United States
Environmental Protection
Agency

Office of Pollution
Prevention and Toxics
(7408)

EPA 745-R-99-003
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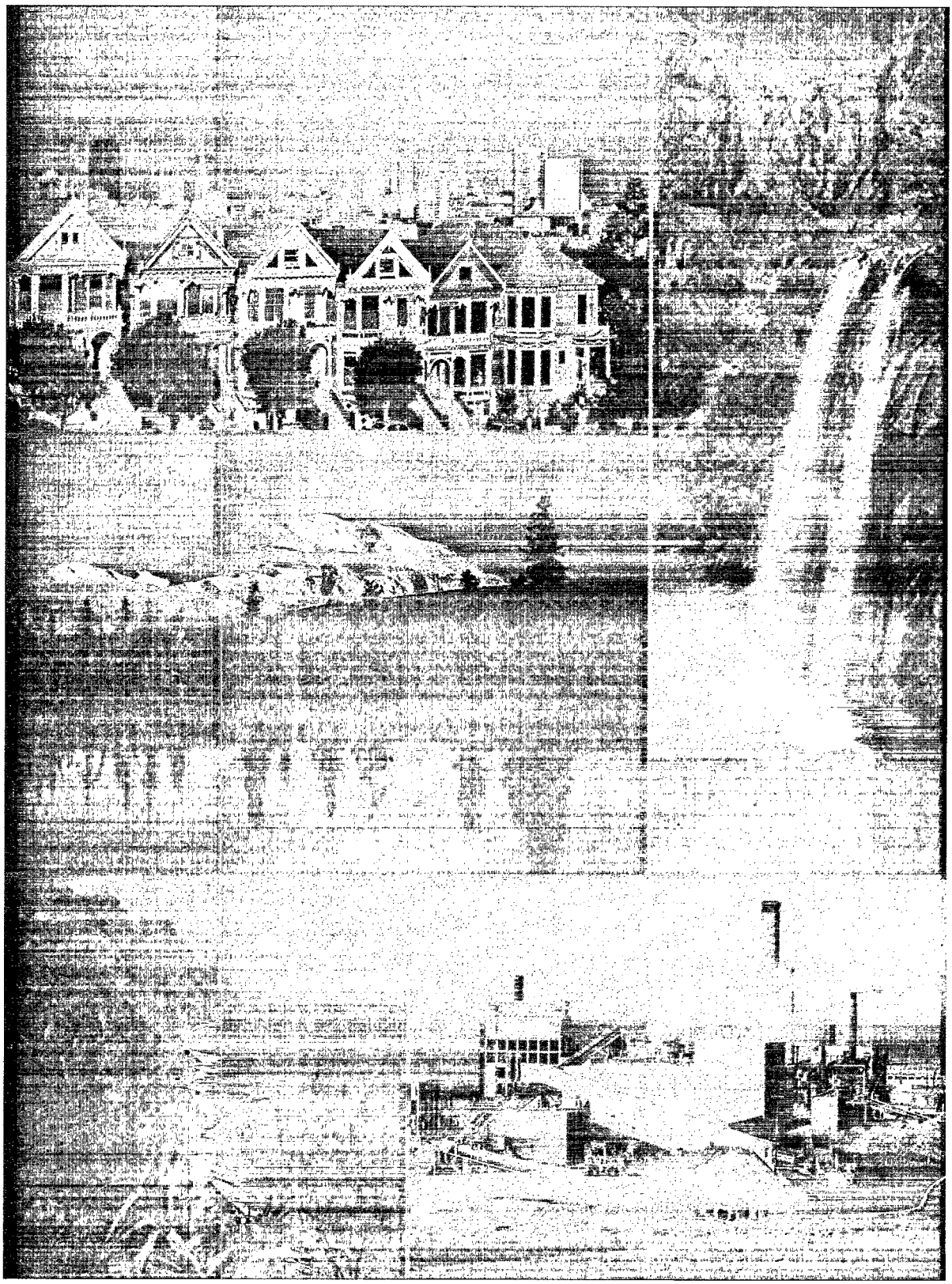
EPA

1997 Toxics Release Inventory



PUBLIC ACCESS TO THE TOXICS RELEASE INVENTORY

TRI Reports and Data Products

Product	Supplier	Contact Information	Order Information
1997 TRI Public Data Release (annual report)	U.S. EPA EPCRA Hotline	(800) 424-9346 Fax Document Requests Only: (703) 412-3333 Hours: 9:30 a.m. - 7:30 p.m. (Eastern Time)	EPA 745-R-99-003 (**Free**)
1997 State Fact Sheets	EPA's National Service Center for Environmental Publications (NSCEP)	(800) 490-9198 (513) 489-8190 Fax: (513) 489-8695	EPA 745-F-99-001 (**Free**)
1987-1996 TRI CD-ROM http://www.epa.gov/opptintr/tri/cd-rom.htm	U.S. GPO	(202) 512-1800	EPA 745-C-99-003 (about $40)
	National Technical Information Service (NTIS)	(703) 487-4650 or (800) 553-6847	EPA 745-C-99-003 (about $40)
	NSCEP	(800) 490-9198 (513) 489-8190 Fax: (513) 489-8695	EPA 745-C-99-003 (**Free** to libraries, educators, students, non-profits, and community groups)
1997 State Data Files, National Files, and Federal Facilities files in .dbf (DBase format).	U.S. GPO	(202) 512-1530	$15 - $25/disk
	U.S. EPA	http://www.epa.gov/opptintr/disks97.htm	Free
TRI Information Kit	NSCEP	(800) 490-9198 (513) 489-8190 Fax: (513) 489-8695	EPA 749-F-98-002 (**Free**)
	TRI User Support Service (TRI-US)	(202) 260-1531 Fax: (202) 401-2347	EPA 749-F-98-002 (**Free**)
Chemicals in the Environment	NSCEP	(800) 490-9198 (513) 489-8190 Fax: (513) 489-8695	Toxics Release Inventory (TRI) Pamphlet EPA 747-R-97-0016

Note: The 1987-1997 CD-ROM, containing the latest available data, will be published later in 1999.

Accessing TRI Data Online

Data from Online Providers	Internet Address	Special Notes
Right to Know Network (RTKNET) – Provides public access to TRI and related environmental data bases. For more information, call (202) 797-7200.	http://www.rtk.net ftp://ftp.rtknet.org	No charge for Internet access. Direct access by modem at parameters to 8,N,1 and log in as "public". Phone charge may apply.
National Library of Medicine (NLM) – Offers comprehensive, user friendly searching of the TRI data base. For more information, call (301) 496-6531.	http://www.nlm.nih.gov	$18 - $20 per hour charge. Password required.
U.S. EPA Internet Server – Access to a variety of reports, data files, and TRI information from EPA. For more information, call TRI-US at (202) 260-1531.	TRI-specific information: http://www.epa.gov/opptintr/tri http://www.epa.gov/enviro	General information: http://www.epa.gov ftp://ftp.epa.gov gopher://gopher.epa.gov

1997
Toxics Release
Inventory

U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxics (7408)
Washington, D.C. 20460

TABLE OF CONTENTS

CHAPTER 1 -- TOXICS RELEASE INVENTORY REPORTING AND THE 1997 PUBLIC DATA RELEASE ..... 1 - 1

Introduction and Background ..... 1 - 1

1997 Public Data Release ..... 1 - 2

TRI Reporting ..... 1 - 2

- Who Must Report? ..... 1 - 3
- What Must Be Reported? ..... 1 - 3
- What Are the Benefits and Limitations of the Data ..... 1 - 4
  - Benefits ..... 1 - 4
  - Limitations ..... 1 - 6

TRI In Perspective ..... 1 - 7

- TRI Expansion ..... 1 - 7
  - Chemical Expansion ..... 1 - 8
  - Facility Expansion ..... 1 - 8
  - Persistent, Bioaccumulative Toxic Chemicals ..... 1 - 9
- TRI Reporting Forms ..... 1 - 9
  - Form R ..... 1 - 9
  - Form A ..... 1 - 9
- Future TRI Modifications ..... 1 - 10
  - Pollution Prevention Act Reporting ..... 1 - 10
  - Redesign of TRI Reporting Forms and TRI Stakeholder Dialogue ..... 1 - 10
  - Airports Petition and Rulemaking Update ..... 1 - 11
- International Aspects of TRI ..... 1 - 12

How Can I Obtain Additional TRI Information ..... 1 - 13

CHAPTER 1 - EXHIBITS

Box 1-1. Who Reported Toxic Chemical Release Inventory Reports for the 1997 Reporting Year? .. 1 - 3

Box 1-2. Who Will Report to TRI Starting in the 1998 Reporting Year? ..... 1 - 3

Box 1-3. What Must Be Reported ..... 1 - 4

Box 1-4. Factors to Consider in Using TRI Data ..... 1 - 5

CHAPTER 2 -- NATIONAL OVERVIEW OF 1997 TOXICS RELEASE INVENTORY ..... 2 - 1

Introduction ..... 2 - 1

TRI Releases and Waste Management ..... 2 - 1

TRI Chemicals Managed in Waste ..... 2 - 7

Waste Management Information Collected ..... 2 - 7

What to Consider When Using TRI Data ..... 2 - 9

Toxicity of the Chemical ..... 2 - 9

Exposure Considerations ..... 2 - 9

1997 National Overview ..... 2 - 11

On- and Off-site Releases ..... 2 - 11

On-site Releases ..... 2 - 11

Off-site Releases ..... 2 - 13

Other On-site Waste Management ..... 2 - 13

Transfers Off-site for Further Waste Management ..... 2 - 13

TRI Chemicals Managed in Waste ..... 2 - 14

Differences between Amounts Reported in Sections 5 and 6 and in Section 8 of Form R ..... 2 - 15

1997 TRI Data by State ..... 2 - 15

On- and Off-site Releases by State ..... 2 - 16

On-site Releases ..... 2 - 16

Off-site Releases ..... 2 - 18

Transfers Within and Among State ..... 2 - 22

Off-site Releases ..... 2 - 22

Transfers Off-site for Further Waste Management ..... 2 - 22

Management of TRI Chemicals in Waste by State ..... 2 - 24

1997 TRI Data by Chemical ..... 2 - 27

Top 20 Chemicals for On- and Off-site Releases ..... 2 - 27

Use, Toxicity, and Environmental Fate Information ..... 2 - 29

Top 20 Chemicals for Quantities Managed in Waste 2-31

Metals and Metal Compounds ..... 2 - 32

On- and Off-site Releases of Metals and Metal Compounds ..... 2 - 33

Quantities of Metals and Metal Compounds Managed in Waste ..... 2 - 38

OSHA Carcinogens ..... 2 - 39

Clarification of the Basis for Carcinogen Listings on the EPCRA Section 313 List of Toxic Chemicals ..... 2 - 39

On- and Off-site Releases of OSHA Carcinogens ..... 2 - 39

Quantities of OSHA Carcinogens Managed in Waste ..... 2 - 46

Chemicals Affecting Children's Health ..... 2 - 46

Nitrate Compounds and Children's Health ..... 2 - 47

Mercury and Children's Health ..... 2 - 51

Ozone and Children's Health ..... 2 - 51

Prevention of TRI Chemicals in Waste ..... 2 - 51

Source Reduction ..... 2 - 52

Facility Projections of TRI Chemicals in Waste ..... 2 - 52

National Overview ..... 2 - 52

Projected Waste Management Data by State ..... 2 - 54

Chemical-specific Release and Waste Management Data ..... 2 - 54

CHAPTER 2 - EXHIBITS

Table 2-1. 1997 TRI Facilities and Forms ..... 2 - 11

Table 2-2. 1997 TRI On- site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management ..... 2 - 12

Table 2-3. 1997 TRI Waste Management ..... 2 - 14

Table 2-4. TRI On-site and Off-site Releases, by State, 1997 ..... 2 - 18

Table 2-5. TRI Off-site Releases (Transfers Off-site to Disposal), 1997 ..... 2 - 20

Table 2-6. TRI Releases in the State and Transferred out of State, 1997 ..... 2 - 23

Table 2-7. TRI Transfers Off-site for Further Waste Management Among and Within States, 1997 ..... 2 - 24

Table 2-8. Quantities of TRI Chemicals in Waste, by State, 1997 ..... 2 - 25

Table 2-9. Top 20 Chemicals with Largest Total On-site and Off-site Releases, 1997 ..... 2 - 28

Table 2-10. Top 20 TRI Chemicals with Largest Quantities in Waste, 1997 ..... 2 - 34

Table 2-11. TRI On-site and Off-site Releases of Metals and Metal Compounds 1997 ..... 2 - 35

Table 2-12. TRI Off-site Releases of Metals and Metal Compound, 1997 ..... 2 - 36

Table 2-13. Quantities of TRI Metals and Metal Compounds in Waste, 1997 ..... 2 - 38

Table 2-14. TRI On-site and Off-site Releases of OSHA Carcinogens, 1997 ..... 2 - 42

Table 2-15. Quantities of OSHA Carcinogens in Waste, 1997 ..... 2 - 48

Table 2-16. TRI On-site and Off-site Releases for Some Developmental Toxins, Added to TRI for 1995 Reporting Year, Top 10 Chemicals for Total Releases, 1997 ..... 2 - 50

Table 2-17. Facilities and Forms Reporting Source Reduction Activity, by Category, 1997 ..... 2 - 54

Table 2-18. Current Year and Projected Quantities of TRI Chemicals in Waste, 1997-1999 ..... 2 - 55

Table 2-19. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1996-1999 ..... 2 - 55

Table 2-20. TRI On-site and Off-site Releases, by Chemical, 1997 ..... 2 - 62

Figure 2-1. Information Collected Under TRI ..... 2 - 2

Figure 2-2. Waste Management Hierarchy ..... 2 - 7

Figure 2-3. 1997 TRI On-site Releases ..... 2 - 13

Figure 2-4. 1997 TRI Off-site Releases ..... 2 - 13

Figure 2-5. 1997 TRI Other On-site Waste Management ..... 2 - 14

Figure 2-6. 1997 TRI Transfers Off-site for Further Waste Management ..... 2 - 14

Figure 2-7. 1997 TRI Waste Management ..... 2 - 15

Box 2-1. An Explanation of On-site Releases ..... 2 - 3

Box 2-2. An Explanation of Off-site Releases (Transfers Off-site to Disposal) ..... 2 - 3

Box 2-3. How Metals and Metal Compounds Should be Reported to TRI ..... 2 - 4

Box 2-4. Use of Data for Metals and Metal Compounds in This Report ..... 2 - 5

Box 2-5. An Explanation of On-site Waste Management. . . . . 2 - 5

Box 2-6. An Explanation of Transfers Off-site for Further Waste Management . . . . . 2 - 6

Box 2-7. An Explanation of Waste Management Information . . . . . 2 - 8

Box 2-8. Basis of OSHA Carcinogen Listing for Individual Chemicals . . . . . 2 - 40

Box 2-9. What is Source Reduction . . . . . 2 - 52

Map 2-1. Geographic Distribution of TRI On-site Releases . . . . . 2 - 17

Map 2-2. Geographic Distribution of Production-related Waste Managed . . . . . 2 - 26

CHAPTER 3 -- YEAR-TO-YEAR- COMPARISON OF TOXICS RELEASE INVENTORY DATA . . . . . 3 - 1

Introduction . . . . . 3 - 1

"Core" Chemicals for Year-to-Year Comparisons . . . . . 3 - 1

Three-year Comparisons . . . . . 3 - 2

Baseline Comparisons . . . . . 3 - 2

Reporting of Ammonia, Hydrochloric Acid, and Sulfuric Acid . . . . . 3 - 2

Threshold Changes . . . . . 3 - 4

Underground Injection and On-site Land Releases . . . . . 3 - 5

Waste Management . . . . . 3 - 5

New Types of Transfers . . . . . 3 - 5

Metals and Metal Compounds . . . . . 3 - 5

Reasons for Change . . . . . 3 - 5

1995-1997 National Overview . . . . . 3 - 6

On- and Off-site Releases, 1995-1997 . . . . . 3 - 6

On-site Releases . . . . . 3 - 7

Off-site Releases . . . . . 3 - 10

Other On-site Waste Management, 1995-1997 . . . . . 3 - 10

Transfers Off-site for Further Waste Management, 1995-1997 . . . . . 3 - 10

Facilities and Forms, 1995-1997 . . . . . 3 - 10

TRI Chemicals Managed in Waste, 1995-1997 . . . . . 3 - 11

1988 and 1995-1997 National Overview . . . . . 3 - 13

On- and Off-site Releases, 1988 and 1995-1997 . . . . . 3 - 13

On-site Releases . . . . . 3 - 13

Off-site Releases . . . . . 3 - 15

Other On-site Waste Management, 1988 and 1995-1997 . . . . . 3 - 16

Transfers Off-site for Further Waste Management, 1988 and 1995-1997 . . . . . 3 - 17

On- and Off-site Releases by State . . . . . 3 - 17

Releases by State, 1995-1997 . . . . . 3 - 17

Releases by State, 1988 and 1995-1997 . . . . . 3 - 19

TRI Chemicals Managed in Waste . . . . . 3 - 19

TRI Chemicals Managed in Waste, 1991 and 1995-1997 . . . . . 3 - 19

Projected Quantities of TRI Chemicals Managed in Waste, 1991 and 1995-1999 . . . . . 3 - 23

Chemical-specific Release and Waste Management . . . . . 3 - 23

CHAPTER 3 – EXHIBITS

Table 3-1. Comparison of TRI On-site and Off-site and Transfers for Further Waste Management, 1995-1997 . . . . . 3 - 8

Table 3-2. Quantities of TRI Chemicals in Waste, 1995-1997 ..... 3 - 12

Table 3-3. Comparison of TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management, 1988 and 1994-1996 ..... 3 - 14

Table 3-4. Change in Total TRI On-site and Off-site Releases, by State, 1995-1997 ..... 3 - 18

Table 3-5. Change in Total TRI On-site and Off-site Releases, by State, 1988 and 1995-1997 ..... 3 - 20

Table 3-6. Quantities of TRI Chemicals in Waste, 1991 and 1995-1997 ..... 3 - 21

Table 3-7. Quantities of TRI Chemicals in Waste, 1991 and 1996-1999 ..... 3 - 22

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997 ..... 3 - 25

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997 ..... 3 - 26

Figure 3-1. Distributing of TRI On-site and Off-site Releases, 1988-1997 ..... 3 - 16

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

Box 3-2. An Explanation of the Modification to the Reporting Requirements for Hydrochloric and Sulfuric Acid ..... 3 - 4

Box 3-3. Reasons Facility Estimates of Releases and Other Waste Management Change ..... 3 - 7

CHAPTER 4 -- INDUSTRY REPORTING TO THE TOXICS RELEASE INVENTORY ..... 4 - 1

TRI Data by Industry, 1997 ..... 4 - 1

On- and Off-site Releases, 1997 ..... 4 - 5

On-site Releases ..... 4 - 5

Off-site Releases ..... 4 - 9

TRI Chemicals Managed in Waste, 1997 ..... 4 - 11

Economic Overview, by Industry, 1997 ..... 4 - 12

Year-by-Year Comparisons, by Industry ..... 4 - 14

On- and Off-site Releases, 1995-1997 ..... 4 - 14
On- and Off-site Releases, 1988 and 1995-1997 ..... 4 - 14

TRI Chemicals Managed in Waste, 1991, 1995, 1997-1999 ..... 4 - 15

Projected Quantities of TRI Chemicals Managed in Waste, 1997-1999 ..... 4 - 15

Quantities of TRI Chemicals in Waste, 1995-1997 ..... 4 - 18

Quantities of TRI Chemicals in Waste, 1991 and 1995-1997 ..... 4 - 20

Economic Overview, by Industry, Multi-Year Comparisons 4-22

CHAPTER 4 – EXHIBITS

Table 4-1. TRI Facilities and Forms, by Industry ..... 4 - 5

Table 4-2. TRI On-site and Off-site Releases, by Industry, 1997 ..... 4 - 6

Table 4-3. TRI Off-site Releases (Transfers Off-site to Disposal), 1997 ..... 4 - 8

Table 4-4. Quantities of TRI Chemicals in Waste Managed, by Industry, 1997 ..... 4 - 10

Table 4-5. Employees, Sales, and Total Production-related Waste, by Industry 1997 ..... 4 - 13

Table 4-6. Changed in Total TRI On-site and Off-site Releases, by Industry, 1995-1997 ..... 4 - 15

Table 4-7. Change in Total TRI On-site and Off-site Releases, by Industry, 1988 and 1995-1997 .... 4 - 16

Table 4-8. Actual and Projected Total Production-related Waste Managed by Industry, 1997-1999 ... 4 - 17

Table 4-9. Total Production-related Waste Managed, by Industry, 1995-1997 ..... 4 - 19

Table 4-10. Total Production-related Waste Managed, by Industry, 1991 and 1995-1997 ..... 4 - 21

Table 4-11. Industrial Production Indexes by Industry, 1991-1997 ..... 4 - 23

Table 4-12. Cumulative Change in Manufacturing Production and in TRI Quantities in Waste Managed, 1991-1997 ..... 4 - 23

Figure 4-1. TRI On-site and Off-site Releases, Industries with Largest Totals, 1997 ..... 4 - 6

Figure 4-2. TRI On-site and Off-site Releases, Industries with Largest Totals, 1997 ..... 4 - 7

Figure 4-3. Quantities of TRI Chemicals in Waste Managed, Industries with Largest Totals, 1997 .... 4 - 11

Box 4-1. Standard Industrial Classification (SIC) Codes ..... 4 - 1

Box 4-2. An Explanation of SIC Codes and TRI ..... 4 - 4

APPENDICES

APPENDIX A. EPA REGIONAL OFFICE AND STATE TRI CONTACTS ..... A - 1

APPENDIX B. PUBLIC ACCESS TO THE TOXICS RELEASE INVENTORY AND RELATED INFORMATION ..... B -1

APPENDIX C. ADDITIONAL INFORMATION FOR ASSESSING THE IMPACTS OF TRI CHEMICALS ..... C - 1

APPENDIX D. TRI DATA QUALITY PROGRAM ..... D - 1

APPENDIX E. TRI FORM R AND FORM A FOR 1997 ..... E - 1

Chapter 1

Toxics Release Inventory Reporting and the 1997 Public Data Release

Introduction and Background

Following a fatal chemical-release accident in Bhopal, India, the Emergency Planning and Community Right-to-Know Act (EPCRA) provisions were enacted to promote emergency planning, to minimize the effects of an accident such as occurred at Bhopal, and to provide the public with information on releases of toxic chemicals in their communities.

