 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.

**Q The Office of Prevention, Pesticides and Toxics has prepared information on the industrial categories that are responsible for the majority of the discharges of the EPCRA section 313 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.

**Q 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 will compare hazardous waste injection data with TRI data to identify and match those contaminants released.

**Q What is EPA's ability to actually measure the EPCRA section 313 compounds in the environment?**

A EPA has official methods for 146 of the 317 individually listed chemicals under EPCRA section 313.

**Q Has EPA been developing methods for those compounds for which adequate methods are not yet available? If not, why not?**

A EPA has considered developing analytical methods for the remaining 171 TRI chemicals. These would cost somewhere between $1.5 million and $2.0 million.

EPA is learning about new chemicals in the environment at a very rapid rate. Data reporting efforts like the TRI are a good mechanism for us to use in deciding which methods to develop next and which chemicals to regulate next.

**Q 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 (202-260-5131)

Office of Solid Waste
Alec McBride (202-260-4761)

Office of Research and Development
Gary McGee (513-569-7303)

**Q 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 the TRI report.

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 POTW to determine whether additional NPDES permit limits are needed.

OWEC/regions/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.

**Q How will EPA use the TRI data in its coastal protection programs?**

A EPA will use the TRI data to develop management plans in the National Estuary Program and the Near Coastal Waters Program. The data will be used to identify sources of toxic discharges into nationally significant estuaries and coastal water in order to provide a basis upon which to prioritize problems and protection programs.

**Q How will EPA use the TRI data in the dredging and disposal programs?**

A EPA will use the TRI data to evaluate the potential contamination of dredged materials that are proposed for disposal in marine waters.

## UNDERGROUND INJECTION QUESTIONS

**Q 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.

**Q What do the TRI data show as underground injection operations?**

A Generally, the largest number of listed facilities are Class I wells, which are industrial or municipal disposal wells injecting 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. The next group of injection wells listed are Class V wells; these wells are important since 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.

**Q 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 EPA receives TRI data attributable to underground injection in general as a release category. This is owing to the current structure of the reporting form, Form R, which 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.

**Q 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.

**Q Have any Class I wells released fluids to underground sources of drinking water (USDWs); and, if so, were these wells adequately repaired?**

A 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. Current UIC monitoring regulations would have prevented these failures. All of these cases were properly addressed by either repairing the wells, or properly plugging and abandoning operations. Class I underground injection wells are safer than virtually all other waste disposal practices.

**Q 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.

## Solid and Hazardous Waste Questions

**Q 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 311/12 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.

**Q 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.

**Q Are the toxic chemicals under EPCRA regulated under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)?**

**A** Approximately 236 of the 317 individually listed toxic chemicals under EPCRA section 313 are also CERCLA hazardous substances. Toxic chemicals that are also CERCLA hazardous substances are subject to all of the requirements of CERCLA, as amended, such as reporting, liability, financial responsibility, cleanup, and penalties.

**Q 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.

**Q How many EPCRA section 313 chemicals are regulated under the Resource Conservation and Recovery Act (RCRA)?**

**A** Approximately two-thirds of the 317 individually listed EPCRA section 313 chemicals are regulated under RCRA. More detailed information is contained in the TRI Chemical Regulatory Matrix in the Appendix of this document.

The criteria used for listing wastes as hazardous does include the presence of hazardous constituents, many of which are toxic chemicals. As such, many of the EPCRA section 313 chemicals are regulated under RCRA when present in hazardous wastes.

Forty of the individually listed EPCRA section 313 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 EPCRA section 313 chemicals are also listed as hazardous wastes when they are unused, or discarded commercial chemical products.

**Q 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 the inventory 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 the 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.

**Q 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 EPCRA section 313 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 EPCRA section 313 chemical may occur in a waste that is exempt and need not be reported under RCRA. EPCRA section 313 does not make this distinction. (Example: Certain wastewater treatment activities are exempt from RCRA, as are small quantity generators who generate less than 100 kg/month of hazardous waste).

SIC code data in TRI are limited to categories 20 through 39; 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 EPCRA section 313 chemicals that are contained in RCRA wastestreams, to facilitate a link between the two data sources.

**Q 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 4800 Treatment, Storage, Incineration, and Land Disposal facilities, including: 1500 land disposal facilities; 350 incinerators; 3000 storage/treatment facilities; 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 EPCRA section 313 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 are listed in EPCRA section 313 SIC codes 20 - 39, and, of these, approximately 7,000 sites report for TRI.

**Q How are TRI releases that are 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. Although the EPCRA section 313 counts placement of toxic chemicals in some of these management units as releases, they are not uncontrolled releases to the environment.

# PUBLIC ACCESS TO THE TOXICS RELEASE INVENTORY

EPA is fully committed to making the Toxics Release Inventory publicly available and continues to expand avenues of access and technical assistance to the TRI user community. EPA believes that increased citizen and community awareness of environmental issues and their involvement in the decision-making process is important to developing successful environmental programs. Effective pollution prevention and control depend on the involvement of federal, state and local governments, industry, and the public.

Outreach continues to be an integral part of EPA's TRI agenda. The Agency has implemented an outreach program that identifies groups and organizations to assist the agency in making the various constituencies aware of the availability and potential uses of the TRI. These groups (also referred to as multiplier and intermediary groups) include librarians, journalists, trade associations, national public interest and environmental groups, states, and others. TRI is a valuable resource to the many who know about and use the information.

A concerted effort has been made to offer TRI in a variety of printed and electronic formats. It has been distributed to nearly 4,000 public and federal depository libraries (i.e., libraries designated to receive government publications) across the country. Online access is provided through an agreement with the National Library of Medicine (see below). Other formats include diskette, microfiche, magnetic tape, CD-ROM (Compact Disc-Read Only Memory), and printed reports. A description of these products is provided later in this section.

Each of the ten EPA Regional offices has established a TRI Coordinator. The TRI Coordinators are very knowledgeable about TRI and other EPCRA provisions (see listing of EPA Regional TRI Coordinators in this Appendix). Most states and the EPA Regional offices have outreach programs that include providing training to industry and other groups. Industry training focuses primarily on understanding reporting requirements and completing the form. Outreach to groups and organizations who have contact with the general public, such as grass roots organizations, the health community, labor, and many other groups, are vital to the success of the Agency's efforts to raise overall awareness of TRI and the other provisions of the Emergency Planning and Right-to-Know Act. The public outreach activities focus on helping others understand, access, and use the data. Concerned citizens, on their own or through organized groups, continue to use TRI to raise and answer questions about chemical releases in their communities.

States also receive TRI reports and make the information available to the public. Many states have their data available before EPA can compile the data for all the states. Some publish TRI annual reports, and many have computerized the data and provide the information to the public in a variety of formats. Each state has an individual designated by the governor for Emergency Planning and Community Right-to-Know Act (EPCRA) activities. For more information about your state's TRI program, contact the EPCRA Coordinator for your state. (See listing of state EPCRA contacts in this Appendix.)

EPA continues to evaluate and provide additional routes of access to TRI and related activities. A description of TRI products, services, and key guidance documents, along with access information for the National Library of Medicine (NLM), the Government Printing Office (GPO), the National Technical Information Service (NTIS), and other access points, is provided below.

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## TRI Products, Services & Guidance Documents

### TRI and Related Products & Services

**TRI Online** -- Accessible via the National Library of Medicine's (NLM) Toxicology Data Network (TOXNET).
Access: NLM
(See below)

**Compact Disc -- Read Only Memory (CD-ROM)** -- Contains the complete national TRI for 1987-1990 and the Hazardous Substances Fact Sheets for TRI chemicals. [CD-ROM for Reporting Year 1991 will be available by Summer 1993.)
Access: NTIS, GPO, Depository Libraries, and EPA Regional Offices

### Ordering Information

**National Library of Medicine (NLM)**
Specialized Information Services
8600 Rockville Pike
For information call: 301-496-6531
Hours: 7 days/week; 24 hours/day
Bethesda, MD 20894

**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)

**(a) 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)**

**Public and Depository Libraries**
Contact the EPCRA Information Hotline at 1-800-535-0202 or TRI-US at 202-260-1531.

**Diskettes** -- State-specific diskettes include selected data from the TRI reporting form. High density 5.25 and 3.50 inch diskettes are available in the Lotus 1-2-3 (version 2.0), dBASE III PLUS, and ASCII for DOS microcomputers and Excel (version 2.1) for Macintosh. (1991 data will be available to the public by Summer 1993.) Access: NTIS, GPO

**(b) 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)**

**Magnetic Tapes** -- Available for all reporting years. Contains the complete national data and is periodically updated. Tapes are standard 1600 or 6250 bpi, 9-track, ASCII or EBCDIC and come with tape documentation. (1991 date will be available by Spring 1993.) Access: NTIS, GPO

**See NTIS, GPO(b) above.**

**Form R Facsimile** -- Photocopies or computer-generated facsimiles of TRI reports.
Access: TRI Information Branch

**TRI Information Branch**
Call: 202-260-1609
Fax: 202-260-4655

**Microfiche** -- Contains the complete TRI for each reporting year along with indices to help locate specific facility reports. Contains listing of Section 313 chemicals, indices and user guide. (Data for 1989 & 1990 will be available from GPO and NTIS by May '93.) Microfiche will not be provided for the 1991 and subsequent reporting years. Access: Selected federal depository, state and county public libraries, GPO, NTIS

**See GPO(a), NTIS above.**

**TRI National Report** -- Covers 1987-1989 data, only. Provides a detailed summary, analysis and comparison of the TRI data. Focuses on reporting requirements, changes from previous year's requirements, state summaries, total releases and transfers of TRI chemical by media and other comparisons and analyses. Maps, charts and tables are presented. (No report available for 1990 or 1991 data.) Access: EPCRA Information Hotline

**Emergency Planning and Community Right-to-Know 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)

**NESE-DB (National Economics, Social and Environmental Data Bank) CD-ROM** -- 1990 TRI state release and transfer data. (Data for 1991 reporting year will be available during the summer of 1993.) Access: Department of Commerce, selected federal depository libraries

**U.S. Department of Commerce**
NESE-DB CD-ROM
Office of Business Analysis
Room 4885
Washington, D.C. 20277 - 2787
Call: 202-377-1986

**TRI-US (TRI User Support Service)** -- General TRI information, searches and search assistance, NLM online search training, CD-ROM training. Access: TRI-US
(See below)

**Toxics Release Inventory User Support Service (TRI-US)**
U.S. EPA
401 M Street, SW. (TS-793)
Washington, D.C. 20460
Call: 202-260-1531
Fax: 202-260-4659
Hours: 8:00 am - 4:30 pm (Eastern Time)

**EPCRA Information Hotline** -- TRI publications, information and assistance.

**See EPCRA Information Hotline above.**

**Roadmap Database** -- Provides assistance to TRI users for identifying regulations and risk assessment information for TRI chemicals (diskette). Access: NTIS

**See NTIS above.**

**TRI-FACTS** -- Supplements the environmental release data on TRI chemicals by providing information related to health, ecological effects, and safety and handling of these chemicals. Access: NLM, CD-ROM, software from EPA Public Clearinghouse (EPIC)

**See NLM and CD-ROM above. A Free Copy of the software is available from EPIC by writing to:**
Cathy Cain
26 West Martin Luther King Drive
Cincinnati, OH 45242

**PC TRI-FACTS** -- TRI-FACTS for the personal computer. Access: EPA

**EPA National Center for Environmental and Public Information**
Cathy Cain
26 Martin Luther King Drive
Cincinnati, OH 45268
Call: 513-891-6685
Fax: 513-891-6561

**RTK Net (Right-to-Know Computer Network)** -- Telecommunication computer service containing the 1987-1990 TRI data, chemical fact sheets, and other data bases. (1991 data will be available in summer 1993.) Access: RTK-Net (See below)

**Right-to-Know Computer 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.")

**GPO Bulletin Board** -- Electronic bulletin board with TRI state specific data. (1991 data will be available in summer 1993.) Access: GPO

**See GPO(b) above.**

**(IRIS) Integrated Risk Information System Database** -- Online access and training and materials for obtaining information on TRI chemicals. Access: NLM

**See NLM above.**

**"Risk Screening Guide"** -- Method for evaluating TRI data for environmental managers. Access: NTIS

**See NTIS above.**

**"Chemicals, the Press and the Public"** -- A journalists' guide to reporting on chemicals in the community. Access: National Safety Council

**National Safety Council**
Environmental Health Center
1050 17th Street, NW. Suite 770
Washington, D.C. 20036
Call: 202-293-2270

**"Public Access to the Toxics Release Inventory"**-- Comprehensive listing and ordering information for TRI products, services, and documents. Access: TRI-US, EPCRA Hotline

**See TRI-US, EPCRA Information Hotline above.**

## National Library of Medicine (NLM): Online Access

The Toxics Release Inventory (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. On-line 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 TRIFACTS. TRIFACTS contains information on health effects, ecological effects, safety, and handling for 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 (TS-793)
Washington, DC 20460
Phone: 202-260-1531
FAX: 202-260-4659

## RTK NET (Right-to-Know Computer 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 1987-1990 are available on RTK NET, along with health facts for each TRI chemical. Data for reporting year 1991 will be available during the summer of 1993. 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 i.d.) Participants can communicate with one another through computer-generated mail, in addition to exchanging and reviewing documents electronically.

Both "live" and "computer" conferences are held. Conference subjects are selected by participants and have included such topics as health, activism, and environmental justice.

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

# TOXICS RELEASE INVENTORY DATA QUALITY PROGRAM

The goals of the U.S. Environmental Protection Agency's (EPA's) data quality program for the Toxics Release Inventory (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; and (4) accurately assess the relative validity of release estimates and other data.

## 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, hosting local and national seminars, and enforcement activities, EPA has endeavored to locate all facilities required to report under section 313 of the Emergency Planning and Community Right-to-Know act (EPCRA) and inform them of their obligations. In addition, EPA has prepared various materials to assist facilities in complying with the Act. 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 Reporting Year 1987 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 emission numbers to all reporting facilities to allow them to verify the entered data. EPA also received submissions from over 2,341 facilities reporting on magnetic media which ensures against data entry errors.

## 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), inserted latitude and longitude for 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.

## Correcting Form R Errors

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 and 1990 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. However, based on limited evaluation of the 1991 Form Rs, a list of common errors to avoid involving the new 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 were more accurate than their 1987 estimates, since their aggregate 1988 estimates were found to be approximately equal to the estimates calculated by the EPA contractor.

For the 1987 and 1988 reporting years, in a different type of survey, EPA also identified approximately 1,800 forms with suspect release data and telephoned facilities to discuss how to improve and correct their estimates. The information from this survey was also used to improve the reporting instructions and technical guidance.

EPA has taken steps to make data quality a priority in its enforcement program. During fiscal year 1992, EPA conducted approximately 600 EPCRA inspections. Of these, over 100 focused on data quality in addition to nonreporting violations. To assist in this endeavor, EPA has developed a guidance manual for EPA Regional inspectors on what to look for when auditing an EPCRA reporting facility. The manual contains detailed guidance on how to determine if a facility has identified all reportable chemicals, made proper threshold determinations, and provided reasonable release estimates.