Section 313 of EPCRA established the Toxics Release Inventory (TRI) Program, a national database that identifies facilities, chemicals manufactured and used at the identified facilities, and the annual amounts of these chemicals released (in routine operations and in accidents and other one-time events) and otherwise managed on- and off-site in waste.

In 1990, Congress passed the Pollution Prevention Act (PPA). Among its requirements was a mandate to expand TRI to include additional information on toxic chemicals in waste and on source reduction methods. Beginning in 1991, covered facilities were required to report quantities of TRI chemicals recycled, combusted for energy recovery, and treated on- and off-site. This waste management data has strengthened TRI as a tool for providing information on facilities' handling of TRI chemicals as well as for analyzing progress in reducing releases.

The Toxics Release Inventory (TRI) Program has been a tremendously successful program and the results speak loudly for themselves. Industries have reduced their on- and off-site releases of TRI chemicals by more than 40% or 1.45 billion pounds (for chemicals reportable in all years). Governments — federal, state, and local — have used the TRI to set priorities, measure progress, and target areas of special and immediate concern. The public, our most important customer, has used the TRI data to understand their local environment, to participate in local and national debates about the choices being made that effect their health and the health of their children and, ultimately, to exert their influence on the outcome of these debates.

Since 1987, the first year of TRI reporting, the TRI and the Right-to-Know Program has grown. The number of chemicals has doubled, federal facilities have been added, new sectors will be reporting for the first time with the 1998 reporting year, and EPA has proposed to lower the EPCRA section 313 reporting thresholds for certain persistent, bioaccumulative toxic (PBT) chemicals and to add certain other PBT chemicals to the section 313 list of toxic chemicals. Our progress is to a large degree the result of our open process. The Agency applauds those who have worked with us to assure that we meet the challenge that EPCRA posed, and we encourage those who continue to push us to assure and maintain the integrity and goals of the Program.

As we move into the second decade of the TRI Program, many challenges in the Right-to-Know Program remain to be met. TRI was designed to be a program that would evolve, over time, to meet the changing needs of an informed and involved public. The program will never be static and will never be "finished." As new chemicals of concern are identified, they will be added. Sectors that appear to

contribute significantly to environmental loadings will be added. Data collection will be modified to meet new information needs and access technologies will be developed over time to assure enhanced public access.

The *1997 Toxics Release Inventory Public Data Release* provides an overview of the information collected through TRI. It summarizes data collected for calendar year 1997. For comparison purposes, this report also provides basic data for the preceding year (1996), for the new baseline year (1995), for the period since the PPA mandated collection of waste management data (1991), and for the original baseline year (1988). TRI's on-line computer database and CD-ROM contain data collected for all years, including those not found in this report.

1997 Public Data Release

This year the *1997 TRI Public Data Release* contains four chapters and focuses on the TRI data at the national level. The data are analyzed at the national level by state, by chemical and by industry. Unlike last year, this year's data release does not contain industry-specific chapters. The industry-specific chapters will be revised in the future but not in 1999.

Also, in previous data release publications, the year-to-year comparison chapter has had extensive analyses of the current year data compared to the 1988 core set of chemicals and the 1991 core set of chemicals. In this year's data release, the bulk of the year-to-year comparison is done with a new baseline year of 1995. However, there are still several tables in the *1997 TRI Public Data Release* which compare the current year data to the base years of 1988 and 1991. In addition to the change in the baseline year, the text and tables have been reorganized to put the data in terms of the waste management hierarchy.

TRI Reporting

The Toxics Release Inventory is a publicly available database that contains information on specific toxic chemical releases and other waste management activities from the manufacturing sector of the U.S. economy and, since 1994, federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). Following passage of the Pollution Prevention Act of 1990, TRI was expanded to include mandatory reporting of additional waste management and pollution prevention activities.

The information collected under these laws can be used by the public to identify facilities and chemical release patterns that warrant further study and analysis. Combined with hazard and exposure information, TRI has proven to be a valuable tool for risk identification.

Each year, facilities that meet certain thresholds must report their releases and other waste management activities for listed toxic chemicals to EPA and to the state or tribal entity in whose jurisdiction the facility is located. The TRI list for 1997 included more than 600 chemicals and 28 chemical categories. Each facility submits a TRI reporting form, known as Form R, for each TRI chemical it has manufactured, processed, or otherwise used during 1997 in amounts exceeding the thresholds. Starting with the 1995 reporting year, facilities with lower levels of reportable amounts that do not *manufacture, process, or otherwise use* more than 1 million pounds of the chemical can file a much shorter certification statement, Form A (see "TRI Reporting Forms," later in this chapter).

Reports for each calendar year are due by July 1 of the following year. After completion of data entry and data quality assurance activities, the Agency makes the data available to the public in printed reports, in a computer database, and through a variety of other information products such as CD-ROMs.

States also make available to the public copies of the forms filed by facilities in their jurisdiction. In addition, some states independently produce a data release report.

Who Must Report?

Manufacturing facilities that have the equivalent of 10 or more full-time employees and meet the established thresholds for manufacture, processing, or "otherwise use" of listed chemicals must report their releases and other waste management quantities (including quantities transferred off-site for further waste management). Manufacturing facilities are defined as facilities in Standard Industrial Classification (SIC) primary codes 20-39, which include, among others: chemicals, petroleum refining, primary metals, fabricated metals, paper, plastics, and transportation equipment. Federal facilities have been required to report since 1994, regardless of their SIC classification. In May 1997, EPA added seven new industry sectors that will report to the TRI for the first time in July 1999 for reporting year 1998.

Thresholds for manufacturing and processing are currently 25,000 pounds for each listed chemical, while the threshold for otherwise using is 10,000 pounds per chemical. Beginning with the 1995 reporting year, certain facilities are able to take advantage of a burden-reducing reporting threshold. (See "Form A" in "TRI Reporting Forms," later in this chapter.)

What Must Be Reported?

Each year, facilities report to TRI the amounts of toxic chemicals released on-site to the air, water, and land and injected underground (Section 5 of TRI Form R), and the amounts of chemicals transferred off-site for recycling, energy recovery, treatment, and disposal (Section 6 of Form R).

Box 1-1. Who Reported Toxic Chemical Release Inventory Reports for the 1997 Reporting Year?

Who Reported Toxic Chemical Release Inventory Reports for the 1997 Reporting Year?

A facility must report to TRI if it:

- Conducts manufacturing operations within Standard Industrial Classification (SIC) codes 20 through 39 (or is a federal facility in any SIC code),
- Has 10 or more full-time equivalent employees, and
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year.

Box 1-2. Who Will Report to TRI Starting in the 1998 Reporting Year?

Who Will Report to TRI Starting in the 1998 Reporting Year?

- Metal mining (SIC code 10, except for SIC codes 1011, 1081, and 1094)
- Coal mining (SIC code 12, except for 1241 and extraction activities)
- Electrical utilities that combust coal and/or oil (SIC codes 4911, 4931, and 4939)
- Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste treatment and disposal facilities (SIC code 4953)
- Chemicals and allied products wholesale distributors (SIC code 5169)
- Petroleum bulk plants and terminals (SIC code 5171)
- Solvent recovery services (SIC code 7389)

They also report production-related waste management information on quantities recycled, combusted for energy recovery, treated, or released or otherwise disposed of, both on- and off-site, and catastrophic or other one-time releases (Section 8 of the Form R).

Facilities provide specific identifying information, such as:

- Name
- Location
- Type of business
- Contact names
- Name of parent company
- Environmental permit numbers

They also provide information about the manufacture, process, and otherwise use of the listed chemical at the facility and the maximum amount of the chemical on-site during the year. Facilities provide information about methods used to treat waste streams containing the toxic chemicals at the site and the efficiencies of those treatment methods. In addition to information about the amount of toxic chemicals sent off-site for waste management, facilities also must specify the destination of these transfers. Beginning with the 1991 reports, facilities were required to provide information about source reduction activities, along with the quantities managed in waste by activities such as recycling. Companies must provide a production index that can help relate changes in reported quantities of toxic chemicals in waste managed to changes in production.

These additional data elements facilitate tracking of industry progress in reducing waste generation and moving towards safer management alternatives. While current TRI data cannot provide an absolute measure of pollution prevention, the data can provide new insight into the complete toxics cycle.

Box 1-3. What Must Be Reported to TRI?

What Must Be Reported?

Information reported by facilities includes:

- Basic information identifying the facility;
- Name and telephone number of a contact person;
- Environmental permits held;
- Amounts of each listed chemical released to the environment at the facility;
- Amounts of each chemical shipped from the facility to other locations for recycling, energy recovery, treatment, or disposal;
- Amounts of each chemical recycled, burned for energy recovery, or treated at the facility;
- Maximum amount of chemical present on-site at the facility during the year;
- Types of activities conducted at the facility involving the toxic chemical; and
- Source reduction activities.

What Are the Benefits and Limitations of the Data?

We believe that people know what's best for their own communities and, given the facts, they themselves will determine what is best to protect public health and the environment.

—Carol Browner, U.S. EPA Adminstrator

Benefits

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

priority-setting at the local level. More than 1,500 citizen groups have used TRI data to achieve the goal of a cleaner and healthier neighborhood.

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

Industry can use the data to obtain an overview of the release and other waste management of toxic chemicals, to identify and reduce costs associated with toxic chemicals in waste, to identify promising areas of pollution prevention, to establish reduction targets, and to measure and document progress toward reduction goals. Public availability of the data has prompted many facilities to work with communities to develop effective strategies for reducing environmental and human health risks posed by toxic chemical releases. Since 1988, facilities have reduced toxic releases, on- and off-site, by 42.8%, for chemicals reportable in all years.

Completion of TRI chemical expansion for the 1995 reporting year has significantly increased the usefulness of the data. The scope of the program was broadened to include 286 new chemicals and chemical categories[1] on the toxic chemical list for a total of 643 reportable chemicals and chemical categories. Many of these new chemicals are high production volume (HPV) chemicals and highly toxic substances. (See "TRI Expansion," later in this chapter for more information.)

Box 1-4. Factors to Consider in Using TRI Data

Factors to Consider in Using TRI Data

Toxicity of the Chemical: TRI chemicals vary widely in their ability to produce toxic effects. Some high volume releases of less toxic chemicals may appear to be a more serious problem than lower-volume releases of highly toxic chemicals, when just the opposite may be true.

Exposure Considerations: The potential for exposure is greater the longer the chemicals remains unchanged in the environment. Sunlight, heat, or microorganisms may or may not decompose the chemical. For example, microorganisms readily degrade some chemicals, such as methanol, into less toxic chemicals, whereas metals are persistent and will not degrade when released to the environment.

Type of Release (Environmental Medium): Chemical exposure of a population depends on the environmental medium (air, water, land, etc.) to which a chemical is released. The medium also affects the types of exposures possible, such as inhalation, dermal exposure, or ingestion.

EPA also expanded the industry coverage of the TRI program because of the recognition that the manufacturing sector is not the only industrial sector releasing toxic chemicals to the environment or otherwise managing them as waste. EPA focused particular attention on sectors linked to manufacturing—those providing energy, further managing products, or further managing waste from the manufacturing sector. On May 1, 1997, EPA published a final rule expanding TRI's industry coverage. As a result of this effort, EPA added seven industry sectors: metal mining, coal mining, electrical utilities that combust coal and/or oil, hazardous waste treatment and disposal facilities, chemical wholesale distributors, petroleum bulk stations and terminals, and solvent recovery services. Facilities in these industries will begin reporting in July 1999 for the year 1998.

EPA believes this action will greatly enhance communities' Right-to-Know by requiring TRI reports from an estimated 6,600 additional facilities. EPA is conducting an aggressive outreach campaign, including guidance, training, and technical assistance,

[1] Of the 286 chemicals, 20 were diisocyanates and 19 were polyaromatic compounds. These are reported not as individual chemicals, but as two chemical compound categories. Not individually counting the members of these two categories converts 286 to 249. Furthermore, three other chemicals have been remanded and one chemical was not reportable because of an administrative stay. Thus, the number of chemicals added to TRI, beginning with the 1995 reporting year, was 245.

to assist these new industries in understanding their reporting obligations. In addition, as a result of a Presidential Executive Order, federal facilities have been required to report since 1994.

In order to further enhance communities' Right-to-Know, on January 5, 1999 (64 FR 688) EPA published a proposed rule to lower the EPCRA section 313 reporting thresholds for certain persistent, bioaccumulative toxic (PBT) chemicals and to add certain other PBT chemicals to the section 313 list of toxic chemicals. These PBT chemicals are of particular concern not only because they are toxic but also because they remain in the environment for long periods of time, are not readily destroyed (i.e., they are persistent) and build up or accumulate in body tissue (i.e., they bioaccumulate). Relatively small releases of PBT chemicals can pose human and environmental health threats. Consequently these chemicals warrant recognition by communities as potential health threats and need to be captured by the TRI Right-to-Know Program.

Limitations

While TRI provides the public, industry, and state and local governments an invaluable source of key environmental data, it has some limitations that must be considered when using the data. Through the 1997 reporting year, the program applies to industries in the manufacturing sector and those owned by the federal government. It, therefore, does not cover all sources of releases and other waste management activities of TRI chemicals. With finalization of the facility expansion rule, industries providing energy, further managing products, or further managing waste from the manufacturing sector will also report. Although TRI is successful in capturing information on a significant portion of toxic chemicals currently being used by covered industry sectors, it does not cover all toxic chemicals or all industry sectors, nor will it do so after the facility expansion takes effect. In addition, facilities that do not meet the TRI threshold levels (those with fewer than 10 full-time employees or those not meeting TRI quantity thresholds) are not required to report. More information will be captured when the PBT rulemaking is complete, but this will still only be for a subset of chemicals on TRI. Thus, while the TRI includes 71,670 reports from 21,490 facilities for 1997, the 2.58 billion pounds of on-and off-site releases reported represent only a portion of all toxic chemical releases nationwide.

Another limitation of the existing TRI Program is that the data currently collected provide limited information on the life cycle of chemicals used by facilities. Beyond reporting on releases and other waste management, only limited and very general information on chemical storage is provided and none on the toxicity of the chemicals. In addition, this report does not account for toxic emissions from cars and trucks, nor from the majority of sources of releases of pesticides, volatile organic compounds, fertilizers or from many other non-industrial sources.

Furthermore, facilities report estimated data to TRI, and the program does not mandate that they monitor their releases. Various estimation techniques are used when monitoring data are not available, and EPA has published estimation guidance for the regulated community. Variations between facilities can result from the use of different estimation methodologies. These factors should be taken into account when considering data accuracy and comparability.

As discussed above, the TRI data summarized in this report reflect chemical releases and other waste management activities that occurred in the 1997 calendar year. Patterns of releases and other waste management activities can change dramatically from one year to the next. Thus, it is important to recognize that current facility activities may be different from those reported for 1997.

TRI reports reflect releases and other waste management activities 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.

Furthermore, TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and other waste management activities of toxic chemicals. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical after it is released, the locality of the release, and the human or other populations that are exposed to the chemical after its release.

TRI in Perspective

TRI has achieved tremendous results. The public now has a much better picture of potential toxic chemical risks in their communities, while industry and government have better data for identifying opportunities and measuring successes in preventing pollution. The sections below provide an overview of recent and proposed expansions to TRI. These expansions allow TRI to provide even more valuable information to the general public and industry.

TRI Expansion

There are few who would disagree that the 1987 Emergency Planning and Community Right-to-Know Act (EPCRA) provisions have proven to be among the most successful stimuli for reducing the amount of toxic chemicals that enter the environment. TRI, specifically, has focused public and industry attention on the billions of pounds of toxic materials that are released directly into our air, our land and our water, or injected underground, or are recycled, burned for energy recovery or otherwise treated. While all releases are not equal, and some may not lend themselves to reduction or elimination, the TRI has forced a hard look at our approach to the use of toxic chemicals. This hard look has been beneficial. Between 1988, TRI's baseline year, and 1997, industrial on- and off-site releases have decreased 42.8% from 3.40 billion pounds to 1.94 billion pounds, for chemicals reportable in all years (see Chapter 3 for additional information). This reduction reflects the hard work of manufacturing facilities that have refined their processes, looked for source reduction opportunities, assured outstanding housekeeping practices and worked to minimize the footprint they leave on their surrounding environment. Designed to be non-intrusive, TRI has provided the guide for all to use when seeking areas for environmental improvement.

One valid criticism of the program has been the limited breadth and depth of its chemical, facility, and data coverage. In 1987, when the Congress passed EPCRA, 300-plus chemicals and chemical categories were included in the "TRI Chemical List." This list combined two existing chemical lists: the New Jersey Environmental Hazardous Substance List and the Maryland Chemical Inventory Report List. Over time, through EPA's petition process, the original list has been modified as the Agency responded to petitions to add and delete chemicals, given the law's toxicity listing criteria. These criteria focus on both acute and chronic health effects as well as environmental effects. TRI's coverage of facilities has been limited to the manufacturing sector (SIC codes 20- 39), required to report under EPCRA section 313. Finally, data coverage was initially confined to information on releases and certain transfers off-site for further waste management.

Over time, EPA has worked to expand TRI to cover other industrial sectors and other chemicals that have similar adverse impacts on our environment. Towards that end, the Agency has pursued an expansion strategy that would enlarge the boundaries of TRI in several directions. EPA's recent actions include a significant expansion of the number of chemicals in the program to give the public a more complete picture of toxic chemicals in their communities. At the same time, EPA provided a burden reducing option (Form A) for facilities with lower levels of reportable amounts. EPA has also expanded the facilities reporting to TRI. Additionally, EPA has recently proposed a rule (64 FR 688) to lower the EPCRA section 313 reporting thresholds for certain persistent, bioaccumulative toxic (PBT) chemicals and to add certain other PBT chemicals to the section 313 list of toxic chemicals.

Chemical Expansion

The chemical expansion phase included two major actions. The first occurred in 1993 with the addition of certain Resource Conservation and Recovery Act (RCRA) (58 FR 63500) chemicals and certain hydrochlorofluorocarbons (HCFCs) (58 FR 63496) to EPCRA section 313.

The second action of this phase was the addition of 286 chemicals and chemical categories on November 30, 1994 (59 FR 61432). These 286 additional chemicals can be characterized as high or moderately high in toxicity, and they are currently manufactured, processed, or otherwise used in the U.S. This expansion of the chemical list raised the number of chemicals and chemical categories reported to TRI to over 600. Specifically, the rule added more than 150 pesticides, certain Clean Air Act chemicals, certain Clean Water Act Priority Pollutants, and certain Safe Drinking Water Act chemicals. Many of the chemicals are carcinogens, reproductive toxicants, or developmental toxicants. Of particular note is the addition of industrial chemicals such as diisocyanates, n-hexane, N-methyl-2-pyrrolidone, and chemicals such as polycyclic aromatic compounds that result from the combustion of fuels. This 1997 data release marks the third year facilities have reported on these added chemicals.

While this constituted a major component of the chemical expansion, the TRI chemical list is always fluid and dynamic. EPA continues to review other chemicals for addition, including chemicals that were proposed for addition but not listed in 1994. EPA may also add or delete a number of chemicals each year through the petition process. Chemicals may be added or deleted according to the toxicity criteria outlined in sections 313(c) and (d) of EPCRA.

Facility Expansion

Since the enactment of EPCRA, the TRI Program has focused on the releases and other waste management activities of the manufacturing sector—facilities classified as being primarily in SIC codes 20-39. To provide the public with a more complete picture of the toxics in their community, EPA undertook a detailed examination of other, non-manufacturing industries to determine which may be significant generators of toxic chemical releases and other wastes. Factors used to evaluate which industries would be considered for this expansion included other available data on toxic chemical releases and other waste management activities, the interrelationship of non-manufacturing operations to manufacturing operations, the degree to which reporting would be expected to occur, and the potential burden that TRI reporting might impose on these facilities.

As a result of its assessments, EPA added seven industry sectors to TRI in May 1997.

The sectors are:

- Metal mining (SIC code 10 except for SIC codes 1011, mining of iron ores; 1081 metal mining services on a contract or fee basis, such as drilling or exploration and development; and 1094, mining of uranium-radium-vanadium ores);
- Coal mining (SIC code 12 except for 1241 and extraction activities);
- Electrical utilities that combust coal and/or oil (SIC codes 4911, 4931 and 4939);
- RCRA subtitle C hazardous waste treatment and disposal facilities (SIC code 4953);
- Chemicals and allied products wholesale distributors (SIC code 5169);
- Petroleum bulk plants and terminals (SIC code 5171); and
- Solvent recovery services (SIC code 7389).

The first reports from these facilities are due July 1, 1999, for the 1998 reporting year. As part of this rule, EPA revised its interpretation of otherwise use to clarify that the treatment for destruction, stabilization,

and disposal of toxic chemicals in wastes received from other facilities is reportable. EPA estimates that about 6,600 additional facilities will submit more than 37,000 additional Form R reports because of the addition of these industry groups. EPA will continue to review other industries for possible inclusion in the TRI Program.