In fiscal year 1990, $1 million was awarded to 11 states to develop and implement TRI data quality assurance programs. These projects focused on one or more broad data quality assurance objectives: 1) verification of the accuracy of the estimates and other data submitted by the facilities; 2) identification of facilities that should have reported but did not; and 3) identification of discrepancies between TRI data reported to EPA and to the state. Quality assurance activities 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.

# SUMMARY OF EPA PROGRAM OFFICE, REGIONAL OFFICE, AND STATE USES OF TOXICS RELEASE INVENTORY DATA

## 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 use the regulatory development process to promote source reduction within the EPA programs. As an example, for the "Metal Products and Machinery" effluent guideline being developed under the Clean Water Act, OPPT has used TRI data to identify the types of source reduction techniques already adopted by some facilities. This information will help the Agency to identify candidate facilities for site visits, as well as technologies that might serve as the basis for the selection of a prevention-oriented "Best Available Technology" treatment standard for the effluent guideline ultimately developed.

OPPT is developing an "opportunities map" for targeting potential new projects and collaborators under the Design for the Environment (DfE) Program. One of DfE's primary objectives is to effect behavioral change in the private sector by removing structural impediments to pollution prevention, and by promoting the concept of "green design." The targeting effort under DfE will draw upon existing information, including TRI data, to identify: (a) key sources of environmental problems, (b) potential change agents, and (c) the necessary infrastructural and institutional changes to effect environmental improvement.

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 7,600 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 Enforcement (OE) and Office of Compliance Monitoring (OCM)

OE, OCM, and EPA Regional offices continue to use TRI data as a tool in inspection targeting and enforcement. In addition, the TRI data are constantly evaluated with an eye towards sector-wide EPCRA initiatives. Finally, the data are included in an enforcement data base system that is used to develop multi-media/multi-statute cases and initiatives.

OCM and OE cross-check data collected under EPCRA and the Toxic Substances Control Act (TSCA) to identify those facilities or types of businesses that reported for some but not all of the reporting rules. By using TRI data and the Facility and Company Tracking System (FACTS), enforcement personnel are able to identify additional facilities owned by the same parent corporation or the same company that may be subject to liability.

OCM uses the TRI data in its EPCRA Targeting System (ETS), which provides local access to TRI and FACTS data for all facilities subject to EPCRA section 313 requirements. ETS supports creation of prioritized inspection targeting lists, generated from a wide array of selection criteria, and daily targeting activities, such as contact with facilities and tracking tips and complaints. Nine of the ten EPA Regional field offices have been introduced to this new system.

The Multi-media Coordination Team (MCT), which was established as an experimental unit in OE during the summer of 1991, is using TRI data through the Integrated Data for Enforcement Analysis (IDEA) system. IDEA provides integrated data on individual facilities' compliance records for most of the statutes administered by EPA through access to approximately ten separate data bases, including the Toxics Release Inventory System (TRIS). The TRI data aid OE in developing enforcement initiatives. EPA uses the 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.

OE staff routinely access TRI data on facilities for which violations under other statutes have been identified, with an eye toward including EPCRA violations in the same case or using the information as leverage in negotiations.

TRI data continue to be extremely helpful in identifying pollution prevention projects. Enforcement staff use data on releases and transfers to identify (or evaluate) projects that will significantly reduce emissions, or those that will help prevent or minimize the release of extremely hazardous substances under EPCRA section 302.

OCM places a high priority on enhancing the use of TRI data among Regional field personnel. OCM has issued guidance to the field offices on the resources available to their inspectors in identifying non-reporters, late reporters, and data quality errors. These resources provide the inspectors with valuable information extrapolated from the Toxics Release Inventory, such as facility reporting rates, processes, and releases.

## 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 data base 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.

OW has also identified the TRI data as one source EPA Regional offices should use to list a water body or facility under section 304(l) of the Clean Water Act. Section 304(l) requires listing of navigable waters that do not meet certain water quality standards and development of appropriate pollution control strategies for those water bodies.

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) subject to pretreatment standards 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 reported TRI discharges to surface water to identify any 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 opposed 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.

## EPA Regional Use of TRI Data

The Regions continue to use the data as an outreach tool, in enforcement targeting, and as an aid in risk screening. Multi-media inspections that include EPCRA, TSCA, Air, Water, and the RCRA programs have increased. This past year, pollution prevention initiatives, some of which rely on TRI as the yardstick of their success, were evident in all the Regions. A few examples of TRI data use in the Regions follow.

EPA's Region 5 (headquartered in Chicago) has used the TRI data extensively, particularly in their air and water programs. The Region 5 Air and Radiation Division has used the TRI data in four program areas: 1) identification of largest lead emissions sources in the Region, review of those sources for compliance with the Clean Air Act, and evaluation of their potential for voluntary emissions reductions; 2) support for enforcement cases, including identification of specific air toxics at a source and identification of Clean Air Act violations; 3) evaluation of company submittals seeking to receive compliance extensions through the Early Reduction Program; and 4) quantification of atmospheric deposition of heavy metals to the Great Lakes.

The Region 5 Water Division uses the TRI data as a baseline data set for a variety of purposes. In the permits program, TRI data provide a checklist for pollutants and their estimated loads that are used to ensure that reported pollutants are being addressed adequately through regulation or enforcement. In non-regulatory water programs, such as the Great Lakes Lakewide Management Plans and Remedial Action Plans and geographic initiatives in Northwest Indiana and Southeast Michigan, TRI data are used as a baseline data set for assessing and targeting the multi-media regulatory programs for existing effluent limitation and for pollution prevention activities. TRI data are also used in these geographic programs to identify potential sources of Critical Pollutants to individual Great Lake drainage basins and to specific sub-watersheds, allowing these areas to be ranked and prioritized based on relative watershed loadings.

EPA's Region 9 (headquartered in San Francisco) is using TRI data in a Government-Industry Pollution Prevention Project in Los Angeles County. This project is designed to extend EPA's 33/50 voluntary pollution prevention program to all TRI emitters in this geographic area, which has the highest TRI emissions in Region 9. In this project, the Region is working to form a partnership with industry and other governmental agencies in order to promote pollution prevention through community involvement, pilot pollution prevention projects, and incentives for industry participation.

## State Use of TRI Data

State TRI programs vary greatly in resources and sophistication; some states are able to do little more than store TRI forms in filing cabinets and boxes, while other states have complex programs of TRI data availability, data analysis, and pollution prevention activities. A 1992 survey of states and territories found that 34 of 52 respondents had entered at least one year's TRI data into a computer database; 28 of these included 3 or more years of data in their database. Twenty-six states generate customized database reports, 20 states provide data runs for the public, and 6 states allow direct public access to the computerized database. A follow-up survey completed in March 1993 found that 16 of 46 states used TRI data in Geographical Information Systems or other mapping projects, and 14 help analyze the data for the public by providing health effects or risk analysis information. More complete information about these survey results can be found in the TRI State Fact Sheet Book (EPA 745-F-93-002), May 1993.

The U.S. EPA has promoted state management, use, and quality assurance of the TRI data through a variety of grant programs, including two TRI-specific programs in 1990 and 1991. In 1990, the EPA awarded a total of $1.0 million to eleven states for data management and data quality projects under the TRI Data Quality Assurance program. In 1991, EPA awarded $800,000 to 10 states for a variety of start-up and advanced TRI program activities under the TRI Data Capabilities Program. Many of the products of these grant activities have been distributed to EPA Regions, other states, and State Emergency Response Commissions (SERCs) and Local Emergency Planning Committees (LEPCs). TRI-related grants have also been awarded to states through the EPA's compliance monitoring, pollution prevention, and other programs.

The Office of Pollution Prevention within the New Jersey Department of Environmental Protection and Energy is using the TRI database in conjunction with the department's Geographic Information System (GIS) and information collected through the state's own Right-to-Know program to conduct pollution prevention research. The objectives of this study are to identify facilities, processes, and geographic areas where pollution prevention measures are likely to be most effective, to prioritize facilities for emissions reductions actions, and to develop and document these identification and prioritization methods for use by other states.

Among the activities in this New Jersey project are 1) enhancement of facility locational data within the TRI database and generation of locational data for POTWs and off-site disposal facilities, 2) creation of chemical groups based on similar health and environmental effects to help determine patterns of impact, 3) using grid cells and minor watershed boundaries to aggregate releases and map their density and approximate areal extent, 4) developing comparison methods for prioritizing geographic areas or groups of facilities for targeting pollution prevention efforts, 5) analysis of throughput efficiency for facilities in two priority areas, and 6) designing a user interface to make the TRI data and modeling results more accessible, particularly to people who are not regular GIS users.

The state of Virginia maintains an up-to-date electronic database of TRI data, which is also integrated with reporting under other sections of EPCRA, including sections 302, 304, 311, and 312 (sections related to emergency planning, emergency release notification, and chemical inventory reporting). Virginia also publishes an annual TRI summary report that is made available as hard copy and on diskette. Virginia state and local government planners and policy-makers are using TRI data and reports in the areas of hazardous materials response, emergency planning, environmental enforcement, and minimization of hazardous waste. Partly as a result of the state's TRI annual report, state agencies responsible for environmental protection have increased their technical assistance to and regulatory compliance monitoring of Virginia facilities.

The state of Washington is using TRI release information in its pollution prevention legislation, both for determining which facilities must participate in pollution prevention planning and as part of the basis for planning fees.

# POTENTIAL HEALTH AND ENVIRONMENTAL EFFECTS OF FIFTEEN HIGH RELEASE TRI CHEMICALS AND TRI OZONE-DEPLETING CHEMICALS

The fifteen Toxics Release Inventory (TRI) chemicals that were released to the environment in greatest quantity in 1991 are listed in Tables A-1 and A-2. Table A-1 provides a 'X-list' summary of potential adverse health and environmental effects of these high release TRI chemicals. Table A-2 lists available EPA drinking water levels and ambient air standards for the chemicals. The list contains thirteen discrete chemicals (assuming the three xylene isomers are considered one chemical) and two groups of unspecified metal (manganese and zinc) compounds. Included in the list of thirteen discrete chemicals are two inorganic gases (chlorine and ammonia), three inorganic acids (hydrochloric, sulfuric, and phosphoric), and eight volatile organic solvents (two ketones, two aromatic hydrocarbons, two chlorinated hydrocarbons, carbon disulfide, and methanol).

The following is a summary of potential adverse health and environmental effects of the 1991 top fifteen volume-released TRI chemicals/chemical categories.

**Acetone** (also known as dimethylketone) is a flammable liquid that is likely to evaporate when exposed to air. Acetone is irritating to the skin, eye, nose, throat, and upper respiratory tract. EPA has categorized acetone as a Group D carcinogen; EPA has concluded that acetone is not classifiable as to its cancer-causing potential. Sufficient cancer evidence is not available in either human studies or animal studies to allow EPA to make a more definite determination. For non-cancer effects, EPA has established an oral reference dose (RfD) of 0.1 mg/kg/day for acetone. The RfD is based on results from a 90-day rat gavage study showing no adverse kidney effects at a dose of 100 mg/kg/day. The RfD assumes that a 70 kg person could consume (by the oral route) up to 7 mg of acetone daily over a lifetime without appreciable risk of adverse non-cancer effects. An inhalation reference concentration (RfC) for potential non-cancer effects of acetone is currently pending Agency review.

Acetone is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to exceed 1 mg/L. Acetone is not expected to persist in water or bioaccumulate in aquatic life. Because of its potential to volatilize and react in the lower atmosphere, acetone may contribute to formation of photochemical smog.

**Ammonia** is a corrosive and severely irritating gas with a pungent odor; ammonia can also exist in aqueous solutions. Ammonia is irritating to the skin, eyes, nose, throat, and upper respiratory system. EPA has established an inhalation reference concentration (RfC) of 0.1 mg/m$^3$ (approximately 0.14 ppm) for non-cancer effects for ammonia. The RfC is based on results showing no adverse effects on lung function in workers monitored during a chronic occupational exposure study. The RfC assumes that a person, breathing 20 cubic meters a day, can be exposed over a lifetime to daily atmospheric amounts of less than 2 mg of ammonia without appreciable risk for adverse non-cancer lung effects. EPA has not evaluated ammonia for its cancer-causing potential or established an oral reference dose (RfD) for its potential non-cancer effects.

Ammonia is expected to have moderate toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to be between 0.1 mg/L and 1 mg/L. Ammonia is not expected to persist in water or bioaccumulate in aquatic life. 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 may stimulate 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.

**Carbon disulfide** is a flammable liquid that is likely to evaporate when exposed to air. For non-cancer effects, EPA has established an oral reference dose (RfD) of 0.1 mg/kg/day for carbon disulfide. The RfD is based on results from a inhalation developmental toxicity study in rats showing no adverse effects at a level of 20 ppm. (One ppm of carbon disulfide is equivalent to 3.1 mg per cubic meter of air). The RfD assumes that a 70 kg person could consume (by the oral route) up to 7 mg of carbon disulfide daily over a lifetime without appreciable risk of adverse non-cancer effects. An inhalation reference concentration (RfC) for potential non-cancer effects of carbon disulfide is currently pending Agency review. EPA has not evaluated carbon disulfide for its cancer-causing potential.

Carbon disulfide is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to be greater than 1 mg/L. Carbon disulfide is not expected to persist in water or bioaccumulate in aquatic life.

**Chlorine** is a corrosive and severely irritating gas with a suffocating odor. Contact with moisture (e.g., the water present in mucous membranes in the nose and throat) results in the formation of hydrochloric acid. Chlorine can severely damage exposed tissue (the skin, eye, nose, throat, upper respiratory tract, and the lung). EPA has not evaluated chlorine for its cancer-causing potential or established an oral reference dose (RfD) or an inhalation reference concentration (RfC) for its potential non-cancer effects. A cancer assessment of chlorine and an inhalation reference concentration (RfC) for its non-cancer effects are currently pending Agency review.

Chlorine is expected to have high toxicity to aquatic organisms. Concentrations lethal to half the organisms in a test population are expected to be less than 0.1 mg/L. Chlorine is not expected to persist in water or bioaccumulate in aquatic life. Chlorine is expected to damage exposed portions of terrestrial plants.

**Dichloromethane** (also known as methylene chloride) is a non-flammable liquid that is likely to evaporate when exposed to air. EPA has classified dichloromethane as a Group B2 or a 'probable human' carcinogen. This determination is based on sufficient evidence of cancer from animal studies of dichloromethane; it has been shown to cause cancer in both oral and inhalation studies. Sufficient evidence of cancer is not available from human studies. Non-cancer effects of dichloromethane include its potential to cause adverse liver and kidney effects. For these effects, EPA has established an oral reference dose (RfD) of 0.06 mg/kg/day for dichloromethane. The RfD is based on results from a two-year rat drinking water study showing no adverse effects at a dose of 6 mg/kg/day . The RfD assumes that a 70 kg person could consume (by the oral route) up to 4.2 mg of dichloromethane daily for a lifetime without appreciable risk of adverse non-cancer effects. An inhalation reference concentration (RfC) for potential non-cancer effects of dichloromethane is currently pending Agency review.