Since the final rule was published, EPA has developed guidance documents to help facilities in each of the newly added industries understand and comply with EPCRA section 313 requirements. The final guidance documents are available from EPA's Web site at **http://www.epa.gov/opptintr/tri**. In addition, the Agency is conducting training sessions around the country. The training sessions give an overview of EPCRA section 313 reporting requirements, with training modules that provide exercises in interpretation and form completion.

Persistent, Bioaccumulative Toxic Chemicals

On January 5, 1999 (64 FR 688), EPA published a proposed rule to lower the EPCRA section 313 reporting thresholds for certain persistent, bioaccumulative toxic (PBT) chemicals and to add certain other PBT chemicals to the section 313 list of toxic chemicals. These PBT chemicals are of particular concern not only because they are toxic but also because they remain in the environment for long periods of time, are not readily destroyed (i.e., they are persistent) and build up or accumulate in body tissue (i.e., they bioaccumulate). Relatively small releases of PBT chemicals can pose human and environmental health threats. Consequently these chemicals warrant recognition by communities as potential health threats and need to be captured by the TRI Right-to-Know Program.

At the current EPCRA section 313 reporting thresholds, facilities that manufacture, process and/or otherwise use PBT chemicals are not reporting many of the releases and other waste management data associated with these chemicals. The existing thresholds of 25,000 and 10,000 pounds are inadequate to ensure that the public has access to information about the quantities of these PBT chemicals which may enter their communities from local industrial facilities. The proposed rule includes several actions necessary to ensure that additional information on PBT chemicals is reported under section 313, including a proposal for lower reporting thresholds for PBT chemicals and a special reporting threshold for dioxin and dioxin-like compounds. The rule also includes proposed modifications to certain reporting exemptions and requirements for those chemicals that would be subject to the lower reporting thresholds. EPA anticipates that a final rule for PBT chemical reporting will be issued by the end of 1999.

TRI Reporting Forms

Form R

The Form R is the reporting form that must be annually submitted by the owner or operator of a covered facility. The reports are submitted on or before July 1 and cover activities that occurred at the facility during the previous calendar year. EPA provides the reporting forms with instructions and technical guidance on how to calculate toxic chemical releases or emissions from facilities. The *Toxic Chemical Release Inventory Reporting Forms and Instructions* are available on the Internet at **http://www.epa.gov/opptintr/tri**. In addition, EPA does provide a simplified form of reporting based on an alternate threshold for facilities with low annual amounts of a listed toxic chemical in waste (see "Form A" below).

Form A

While expanding chemical and industry coverage, EPA also provided a burden-reducing option for facilities with relatively low quantities of listed toxic chemicals in waste. Beginning in 1995, as the expanded chemical list went into effect, facilities whose total annual reportable amount of a listed toxic chemical does not exceed 500 pounds can apply a higher activity threshold in determining their reporting obligations. The total annual reportable amount is defined as the sum of the waste

management categories that would be reported to TRI: quantities released (including disposal), recovered as a result of on-site recycling operations, combusted on-site for energy recovery, and treated at the facility, plus amounts transferred off-site for recycling, energy recovery, treatment, and disposal. These amounts correspond to total production-related waste in this report.

If the facility does not exceed the total production-related amount of 500 pounds, and does not manufacture, process, or otherwise use more than 1 million pounds of the listed chemical, the facility does not have to file a Form R. Instead of filing a Form R detailing all its releases and waste management activities, the facility can submit a certification statement (Form A). Form A certifies that the facility met the conditions outlined above for the listed chemical, but does not require reporting of any amounts of the toxic chemical released or otherwise managed as waste.

Future TRI Modifications

Pollution Prevention Act Reporting

Under the Pollution Prevention Act of 1990 (PPA), EPA is required to collect information on source reduction and recycling activities on TRI's Form R. In September 1991, all facilities subject to TRI reporting were required to provide the following data:

- Quantity of the chemical (prior to recycling, treatment, or disposal) entering any waste stream or released to the environment;
- Quantities of the chemical recycled at the facility and elsewhere;
- Quantities of the chemical treated at the facility and elsewhere;
- Information on source reduction activities and the methods used to identify those activities;
- Quantities of the chemical released in one-time events not associated with production processes;
- Quantities of the chemical expected to enter any waste stream or be recycled in future years; and
- Production ratio or activity index for the reported chemical.

This change in the program generated many comments (regarding, for example, definitions of waste stream, reportable recycling, and in-process recycling) from industry, environmental groups, and the public. Therefore, EPA sought to develop a consensus approach through a special subcommittee of the National Advisory Committee on Environmental Protection and Technology (NACEPT), which was composed of industry, environmental groups and governmental agencies. As a result of those discussions, the Agency is currently developing a supplemental notice of proposed rulemaking (SNPR) and final rule.

Redesign of TRI Reporting Forms and TRI Stakeholder Dialogue

In May 1997, when EPA finalized the industry expansion rule, the Vice President announced that the Agency would initiate an intensive stakeholder process to comprehensively evaluate the current reporting forms (Form R and Form A) and reporting practices relating to the TRI Program. The goals of this process were to improve the type of right-to-know information available to communities and to help streamline right-to-know reporting to ease the paperwork burden for businesses affected by the requirements. EPA utilized the Toxics Data Reporting Committee (TDR) of the National Advisory Council for Environmental Policy and Technology (NACEPT) and additional public stakeholder meetings to obtain input from interested parties on these issues.

NACEPT is a federal advisory committee under the Federal Advisory Committee Act, PL 92-463. It provides advice and recommendations to the Administrator of EPA on a broad range of environmental policy issues. The TDR committee was created under NACEPT's auspices. The TDR committee consisted of 24 members from industry,

academia, government agencies, environmental groups, environmental justice groups, labor, and public interest groups. After meeting eight times during fiscal years 1998 and 1999 and completing a final report, the committee identified possible improvements and burden reduction measures in the TRI Program. The committee also supplied EPA with ideas about how EPA presents the data to the public.

EPA has reviewed the suggestions received from NACEPT and already implemented some of the Committee's ideas and is currently pursuing the implementation of other Committee ideas. Some examples of Committee suggestions already implemented by EPA include industry-specific guidance documents, the inclusion of economic and production information in industry sector chapters in the annual data release, and examples of sector-specific success stories in the data release. Some examples of Committee ideas that EPA is currently pursuing include an intelligent TRI software that would lead users through the reporting requirements of EPCRA section 313, a TRI users guide for the general public, and a hazard matrix for EPCRA section 313 chemicals. Once the new Information Office is established, the Agency expects to establish a new mechanism for stakeholder input on TRI and other information access issues.

In addition to the NACEPT process, EPA obtained additional views and information from stakeholders by holding a number of smaller meetings for interested parties. EPA held seven public meetings to solicit comments from stakeholders regarding the issues outlined above. These meetings were held in Washington, DC; San Francisco, CA; Chicago, IL; Dallas, TX; New York, NY; Kansas City, KS; and Atlanta, GA.

Airports Petition and Rulemaking Update

On April 16, 1997, EPA received a petition from the Natural Resources Defense Council, the Defenders of Wildlife, the National Audubon Society, and the Humane Society of the U.S. requesting EPA to initiate rulemaking to add SIC code 45, transportation by air, to the list of facilities required to report to TRI. The petitioners stated that airports should report because they meet EPA's three criteria for adding facilities under section 313 of EPCRA. In addition, the petitioners asserted that requiring such reporting would further the purposes of EPCRA by making TRI information publicly available to communities located near airports.

In response, EPA issued a Notice of Receipt and request for comments in the *Federal Register* on February 10, 1998. In the notice, the Agency published the full text of the petition and requested comments on 1) whether the use of TRI chemicals would or should be exempt under the Motor Vehicle Maintenance Exemption, 40 CFR 372.38(c), and 2) the practical impacts of requiring airports to report under section 313 of EPCRA. The Agency recognizes that if airports were required to report under section 313 of EPCRA and 6607 of the PPA, there could be unique reporting issues associated with their ownership, operation, and control. Therefore, information gathered from those who commented on the February 10, 1998, *Federal Register* notice will be instrumental in helping the Agency determine whether to add airports as facilities that should report to TRI.

Additionally, EPA is presently considering changes to the motor vehicle maintenance exemption, as well as the structural component exemption, the routine janitorial and facility grounds maintenance exemption, the personal use exemption, and the intake water/air exemption. These exemptions were implemented at the origin of the program to exempt ancillary uses of toxic chemicals at facilities in the manufacturing sector. However, if airports are added to EPCRA section 313 reporting, these exemptions, in particular the motor vehicles maintenance exemption, would exempt a significant majority of the releases and other waste management activities. Uses of toxic chemicals to maintain airplanes and other vehicles at airports are instrumental to the business of the airport. Thus, if EPA adds airports to EPCRA section 313, the Agency must make changes to the motor vehicle maintenance exemption so that releases of concern to the community would be reported by airports.

International Aspects of TRI

Toxic chemical releases know no boundaries. While TRI data provide a wealth of information about releases, on-site waste management, and off-site transfers of toxic chemicals within the U.S., information from other countries is limited. This, however, is changing. There are an increasing number of countries developing TRI-like systems. The international term for these systems is Pollutant Release and Transfer Registers (PRTRs).

The real stimulus for PRTRs was the 1992 United Nations conference on the environment, popularly known as the Earth Summit. One conclusion from this conference was the benefit and value of PRTRs. Countries were encouraged to develop these systems. In an important step, the Earth Summit also linked these PRTR systems with public Right-to-Know, an integral aspect of TRI.

Since 1992, there has been a growing interest in PRTRs. The Organisation for Economic Cooperation and Development (OECD), an organization of 29 industrialized democracies, created a guidance document for governments on PRTRs. Development of this guidance manual included the participation of representatives from government, industry, and other non-governmental organizations. Following the publication of this manual in 1996 and recognizing the value and importance of PRTR systems to environmental protection, the OECD environment ministers issued a Council Recommendation that encourages all OECD nations to establish PRTR systems.

For developing nations, the United Nations Institute for Training and Research (UNITAR) developed a step-by-step process, with accompanying guidance manuals, on how to implement a PRTR system. In an initial phase, UNITAR selected three countries to serve in a pilot program (Mexico, Czech Republic, Egypt). The goal was to take the lessons learned from this pilot stage to help other industrializing nations develop PRTR systems.

Currently, PRTR work now has entered its second stage. While the initial work, including the OECD's guidance manual and UNITAR's pilot program, focused on creating the framework for PRTR development, the second stage is shifting to greater coordination between countries and international organizations. This is exemplified by a recent international conference on PRTR systems, which focused on measuring progress, identifying barriers, and discussing options for cooperation between nations. The PRTR conference was held in September, 1998, by the OECD, along with UNITAR and the United Nations Environment Programme (UNEP). Japan, which introduced legislation creating its PRTR in February, 1999, played host to the conference. The U.S. co-chaired the conference with Japan in recognition of its role in the PRTR movement.

Present work by the OECD focuses on facilitating the integration of PRTR systems with chemicals management activities. In 1999, the OECD is working on a project that focuses on the beneficial link between Environmental Management Systems (EMS), such as ISO 14000, and PRTR data. Other work includes a project for the OECD nations to coordinate the development of estimation guidance documents for industry.

UNITAR has moved from the three pilot nations to a new group of countries. Using its materials developed in the pilot stage, UNITAR is helping the Slovak Republic and is in planning discussions with Argentina. UNEP also is working with nations to implement PRTR systems, including a project to facilitate PRTR development in Russia, Ukraine, Kazakhstan and Uzbekistan.

Recognizing this new focus, the international community has formed a PRTR Coordination Group to coordinate and prevent duplication of efforts. The U.S. is the chair of the group, while the OECD is the Secretariat. With the number of countries with operational PRTR systems growing from the present eight (Australia, Canada, France, Mexico,

Netherlands, Norway, United Kingdom, U.S.) to over 30 in the next few years, the need for this PRTR Coordination Group is obvious.

A reflection of the international recognition of the importance of PRTR systems is the recent selection of PRTRs as a thematic discussion at the next meeting of the Intergovernmental Forum on Chemical Safety (IFCS). The IFCS is the body of governments that guides the development of chemicals management issues outlined at the 1992 Earth Summit. The meeting is scheduled for October, 2000, in Brazil. As the chair of the PRTR Coordination Group, the U.S. will play a significant role in the planning for this meeting.

On a more regional scale, North America offers the first opportunity to collect PRTR data across a continent. The U.S. has collected PRTR data since 1987. The first year of Canadian data is 1993. Mexico is phasing in its PRTR system starting with the 1997 reporting year. Facilities must file air emissions data for 1997, while voluntarily reporting for other releases. Mexico intends to make these other media mandatory.

Supporting this work is the Commission on Environmental Cooperation (CEC), an organization created by the environmental side agreements to the North American Free Trade Agreement (NAFTA). The CEC has developed two important reports. The first compares PRTR systems in the three North American nations. The second report, developed annually, compiles and analyzes the data from the North American PRTR systems. The 1994, 1995, and 1996 reports include only U.S. and Canadian data. The reports also provide information about the Mexican PRTR system, with the goal of including Mexican PRTR data when that system has data comparable to the U.S. and Canadian data.

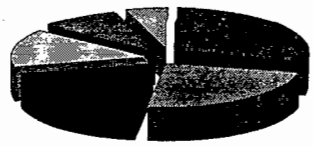
The U.S. will continue to work closely with other countries and international organizations on PRTR issues. The expanding work on PRTRs will require the commitment and guidance of the U.S. and rely on the growing experience of the TRI.

How Can I Obtain Additional TRI Information?

The TRI data are available in an on-line computer database and in a variety of common computer and hard copy formats to ensure that everyone can easily use the information. Information about accessing the TRI database is provided on the inside front cover of this report as well as in Appendix B. The TRI User Support Service (**202-260-1531**) can provide assistance in accessing and using the TRI data. On-line services include the National Library of Medicine's TOXNET system, the Right-to-Know Network (RTK NET), and EPA's Envirofacts system. Appendix B provides additional information on these and other means of access to TRI data.

To request copies of TRI and EPCRA documents or to obtain further information about the program, contact the toll-free Emergency Planning and Community Right-to-Know Information Hotline at **1-800-424-9346.** TRI information is also available on the TRI Web site at **http://www.epa.gov/ opptintr/ tri.** Other potential sources of TRI information include the state EPCRA section 313 contact, the EPA Regional Office, or the facility itself. Information about EPA regional and state EPCRA section 313 contacts appears in Appendix A.

Chapter 2



National Overview of 1997 Toxics Release Inventory

Introduction

This chapter summarizes information reported by TRI facilities for calendar year 1997. This summary includes data for facilities' on- and off-site releases of TRI chemicals, other on-site waste management, and transfers to off-site locations for further management. This chapter also presents data on TRI chemicals managed in waste in 1997: quantities recycled on- and off-site, combusted for energy recovery on- and off-site, and treated on- and off-site, along with quantities released on- and off-site.

The chapter begins with a description of the categories of releases and other waste management activities that are reportable to TRI. It then describes information on toxicity and exposure considerations pertinent to use of TRI data. National, state, and chemical analyses of the 1997 data follow. Chapter 3 examines chemical reporting over time, comparing chemicals that have been reportable in all years (or "core" chemicals). Chapter 4 analyzes release and waste management data by industry sector for the 20 manufacturing sectors required to report to TRI in 1997.

TRI Releases and Waste Management

Figure 2-1 illustrates on-site and off-site releases, on-site waste management activities, and transfers off-site for further waste management, reportable to TRI. Box 2-1 describes reportable releases that may occur on-site at the facility and identifies types of activities that may contribute releases to various media. Box 2-2 describes releases that may result from a facility's transferring chemicals off-site for disposal. As noted in Box 2-2, off-site releases include additional details about off-site transfers of metals and metal compounds, beginning with reporting year 1997. Box 2-3 explains how facilities should report metals and metal compounds, and Box 2-4 describes EPA's methodology for using these data in analyses in this report. Box 2-5 lists on-site waste management activities that are reportable to TRI. Box 2-6 describes transfers off-site for further waste management.

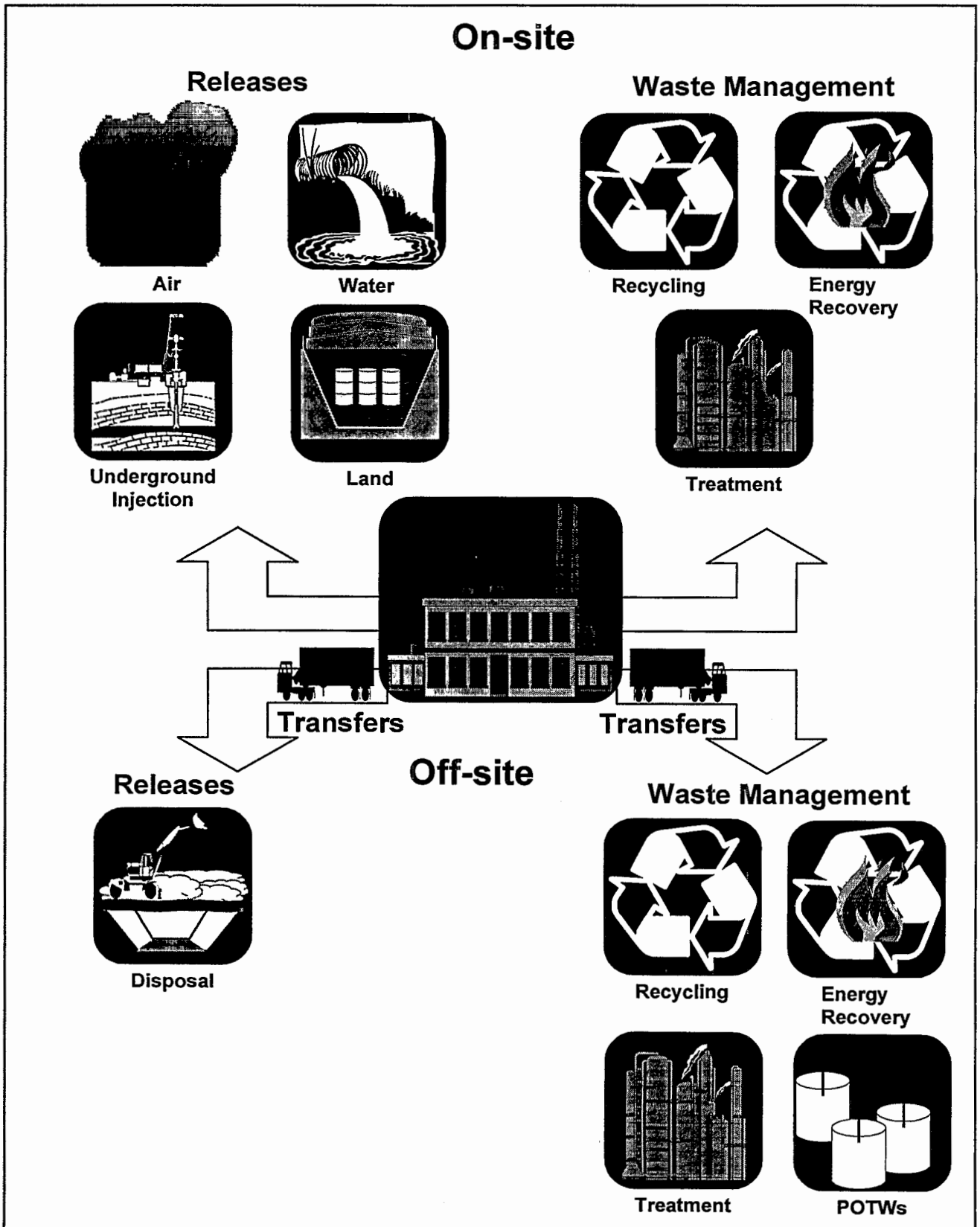


Figure 2-1. Information Collected Under TRI

Box 2 - 1. An Explanation of On-site Releases

An Explanation of On-site Releases

A release is a discharge of a toxic chemical to the environment. On-site releases include emissions to the air, discharges to bodies of water, releases at the facility to land, as well as releases into underground injection wells. Releases are reported to TRI by media type. On-site releases are reported in Section 5 of Form R.

Air Emissions. Releases to air are reported either as point source or fugitive emissions. Point source emissions, also referred to as stack emissions, 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.

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

Underground Injection. Underground injection is the subsurface emplacement of fluids through wells. TRI chemicals associated with manufacturing, the petroleum industry, mining, commercial and service industries, and federal and municipal government-related activities may be injected into Class I, II, III, IV, or V wells, if they do not endanger underground sources of drinking water (USDW), public health, or the environment. The different types of authorized injection activities are:

- Class I industrial, municipal, and manufacturing wells inject fluids into deep, confined, and isolated formations below potable water supplies.
- Class II oil- and gas-related wells re-inject produced fluids for disposal, enhanced recovery of oil, or hydrocarbon storage.
- Class III wells are associated with the solution mining of minerals.
- Class IV wells may inject hazardous or radioactive fluids directly or indirectly into USDW, only if the injection is part of an authorized CERCLA/RCRA clean-up operation.
- Class V wells, which include all types of injection wells that do not fall under I-IV, may inject only if they do not endanger USDW, public health, or the environment. Class V wells are, generally, shallow drainage wells, such as floor drains connected to dry wells or drain fields.

Beginning with the 1996 reporting year, facilities separately report amounts injected into Class I wells and into all other wells.

On-site Land Releases. On-site releases to land occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals in landfills (in which wastes are buried), land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal methods (such as waste piles) or releases to land (such as spills or leaks). Beginning with the 1996 reporting year, facilities separately report amounts released to RCRA subtitle C landfills from amounts released to other on-site landfills.