Dichloromethane is expected to have moderate toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to be between 0.1 mg/L and 1 mg/L. Dichloromethane is not expected to persist in water or bioaccumulate in aquatic life. Because of dichloromethane is expected to react in the lower atmosphere, it is unlikely to remain in air long enough to reach the upper layers of the atmosphere (the stratosphere) and be a source of ozone-destroying chlorine atoms.

**Hydrochloric acid (HCl)** is an aqueous solution of hydrogen chloride gas; its vapors have a pungent odor. Hydrochloric acid and hydrogen chloride gas are severely irritating to the skin, eyes, nose, throat, and upper respiratory tract. EPA has established an inhalation reference concentration (RfC) of 0.007 $mg/m^3$ (approximately 0.005 ppm) for HCl for non-cancer effects. The RfC is based on results showing abnormal increases in cell growth in the upper respiratory tract of animals exposed to HCl/air concentrations of 10 ppm over their lifetimes. The RfC assumes that a person, breathing 20 cubic meters a day, can be exposed over a lifetime to daily atmospheric amounts of less than 0.14 mg of hydrogen chloride without appreciable risk for adverse non-cancer upper respiratory effects. EPA has not evaluated HCl for its cancer-causing potential or established an oral reference dose (RfD) for its potential non-cancer effects. HCl has been shown to cause adverse effects in the developing fetus in animal studies.

Hydrochloric acid is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms in a test population are expected to be greater than 1 mg/L. HCl is not expected to persist in water or bioaccumulate in aquatic life. Depending on the capacity to resist changes in acidity and alkalinity (the buffering capacity) of receiving water, HCl can increase the water's acidity (as measured by decreases in pH). A pH lower than 6.5 is generally considered to be unsuitable for the reproduction of sensitive aquatic populations.

**Manganese** is an essential element in human growth and maintenance of health. Of the trace elements required for human health, manganese is probably one of the least toxic when it is ingested in the diet. Manganese appears to be more toxic when exposure occurs by drinking water or by inhalation. Manganese compounds are of particular concern for human health when they exist in air as dusts or as fumes. EPA has categorized manganese as a Group D carcinogen; EPA has concluded that manganese is not classifiable as to its cancer-causing potential. Sufficient cancer evidence is not available in either human studies or animal studies to allow EPA to make a more definite determination. For non-cancer effects, EPA has established two oral reference doses (RfDs) for manganese, one for dietary ingestion and one for ingestion by drinking water. These oral RfDs for manganese are 0.14 mg/kg/day for dietary intake and 0.005 mg/kg/day for drinking water intake. The RfD (derived for dietary ingestion) is based a composite level (0.14 mg/kg/day) for manganese thought to be acceptable in the human diet. This RfD assumes that a 70 kg person could consume (through the diet) up to 9.8 mg of manganese daily over a lifetime without appreciable risk of adverse non-cancer effects. The RfD (derived for drinking water ingestion) is based on results from an epidemiology study of potential adverse central nervous system effects in people consuming manganese-contaminated drinking water. Adverse effects were observed at a daily dose of manganese at 0.06 mg/kg but not at 0.005 mg/kg. This RfD assumes that a 70 kg person could ingest up to 0.35 mg of manganese in drinking water daily over a lifetime without appreciable risk of adverse non-cancer, central nervous system effects. For non-cancer effects, EPA has established an inhalation reference concentration (RfC) of 0.0004 mg/m$^3$ for manganese. The RfC is based on results from a chronic worker exposure study showing manganese-related, adverse central nervous system and respiratory effects at a level as low as 0.97 mg of manganese/m$^3$. The RfC assumes that a person, breathing 20 cubic meters a day, can be exposed over a lifetime to daily atmospheric amounts of less than 0.008 mg of manganese without appreciable risk for adverse non-cancer, central nervous system or upper respiratory effects. Manganese may also cause adverse reproductive effects in humans by the inhalation route.

Manganese and its compounds are expected to have moderate toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to be between 0.1 mg/L and 1 mg/L. Manganese is likely to persist in water. Its concentration in aquatic tissue is not expected to be significantly higher than its concentration in surrounding water.

**Methanol** is a flammable liquid that is likely to evaporate when exposed to air. For non-cancer effects, EPA has established an oral reference dose (RfD) of 0.5 mg/kg/day for methanol. The RfD is based on results from a 90-day gavage study in rats showing no adverse changes in liver enzyme levels or in brain weight at a dose as high as 500 mg/kg/day. The RfD assumes that a 70 kg person could consume (by the oral route) up to 35 mg of methanol daily over a lifetime without appreciable risk of adverse non-cancer effects. An inhalation reference concentration (RfC) for potential non-cancer effects of methanol is currently pending Agency review. EPA has not evaluated methanol for its cancer-causing potential.

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 mg/L. Methanol is not expected to persist in water or bioaccumulate in aquatic life.

**Methylchloroform** (see 1,1,1-Trichloroethane)

**Methyl ethyl ketone** (MEK) is a flammable liquid that is likely to evaporate when exposed to air. MEK is irritating to the skin, eye, nose, throat, and upper respiratory tract. EPA has categorized MEK as a Group D carcinogen; EPA has concluded that MEK is not classifiable as to its cancer-causing potential. Sufficient cancer evidence is not available in either human studies or animal studies to allow EPA to make a more definite determination. For non-cancer effects, EPA has established an inhalation reference concentration (RfC) of 1 mg/m$^3$ for MEK. The RfC is based on results from an inhalation developmental toxicity study in rats showing no adverse effects at 100 ppm. (One ppm of MEK is equivalent to 2.9 mg per cubic meter of air). The RfC assumes that a person, breathing 20 cubic meters of air per day, can be exposed over a lifetime to daily atmospheric amounts of less than 20 mg of MEK without appreciable risk of adverse non-cancer effects. An oral reference dose (RfD) for potential non-cancer effects of methyl ethyl ketone has recently been withdrawn for further Agency review.

Methyl ethyl ketone is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to exceed 1 mg/L. Methyl ethyl ketone is not expected to persist in water or bioaccumulate in aquatic life. Because of its potential to volatilize and react in the lower atmosphere, MEK may contribute to formation of photochemical smog.

**Methylene Chloride** (see Dichloromethane)

**Phosphoric acid** exists as either a solid or thick liquid. Aqueous solutions of phosphoric acid are corrosive and irritating to the skin, eye, and mucous membranes. EPA has not evaluated phosphoric acid for its cancer-causing potential or established an oral reference dose (RfD) or inhalation reference concentration (RfC) for its potential non-cancer effects.

Phosphoric acid is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms in a test population are expected to be greater than 1 mg/L. Phosphoric acid is not expected to persist in water or bioaccumulate in aquatic life. Depending on the capacity to resist changes in acidity and alkalinity (the buffering capacity) of receiving water, phosphoric acid can increase the water's acidity (as measured by decreases in pH). A pH lower than 6.5 is generally considered to be unsuitable for the reproduction of sensitive aquatic populations. 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 may stimulate the overgrowth of algae whose death and decay may lead to depletion of the dissolved oxygen content of the water. Low levels of dissolved oxygen limit the type of aquatic organisms that can survive in the water.

**Sulfuric acid** is a corrosive liquid that is severely irritating to the skin, eye, nose, throat, and upper respiratory tract. EPA has not evaluated sulfuric acid for its cancer-causing potential or established an oral reference dose (RfD) or inhalation reference concentration (RfC) for its potential non-cancer effects.

Sulfuric acid is expected to have moderate toxicity to aquatic organisms. Concentrations lethal to half the organisms in a test population are expected to be between 0.1 mg/L and 1 mg/L.

Sulfuric acid is not expected to persist in water or bioaccumulate in aquatic life. Depending on the capacity to resist changes in acidity and alkalinity (the buffering capacity) of receiving water, sulfuric acid can increase the water's acidity (as measured by decreases in pH). A pH lower than 6.5 is generally considered to be unsuitable for the reproduction of sensitive aquatic populations.

**Toluene** is a flammable liquid that is likely to evaporate when exposed to air. EPA has categorized toluene as a Group D carcinogen; EPA has concluded that toluene is not classifiable as to its cancer-causing potential. Sufficient cancer evidence is not available in either human studies or animal studies to allow EPA to make a more definite determination. For non-cancer effects, EPA has established an oral reference dose (RfD) of 0.2 mg/kg/day for toluene. The RfD is based on results from a 90-day gavage study in rats showing no adverse liver and kidney effects at a dose as high as 312 mg/kg/day. The RfD assumes that a 70 kg person could consume (by the oral route) up to 14 mg of toluene daily for a lifetime without appreciable risk of adverse non-cancer effects. For non-cancer effects, EPA has established an inhalation reference concentration (RfC) of 0.4 mg/m$^3$ (approximately 0.1 ppm) for toluene. The RfC is based on results from a chronic occupational exposure study showing adverse central nervous system effects in workers exposed at a level as low as 88 ppm (approximately 330 mg/m$^3$). The RfC assumes that a person, breathing 20 cubic meters a day, can be exposed over a lifetime to daily atmospheric amounts of less than 8 mg of toluene without appreciable risk for adverse non-cancer effects. Toluene has been shown to damage the developing fetus in animal studies at high levels of exposure, as low as 420 mg/kg/day orally and 200 ppm (approximately 760 mg/m$^3$) by inhalation.

Toluene is expected to be moderately toxic to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to be between 0.1 mg/L and 1 mg/L. Toluene is not expected to persist in water or bioaccumulate in aquatic life. Because of its potential to volatilize and react in the lower atmosphere, toluene may contribute to formation of photochemical smog.

**1,1,1-Trichloroethane** (also known as methylchloroform) is a non-flammable liquid that is likely to evaporate when exposed to air. EPA has categorized methylchloroform as a Group D carcinogen; EPA has concluded that methylchloroform is not classifiable as to its cancer-causing potential. Sufficient cancer evidence is not available in either human studies or animal studies to allow EPA to make a more definite determination. Available evidence from short-term assays suggests methylchloroform may be a mutagen. EPA has recently withdrawn an oral reference dose (RfD) for potential non-cancer effects of methylchloroform. An inhalation reference concentration (RfC) for potential non-cancer effects of methylchloroform is currently pending Agency review.

Methyl chloroform is expected to have low toxicity to aquatic organisms; concentrations lethal to half the organisms of a test population are expected to be greater than 1 mg/L. Methylchloroform is not expected to persist in water or bioaccumulate in aquatic life. Because of its expected low reactivity in the lower atmosphere, methylchloroform could stay in air long enough to reach the upper layers of the atmosphere. Methylchloroform could be a source of ozone-destroying chlorine atoms in the upper layer of the atmosphere known as the stratosphere.

**Xylene** is the name shared by three chemicals, each a dimethyl benzene isomer; the chemicals are flammable liquids that are likely to evaporate when exposed to air. EPA has categorized xylene as a Group D carcinogen; EPA has concluded that xylene is not classifiable as to its cancer-causing potential. Sufficient cancer evidence is not available in either human studies or animal studies to allow EPA to make a more definite determination. For non-cancer effects, EPA has established an oral reference dose (RfD) of 2 mg/kg/day for xylene. The RfD is based on results from a lifetime rat gavage study showing no adverse effects at a dose as high as 250 mg/kg/day. The RfD assumes a 70 kg person could consume (by the oral route) up to 140 mg of xylene daily over a lifetime without appreciable risk of adverse non-cancer effects. An inhalation reference concentration (RfC) for potential non-cancer effects of xylene is currently pending Agency review. Limited information suggests xylene may damage the developing fetus of animals at high levels of inhalation exposure.

Xylene is expected to have moderate toxicity to aquatic organisms. Concentrations lethal to one half the organisms of a test population are expected to be between 0.1 mg/L and 1 mg/L. Xylene is not expected to persist in water or bioaccumulate in aquatic life. Because of its potential to volatilize and react in the lower atmosphere, xylene may contribute to formation of photochemical smog.

**Zinc** is also an essential element in human growth and maintenance of health. EPA has categorized zinc as a Group D carcinogen; EPA has concluded that zinc is not classifiable as to its cancer-causing potential. Sufficient cancer evidence is not available in either human studies or animal studies to allow EPA to make a more definite determination. EPA has established an oral reference dose (RfD) of 0.3 mg/kg/day for soluble zinc salts. The RfD is based on results from a clinical study of potential effects in people consuming zinc supplements in their diet. Adverse effects indicative of imbalances of copper in the body were observed at a daily dose of supplemental zinc at 1 mg/kg. The RfD assumes that a 70 kg person could ingest up to 21 mg of soluble zinc salts daily over a lifetime without appreciable risk of adverse effects. EPA has not established an inhalation reference concentration (RfC) for zinc for its potential non-cancer effects. Zinc has been shown to damage the developing fetus at doses as low as 100 mg/kg/day in animal studies.

Zinc and its salts are expected to be highly toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to be less than 0.1 mg/L. Zinc is likely to persist in water. Its concentration in aquatic tissue is expected to be significantly higher than its concentration in surrounding water.

**Table A-1. Potential Adverse Human Health and Environmental Effects of the Top Fifteen Released TRI Chemicals (1991).**

| CHEMICALS | POTENTIAL ADVERSE EFFECTS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Irr/ Corr | Cancer | Muta | Chronic | Develop | Repro | Aquatic | Ozone Deple-tion | Smog Forma-tion |
| Acetone | X | | | | | | | | X |
| Ammonia | X | | | | | | X | | |
| Carbon Disulfide | X | | | X | X | | | | |
| Chlorine | X | | | | | | X | | |
| Dichloromethane | | X | | X | | | X | | |
| Hydrochloric Acid | X | | | X | X | | ? | | |
| Manganese | | | | X | | X (inhal) | X | | |
| Methanol | | | | ? | | | | | |
| Methyl Ethyl Ketone | X | | | | | | | | X |
| Phosphoric Acid | X | | | | | | X | | |
| Sulfuric Acid | X | | | | | | X | | |
| Toluene | | | | X | X | | X | | X |
| 1,1,1-Trichloro-ethane | | | | | | | | X | |
| Xylene | | | | | ? | | X | | X |
| Zinc | | | | X | X | | X | | |