Box 2 - 2. An Explanation of Off-site Releases (Transfers Off-site to Disposal)

An Explanation of Off-site Releases (Transfers Off-site to Disposal)

An off-site release is a discharge of a toxic chemical to the environment that occurs as a result of a facility's transferring a waste containing a TRI chemical off-site to disposal, as reported in Section 6 of Form R. Certain other types of transfers are also categorized as off-site releases because, except for location, the outcome of transferring the chemical off-site is the same as releasing it on-site.

Transfers to Disposal. Toxic chemicals in waste that are transferred off-site for disposal generally are either released to land at an off-site facility or are injected underground. (See discussion of on-site releases to land and underground injection for a description of these release types.)

Storage Only. Generally, a toxic chemical is sent off-site for storage because there is no known disposal method. One example is toxic chemicals in mixed hazardous and radioactive waste. EPA considers this an off-site release because this method is being used as a form of disposal and the toxic chemical will remain there indefinitely.

Unknown. The "unknown" category of disposal indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Therefore, EPA has categorized this method as the lowest type of waste management (environmentally least desirable) and has included it as a type of disposal for reporting purposes. Thus, it is considered to be an off-site release.

Metals and Metal Compounds. The transfer of metals and metal compounds to solidification/stabilization and to wastewater treatment (either publicly or privately owned treatment works) also result in releases and are classified as off-site releases (transfers to disposal) (see Box 2-3).

Box 2 - 3. How Metals and Metal Compounds Should be Reported to TRI

How Metals and Metal Compounds Should be Reported to TRI

In Section 6.1 of Form R, facilities report amounts of listed chemicals transferred to publicly owned treatment works (POTWs). Because metals are not destroyed by sewage treatment processes, amounts of metals and metal compounds reported in Section 6.1 are considered transfers to disposal.

In Section 6.2 of Form R, facilities report the amounts sent to each off-site location to which the facility ships or transfers wastes containing the reported toxic chemical for the purposes of recycling, energy recovery, treatment, or disposal. Metals and metal compounds are managed in waste either by being released (including disposal) or by being recycled. The metal has no heat value and thus cannot be combusted for energy recovery and cannot be treated because it cannot be destroyed regardless of whether the stream containing the metal is sent for energy recovery or treatment. Thus, transfers of metals and metal compounds for further waste management should be reported as either a transfer for recycling or a transfer for disposal. The applicable waste management code for transfers of metals and metal compounds for recycling is M24. Applicable codes for transfers for disposal include M10, M41, M62, M71, M72, M73, M79, M90, M94, and M99. Two codes, M41 and M62, were new for the 1997 reporting year. These codes are for transfers to waste management in which the wastestream may be treated but the metal contained in the wastestream is not treated and is ultimately released. For example, M41 would be used for a metal or metal compound which is stabilized in preparation for disposal.

Prior to the 1997 reporting year, some facilities reported transfers of metals and metal compounds for further waste management using two waste treatment codes, M40 and M61. Beginning in reporting year 1997, metals and metal compounds must be reported using one of the 10 disposal codes or the applicable recycling code (M24 for metals recovery).

Off-site Transfers for Further Waste Management: Codes from Section 6.2 of Form R

Recycling		**Disposal**	
M20	Solvents/Organics Recovery	M10	Storage Only
M24	Metals Recovery	M41	Solidification/Stabilization–Metals and Metal Compounds only
M26	Other Reuse or Recovery	M62	Wastewater Treatment (Excluding POTWs)–Metals and Metal Compounds only
M28	Acid Regeneration	M71	Underground Injection
M93	Transfer to Waste Broker–Recycling	M72	Landfill/Disposal Surface Impoundment
Energy Recovery		M73	Land Treatment
M56	Energy Recovery	M79	Other Land Disposal
M92	Transfer to Waste Broker–Energy Recovery	M90	Other Off-site Management
		M94	Transfers to Waste Broker–Disposal
Waste Treatment		M99	Unknown
M40	Solidification/Stabilization		
M50	Incineration/Thermal Treatment		
M54	Incineration/Insignificant Fuel Value		
M61	Wastewater Treatment (Excluding POTWs)		
M69	Other Waste Treatment		
M95	Transfer to Waste Broker–Waste Treatment		

In Section 8.1 of Form R, facilities report quantities of listed chemicals released on- and off-site (excluding one-time catastrophic or remedial releases). Except for those quantities recycled, metals and metal compounds should be reported in Section 8.1 of the Form R. This includes those quantities of metals and metal compounds reported in:

- Section 5 as on-site releases
- Section 6.2 as sent off-site for stabilization/solidification (M41) or wastewater treatment (excluding POTWs) (M62) and/or,
- Section 6.1 as discharges to POTWs.

These quantities should not be reported in Section 8.7 of the Form R.

Box 2 - 4. Use of Data for Metals and Metal Compounds in This Report

Use of Data for Metals and Metal Compounds in This Report

Off-site releases (transfers to disposal) in tables in this report include the quantities of metals and metal compounds that were reported using the incorrect waste management codes, M40 and M61, in Section 6.2 (e.g., waste treatment codes instead of recycling or disposal codes) along with the quantities of metals and metal compounds that were reported correctly in Section 6.2. For the years prior to 1997 (presented in Chapter 3), EPA has also included the quantities of metals and metal compounds that were reported using the two waste management codes, M40 and M61, as off-site releases rather than off-site waste treatment. In addition, when discussing off-site releases of TRI chemicals, EPA has included those quantities of metals and metals compounds reported as discharges to POTWs in Section 6.1 of the Form R.

Chemicals considered to be metals and metal compounds in this report appear in Tables 2-11 through 2-13.

Box 2 - 5. An Explanation of On-site Waste Management

An Explanation of On-site Waste Management

On-site waste management activities are reported in Section 8 of Form R. These amounts do not include one-time events such as accidental releases or remediation (clean-up).

Recycled On-site. This is the quantity of the toxic chemical recovered at the facility and made available for further use. To avoid double-counting, the amount reported represents the amount exiting the recycling unit. It is not the quantity that entered an on-site recycling or recovery operation. For example, 3,000 pounds of a listed chemical enters a recycling operation. Of this, 500 pounds of the chemical are in residues from the recycling operation that are subsequently sent off-site for disposal. The quantity reported as recycled on-site would be 2,500 pounds.

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

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

Box 2 - 6. An Explanation of Transfers Off-site for Further Waste Management

An Explanation of Transfers Off-site for Further Waste Management

An off-site transfer, reported in Section 6 of Form R, is the transfer of toxic chemicals in waste to a facility that is geographically or physically separate from the facility reporting under TRI. Chemicals reported to TRI as transferred are sent to off-site facilities for the purposes of recycling, energy recovery, treatment, or disposal. The amounts reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers to disposal, these amounts do not necessarily represent entry of the chemical into the environment. Transfers to disposal represent an off-site release (see Box 2-2).

Transfers Off-site to Recycling. Toxic chemicals in waste that are sent off-site for the purposes of recycling are generally recovered by a variety of recycling methods, including solvent recovery and metals recovery. 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 to Energy Recovery. 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 heat or energy for use at that location. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers Off-site to Treatment. Toxic chemicals in waste 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.

Transfers to Publicly Owned Treatment Works (POTWs). A POTW is a wastewater treatment facility that is owned by a state or municipality. Wastewaters from facilities reporting under TRI are transferred through pipes or sewers to a POTW. Treatment or removal of a chemical from the wastewater depends upon the nature of the chemical, as well as the treatment methods present at the POTW. In general, chemicals that are easily utilized as nutrients by microorganisms, or have a low solubility in water, are likely to be removed to some extent. Chemicals that are volatile and have a low solubility in water may evaporate into the atmosphere. Not all TRI chemicals can be treated or removed by a POTW. Some chemicals, such as metals, may be removed, but are not destroyed and may be disposed of in landfills or discharged to receiving waters; transfers of metals and metal compounds to POTWs are categorized as off-site releases, as explained in Boxes 2-2 and 2-3.

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

TRI Chemicals Managed in Waste

The Pollution Prevention Act of 1990 (PPA) requires facilities to report information about the quantities of TRI chemicals they manage in waste, both on- and off-site. The PPA also requires facilities to provide information about their efforts to reduce or eliminate those quantities. Facilities began reporting this information with the 1991 reporting year.

The Pollution Prevention Act established as national policy that source reduction is the preferred approach to managing waste. Source reduction is defined as an activity that prevents the generation of waste. The PPA also established as national policy a hierarchy of waste management options, illustrated in Figure 2-2, for situations where source reduction cannot be implemented feasibly.

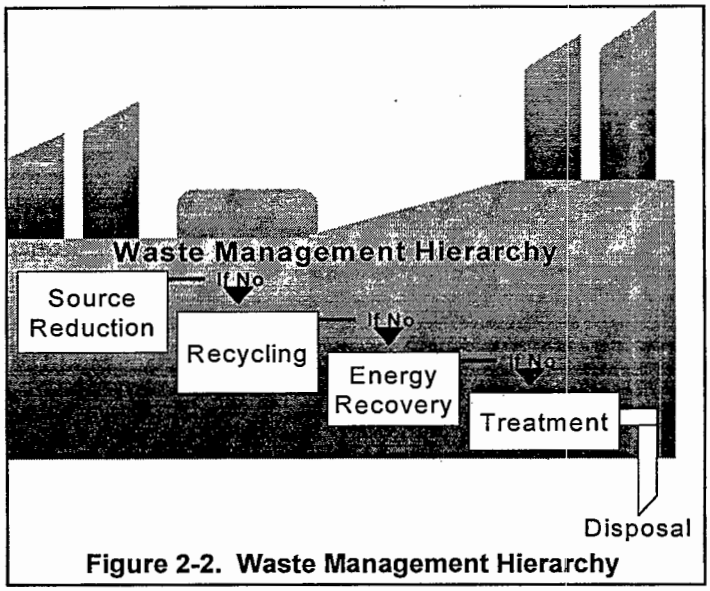


Figure 2-2. Waste Management Hierarchy

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

Throughout this book, data tables present waste management information in the order of the hierarchy: recycling, energy recovery, treatment, and release (including disposal).

Waste Management Information Collected

Box 2-7 describes the waste management information facilities must report to TRI. The amount of TRI chemicals in waste reported includes both waste generated by the facility and waste received by the facility for the purpose of waste management. Facilities report these data as estimates for the reporting year (1997) and the previous year (1996) and as projections for the two following years (1998 and 1999). The PPA requires this data projection to encourage facilities to consider their future waste generation, opportunities for source reduction, and potential improvement in waste management options as presented in the hierarchy. Future-year estimates are not commitments that facilities reporting to TRI must meet.

Box 2 - 7. An Explanation of Waste Management Information

An Explanation of Waste Management Information

Information about facilities' management of TRI chemicals in waste is reported in Section 8 of Form R.

Recycled On-site. This is the quantity of the toxic chemical recovered at the facility and made available for further use. To avoid double-counting, the amount reported represents the amount exiting the recycling unit. It is not the quantity that entered an on-site recycling or recovery operation. For example, 3,000 pounds of a listed chemical enters a recycling operation. Of this, 500 pounds of the chemical are in residues from the recycling operation that are subsequently sent off-site for disposal. The quantity reported as recycled on-site would be 2,500 pounds.

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

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

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

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

Treated Off-site. This is the quantity of the toxic chemical that left the facility boundary and was sent to POTWs or other off-site locations for treatment, not the amount that was destroyed at the off-site location(s). This quantity includes the amount(s) reported in Section 6 of Form R as transferred to POTWs or other off-site locations for treatment, less any amount(s) associated with non-routine events and not including quantities of metals and metal compounds (see Box 2-3).

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

Production-related Waste Managed. This includes: quantities released to the environment both at the facility and sent off-site for release (including disposal); quantities treated at the facility or sent off-site for treatment; quantities combusted for energy recovery at the facility or sent off-site for energy recovery; and quantities recycled at the facility or sent off-site for recycling. Source reduction or other movement up the waste management hierarchy is feasible for these production-related wastes. Production related wastes do not include quantities reported as released to the environment due to one-time events.

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

The individual waste management quantities reported are mutually exclusive to avoid double-counting. For example, an incinerator may destroy 99% of the chemical in the waste; in this case, the amount reported as treated on-site would be the amount destroyed by the incinerator, not the amount that entered the incinerator. The amount not destroyed in incineration (1%) would be reported as released. The sum of the individual quantities in a given year equals the total quantity of TRI chemicals in waste resulting from routine production operations at a facility during that year.

For the reporting year only, facilities must also report the quantity of waste released (including disposal) as a result of activities other than routine production operations. This quantity appears in data tables in this book as "non-production-related waste managed." It includes waste released to the environment at the facility or transferred off-site because of catastrophic events or remedial (clean-up) actions at the facility. Non-production-related waste is considered less amenable to source reduction because facilities cannot reasonably anticipate these quantities.

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

What to Consider When Using TRI Data

Users of TRI information should be aware that TRI data reflect releases and other waste management of chemicals, not exposures of the public to those chemicals. TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and other waste management activities which involve toxic chemicals. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical and the length of their exposure after it is released, and the human or other populations that are exposed to the chemical and the length of their exposure after its release. Listed below are some of the factors that should be considered when reviewing TRI data.

Toxicity of the Chemical

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

- Some high-volume releases of less toxic chemicals may appear to be a more serious problem than lower-volume releases or more toxic chemicals, when just the opposite may be true. For example, phosgene is toxic in smaller quantities than methanol. A comparison between these two chemicals for setting hazard priorities or estimating potential health concerns, solely on the basis of volumes released, may be misleading.

Exposure Considerations

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

    - For example, microorganisms readily degrade some chemicals, such as methanol, into less toxic chemicals; volatile organic compounds, such as ethylene and propylene, react in the atmosphere and contribute to the formation of smog; metals are persistent and will not degrade upon release to the environment.

- As a result, smaller releases of a persistent, highly toxic chemical may create a more serious problem than larger releases of a chemical that is rapidly converted to a less toxic form.

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

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

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

♦ **The environmental medium (air, water, land, or underground injection) to which the toxic chemical has been released.** Chemical exposure of a population depends on the environmental medium to which a chemical is released. The medium also affects the types of exposures possible, such as inhalation, dermal exposure, or ingestion.

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

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

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

♦ **The type of off-site facility receiving the chemical and the efficiency of its waste management practices.** The amount of a toxic chemical that ultimately enters the environment depends on how the chemical was handled during disposal, treatment, energy recovery, or recycling activities. Several factors to keep in mind when considering amounts sent off-site are presented below:

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

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

- The efficiency of the treatment of toxic chemicals in waste sent to sewage treatment plants varies depending on the chemical and the sewage plant. This means that the amount of a toxic chemical that ultimately enters the environment may be an underestimate because of these differences in treatment efficiencies. For example, some high-volume pollutants, such as methanol, are readily degraded by most sewage treatment plants. Other chemicals, such as methyl ethyl ketone (MEK), may be partially treated and partially released. 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. In addition, metals sent to sewage treatment

plants may be removed with solid wastes and sent to landfills, or they may pass through the plant and be discharged into surface waters; they are not, however, destroyed.

- The efficiency of other treatment methods, such as incineration, also depends upon the specifications of the treatment facility and the nature of the chemical.

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

♦ **On-site waste management of the toxic chemical.** As with off-site waste management, the amount of the toxic chemical released to the environment depends on how the chemical was handled during disposal, treatment, energy recovery, or recycling activities. However, since the waste management is on-site, any amount of the chemical that enters the environment after waste management is reported to TRI as part of that facility's releases.

1997 National Overview

This chapter discusses and analyzes data for 1997 for all chemicals reported under TRI.

For 1997, 21,490 facilities filed 71,670 TRI reporting forms, an average of 3.3 forms per facility (see Table 2-1). Fifteen percent of the submissions were Form A certification statements rather than the Form R detailed reporting form. EPA established the Form A certification option, beginning with the 1995 reporting year, for facilities that meet TRI reporting thresholds, but whose total annual reportable amount[1] for a listed chemical does not exceed 500 pounds and who do not manufacture, process, or otherwise use more than 1 million pounds of the chemical. Form A certification statements do not report amounts of chemical releases, transfers, or other waste management activities. (Form A certification statements are further explained in Chapter 1.)

Table 2-1. 1997 TRI Facilities and Forms

	Number	Percent
Total Facilities	21,490	
Total Forms	71,670	100.0
Form Rs	61,123	85.3
Form As	10,547	14.7

On- and Off-site Releases

In 1997, on- and off-site releases reported to TRI totaled 2.58 billion pounds of toxic chemicals, as shown in Table 2-2. This includes amounts released directly to the air, water, or land, as well as disposal of toxic chemicals on-site or off-site in landfills, surface impoundments, land treatment, and underground injection wells.

On-site Releases

On-site releases totaled 2.12 billion pounds (see Table 2-2). The largest category was air emissions, with 1.33 billion pounds. These releases to air consisted of 1.01 billion pounds of point source (stack) emissions and 317.2 million pounds of non-point (fugitive) emissions. As shown in Figure 2-3, air emissions represented two-thirds (62.9%) of all on-site releases.

Facilities discharged 218.4 million pounds of toxic chemicals into the nation's rivers, lakes, bays, and other bodies of water in 1997. Underground injection totaled 219.5 million pounds, and 99.8% of this amount went to Class I wells (described in Box 2-1). Another 346.9 million pounds was released on-site to land. Of this total, the largest amount (130.0 million

[1]The total annual reportable amount is defined as the sum of the production-related waste management categories that would be reported to TRI: quantities released (including disposal), recovered as a result of recycling operations, combusted for energy recovery, or treated at the facility, plus amounts transferred off-site for recycling, energy recovery, treatment, or disposal. These amounts correspond to total production-related waste in this report.

Table 2-2. 1997 TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management

	Pounds	Percent		Pounds	Percent
On-site Releases			**Other On-site Waste Management**		
Total Air Emissions	1,331,663,886	62.9	Recycled On-site	7,986,618,922	42.5
Fugitive Air Emissions	317,233,311	15.0	Energy Recovery On-site	3,805,792,208	20.2
Point Source Air Emissions	1,014,430,575	47.9	Treated On-site	7,012,922,513	37.3
Surface Water Discharges	218,371,961	10.3			
Underground Injection	219,513,898	10.4	Total Other On-site Waste Management	18,805,333,643	100.0
Class I Wells	219,070,242	10.4			
Class II-V Wells	443,656	0.0	**Transfers Off-site for Further Waste Management**		
On-site Land Releases	346,904,510	16.4	Transfers to Recycling	2,381,458,528	69.7
RCRA Subtitle C Landfills	20,472,578	1.0	Transfers to Energy Recovery	507,985,556	14.9
Other On-site Land Releases	93,639,517	4.4	Transfers to Treatment	258,693,439	7.6
Land Treatment	5,794,667	0.3	Transfers to POTWs	266,863,876	7.8
Surface Impoundments	96,952,876	4.6			
Other Disposal	130,044,872	6.1	Total Transfers Off-site for Further Waste Management	3,415,001,399	100.0
Total On-site Releases	2,116,454,255	100.0			
Off-site Releases (Transfers Off-site to Disposal)					
Storage Only[a]	6,626,857	1.4			
Solidification/Stabilization[b]	144,325,113	31.3			
Metals and Metal Compounds Only					
Wastewater Treatment (excluding POTWs)[c]	6,074,558	1.3			
Metals and Metal Compounds Only					
Transfers to POTWs[d]	2,399,930	0.5			
Metals and Metal Compounds Only					
Underground Injection	14,265,756	3.1			
Landfills/Disposal Surface Impoundments	251,854,306	54.6			
Land Treatment	1,264,484	0.3			
Other Land Disposal	10,314,727	2.2			
Other Off-site Management	11,994,251	2.6			
Transfers to Waste Broker for Disposal	7,377,734	1.6			
Unknown[e]	4,601,113	1.0			
Total Off-site Releases	461,098,829	100.0			
Total On- and Off-site Releases	2,577,553,084				

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Other On-site Waste Management** from Section 8. **Total Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R.

[a]"Storage only" (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to "storage only" are included as a form of disposal (off-site release). See Box 2-2.

[b]Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste management code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste management code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste treatment code M40; in this report, such amounts have been included in solidification/stabilization of metals and metal compounds.

[c]Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste management code M62) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste management code M61). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste management code M61; in this report, such amounts have been included in transfers of metals and metal compounds to wastewater treatment.

[d]Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

[e]"Unknown" (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as "unknown" transfers are treated as a form of disposal (off-site release).

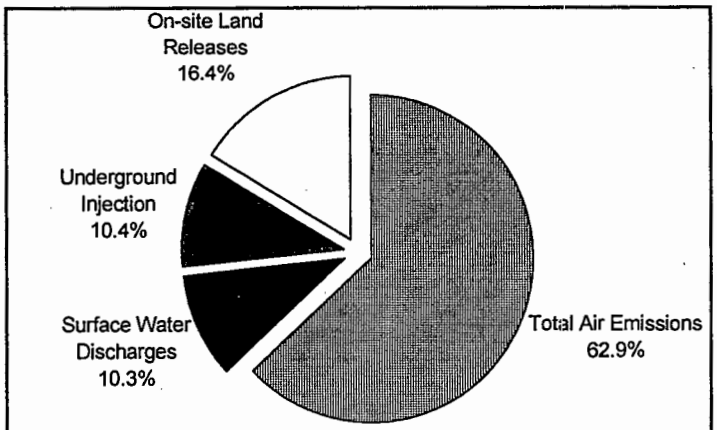


Figure 2-3. 1997 TRI On-site Releases

Note: On-site Releases from Section 5 of Form R.

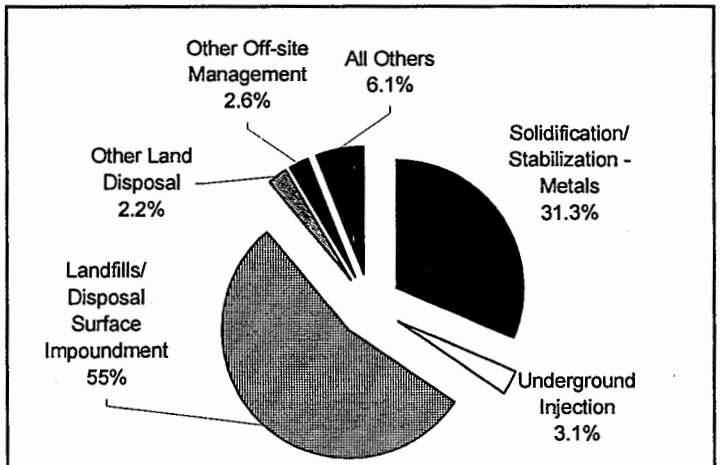


Figure 2-4. 1997 TRI Off-site Releases

Note: Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.
* See notes to Table 2-2.

pounds) was reported as "other disposal", which includes accidental releases and disposal methods other than landfilling or surface impoundment.

Off-site Releases

As explained in Box 2-2, off-site releases in this report consist of two general types of off-site transfers: transfers of all TRI chemicals to disposal (including landfills, surface impoundments, underground injection, and other disposal practices including storage) and transfers of metals and metal compounds to solidification/stabilization and to wastewater treatment by private treatment services or publicly owned treatment works (POTWs, or municipal sewage treatment facilities).

TRI facilities reported a total of 461.1 million pounds of toxic chemicals in transfers off-site that represent releases to the environment (see Table 2-2). The majority of the off-site releases – 251.9 million pounds – was sent to disposal in landfills or disposal surface impoundments. Another 144.3 million pounds consisted of metals and metal compounds sent to solidification or stabilization. Together, these two types of off-site releases – landfills/disposal surface impoundments and metals solidification/stabilization – accounted for nearly 86% of all off-site releases in 1997, as illustrated in Figure 2-4. No other type of off-site release amounted to more than 3% of the total.

Other On-site Waste Management

Facilities reported other on-site waste management—recycling, energy recovery, and treatment—totaling 18.81 billion pounds in 1997 (see Table 2-2). Recycling amounted to 7.99 billion pounds. On-site energy recovery totaled 3.81 billion pounds in 1997, and treatment totaled 7.01 billion pounds.

As shown in Figure 2-5, 42.5% of other on-site waste management consisted of recycling.

Transfers Off-site for Further Waste Management

In 1997, facilities sent 3.42 billion pounds of toxic chemicals to off-site locations for further waste management: recycling, energy recovery, or treatment (including POTWs), as also shown in Table 2-2. As with on-site waste management, the largest category

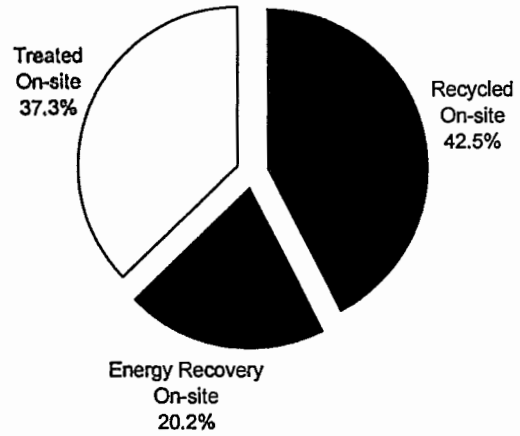


Figure 2-5. 1997 TRI Other On-site Waste Management

Note: Other On-site Waste Management from Section 8 of Form R.

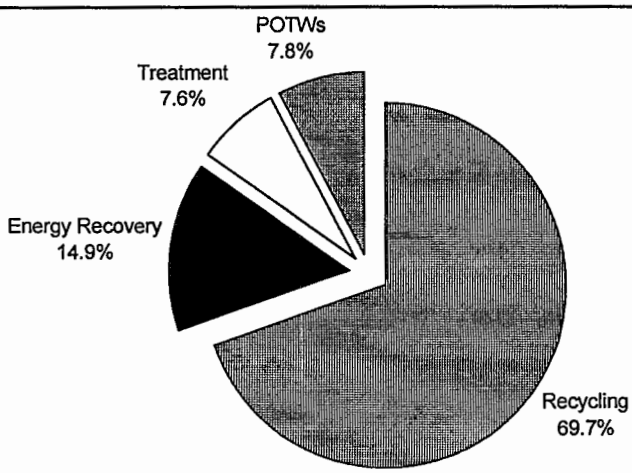


Figure 2-6. 1997 TRI Transfers Off-site for Further Waste Management

Note: Total Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R.

was recycling. Transfers to recycling totaled 2.38 billion pounds. This amounted to 69.7% of the off-site transfers, as shown in Figure 2-6.

TRI facilities also reported sending 508.0 million pounds of toxic chemicals off-site to be burned for energy recovery. Transfers to treatment totaled 258.7 million pounds, while transfers to POTWs totaled 266.9 million pounds.

TRI Chemicals Managed in Waste

In 1997, TRI facilities reported managing 24.73 billion pounds of TRI chemicals in production-related waste, as shown in Table 2-3. However, two facilities revised their submissions after the TRI data were "frozen" for preparation of this report. These revisions, described below, would change total production-related waste managed to 23.85 billion pounds.

A total of 7.99 billion pounds was recycled on-site, while another 7.01 billion pounds was treated on-site. On-site energy recovery was the third-largest waste management method, with 3.81 billion pounds. However, one facility reported on-site energy recovery of 422.0 million pounds of ethylene and 272.0 million pounds of propylene in 1997. The facility has since revised these quantities to zero. Another facility reported on-site energy recovery of 193.8 million pounds of ethylene in 1997. The facility

Table 2-3. 1997 TRI Waste Management

Waste Management Activity	Pounds	Percent	On- and Off-site Percent
Recycled On-site	7,986,618,922	32.3	42.0
Recycled Off-site	2,390,787,879	9.7	
Energy Recovery On-site *	3,805,792,208	15.4	17.5
Energy Recovery Off-site	525,610,064	2.1	
Treated On-site	7,012,922,513	28.4	30.5
Treated Off-site	536,021,338	2.2	
Quantity Released On- and Off-site	2,467,643,821	10.0	10.0
Total Production-related Waste Managed *	24,725,396,745	100.0	100.0
Non-Production-related Waste Managed	37,761,187		

Note: Data from Section 8 of Form R.

* One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene and 272,000,000 pounds of propylene in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. These revisions change on-site energy recovery to 2,930,962,208 pounds and total production-related waste managed to 23,850,566,745 pounds. As a percentage of total production-related waste, on-site energy recovery changes to 12.3%; other waste management activities increase by 1% or less. Percentages for on- and off-site waste management activities change as follows: recycled on- and off-site to 43.5%, energy recovery on- and off-site to 14.5%, treated on- and off-site to 31.7%, and quantity released on- and off-site to 10.3%.

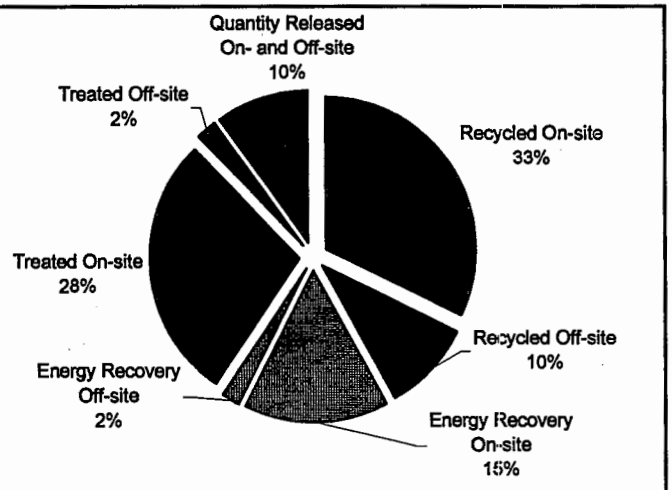


Figure 2-7. TRI Waste Management

Note: Data from Section 8 of Form R.
* One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene and 272,000,000 pounds of propylene in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. These revisions change on-site energy recovery to 12.3%; other waste management activities increase by 1% or less.

has since revised this quantity to 13.0 million pounds. These revisions would change on-site energy recovery to a total of 2.93 billion pounds.

Quantities released on- and off-site ranked fourth among waste management options in 1997, with 2.47 billion pounds.

As shown in Figure 2-7, TRI facilities managed the majority of their production-related waste by recycling and energy recovery. In the waste management hierarchy (explained earlier in this chapter), these represent environmentally preferable options for chemicals in waste that cannot be prevented in the first place.

Recycling on- and off-site and energy recovery on- and off-site accounted for nearly 60% of production-related waste in 1997. Approximately 30% of the waste was treated on- and off-site, environmentally a less desirable management method. Ten percent of the waste was reported in the least desirable option, quantity released on- and off-site.

Differences between Amounts Reported in Sections 5 and 6 and in Section 8 of Form R

The quantity released on- and off-site presented in Table 2-3 is not the same as the total on- and off-site releases presented in Table 2-2. This difference arises primarily from the types of releases reported on different sections of the Form R. The quantity released on- and off-site in Table 2-3 reflects all on- and off-site releases as collected in Section 5 of the Form R and transfers off-site for disposal as reported in Section 6 (including metals and metal compounds as described in Box 2-3). However, total on- and off-site releases in Table 2-2 is limited to production-related on- and off-site releases as collected in Section 8.1 of the Form R. Although these totals are often the same, production-related releases reported in Section 8.1 do not include those releases associated with catastrophic events, remedial actions, or other one-time events not related to production. For the same reason, transfers for recycling, energy recovery, and treatment (including POTWs for non-metals) reported in Section 6 do not exactly correspond with similar quantities reported in Section 8. Once again, the relevant parts in Section 8 only include the waste management of production-related materials.

Other reasons also contribute to the different quantities reported in different sections of the Form R. For example, a release or transfer of less than 1,000 pounds may be reported in ranges in Section 5 and 6 whereas an exact amount must be included in Section 8. Furthermore, facilities may round off the quantities reported in Section 8 to two significant digits.

1997 TRI Data by State

Tables 2-4 through 2-8 present the distribution of TRI releases and other waste management by state. No reports were received in 1997 for the Northern Mariana Islands.

On- and Off-site Releases by State

On-site Releases

The top states for total releases in 1997 were Texas with 261.7 million pounds, Louisiana with 186.0 million pounds, and Ohio with 158.7 million pounds (see Table 2-4). These were also the top-ranking states for on-site releases. Ranking fourth and fifth for total on- and off-site releases were Pennsylvania with 143.2 million pounds and Illinois with 127.6 million pounds. Another three states also exceeded 100 million pounds each: Indiana with 122.5 million pounds, Tennessee with 106.9 million pounds, and Utah with 103.7 million pounds. Map 2-1 illustrates the geographic distribution of TRI on-site releases. Texas facilities reported primarily air emissions – 108.4 million pounds—and underground injection—89.9 million pounds. These were the largest amounts of air emissions and underground injection reported in any state. Tennessee ranked second for releases to air with 81.9 million pounds, and Louisiana ranked third with 74.8 million pounds.

For underground injection, Louisiana facilities reported the second-largest total (54.2 million pounds), and Florida ranked third (with 27.5 million pounds). All underground injection in the top three states was reported as injected to Class I wells.

Facilities in California reported the largest amount of injection to Class II-V wells, 415,000 pounds. Facilities in 29 states and territories reported no underground injection. (Some states are not geologically suitable for the practice of underground injection. Others have banned this disposal method or have never implemented an underground injection control program.)

Louisiana led all states for surface water discharges, with 46.9 million pounds, followed by Pennsylvania with 38.5 million pounds and Texas with 20.8 million pounds.

Facilities reported larger total on-site land releases in Montana than in any other state, 37.7 million pounds. New Mexico facilities reported the second-largest total, 31.6 million pounds, followed by Ohio with 28.7 million pounds. In Montana and New Mexico, on-site land releases represented the great majority of total on- and off-site releases reported in the state (87.0% of the total in Montana and 92.5% in New Mexico). In both of these states, the predominant type of land release was "other disposal." In contrast, on-site land releases by Ohio facilities amounted to 18.1% of that state's total on- and off-site releases. The largest type of on-site land release in Ohio was surface impoundment.

Map 2-1. Geographic Distribution of TRI On-site Releases, 1997

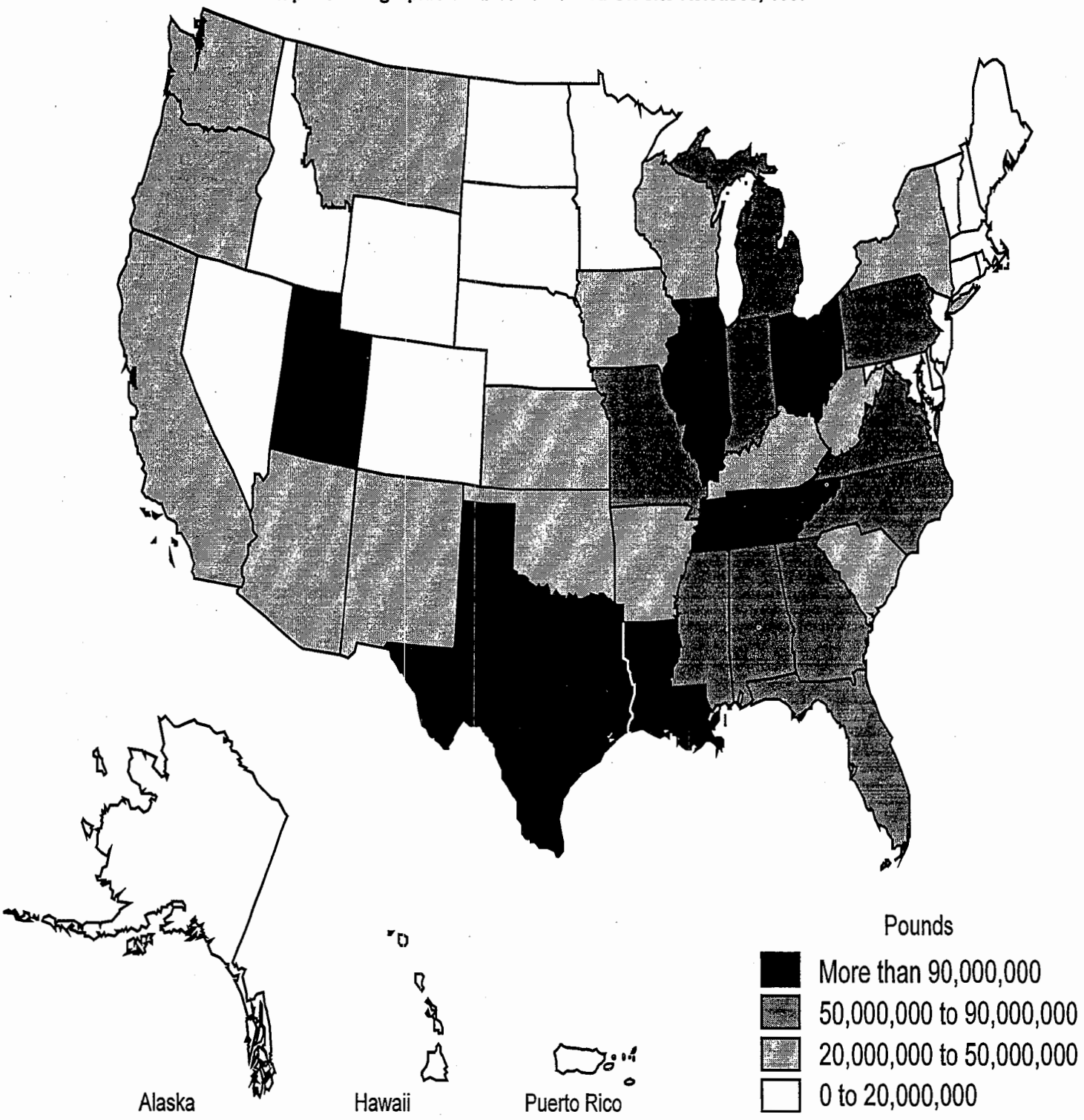


Table 2-4. TRI On-site and Off-site Releases, by State, 1997

State	Total Facilities	On-site Releases										Off-site Releases	
				Underground Injection		On-site Land Releases							
		Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other Landfills	Land Treatment	Surface Impound-ments	Other Disposal	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	526	62,192,085	4,759,101	0	10	642,737	8,958,859	249,046	597,187	186,892	77,585,917	17,085,362	94,671,279
Alaska	8	4,279,656	333,613	20	410	0	67	0	0	1,881	4,615,647	1,507	4,617,154
American Samoa	1	12,750	0	0	0	0	0	0	0	0	12,750	0	12,75
Arizona	205	8,870,245	4,618	6	0	0	79,992	118,584	2,123,297	19,787,686	30,984,428	434,071	31,418,499
Arkansas	371	25,374,381	1,800,354	1,463,498	0	266,660	1,224,434	138,247	2,097,593	14,775	32,379,942	27,342,321	59,722,263
California	1,378	31,291,758	4,274,294	0	414,781	29,707	514,245	269,542	197,620	63,604	37,055,551	8,095,061	45,150,617
Colorado	181	3,474,142	928,029	5	0	0	58,680	18,902	5,105	22,249	4,507,112	640,449	5,147,561
Connecticut	310	5,442,235	670,797	0	0	5	38,310	0	38	278	6,151,663	3,518,017	9,669,680
Delaware	68	2,791,795	229,709	0	0	0	15,130	0	282,801	58	3,319,493	187,340	3,506,833
District of Columbia	3	3,310	5	0	0	0	0	0	0	3,300	6,615	0	6,615
Florida	519	32,103,556	8,636,614	27,506,942	0	3,552	74,934	815,426	6,844,702	12,179,513	88,165,239	7,253,482	95,418,721
Georgia	709	48,218,319	7,181,085	0	0	2,070	986,462	310,922	1,739,518	108,585	58,546,961	13,334,549	71,881,510
Guam	1	0	0	0	0	0	0	0	0	0	0	0	
Hawaii	14	409,983	2,119	0	25,750	0	0	5,938	0	250	444,040	8,365	452,405
Idaho	62	5,346,693	1,128,221	0	0	702	512,920	504,247	6,211,663	3,786,362	17,490,808	257,770	17,748,578
Illinois	1,289	65,096,174	4,854,561	3,352	0	11,856,367	11,454,803	151,770	793,229	357,562	94,567,818	33,033,233	127,601,051
Indiana	1,004	57,036,975	2,311,707	1,262,661	0	518,457	16,665,662	50,948	0	92,759	77,939,169	44,608,861	122,548,030
Iowa	408	24,346,264	2,616,551	0	0	66,556	1,985,997	3,018	1,628	20,853	29,040,867	5,155,244	34,196,111
Kansas	274	20,100,977	571,315	996,103	0	89,549	851,772	83,023	2,200	28,719	22,723,658	4,008,558	26,732,216
Kentucky	423	35,133,354	669,063	0	0	209,524	2,499,096	0	25,100	209,567	38,745,704	8,555,487	47,301,191
Louisiana	293	74,838,852	46,909,318	54,243,582	0	4,256	5,896,933	15,805	1,729,072	139,811	183,777,629	2,260,624	186,038,253
Maine	84	6,627,367	996,800	0	0	67,994	265,088	0	251	4,690	7,962,190	1,807,793	9,769,983
Maryland	193	7,843,147	2,026,236	1	0	15	2,154,755	228,541	257,830	6,244	12,516,769	1,182,575	13,699,344
Massachusetts	475	5,620,129	49,400	0	0	8,430	14,800	0	0	24,804	5,717,563	1,335,847	7,053,410
Michigan	904	44,346,088	529,145	5,596,855	0	72,864	2,471,687	26,879	0	23,969	53,067,487	32,214,433	85,281,920
Minnesota	472	17,023,305	324,718	0	0	250	153,816	88,426	6,543	1,556	17,598,614	2,567,851	20,166,465
Mississippi	310	38,040,435	11,945,812	8,544,641	0	3,331	929,367	4,425	4,708,458	463,187	64,639,656	1,526,415	66,166,071
Missouri	553	33,788,155	3,332,020	0	0	102,017	518,716	261,827	0	19,288,597	57,291,332	5,532,654	62,823,986
Montana	29	4,314,764	97,172	0	0	500	0	0	11,845	37,707,064	42,131,345	1,221,040	43,352,385
Nebraska	161	7,332,796	543,072	0	0	0	2,510	543,125	20,126	44,477	8,486,106	9,491,869	17,977,975

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

Off-site Releases

As shown in Table 2-4, Pennsylvania facilities reported 63.3 million pounds of off-site releases (transfers off-site to disposal, including transfers of metals and metal compounds to solidification/ stabilization, treatment, and POTWs). Ohio ranked second with 45.5 million pounds, closely followed by Indiana with 44.6 million pounds. Nearly half (44.2%) of Pennsylvania's total releases were transferred off-site for disposal, as were more than one-quarter (28.7%) of Ohio's and more than one-third of Indiana's (36.4%).

Nebraska was the only state in which off-site releases (9.5 million pounds) were larger than on-site releases (8.5 million pounds).