**Table A-2. Drinking Water Health Advisories/Maximum Contaminant Levels and Air Standards for the Top Fifteen Released TRI Chemicals (1991).**

| CHEMICALS | HEALTH ADVISORIES | MAXIMUM CONTAMINANT (mg/L) Goal | MAXIMUM CONTAMINANT (mg/L) Level | AMBIENT AIR STANDARDS |
|---|---|---|---|---|
| Acetone | None | None | | None |
| Ammonia | None | None | | None |
| Carbon Disulfide | None | None | | None |
| Chlorine | None | None | | None |
| Dichloromethane | 10-day (child): 2 mg/L<br>longer term<br>(child): 0.5 mg/L<br>(adult): 2 mg/L | 0 | 0.005 | None |
| Hydrochloric Acid | None | None | | None |
| Manganese | None | 1.3 (proposed) | | None |
| Methanol | None | None | | None |
| Methyl Ethyl Ketone | 10-day (child): 8 mg/L<br>longer term (child): 3 mg/L<br>lifetime (adult): 0.2 mg/L | None | | None |
| Phosphoric Acid | None | None | | None |
| Sulfuric Acid | None | None | | None |
| Toluene | 10-day (child): 3 mg/L<br>longer term (child): 3 mg/L<br>lifetime (adult): 2 mg/L | 1 | 1 | None |
| 1,1,1-Trichloroethane | 10-day (child): 40 mg/L<br>longer term (child): 40 mg/L<br>lifetime (adult): 0.2 mg/L | 0.2 | 0.2 | None |
| Xylene | 10-day (child): 40 mg/L<br>longer term (child): 40 mg/L<br>lifetime (adult): 10 mg/L | 10 | 10 | None |
| Zinc | None | None | | None |

## Ozone Depleters

The following chemicals are listed on the EPCRA section 313 toxic chemical list because of their contribution to the depletion of stratospheric ozone: Bromochlorodifluoromethane (Halon 1211), Bromomethane (methyl bromide), Bromotrifluoromethane (Halon 1301), Carbon tetrachloride, Dibromotetrafluoroethane (Halon 2402), Dichlorodifluoromethane (CFC-12), Dichlorotetrafluoroethane (CFC-114), Freon-113, Monochloropentafluoroethane (CFC-115), 1,1,1-Trichloroethane (methyl chloroform), and Trichlorofluoromethane (CFC-11).

As discussed in Chapter 1, the result of these ozone-depleting chemicals' being released into the atmosphere is a decrease in the earth's protective ozone layer, yielding an increase in the amount of ultraviolet-B radiation that reaches the earth's surface. Ultraviolet-B radiation is known to cause many adverse human health and environmental effects. The following are some of the effects associated with UV-B radiation exposure:

### Health Effects

#### *Skin Cancer*

Exposure to ultraviolet-B radiation has been implicated with two types of nonmelanoma skin cancer: squamous cell cancer and basal cell cancer. In addition, experimental evidence suggests that ultraviolet-B radiation plays an important role in causing malignant melanoma skin cancer. Recent studies predict that for each 1 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 affects 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.

# TRI CHEMICALS IN OTHER FEDERAL PROGRAMS: REGULATORY MATRIX

Many of the chemicals covered under the ToxicS Release Inventory (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:** Under the Emergency Planning and Community Right-to-Know Act (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 (NRC). 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) lists 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 | 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 | | |
| 7440-38-2 | Arsenic | | | X | | | X | | |
| 1332-21-4 | Asbestos (friable) | | X | X | | X | X | | |
| 7440-39-3 | Barium | | | | | | | | |
| 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 | | |
| 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 | | | |
| 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 |

| CAS Number | Chemical | EPCRA 302 | CAA 112 | CERCLA | FIFRA | NPDWR | PPL | RCRA P | RCRA U |
|---|---|---|---|---|---|---|---|---|---|
| 75-63-8 | Bromotrifluoromethane (Halon 1301) | | | X | | | | | |
| 106-99-0 | 1,3-Butadiene | | X | X | | | | | |
| 141-32-2 | Butyl acrylate | | | | | | | | |
| 71-36-3 | n-Butyl alcohol | | | X | | | | | X |
| 78-92-2 | sec-Butyl alcohol | | | | | | | | |
| 75-65-0 | tert-Butyl alcohol | | | | | | | | |
| 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 | | |
| 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 |
| 126-99-8 | Chloroprene | | X | X | | | | | |
| 1897-45-6 | Chlorothalonil | | | | X | | | | |
| 7440-47-3 | Chromium | | | X | | | X | | |
| 7440-48-4 | Cobalt | | | | | | | | |
| 7440-50-8 | Copper | | | X | X | | X | | |
| 8001-58-9 | Creosote | | | X | X | | | | X |

| CAS Number | Chemical | EPCRA 302 | CAA 112 | CERCLA | FIFRA | NPDWR | PPL | RCRA P | RCRA U |
|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | |
| 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 |
| 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 |

| CAS Number | Chemical | EPCRA 302 | CAA 112 | CERCLA | FIFRA | NPDWR | PPL | RCRA P | RCRA U |
|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | |
| 117-84-0 | n-Dioctyl phthalate | | | X | | | X | | X |
| 123-91-1 | 1,4-Dioxane | | X | X | | | | | X |
| 122-66-7 | 1,2-Diphenylhydrazine | | X | X | | | X | | X |
| 106-89-8 | Epichlorohydrin | X | X | X | | X | | | X |
| 110-80-5 | 2-Ethoxyethanol | | | X | | | | | X |
| 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 | | | | | | | | |
| 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 | | | | |
| 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 | | |
| 58-89-9 | Lindane | X | X | X | X | X | X | | X |
| 108-31-6 | Maleic anhydride | | X | X | | | | | X |
| 12427-38-2 | Maneb | | | | X | | | | |

| CAS Number | Chemical | EPCRA 302 | CAA 112 | CERCLA | FIFRA | NPDWR | PPL | RCRA P | RCRA U |
|---|---|---|---|---|---|---|---|---|---|
| 7439-96-5 | Manganese | | | | | | | | |
| 7439-97-6 | Mercury | | | 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 | | |
| 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 | | | | | | | |
| 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 |

| CAS Number | Chemical | EPCRA 302 | CAA 112 | CERCLA | FIFRA | NPDWR | PPL | RCRA P | RCRA U |
|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | |
| 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 | | |
| 7440-22-4 | Silver | | | X | X | | X | | |
| 7757-82-6 | Sodium sulfate (solution) | X | X | X | | | | | X |
| 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 | | |
| 62-55-5 | Thioacetamide | | | X | | | | | X |
| 139-65-1 | 4,4'-Thiodianiline | | | | | | | | |
| 62-56-6 | Thiourea | | | X | | | | | X |

| CAS Number | Chemical | EPCRA 302 | CAA 112 | CERCLA | FIFRA | NPDWR | PPL | RCRA P | RCRA U |
|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 | | |
| 12122-67-7 | Zineb | | | | | | | | |
| | Antimony compounds | | X | X | | | | | |
| | Arsenic compounds | | X | X | | X | | | |
| | Barium compounds | | | | | X | | | |
| | Beryllium compounds | | X | X | | | | | |
| | Cadmium compounds | | X | X | | X | | | |
| | Chlorophenols | | | X | | | | | |
| | Chromium compounds | | X | X | | X | | | |
| | Cobalt compounds | | X | X | | | | | |
| | Copper compounds | | | X | X | X | | | |
| | Cyanide compounds | | X | X | | | | | |
| | Glycol ethers | | X | X | | | | | |
| | Lead compounds | | X | X | | X | | | |
| | Manganese compounds | | X | X | | | | | |
| | Mercury compounds | | X | X | | X | | | |

| CAS Number | Chemical | EPCRA 302 | CAA 112 | CERCLA | FIFRA | NPDWR | PPL | RCRA P | RCRA U |
|---|---|---|---|---|---|---|---|---|---|
| | Nickel compounds | | X | X | | | | | |
| | Poly brominated biphenyls | | | | | | | | |
| | Selenium compounds | | X | X | | X | | | |
| | Silver compounds | | | X | X | | | | |
| | Thallium compounds | | | X | | | | | |
| | Zinc compounds | | | X | X | | | | |

# TOXICS RELEASE INVENTORY FORM R FOR 1991

The Form R for 1991 modifies previous years' forms in both content and format. While several sections of the form were rearranged, the biggest change was the addition of a number of information elements mandated by the Pollution Prevention Act of 1990 in section 8 (see chapter 2 for a detailed discussion of the information collected under this Act). In past years, section 8 was optional; in the 1991 form, the section is mandatory.