Table 2-5 more closely examines off-site releases by state. Transfers to landfills/disposal surface impoundments accounted for more than half of off-site releases in 30 of the 55 states and territories. In Pennsylvania, which ranked first for off-site releases, facilities reported 47.9 million pounds of such transfers, representing 75.7% of the state's total off-site releases. Pennsylvania reported the nation's largest amount in this category, accounting for 19.0% of the U.S. total. One Pennsylvania facility reported

Table 2-4. TRI On-site and Off-site Releases, by State, 1997, continued

State	Total Facilities	On-site Releases: Total Air Emissions	Surface Water Discharges	Underground Injection: Class I Wells	Underground Injection: Class II-V Wells	On-site Land Releases: RCRA Subtitle C Landfills	On-site Land Releases: Other Landfills	On-site Land Releases: Land Treatment	On-site Land Releases: Surface Impoundments	On-site Land Releases: Other Disposal	Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Nevada	51	1,695,716	0	0	0	0	2,542,506	0	181,005	0	4,419,227	15,886	4,435,113
New Hampshire	105	2,183,222	114,890	0	0	0	211,070	0	3,700	1,255	2,514,137	272,796	2,786,933
New Jersey	557	9,500,420	5,399,681	2	0	440,732	586,134	1,798	3,603	226,570	16,158,940	4,608,497	20,767,437
New Mexico	40	2,455,382	8,050	0	0	0	255	639,051	974,254	30,010,477	34,087,469	83,532	34,171,001
New York	657	24,273,000	4,367,682	500	0	986,700	256,250	5	6,472	49,458	29,940,067	8,645,580	38,585,647
North Carolina	848	52,057,024	6,460,436	29,100	0	40,230	7,526,328	155,171	10,839,022	18,125	77,125,436	7,941,510	85,066,946
North Dakota	34	1,946,963	439,714	0	0	0	13	750	1,700	0	2,389,140	33,285	2,422,425
Ohio	1,589	66,806,601	6,061,775	11,584,640	0	2,837,300	5,139,507	444	20,517,750	179,260	113,127,277	45,548,556	158,675,833
Oklahoma	284	18,448,377	716,150	1,722,479	2,200	553,551	100,034	522	1,409	75,995	21,620,717	3,178,213	24,798,930
Oregon	256	17,126,435	4,266,121	41,110	0	18,650	408,866	108,835	0	2,369,662	24,339,679	6,591,882	30,931,561
Pennsylvania	1,222	39,754,658	38,517,920	0	0	133,851	265,948	81,546	114,761	1,075,905	79,944,589	63,298,931	143,243,520
Puerto Rico	150	7,154,090	17,529	0	0	250	1,287	0	3,219	16	7,176,391	767,785	7,944,176
Rhode Island	133	1,767,107	2,177	0	0	0	0	0	0	4,332	1,773,616	405,268	2,178,884
South Carolina	471	44,308,861	2,648,852	0	0	44,651	1,676,997	10,997	361,640	33,721	49,085,719	9,359,020	58,444,739
South Dakota	69	2,292,307	1,800,093	0	0	0	250	0	0	2,094	4,094,744	121,839	4,216,583
Tennessee	644	81,947,095	1,568,988	9,273,267	0	44,057	5,035,752	66,976	954	18,005	97,955,094	8,926,783	106,881,877
Texas	1,217	108,366,675	20,788,710	89,929,406	0	1,280,565	3,575,896	424,265	14,714,640	1,267,985	240,348,142	21,361,837	261,709,979
Utah	143	65,561,602	1,230,027	0	0	16,749	5,635,142	103,898	21,342,716	35,957	93,926,091	9,791,134	103,717,225
Vermont	37	216,040	188,985	0	0	0	257	0	0	5	405,287	161,408	566,695
Virgin Islands	2	1,401,398	25,723	0	0	0	0	536	932	0	1,428,589	108	1,428,697
Virginia *	424	47,301,315	3,807,904	51,817	0	124,390	1,056,804	7,676	30	29,880	52,379,816	5,548,253	57,928,069
Washington	283	21,629,906	2,463,756	0	0	3,468	106,996	214,688	1,750	13,813	24,434,377	7,396,089	31,830,466
West Virginia	139	13,979,963	6,771,631	0	0	1,049	9,997	20,275	16,129	24,206	20,823,250	3,947,692	24,770,942
Wisconsin	875	25,893,626	2,972,233	5	0	842	1,172,593	65,793	8,069	21,871	30,135,032	20,424,365	50,559,397
Wyoming	32	2,296,413	7,485	6,820,250	505	0	1,600	2,800	203,315	16,988	9,349,356	7,802	9,357,158
Total	21,490	1,331,663,886	218,371,961	219,070,242	443,656	20,472,578	93,639,517	5,794,667	96,952,876	130,044,872	2,116,454,255	461,098,829	2,577,553,084

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Because of an EPA data entry error for one facility, 51,817 pounds were incorrectly identified as underground injection to Class I wells in Virginia in 1997. This amount should have been entered as discharged to surface waters. The correct amount for surface water discharges in Virginia is 3,859,721 pounds and the correct amount for underground injection to Class I wells is zero. The error was corrected in the *1997 TRI Public Data Release State Fact Sheet* for Virginia, but was not discovered in time to be corrected in tables throughout this book.

transferring 22.9 million pounds of zinc compounds to landfills/disposal surface impoundments.

Off-site releases of metals and metal compounds included 144.3 million pounds sent to solidification/stabilization, 6.1 million pounds in wastestreams sent to treatment, and 2.4 million pounds sent to POTWs. Arkansas facilities reported the largest transfers of metals to solidification/ stabilization, 23.5 million pounds, and this amount represented 86.0% of the state's total off-site releases. Ohio ranked first for transfers of metals to wastewater treatment (excluding POTWs) with 2.8 million pounds. Illinois ranked first for transfers of metals and metal compounds to POTWs with 401,000 pounds. These transfers represented a much smaller proportion of off-site releases in the two states: 6.0% of Ohio's total and 1.2% of Illinois'.

As noted earlier in this chapter, transfers of metals to solidification/stabilization and transfers of all TRI chemicals to landfills/disposal surface impoundments together constituted the large majority (85.9%) of all off-site releases in 1997.

Table 2-5. TRI Off-site Releases (Transfers Off-site to Disposal), 1997

State	Storage Only[a] Pounds	Solidification/Stabilization Metals Only[b] Pounds	Wastewater Treatment (excluding POTWs) Metals Only[c] Pounds	Transfers to POTWs Metals Only[d] Pounds	Underground Injection Pounds
Alabama	47,254	2,699,127	190,905	19,610	1,405,469
Alaska	0	7	0	0	0
American Samoa	0	0	0	0	0
Arizona	0	14,036	106	5,716	0
Arkansas	335	23,524,550	1,783	18,239	254,866
California	39,316	852,305	34,117	105,122	66,155
Colorado	1,900	86,548	8,728	5,664	0
Connecticut	37,056	370,641	81,087	9,534	796
Delaware	550	4,252	39,563	6,913	76,551
District of Columbia	0	0	0	0	0
Florida	2,144,362	633,215	41,435	62,564	92,185
Georgia	5,112	10,014,893	167,612	77,014	326,700
Guam	0	0	0	0	0
Hawaii	34	0	0	0	0
Idaho	204,604	45,795	52	490	0
Illinois	715,663	13,649,299	1,048,548	400,840	677,600
Indiana	88,714	17,452,622	402,100	107,254	582,400
Iowa	3,438	1,715,907	1,598	39,493	108,746
Kansas	39,899	194,941	4,902	9,135	646,749
Kentucky	13,260	2,806,555	163,820	52,651	42,544
Louisiana	90,143	34,058	1,300	938	230,276
Maine	44,617	4,558	1,500	70,106	0
Maryland	2,522	200,243	110,660	103,036	0
Massachusetts	70,851	393,912	36,829	25,492	0
Michigan	13,144	2,024,491	198,210	113,389	4,303
Minnesota	0	88,251	2	128,031	0
Mississippi	108,939	126,061	9,907	6,415	159,861
Missouri	284,207	98,108	14,845	85,699	56,104
Montana	0	0	0	285	8,656
Nebraska	2,732	755,590	250	12,527	0
Nevada	0	12	0	2	0
New Hampshire	17,250	128,017	4,225	3,419	0
New Jersey	120,877	2,296,591	19,154	54,030	47,132
New Mexico	0	205	0	405	0
New York	324,075	3,386,718	80,881	163,264	34,914
North Carolina	45,839	4,026,333	18,864	42,631	1,450
North Dakota	0	0	60	8	0
Ohio	449,434	10,307,784	2,751,824	216,733	903,757
Oklahoma	3,676	123,510	32,647	15,722	60,859
Oregon	0	5,915,916	21	7,299	0
Pennsylvania	180,356	12,889,436	235,615	71,666	30,258
Puerto Rico	11,518	72,241	0	2,502	0
Rhode Island	20,903	118,019	20,668	11,121	0
South Carolina	4,525	2,111,075	21,997	71,574	27,126
South Dakota	0	0	0	665	0
Tennessee	45,866	2,895,994	35,985	57,140	87,207
Texas	232,398	4,778,384	96,089	62,675	8,330,980
Utah	79,901	8,919,524	0	6,915	0
Vermont	1,316	24,831	4	520	0
Virgin Islands	8	0	0	0	0
Virginia	1,083,524	2,396,362	33,729	63,838	0
Washington	17,855	3,964,589	60,465	2,520	0
West Virginia	0	272,121	34	3,759	0
Wisconsin	28,884	1,907,486	102,437	75,355	2,112
Wyoming	0	0	0	10	0
Total	6,626,857	144,325,113	6,074,558	2,399,930	14,265,756

Note: Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/ stabilization and for wastewater treatment, including to POTWs.

[a]"Storage only" (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to "storage only" are included as a form of disposal (off-site release). See Box 2-2.

[b]Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste management code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste management code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste treatment code M40; in this report, such amounts have been included in solidification/stabilization of metals and metal compounds.

Table 2-5. TRI Off-site Releases (Transfers Off-site to Disposal), 1997, continued

State	Landfills/ Disposal Surface Impoundments Pounds	Land Treatment Pounds	Other Land Disposal Pounds	Other Off-site Management Pounds	Transfers to Waste Broker for Disposal Pounds	Unknown[c] Pounds	Total Off-site Releases Transfers Off-site to Disposal Pounds
Alabama	3,726,736	108,894	2,181,407	6,604,044	24,194	77,722	17,085,362
Alaska	0	0	0	0	1,500	0	1,507
American Samoa	0	0	0	0	0	0	0
Arizona	297,622	0	52,350	7,087	54,904	2,250	434,071
Arkansas	3,320,601	14,776	82,195	53,576	70,630	770	27,342,321
California	6,619,961	12,711	199,959	47,584	51,733	66,098	8,095,061
Colorado	516,565	1,265	12,085	46	7,605	43	640,449
Connecticut	1,326,650	1,855	159,518	93,076	1,435,365	2,439	3,518,017
Delaware	32,775	0	26,100	351	5	280	187,340
District of Columbia	0	0	0	0	0	0	0
Florida	3,122,300	73,953	34,432	1,006,748	41,734	554	7,253,482
Georgia	2,166,678	140,495	54,139	188,516	124,610	68,780	13,334,549
Guam	0	0	0	0	0	0	0
Hawaii	6,281	0	0	0	2,050	0	8,365
Idaho	3,608	0	765	1,050	1,406	0	257,770
Illinois	15,443,557	1,950	187,461	467,768	342,448	98,099	33,033,233
Indiana	24,743,197	39,252	44,095	228,256	621,340	299,631	44,608,861
Iowa	2,986,756	20,925	26,963	198,944	26,412	26,062	5,155,244
Kansas	2,999,058	10,595	31,422	6,805	21,832	43,220	4,008,558
Kentucky	3,679,302	428	1,698,026	40,425	39,371	19,105	8,555,487
Louisiana	1,360,563	49,608	87,097	406,620	11	10	2,260,624
Maine	1,524,598	7,702	134,966	1,727	5,193	12,826	1,807,793
Maryland	514,895	0	216,300	715	12,532	21,672	1,182,575
Massachusetts	482,437	10,985	165,429	1,423	124,567	23,922	1,335,847
Michigan	28,999,752	11,547	95,773	537,604	100,803	115,417	32,214,433
Minnesota	2,253,775	14,077	1,781	39,637	38,988	3,309	2,567,851
Mississippi	1,013,709	38,977	8,395	5,582	47,360	1,209	1,526,415
Missouri	4,865,641	4,788	47,434	3,579	46,662	25,587	5,532,654
Montana	1,211,592	0	0	2	505	0	1,221,040
Nebraska	6,874,663	156,744	1,633,548	55,093	722	0	9,491,869
Nevada	15,612	0	0	0	260	0	15,886
New Hampshire	61,147	0	1,584	20,071	28,634	8,449	272,796
New Jersey	1,527,181	0	430,032	26,191	48,382	38,927	4,608,497
New Mexico	77,283	0	0	0	894	4,745	83,532
New York	4,552,032	1,856	21,072	18,077	34,977	27,714	8,645,580
North Carolina	3,300,433	23,382	51,992	58,592	229,754	142,240	7,941,510
North Dakota	33,142	0	75	0	0	0	33,285
Ohio	27,525,764	86,475	132,342	207,610	697,189	2,269,644	45,548,556
Oklahoma	2,929,259	1,348	337	2	10,733	120	3,178,213
Oregon	416,046	85,791	137,266	8,350	13,896	7,297	6,591,882
Pennsylvania	47,936,625	7,369	82,818	710,552	249,140	905,096	63,298,931
Puerto Rico	419,308	0	233,845	28,371	0	0	767,785
Rhode Island	169,631	0	17,487	0	23,467	23,972	405,268
South Carolina	4,655,171	40,002	340,854	75,302	1,951,501	59,893	9,359,020
South Dakota	75,348	79	0	0	45,747	0	121,839
Tennessee	5,317,450	1,081	26,680	363,602	39,737	56,041	8,926,783
Texas	7,143,943	112,159	257,324	205,479	91,417	50,989	21,361,837
Utah	735,016	124	0	750	255	48,649	9,791,134
Vermont	119,477	0	7	2,370	12,873	10	161,408
Virgin Islands	100	0	0	0	0	0	108
Virginia	1,811,987	9,693	35,678	0	104,135	9,307	5,548,253
Washington	2,067,951	30,427	1,137,136	12,287	93,509	9,350	7,396,089
West Virginia	3,617,372	0	51,422	424	2,560	0	3,947,692
Wisconsin	17,246,714	143,171	174,386	259,963	454,192	29,665	20,424,365
Wyoming	7,042	0	750	0	0	0	7,802
Total	251,854,306	1,264,484	10,314,727	11,994,251	7,377,734	4,601,113	461,098,829

Note: Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

[b]Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste management code M62) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste management code M61). Because wastewater treatment does not destroy metals such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste treatment code M60; in this report, such amounts have been included in transfers of metals and metal compounds to wastewater treatment.

[d]Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

[c]"Unknown" (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as "unknown" transfers are treated as a form of disposal (off-site release).

Transfers Within and Among States

Off-site Releases

TRI facilities report the specific off-site locations to which they are transferring TRI chemicals. Table 2-6 summarizes off-site releases (transfers to disposal) that were transferred within the state, received into the state from TRI facilities elsewhere, or sent out of state. The largest transfers to disposal within a state occurred in Pennsylvania, with 49.8 million pounds. Ohio received the largest amount of such transfers—61.0 million pounds—from facilities located in other states. Arkansas shipped the largest amount—25.7 million pounds—of TRI chemicals to disposal to locations outside of the state.

When all releases in a state are taken into account, Texas led all states and territories for the largest total on- and off-site releases reported as occurring within the state. TRI facilities reported on- and off-site releases in Texas of 258.3 million pounds (whether originating from facilities in Texas or transferred into Texas from facilities in other states and territories). By this accounting, Ohio ranked second with 213.0 million pounds and Louisiana ranked third with 189.4 million pounds, reversing their ranking for total on- and off-site releases (discussed above).

Most off-site releases were transferred within the state where they originated (285.9 million pounds). A total of 175.2 million pounds were sent by facilities in one state to locations in another.

Transfers Off-site for Further Waste Management

States reported larger amounts of transfers off-site for further waste management into other states than were transferred within the state. Nationwide, transfers from one state to another totaled 1.94 billion pounds, while transfers within states totaled 1.47 billion pounds, as shown in Table 2-7. These transfers off-site for further waste management include transfers to recycling, energy recovery, and treatment.

South Carolina ranked first for amounts transferred out of state for further waste management with 317.3 million pounds, principally to recycling (307.5 million pounds). The largest transfers for further waste management within a state were reported in Texas, with 213.6 million pounds. The largest transfer types within Texas were transfers to energy recovery (76.5 million pounds) and transfers to recycling (60.3 million pounds). Tennessee was the largest recipient state, with 264.3 million pounds transferred into the state for further waste management. This included 259.4 million pounds transferred into Tennessee for recycling.

Accounting for the transfer of TRI chemicals among states, Texas had the largest total transfers to destinations within its borders (whether originating from facilities in Texas or transferred into Texas from facilities in other states and territories). Transfers within and into Texas totaled 311.1 million pounds. Tennessee ranked second with 299.2 million pounds, and Pennsylvania ranked third with 285.7 million pounds.

Table 2-6 TRI Releases in the State and Transferred Out of State, 1997

State	Releases in the State				Transferred Out of State
	Total On-site Releases	Transferred Within State	Transferred into State	Total Releases in the State[b]	
	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	77,585,917	8,174,562	3,562,232	89,322,711	8,910,800
Alaska	4,615,647	1,500	0	4,617,147	7
American Samoa	12,750	0	0	12,750	0
Arizona	30,984,428	318,186	325,378	31,627,992	115,885
Arkansas	32,379,942	1,634,404	318,560	34,332,906	25,707,917
California	37,055,551	2,948,698	194,765	40,199,014	5,146,363
Colorado	4,507,112	537,531	64,355	5,108,998	102,918
Connecticut	6,151,663	963,681	389,037	7,504,381	2,554,336
Delaware	3,319,493	48,389	17,224	3,385,106	138,951
District of Columbia	6,615	0	574	7,189	0
Florida	88,165,239	1,771,893	146,268	90,083,400	5,481,589
Georgia	58,546,961	2,025,495	308,807	60,881,263	11,309,054
Guam	0	0	0	0	0
Hawaii	444,040	8,365	0	452,405	0
Idaho	17,490,808	48,020	25,996,169	43,534,997	209,750
Illinois	94,567,818	24,307,900	15,388,095	134,263,813	8,725,333
Indiana	77,939,169	39,990,373	1,952,183	119,881,725	4,618,488
Iowa	29,040,867	945,884	69,739	30,056,490	4,209,360
Kansas	22,723,658	2,820,968	3,927,143	29,471,769	1,187,590
Kentucky	38,745,704	4,736,857	1,193,892	44,676,453	3,818,630
Louisiana	183,777,629	1,696,311	3,939,145	189,413,085	564,313
Maine	7,962,190	1,271,234	25,675	9,259,099	536,559
Maryland	12,516,769	448,065	340,869	13,305,703	734,510
Massachusetts	5,717,563	617,471	310,622	6,645,656	718,376
Michigan	53,067,487	30,978,481	13,377,639	97,423,607	1,235,952
Minnesota	17,598,614	1,025,936	27,395	18,651,945	1,541,915
Mississippi	64,639,656	770,565	36,282	65,446,503	755,850
Missouri	57,291,332	3,252,869	428,775	60,972,976	2,279,785
Montana	42,131,345	295	1,615,870	43,747,510	1,220,745
Nebraska	8,486,106	963,297	66,416	9,515,819	8,528,572
Nevada	4,419,227	15,874	3,861,715	8,296,816	12
New Hampshire	2,514,137	51,148	230,105	2,795,390	221,648
New Jersey	16,158,940	1,857,047	1,066,750	19,082,737	2,751,450
New Mexico	34,087,469	75,494	0	34,162,963	8,038
New York	29,940,067	4,142,288	5,129,547	39,211,902	4,503,292
North Carolina	77,125,436	3,434,565	493,644	81,053,645	4,506,945
North Dakota	2,389,140	31,663	467,020	2,887,823	1,622
Ohio	113,127,277	38,899,852	60,975,728	213,002,857	6,648,704
Oklahoma	21,620,717	2,138,197	6,440,492	30,199,406	1,040,016
Oregon	24,339,679	666,467	2,530,439	27,536,585	5,925,415
Pennsylvania	79,944,589	49,778,985	3,309,558	133,033,132	13,519,946
Puerto Rico	7,176,391	597,369	89	7,773,849	170,416
Rhode Island	1,773,616	127,033	174,513	2,075,162	278,235
South Carolina	49,085,719	5,107,943	5,122,072	59,315,734	4,251,077
South Dakota	4,094,744	120,581	0	4,215,325	1,258
Tennessee	97,955,094	5,077,135	625,660	103,657,889	3,849,648
Texas	240,348,142	15,951,112	2,026,797	258,326,051	5,410,725
Utah	93,926,091	1,029,479	2,452,841	97,408,411	8,761,655
Vermont	405,287	6,156	715	412,158	155,252
Virgin Islands	1,428,589	0	0	1,428,589	108
Virginia	52,379,816	2,807,105	208,522	55,395,443	2,741,148
Washington	24,434,377	1,181,880	55,663	25,671,920	6,214,209
West Virginia	20,823,250	2,122,786	300,751	23,246,787	1,824,906
Wisconsin	30,135,032	18,330,714	2,099,726	50,565,472	2,093,651
Wyoming	9,349,356	6,729	0	9,356,085	1,073
Other[a]	0	0	3,638,541	3,638,541	0
Total	2,116,454,255	285,864,832	175,233,997	2,577,553,084	175,233,997

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for stabilization/solidification and for wastewater treatment, including to POTWs.

[a]"Other" includes waste sent to other countries, to sites not identified by the reporting facility and transfers to POTWs in more than one state.

[b]Includes on-site releases and off-site releases (off-site transfers to disposal) transferred within the state and transferred into the state (excludes transfers out of state).

Table 2-7. TRI Transfers Off-site for Further Waste Management Among and Within States, 1997

State	Transferred Out of State Pounds	Transferred Within State Pounds	Transferred Into State Pounds	Total Transferred Within and Into State Pounds
Alabama	43,413,736	41,337,819	54,221,028	95,558,847
Alaska	223,112	0	161,312	161,312
American Samoa	0	0	0	0
Arizona	21,575,440	38,121,312	18,783,184	56,904,496
Arkansas	43,032,529	10,211,080	26,996,078	37,207,158
California	27,877,754	90,775,623	24,386,047	115,161,670
Colorado	17,256,993	8,803,322	936,395	9,739,717
Connecticut	19,519,324	17,215,736	58,263,438	75,479,174
Delaware	12,835,256	4,352,454	1,046,487	5,398,941
District of Columbia	7,755	0	138	138
Florida	16,735,583	13,909,930	9,126,759	23,036,689
Georgia	64,312,209	9,643,648	9,683,307	19,326,955
Guam	0	0	0	0
Hawaii	41,255	6,445	33,942	40,387
Idaho	770,180	1,025,818	372,486	1,398,304
Illinois	77,714,438	53,878,659	161,170,840	215,049,499
Indiana	129,231,725	90,991,143	147,104,992	238,096,135
Iowa	32,727,334	14,390,270	17,684,899	32,075,169
Kansas	67,903,009	7,819,236	10,311,711	18,130,947
Kentucky	51,458,191	16,042,468	15,329,984	31,372,452
Louisiana	38,944,414	42,281,688	47,584,282	89,865,970
Maine	6,280,090	535,933	1,594	537,527
Maryland	10,351,515	4,749,812	18,934,509	23,684,321
Massachusetts	25,069,885	20,025,248	6,843,058	26,868,306
Michigan	93,287,880	128,330,924	98,989,262	227,320,186
Minnesota	13,686,902	20,676,608	15,837,508	36,514,116
Mississippi	20,173,594	6,077,321	2,297,667	8,374,988
Missouri	46,259,322	55,132,104	96,283,297	151,415,401
Montana	2,996,683	46,114	7,189,083	7,235,197
Nebraska	17,030,942	9,258,975	5,019,077	14,278,052
Nevada	1,951,708	50,689	1,270,312	1,321,001
New Hampshire	11,538,941	2,508,207	33,822	2,542,029
New Jersey	53,036,628	43,967,389	52,667,553	96,634,942
New Mexico	1,600,946	374,624	476,845	851,469
New York	57,226,324	27,245,661	48,434,353	75,680,014
North Carolina	84,482,919	23,490,961	36,796,696	60,287,657
North Dakota	53,780	796,591	164,514	961,105
Ohio	142,068,833	113,932,647	162,401,215	276,333,862
Oklahoma	16,717,085	23,479,164	6,310,124	29,789,288
Oregon	12,392,987	20,481,400	709,055	21,190,455
Pennsylvania	66,239,474	129,328,352	156,373,891	285,702,243
Puerto Rico	7,119,926	24,474,151	0	24,474,151
Rhode Island	7,544,422	723,695	2,843,368	3,567,063
South Carolina	317,346,210	28,991,915	53,049,512	82,041,427
South Dakota	672,627	4,147,140	206,960	4,354,100
Tennessee	58,067,082	34,835,040	264,332,298	299,167,338
Texas	98,947,288	213,588,573	97,490,538	311,079,111
Utah	1,851,618	853,065	3,331,434	4,184,499
Vermont	1,347,949	17,114	25,810	42,924
Virgin Islands	574,006	0	0	0
Virginia	28,815,070	21,083,737	17,464,222	38,547,959
Washington	5,142,709	5,200,749	5,557,332	10,758,081
West Virginia	15,180,840	4,161,566	13,177,344	17,338,910
Wisconsin	53,260,606	41,273,496	22,599,550	63,873,046
Wyoming	458,414	341	1,371,195	1,371,536
Other*	--	--	142,675,135	142,675,135
Total	1,944,355,442	1,470,645,957	1,944,355,442	3,415,001,399

* "Other" includes waste sent to other countries, to sites not identified by the reporting facility and transfers to POTWs in more than one state.

Management of TRI Chemicals in Waste by State

Texas ranked first among states and territories for total production-related waste managed, with 4.17 billion pounds (see Table 2-8). Louisiana ranked second with 2.39 billion pounds. A revision by one facility after preparation of data for this report would change Louisiana's total to 2.21 billion pounds, but would not affect the state rankings. Two other states had totals exceeding 1 billion pounds: Illinois, ranking third with 1.37 billion pounds, and South Carolina, ranking fourth with 1.02 billion pounds. Map 2-2 presents the geographic distribution of production-related waste managed in 1997.

Texas facilities reported the largest quantities in all but one waste management category. The largest quantities reported in Texas were managed on-site: 1.52 billion pounds of treatment, 1.09 billion pounds of recycling, and 984.9 million pounds of energy recovery. The state also ranked first in two off-site categories: treatment (86.2 million pounds) and energy recovery (82.8 million pounds) and first for quantity released on- and off-site (252.1 million pounds). Production-related waste reported in Texas ranged from 10.2% of the national total for quantity released on- and off-site to 25.9% of on-site energy recovery (33.6% when facility revisions previously described are taken into account).

The exception to Texas' dominance of waste management reporting occurred in off-site recycling, which South Carolina led with 302.5 million pounds (12.7% of the total in that category).

Louisiana ranked second in three waste management categories—on-site recycling, on-site treatment, and quantity released on- and off-site—and ranked third for on-site energy recovery. The largest quantities of production-related waste managed in Louisiana were 858.4 million pounds treated on-site, 746.9 million pounds recycled on-site, and 528.1 million pounds burned for energy recovery on-site. The facility revision previously mentioned would change on-site

able 2-8. Quantities of TRI Chemicals in Waste, by State, 1997

	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
	On-site	Off-site	On-site	Off-site	On-site	Off-site			
:ate	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
ılabama	266,066,193	41,610,934	54,993,029	33,306,201	288,994,880	17,224,155	82,908,645	785,104,037	153,670
ılaska	32,133	220,038	456,085	9,423	2,562,157	2,812	4,627,993	7,910,641	102,867
ımerican Samoa	0	0	0	0	0	0	12,750	12,750	0
ırizona	201,656,876	54,239,088	1,157,897	832,659	8,843,621	4,915,653	31,292,633	302,938,427	148,978
ırkansas	217,902,230	50,501,079	52,342,924	6,085,102	117,185,581	1,064,592	57,077,521	502,159,029	275,781
;alifornia	55,746,988	76,635,699	39,353,765	22,087,802	77,309,592	16,729,705	46,419,635	334,283,186	122,957
;olorado	22,745,533	16,314,398	209,711	6,087,968	9,444,535	1,847,447	5,344,502	61,994,094	37,489
;onnecticut	118,391,038	24,579,626	3,400,445	2,809,593	39,959,725	10,289,214	11,102,578	210,532,219	30,290
'elaware	32,896,062	10,540,245	19,255,280	1,643,031	68,642,233	4,999,545	3,499,696	141,476,092	13,626
;istrict of Columbia	0	7,500	0	0	303	1	6,617	14,421	0
·lorida	142,443,179	15,218,840	32,403,559	4,947,217	108,215,564	13,473,106	82,190,057	398,891,522	7,154,759
;eorgia	289,377,913	56,836,367	52,445,180	11,671,644	165,226,092	4,847,787	70,356,043	650,761,026	481,339
;uam	0	0	0	0	0	0	0	0	0
:awaii	40,618	45,511	0	616	3,580,530	1,488	449,743	4,118,506	938
ıdaho	2,753,590	1,042,715	28,600	157,375	96,279,582	711,199	16,977,869	117,950,930	56,150
ıllinois	314,553,894	92,981,867	40,497,594	27,325,176	764,811,973	16,187,464	117,532,113	1,373,890,081	252,386
ındiana	168,107,111	185,877,776	157,374,206	13,195,301	135,292,880	15,822,349	119,914,250	795,583,873	155,904
ıwa	152,237,630	32,048,553	1,686,347	3,621,310	25,903,394	10,444,333	31,816,520	257,758,087	133,929
ıansas	169,145,559	66,696,369	88,572,790	3,503,418	25,239,157	5,387,253	27,931,469	386,476,015	112,956
ıentucky	326,907,570	50,962,133	58,010,928	7,504,357	142,280,834	10,806,098	42,662,478	639,134,398	322,056
;ouisiana[a]	746,853,862	55,863,841	528,113,029	14,703,797	858,448,408	10,741,231	179,794,155	2,394,518,323	2,576,537
ıaine	10,624,371	6,281,909	8,327,078	376,338	63,134,599	654,189	9,334,122	98,732,606	2,905
ıaryland	13,446,585	5,172,039	15,084,938	1,112,858	29,935,385	9,324,872	13,500,222	87,576,899	103,173
ıassachusetts	18,197,626	29,715,353	6,763,717	5,337,558	22,952,311	10,749,906	6,596,628	100,313,099	47,650
ıichigan	378,336,073	128,073,875	83,687,074	67,480,236	89,642,433	38,111,751	80,762,315	866,093,757	304,376
ıinnesota	161,863,212	21,296,995	8,016,186	2,359,251	34,693,861	10,884,199	20,592,140	259,705,844	28,193
ıississippi	223,048,853	20,316,877	23,640,421	3,957,984	166,301,942	1,660,949	64,275,403	503,202,429	167,222
ıissouri	229,823,661	63,356,210	98,456,987	22,336,016	174,927,067	14,861,872	61,515,495	665,277,308	131,397
Montana	46,586,065	2,966,505	2,629,689	59,947	9,236,891	18,892	42,177,572	103,675,561	267
Nebraska	5,730,188	24,885,114	838,327	591,364	9,192,742	1,431,896	13,369,541	56,039,172	49,292
Nevada	1,923,358	1,101,743	0	101,184	11,123,073	23,990	4,443,474	18,716,822	11
New Hampshire	16,698,742	12,663,886	1,490,392	739,937	10,124,456	962,439	2,702,623	45,382,475	16,479
New Jersey	65,692,010	40,686,255	219,383,087	29,506,963	130,644,642	30,015,188	21,394,926	537,323,071	3,014,554
New Mexico	1,480,337	1,190,543	26,313,209	147,019	4,017,170	633,512	41,787,552	75,569,342	0
New York	172,842,264	68,275,239	29,371,265	7,076,667	127,109,643	11,609,888	37,289,240	453,574,206	1,123,167
North Carolina	448,336,582	87,204,537	27,818,415	14,017,992	135,606,112	6,261,666	84,658,221	803,903,525	77,401
North Dakota	6,574	596,287	0	31,171	4,446,858	221,419	2,491,558	7,793,867	2,600
Ohio	217,112,974	188,951,868	108,525,378	38,359,015	140,033,290	34,935,397	153,761,315	881,679,237	3,464,602
Oklahoma[b]	44,023,906	36,333,994	694,233,700	1,383,754	35,229,082	2,647,032	24,265,278	838,116,746	84,540
Oregon	37,958,112	20,003,439	13,964,005	1,336,309	71,513,926	13,852,045	28,787,064	187,414,900	23,939
Pennsylvania	360,008,264	133,879,998	77,893,692	19,317,617	166,360,441	26,732,395	133,685,107	917,877,514	6,256,039
Puerto Rico	22,957,397	13,834,881	486,257	10,392,249	17,038,395	8,308,705	7,849,122	80,867,006	31,654
Rhode Island	14,512,098	11,704,702	224,327	792,257	7,242,505	726,078	2,036,452	37,238,419	3,708
South Carolina	449,687,937	302,459,979	65,484,208	14,921,886	116,610,643	14,031,629	55,635,721	1,018,832,003	1,348,509
South Dakota	59,132,065	814,772	1,159,000	247,666	2,689,981	3,801,806	4,142,933	71,988,223	6,251
Tennessee	220,492,375	77,421,606	48,945,665	6,293,238	107,647,244	11,420,987	106,232,230	578,453,345	1,034,219
Texas	1,086,499,032	158,569,874	984,889,997	82,814,401	1,518,558,745	86,209,030	252,075,456	4,169,616,535	2,342,993
Utah	1,940,716	1,997,415	25,388,793	139,834	235,120,198	772,988	96,115,730	361,475,674	5,650,581
Vermont	122,855	2,120,867	0	21,898	1,105,112	157,535	436,086	3,964,353	0
Virgin Islands	634,022	220,119	0	2,060	13,384,698	351,827	1,428,702	16,021,428	0
Virginia	175,060,942	19,598,037	35,839,169	10,140,409	311,231,341	22,099,062	58,508,860	632,477,820	93,220
Washington	96,663,620	6,416,187	12,166,288	857,072	75,521,856	3,627,965	30,845,848	226,098,836	146,155
West Virginia	116,453,349	7,263,396	41,657,129	6,224,775	110,528,227	6,956,661	24,716,703	313,800,240	39,469
Wisconsin	57,504,628	62,772,874	12,737,855	17,638,679	117,250,445	16,405,819	38,957,047	323,267,347	29,846
Wyoming	3,360,150	417,925	74,591	2,470	4,546,158	62,317	9,355,868	17,819,479	4,163
Total[c]	7,986,618,922	2,390,787,879	3,805,792,208	525,610,064	7,012,922,513	536,021,338	2,467,643,821	24,725,396,745	37,761,187

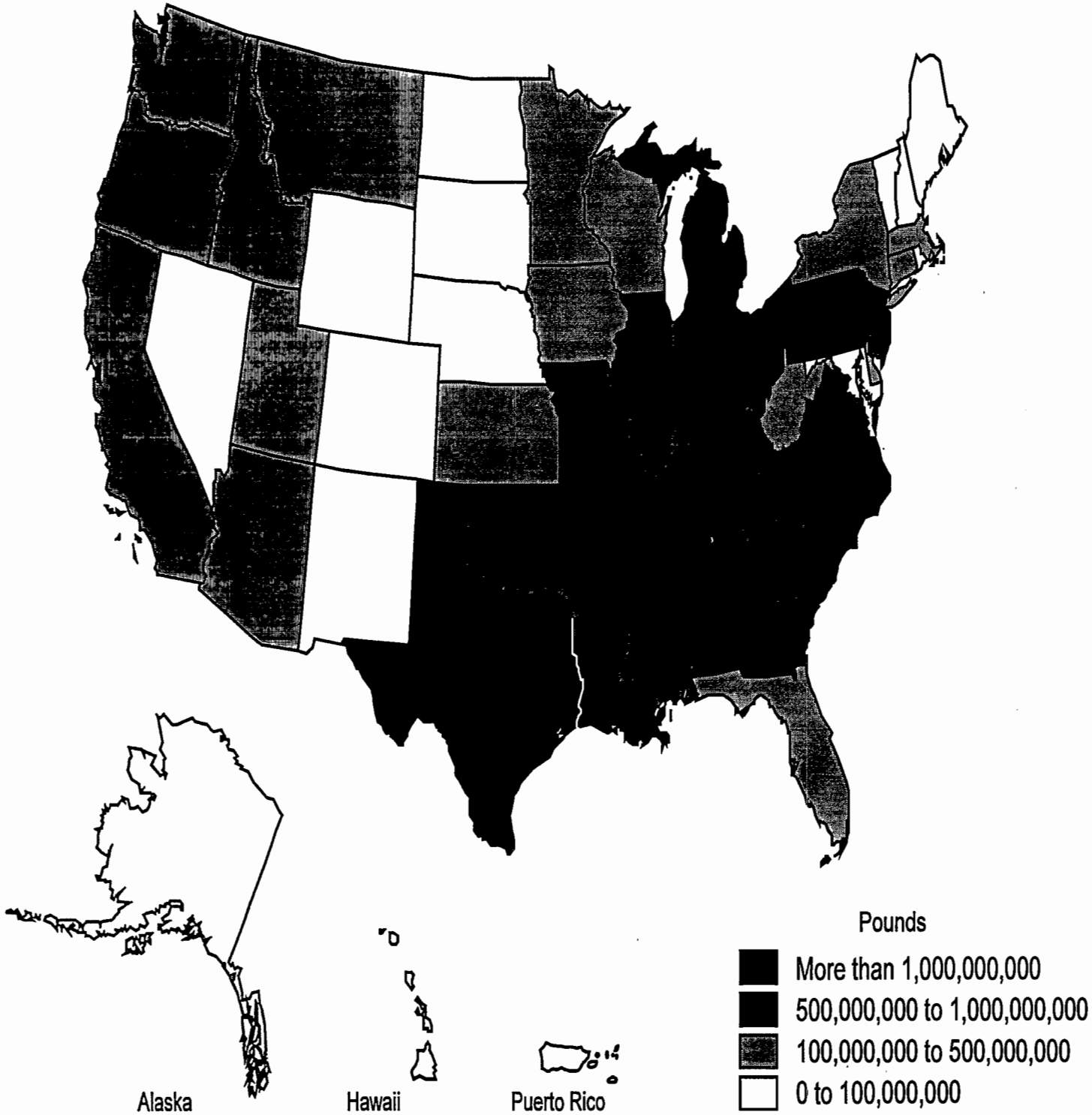
Note: Data from Section 8 of Form R.

[a]One facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. For Louisiana, this changes on-site energy recovery to 347,283,029 pounds and total production-related waste managed to 2,213,688,323 pounds.

[b]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene and 272,000,000 pounds of propylene in 1997. The facility has since revised these quantities to zero. For Oklahoma, this changes on-site energy recovery to 233,700 pounds and total production-related waste managed to 144,116,746 pounds.

[c]Revisions by two facilities (in Louisiana and Oklahoma, respectively) change on-site energy recovery to 2,930,962,208 pounds and total production-related waste managed to 23,850,566,745 pounds.

Map 2-2. Geographic Distribution of Production-related Waste Managed, 1997



Note: One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene and 272,000,000 pounds of propylene in 1997. The facility has since revised these quantities to zero. In Oklahoma, this changes total production-related waste managed to 144,116,746 pounds. Oklahoma's shading in the map changes to light gray. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. In Louisiana, this changes on-site energy recovery to 347,283,029 pounds and total production-related waste managed to 2,213,688,323 pounds. Louisiana's shading in the map remains unchanged.

energy recovery in Louisiana to 347.3 million pounds, but Louisiana would still rank third among all states in this category.

Although Illinois ranked third for total production-related waste managed, the state appeared in the top three for only one method of waste management, ranking third for on-site treatment with 764.8 million pounds.

1997 TRI Data by Chemical

This section presents chemical-specific TRI data for 1997, including the chemicals with the largest releases. It also reviews data for three groups of TRI chemicals of particular concern: metals, chemicals identified as known or suspected OSHA carcinogens, and chemicals that may adversely affect children's health. Also included is information about the uses, toxicity, and environmental fate of the TRI chemicals with the largest reported releases. At the end of this chapter, Table 2-20 presents on- and off-site releases and waste management data for all TRI chemicals for which 1997 reports were received.

Top 20 Chemicals for On- and Off-site Releases

Table 2-9 lists the 20 TRI chemicals with the largest total releases in 1997. With 1.93 billion pounds in releases, these chemicals represented three-quarters (75.0%) of all on- and off-site releases reported to TRI in 1997.

Zinc compounds led all TRI chemicals with releases totaling 306.0 million pounds. Off-site releases (transfers to disposal) contributed nearly 60% (182.4 million pounds) of this total. As explained above, off-site releases of metals and their compounds include transfers to solidification/stabilization and to wastewater treatment including POTWs.

Methanol ranked second for total releases with 221.1 million pounds. In contrast to zinc compounds, 99.6% of methanol releases occurred on-site, especially as air emissions. Methanol led all TRI chemicals for air releases with 194.4 million pounds (25.3 million pounds fugitive emissions and 169.1 million pounds stack emissions).

Ammonia ranked third overall with total releases of just under 200.0 million pounds. Air emissions of ammonia totaled 156.1 million pounds (35.6 million pounds fugitive and 120.6 million pounds stack). Ammonia ranked second for releases to air. Altogether, air emissions represented more than three-quarters of total on- and off-site releases for 12 of the top 20 chemicals. (In addition to methanol and ammonia, these were toluene, xylene, n-hexane, chlorine, hydrochloric acid, methyl ethyl ketone, carbon disulfide, dichloromethane, styrene, and glycol ethers.)