The 1991 Form (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 off-site 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 |
| |

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# FORM R TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

**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?<br>☐ 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) | PUT LABEL HERE |
| | City | |
| | State / Zip Code | |

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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# EPA FORM R

# PART II. CHEMICAL-SPECIFIC INFORMATION

| TRI FACILITY ID NUMBER |
|---|
| |
| Toxic Chemical, Category, or Generic Name |
| |

## SECTION 1. TOXIC CHEMICAL IDENTITY

**(Important: DO NOT complete this section if you complete Section 2 below.)**

| | |
|---|---|
| 1.1 | CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.) |
| 1.2 | Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.) |
| 1.3 | Generic Chemical Name (Important: Complete **only** if Part I, Section 2.1 is checked "yes." Generic Name must be structurally descriptive.) |

## SECTION 2. MIXTURE COMPONENT IDENTITY

**(Important: DO NOT complete this section if you complete Section 1 above.)**

| | |
|---|---|
| 2.1 | Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.) |

## SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY

**(Important: Check all that apply.)**

| | | | |
|---|---|---|---|
| 3.1 | **Manufacture the toxic chemical:** | a. ☐ Produce<br>b. ☐ Import | If produce or import:<br>c. ☐ For on-site use/processing<br>d. ☐ For sale/distribution<br>e. ☐ As a byproduct<br>f. ☐ As an impurity |
| 3.2 | **Process the toxic chemical:** | a. ☐ As a reactant<br>b. ☐ As a formulation component | c. ☐ As an article component<br>d. ☐ Repackaging |
| 3.3 | **Otherwise use the toxic chemical:** | a. ☐ As a chemical processing aid<br>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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# EPA FORM R

## PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

| TRI FACILITY ID NUMBER |
|---|
| |
| Toxic Chemical, Category, or Generic Name |
| |

### SECTION 5. RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

| | | | A. Total Release (pounds/ year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. % From Stormwater |
|---|---|---|---|---|---|
| 5.1 | Fugitive or non-point air emissions | NA | | | |
| 5.2 | Stack or point air emissions | NA | | | |
| 5.3 | Discharges to receiving streams or water bodies (enter one name per box) | | | | |
| 5.3.1 | Stream or Water Body Name | | | | |
| 5.3.2 | Stream or Water Body Name | | | | |
| 5.3.3 | Stream or Water Body Name | | | | |
| 5.4 | Underground injections on-site | NA | | | |
| 5.5 | Releases to land on-site | | | | |
| 5.5.1 | Landfill | NA | | | |
| 5.5.2 | Land treatment/ application farming | NA | | | |
| 5.5.3 | Surface impoundment | NA | | | |
| 5.5.4 | Other disposal | NA | | | |

☐ Check here only if additional Section 5.3 information is provided on page 5 of this form.



Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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# EPA FORM R

## PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

| TRI FACILITY ID NUMBER |
|---|
| |
| Toxic Chemical, Category, or Generic Name |
| |

## SECTION 5.3 ADDITIONAL INFORMATION ON RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

| 5.3 Discharges to receiving streams or water bodies (enter one name per box) | A. Total Release (pounds/ year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. % From Stormwater |
|---|---|---|---|
| 5.3.__ Stream or Water Body Name | | | |
| 5.3.__ Stream or Water Body Name | | | |
| 5.3.__ Stream or Water Body Name | | | |

## SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

### 6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTW)

### 6.1.A Total Quantity Transferred to POTWs and Basis of Estimate

| 6.1.A.1 Total Transfers (pounds/year) (enter range code or estimate) | 6.1.A.2 Basis of Estimate (enter code) |
|---|---|
| | |

### 6.1.B POTW Name and Location Information

| 6.1.B.__ POTW Name | | 6.1.B.__ POTW Name | |
|---|---|---|---|
| Street Address | | Street Address | |
| City | County | City | County |
| State | Zip Code | State | Zip Code |

If additional pages of Part II, Sections 5.3 and/or 6.1 are attached, indicate the total number of pages in this box [ ] and indicate which Part II, Sections 5.3/6.1 page this is, here. [ ]
(example: 1, 2, 3, etc.)



Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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# EPA FORM R

## PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

### SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.___ Off-site EPA Identification Number (RCRA ID No.)

Off-Site Location Name

Street Address

City | County

State | Zip Code | Is location under control of reporting facility or parent company? ☐ Yes ☐ No

| A. Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. | 1. | 1. M |
| 2. | 2. | 2. M |
| 3. | 3. | 3. M |
| 4. | 4. | 4. M |

### SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.___ Off-site EPA Identification Number (RCRA ID No.)

Off-Site Location Name

Street Address

City | County

State | Zip Code | Is location under control of reporting facility or parent company? ☐ Yes ☐ No

| A. Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. | 1. | 1. M |
| 2. | 2. | 2. M |
| 3. | 3. | 3. M |
| 4. | 4. | 4. M |

**If additional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box ☐ and indicate which Part II, Section 6.2 page this is, here. ☐ (example: 1, 2, 3, etc.)**



Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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# EPA FORM R

## PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

| TRI FACILITY ID NUMBER |
|---|
| |
| Toxic Chemical, Category, or Generic Name |
| |

## SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ **Not Applicable (NA)** - **Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.**

| a. General Waste Stream (enter code) | b. Waste Treatment Method(s) Sequence [enter 3-character code(s)] | c. Range of Influent Concentration | d. Waste Treatment Efficiency Estimate | e. Based on Operating Data? |
|---|---|---|---|---|
| 7A.1a | 7A.1b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ | 7A.1c | 7A.1d % | 7A.1e Yes ☐ No ☐ |
| 7A.2a | 7A.2b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ | 7A.2c | 7A.2d % | 7A.2e Yes ☐ No ☐ |
| 7A.3a | 7A.3b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ | 7A.3c | 7A.3d % | 7A.3e Yes ☐ No ☐ |
| 7A.4a | 7A.4b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ | 7A.4c | 7A.4d % | 7A.4e Yes ☐ No ☐ |
| 7A.5a | 7A.5b 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ | 7A.5c | 7A.5d % | 7A.5e Yes ☐ No ☐ |

If additional copies of page 7 are attached, indicate the total number of pages in this box ☐ and indicate which page 7 this is, here. ☐ (example: 1, 2, 3, etc.)

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# EPA FORM R

## 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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# EPA FORM R

## PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

| TRI FACILITY ID NUMBER |
|---|
| |
| Chemical, Category, or Generic Name |
| |

### SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

| | *All quantity estimates can be reported using up to two significant figures.* | Column A 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.

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## States in Each Region

### Region 1

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

### Region 2

New Jersey, New York, Puerto Rico, Virgin Islands

### Region 3

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

### Region 4

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

### Region 5

Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

### Region 6

Arkansas, Louisiana, New Mexico, Oklahoma, Texas

### Region 7

Iowa, Kansas, Missouri, Nebraska

### Region 8

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

### Region 9

Arizona, California, Hawaii, Nevada, American Samoa, Guam, Northern Marianas

### Region 10

Alaska, Idaho, Oregon, Washington

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