Table 2-9. Top 20 Chemicals with Largest Total On-site and Off-site Releases, 1997

CAS Number	Chemical	Air		Surface Water Discharges	Underground Injection		On-site Land Releases	
		Fugitive or Nonpoint Emissions Pounds	Stack or Point Air Emissions Pounds	Pounds	Class I Wells Pounds	Class II-V Wells Pounds	RCRA Subtitle C Landfills Pounds	Other Landfills Pounds
--	Zinc compounds	1,439,010	3,261,934	1,203,833	368,483	0	9,827,280	27,785,517
67-56-1	Methanol	25,252,347	169,124,405	7,019,881	17,621,227	187,607	5,540	315,317
7664-41-7	Ammonia	35,558,747	120,590,003	7,023,065	30,953,105	197,387	23,352	181,233
--	Nitrate compounds	11,960	384,896	148,846,835	40,552,663	250	3,772	11,496
--	Manganese compounds	614,981	906,999	4,206,997	14,412,830	0	3,234,107	25,656,779
108-88-3	Toluene	40,624,222	72,314,721	30,998	510,930	2,705	20,962	18,375
7664-38-2	Phosphoric acid	795,056	1,006,529	43,514,457	13,257	0	5,400	7,617,169
1330-20-7	Xylene (mixed isomers)	17,980,805	56,380,452	36,604	130,995	2,620	2,207	2,897
110-54-3	n-Hexane	22,680,532	48,867,921	58,540	13,221	0	265	861
7782-50-5	Chlorine	1,015,459	63,403,973	301,119	60,595	0	0	50,005
7647-01-0	Hydrochloric acid	2,841,558	56,408,752	1,216	489,005	0	0	10
--	Copper compounds	4,742,739	745,434	105,892	237,184	0	942,977	2,463,555
78-93-3	Methyl ethyl ketone	20,029,691	32,944,541	41,781	485,144	5	7,282	8,596
75-15-0	Carbon disulfide	2,961,175	48,023,779	28,651	517,565	0	0	5
--	Chromium compounds	110,947	276,081	99,497	1,131,559	0	576,612	1,866,187
75-09-2	Dichloromethane	16,374,955	31,290,200	9,492	528,026	0	259	2,200
100-42-5	Styrene	10,826,037	33,300,628	43,954	202,387	0	61,302	418,188
--	Lead compounds	188,278	689,359	36,516	263,980	0	1,120,106	2,542,805
--	Glycol ethers	8,461,559	28,556,856	337,884	5,462	0	806	22,213
7440-66-6	Zinc (fume or dust)	940,823	2,323,823	17,508	1	0	270,093	761,460
	Subtotal	213,450,881	770,801,286	212,964,720	108,497,619	390,574	16,102,322	69,724,868
	Total	317,233,311	1,014,430,575	218,371,961	219,070,242	443,656	20,472,578	93,639,517

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

More nitrate compounds (added to TRI reporting in 1995) were discharged to surface waters than any other chemical, with 148.8 million pounds. TRI facilities also reported surface water discharges of 43.5 million pounds of phosphoric acid, the second-largest amount of such discharges. These two chemicals accounted for 88.1% of all surface water discharges reported to TRI in 1997.

Nitrate compounds and ammonia ranked first and second, respectively, for underground injection. Injection in Class I wells totaled 40.6 million pounds of nitrate compounds and 31.0 million pounds of ammonia. As noted earlier, relatively little injection of TRI chemicals was reported to other classes of underground wells; ammonia ranked first for injection in Class II-V wells with 198,000 pounds.

Zinc compounds led all TRI chemicals for total on-site land releases, with 117.3 million pounds, followed by manganese compounds, with 50.2 million pounds. Zinc compounds ranked first in three of the five types of on-site land releases summarized in Table 2-9, with 9.8 million pounds released to RCRA subtitle C landfills, 27.8 million pounds to other landfills, and 61.7 million pounds to other on-site land disposal. Ammonia was released to on-site land treatment in larger amounts, totaling 2.1 million

Table 2-9. Top 20 Chemicals with Largest Total On-site and Off-site Releases, 1997, continued

CAS Number	Chemical	On-site Land Releases: Land Treatment Pounds	On-site Land Releases: Surface Impoundments Pounds	On-site Land Releases: Other Disposal Pounds	Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
--	Zinc compounds	77,639	17,940,915	61,663,962	123,568,573	182,410,387	305,978,960
67-56-1	Methanol	120,042	380,628	141,887	220,168,881	952,260	221,121,141
7664-41-7	Ammonia	2,067,833	843,712	138,286	197,576,723	2,417,150	199,993,873
--	Nitrate compounds	1,739,402	1,252,109	72,262	192,875,645	4,498,878	197,374,523
--	Manganese compounds	331,134	18,724,654	2,223,807	70,312,288	46,231,218	116,543,506
108-88-3	Toluene	5,316	952	694,801	114,223,982	1,452,282	115,676,264
7664-38-2	Phosphoric acid	190,328	9,027,575	13,387,076	75,556,847	2,734,781	78,291,628
1330-20-7	Xylene (mixed isomers)	12,129	1,720	58,724	74,609,153	723,974	75,333,127
110-54-3	n-Hexane	3,032	250	23,625	71,648,247	297,787	71,946,034
7782-50-5	Chlorine	23,011	5	755	64,854,922	46,946	64,901,868
7647-01-0	Hydrochloric acid	12	0	48,048	59,788,601	447,822	60,236,423
--	Copper compounds	3,597	9,474,619	25,283,483	43,999,480	10,770,350	54,769,830
78-93-3	Methyl ethyl ketone	3	109	143,332	53,660,484	466,246	54,126,730
75-15-0	Carbon disulfide	0	0	0	51,531,175	32,503	51,563,678
--	Chromium compounds	25,593	25,381,630	1,476,411	30,944,517	19,465,080	50,409,597
75-09-2	Dichloromethane	12	0	8,709	48,213,853	226,085	48,439,938
100-42-5	Styrene	8,500	509	48,551	44,910,056	1,583,171	46,493,227
--	Lead compounds	2,362	3,897,020	6,205,566	14,945,992	30,465,946	45,411,938
--	Glycol ethers	7,415	74	9,697	37,401,966	948,930	38,350,896
7440-66-6	Zinc (fume or dust)	750	3,195	6,857,943	11,175,596	24,974,649	36,150,245
	Subtotal	4,618,110	86,929,676	118,486,925	1,601,966,981	331,146,445	1,933,113,426
	Total	5,794,667	96,952,876	130,044,872	2,116,454,255	461,098,829	2,577,553,084

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

pounds, than any other TRI chemical. Ranking 15th overall, chromium compounds had the largest on-site releases to surface impoundments, with 25.4 million pounds.

Use, Toxicity, and Environmental Fate Information

TRI chemicals may cause a variety of adverse health and environmental effects. Information on use, toxicity, and environmental fate is provided here for the top five chemicals with the largest releases in 1997 (see Table 2-9).

Zinc Compounds

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

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

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

Methanol

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

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

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

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

Ammonia

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

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

Aqueous ammonia is moderately toxic to aquatic organisms. Because it is a source of nitrogen, an essential element for aquatic plant growth, ammonia can stimulate primary production of plants and can produce changes in the dominant species of plants, leading to cultural eutrophication and ultimately to deterioration of water quality.

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

Nitrate Compounds

Uses. Many compounds are covered by the nitrate compounds category, and they have many uses. The most significant use is as fertilizers, either straight or blended to make complex fertilizers. Some compounds are also used as oxidizing agents and as constituents in some explosives and pyrotechnics. Nitrate compounds are also used as refining agents for removing air bubbles from melts in the glass and enamel industry and in metallurgy as heat-transfer baths for quench hardening and tempering of steel, light alloys, and copper alloys.

Toxicity. Nitrate compounds that are soluble in water release nitrate ion, which can cause both human health and environmental effects. Human infants exposed to aqueous solutions of nitrate ion can develop a condition in which the blood's ability to carry oxygen is reduced. This reduced supply of oxygen can lead to damaged organs and death.

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

Environmental Fate. Nitrate-nitrogen is the form of nitrogen most available to plants. In the environment, nitrate ion is taken up by plants and becomes part of the natural nitrogen cycle. Excess nitrate can stimulate primary production of plants and can produce changes in the dominant species of plants, leading to cultural eutrophication and ultimately to deterioration of water quality.

Manganese Compounds

Uses. Manganese metal is used primarily in the production of steel such as carbon steel, stainless steel, high-temperature steel, and tool steel where it increases hardness, stiffness, and strength. There are a variety of uses for manganese compounds including the production of dry-cell batteries, matches, fireworks, ceramics, fungicides, and fertilizers. Additional uses include as a catalyst in the chlorination of certain organic compounds, a supplement for animal feed, and in the treatment of wastewater.

Toxicity. Manganese is a widespread element that is essential for normal body functioning in all animal species. Because manganese is an essential nutrient, there are human disease states associated with either deficiencies or excess intakes of manganese. The Food and Nutrition Board of the National Research Council (NRC, 1989) determined an "estimated safe and adequate daily dietary intake" (ESADDI) of manganese to be 2-5 mg/day for adults. Human diets with too little manganese can lead to slowed blood clotting times, dermatitis, changes in hair color, lowered cholesterol levels, and other alterations in metabolism.

Too much manganese can cause serious illness such as effects on the central nervous system. Workers in certain industries who have been exposed to airborne dust containing manganese for many months or years may have mental or emotional disturbances and their body movements may become slow and clumsy. Some of these symptoms may be treated but some may be caused by permanent brain injury. EPA's inhalation reference concentration is 0.00005 milligrams per cubic meter.

It is not certain that eating or drinking too much manganese can cause these same serious symptoms although some studies have indicated that excess dietary intake may be of concern. EPA's oral reference dose is 0.14 mg/kg-day, which is estimated to be an intake for the general population that is not associated with adverse health effects; this is not meant to imply that intakes above the reference dose are necessarily associated with toxicity.

Manganese is also toxic to aquatic organisms with aquatic acute toxicity values as low as 3.2 to 5.7 parts per million (ppm) for invertebrates and as low as 12 ppm for fish. Concentrations as low as 0.2 to 0.3 ppm are toxic to some marine algae.

Environmental Fate. Manganese compounds can be released to the air by industrial emissions and by the erosion of soils containing manganese. These compounds may be present as small dust-like particles that settle out on land and water bodies with the larger particles tending to settle out faster than smaller ones. Manganese compounds from industrial sources can enter the soil, surface water, groundwater, and sewage waters. The chemical state of the manganese, its concentration, and the type of soil or water conditions present, determines the availability of manganese in a particular environment.

Top 20 Chemicals for Quantities Managed in Waste

Table 2-10 lists the 20 TRI chemicals with the largest total production-related waste managed. They accounted for 17.94 billion pounds of production-related waste, nearly three-quarters (72.6%) of the total reported production-related waste managed in 1997. However, revisions by two facilities after data

were "frozen" for this report would change total production-related waste managed to 17.07 billion pounds for the top 20 chemicals.

Facilities reported managing 2.42 billion pounds of methanol in production-related waste, the chemical with the largest total. Methanol was most likely to be managed by on-site treatment (960.2 million pounds) or by on-site recycling (652.6 million pounds). These two categories represented two thirds (66.6%) of the methanol managed in production-related waste. Methanol ranked first for on-site treatment and second for on-site recycling. Methanol also had the largest reported quantities of off-site energy recovery (92.1 million pounds) and off-site treatment (131.7 million pounds) and ranked second for quantity released (226.5 million pounds).

Ethylene ranked second for total production-related waste managed with 1.81 billion pounds. However, the two facilities' revisions previously noted would change this quantity to 1.21 billion pounds, placing ethylene fourth among all TRI chemicals for total production-related waste managed. TRI facilities reported managing 1.80 billion pounds of toluene and 1.44 billion pounds of copper in production-related waste in 1997. These chemicals would rank second and third, respectively, when the revisions affecting ethylene are taken into account. One facility's revision would also change production-related waste reported for propylene from 1.10 billion pounds in 1997 to 825.9 million pounds, and propylene would rank eighth rather than fifth.Nearly two-thirds of the toluene managed (1.12 billion pounds or 62.1% of the total for this chemical) was recycled on-site. Toluene ranked first among TRI chemicals for on-site recycling. Copper was the chemical with the largest quantity of off-site recycling, with 783.5 million pounds. Taking into account the facility revisions, ethylene and propylene were combusted for energy recovery in larger quantities (548.8 million pounds and 446.4 million pounds, respectively) than any other TRI chemical.

Ranking ninth overall, zinc compounds ranked first for quantity released on- and off-site with 277.3 million pounds.

Metals and Metal Compounds

Both metals and their compounds are listed on TRI. Release and waste management data reported in 1997 for these chemicals appear in Tables 2-11 through 2-13. Under EPCRA section 313, facilities that manufacture, process, or otherwise use metal compounds report 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 information on the listed portion of the compound is collected in TRI.

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

On- and Off-site Releases of Metals and Metal Compounds

On- and off-site releases of TRI metals and metal compounds in 1997 totaled 732.8 million pounds, as shown in Table 2-11. TRI facilities reported on- and off-site releases of 342.1 million pounds of zinc and its compounds, 46.7% of the total for metals. Manganese and its compounds ranked second with 143.6 million pounds (19.6%). (As seen in Table 2-9, above, zinc compounds alone ranked first among all TRI chemicals for total releases and manganese compounds alone ranked fifth.)

Off-site releases of 391.5 million pounds represented 53.4% of total releases of metals and metal compounds. (As explained above, transfers of metals to disposal include transfers to solidification/ stabilization and to wastewater treatment at private or public facilities.) Off-site releases of 207.4 million pounds of zinc and its compounds far outweighed those of other metals. The largest type of on-site release of metals was "other disposal", a category of on-site land releases. Other disposal totaled 114.0 million pounds or 15.6% of all on- and off-site releases. Again, the largest component was zinc and its compounds, with 68.5 million pounds. Non-RCRA subtitle C landfills and surface impoundments each received approximately 11% of total releases of metals, with 79.8 million pounds and 82.4 million pounds, respectively. Metals with the largest amounts in these categories were manganese and its compounds with 35.3 million pounds released to other landfills and chromium and its compounds with 25.4 million pounds released to surface impoundments. Altogether, on-site land releases of metals amounted to 296.5 million pounds, 40.5% of the total.

Table 2-12 more closely examines off-site releases of metals. Again, zinc and its compounds had the largest amount with 207.4 million pounds (53.0% of the total). By far the largest amount of metals and their compounds—207.2 million pounds—was sent to off-site landfills and disposal surface impoundments. Solidification/stabilization services received another 144.0 million pounds. These amounts represented 52.9% and 36.8%, respectively, of all off-site releases of metals and metal compounds. Zinc and its compounds had the largest amounts with 97.3 million pounds to landfills/surface impoundments and 99.9 million pounds to solidification/stabilization.

Table 2-10. Top 20 TRI Chemicals with Largest Quantities in Waste, 1997

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
67-56-1	Methanol	652,646,250	19,047,443	338,486,384	92,054,052	960,162,594	131,720,870	226,499,488	2,420,617,081	198,274
74-85-1	Ethylene[a]	115,302,995	14,410	1,151,632,258	14,141,146	496,425,339	1,798,509	29,264,637	1,808,579,294	602,721
108-88-3	Toluene	1,119,206,056	28,405,851	216,605,276	88,849,998	217,192,273	19,924,367	113,112,450	1,803,296,271	272,801
7440-50-8	Copper	603,925,697	783,470,245	225,424	3,551,787	41,296,581	2,006,069	9,658,847	1,444,134,650	368,800
115-07-1	Propylene[b]	65,774,345	35	718,371,130	2,068	297,708,572	125,675	15,905,795	1,097,887,620	955,453
7664-41-7	Ammonia	348,336,500	9,620,303	118,146,876	112,444	290,578,256	16,712,554	194,820,109	978,327,042	714,157
7647-01-0	Hydrochloric acid	72,162,656	4,211,505	180,000	6,673,069	782,653,538	11,481,225	60,106,472	937,468,465	45,552
8001-58-9	Creosote	66,432,245	1,700,000	702,717	67,254	865,430,718	362,602	2,606,664	937,302,200	497,301
--	Zinc compounds	107,656,323	257,386,303	613,266	261,459	70,211,629	18,374,257	277,306,831	731,810,068	6,770,405
--	Lead compounds	333,440,293	303,148,397	56,000	50,842	3,202,463	4,556,056	34,566,800	679,020,851	3,730,552
7664-38-2	Phosphoric acid	453,512,929	4,387,637	2,000	65,620	128,525,343	5,572,441	69,947,907	662,013,877	7,162,494
107-21-1	Ethylene glycol	452,791,021	76,990,931	6,836,406	17,472,536	55,214,574	29,734,918	12,985,925	652,026,311	66,961
110-54-3	n-Hexane	371,918,727	14,085,860	30,687,478	19,134,402	72,743,563	4,724,666	69,383,458	582,678,154	704,970
--	Copper compounds	310,075,700	167,470,119	0	25,643	42,125,835	4,452,985	57,625,028	581,775,310	3,073,536
1330-20-7	Xylene (mixed isomers)	122,408,183	42,050,232	139,297,715	77,876,899	64,130,806	10,457,390	75,793,914	532,015,139	150,541
7664-93-9	Sulfuric acid	245,755,305	2,206,540	940	20	186,759,219	2,867,753	21,847,891	459,437,668	12,115
75-01-4	Vinyl chloride	398,418,771	82,698	21,752,907	17,663	33,633,983	134,349	957,085	454,997,456	6,426
--	Nitrate compounds	99,267,015	1,600,700	0	271,802	49,691,186	73,381,286	202,947,298	427,159,287	182,840
7697-37-2	Nitric acid	28,640,127	2,812,833	27,246	257	306,863,652	16,414,079	22,042,219	376,800,413	115,681
7782-50-5	Chlorine	79,099,777	111,317	0	2,161	229,962,293	1,106,905	64,957,305	375,239,758	40,564
	Subtotal[c]	6,046,770,915	1,718,803,359	2,743,624,023	320,631,122	5,194,512,417	355,908,956	1,562,336,123	17,942,586,915	25,672,144
	Total[c]	7,986,618,922	2,390,787,879	3,805,792,208	525,610,064	7,012,922,513	536,021,338	2,467,643,821	24,725,396,745	37,761,187

Note: Data from Section 8 of Form R.

[a]One facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. Another facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene in 1997. The facility has since revised this quantity to zero. For ethylene, on-site energy recovery changes to 548,802,258 pounds and total production-related waste managed changes to 1,205,749,294 pounds. Ethylene changes in rank from second to fourth.

[b]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 272,000,000 pounds of propylene in 1997. The facility has since revised this quantity to zero. For propylene, on-site energy recovery changes to 446,371,130 pounds and total production-related waste managed changes to 825,887,620 pounds. Propylene changes in rank from fifth to eighth.

[c]Revisions by two facilities for ethylene and propylene change on-site energy recovery to 1,868,794,023 pounds and total production-related waste managed to 17,067,756,915 pounds for the top 20 chemicals. For all chemicals, on-site energy recovery changes to 2,930,962,208 pounds and total production-related waste changes to 23,850,566,745 pounds.

Table 2-11. TRI On-site and Off-site Releases of Metals and Metal Compounds, 1997

	On-site Releases											Off-site Releases	
	Air			Underground Injection		On-site Land Releases							
Chemical	Fugitive or Nonpoint Emissions Pounds	Stack or Point Emissions Pounds	Surface Water Discharges Pounds	Class I Wells Pounds	Class II-V Wells Pounds	RCRA Subtitle C Landfills Pounds	Other Landfills Pounds	Land Treatment Pounds	Surface Impound-ments Pounds	Other Disposal Pounds	Total On-site Releases Pounds	Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
Antimony and antimony compounds	33,112	60,657	41,708	12,212	0	212,830	175,186	1,143	10,394	847,648	1,394,890	4,432,103	5,826,993
Arsenic and arsenic compounds	30,868	169,050	4,133	76,170	0	16,922	1,744,039	2	3,207,391	797,898	6,046,473	1,900,539	7,947,012
Barium and barium compounds	68,095	510,349	966,023	152,000	0	2,569,499	4,509,435	168,293	1,610,709	838,160	11,392,563	10,555,529	21,948,092
Beryllium and beryllium compounds	36	1,145	28	0	0	580	55,890	5	38	0	57,722	10,343	68,065
Cadmium and cadmium compounds	9,971	56,617	2,455	52	0	50,125	33,477	867	484,266	427,964	1,065,794	1,485,431	2,551,225
Chromium and chromium compounds	285,762	674,038	111,302	1,131,560	0	603,820	2,153,750	25,747	25,443,708	1,553,064	31,982,751	25,427,173	57,409,924
Cobalt and cobalt compounds	24,200	42,160	36,814	44,664	0	33,197	81,426	3,449	171,987	349,989	787,886	1,242,382	2,030,268
Copper and copper compounds	5,107,341	1,273,180	146,349	294,697	0	1,159,855	3,310,715	159,321	9,488,448	25,822,478	46,762,384	29,148,825	75,911,209
Lead and lead compounds	298,739	1,003,786	51,234	263,980	0	1,297,680	2,940,071	2,367	3,998,217	9,759,365	19,615,439	36,292,950	55,908,389
Manganese and manganese compounds	1,120,972	1,220,626	4,354,743	14,412,836	6	3,310,389	35,316,215	341,376	18,788,948	2,328,436	81,194,547	62,440,650	143,635,197
Mercury and mercury compounds	9,888	4,543	420	41	0	406	585	5	0	6,885	22,773	50,561	73,334
Nickel and nickel compounds	241,384	523,788	118,351	142,076	0	129,933	660,756	7,213	1,184,103	2,625,135	5,632,739	10,985,703	16,618,442
Selenium and selenium compounds	9,419	73,728	2,432	3,409	0	580	103,751	5	92,280	121,478	407,082	35,796	442,878
Silver and silver compounds	6,861	8,686	6,252	156	0	581	2,130	830	9,600	27,850	62,946	92,702	155,648
Thallium and thallium compounds	0	256	0	0	0	1,000	0	0	0	0	1,256	1,680	2,936
Vanadium* (CAS Number 7440-62-2)	1,001	11,435	708	0	0	1,000	116,500	10	0	0	130,654	43,211	173,865
Zinc and zinc compounds*	2,379,833	5,585,757	1,221,341	368,484	0	10,097,373	28,546,977	78,389	17,944,110	68,521,905	134,744,169	207,385,036	342,129,205
Total	9,627,482	11,219,801	7,064,293	16,902,337	6	19,485,770	79,750,903	789,022	82,434,199	114,028,255	341,302,068	391,530,614	732,832,682

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.
* Only fume or dust forms are reportable.

Table 2-12. TRI Off-site Releases of Metals and Metal Compounds, 1997

Chemical	Storage Only[b] Pounds	Solidification/ Stabilization Metals Only[c] Pounds	Wastewater Treatment (Excluding POTWs) Metals Only[d] Pounds	Transfers to POTWs Metals Only[e] Pounds	Underground Injection Pounds	Landfills/ Disposal Surface Impoundments Pounds
Antimony and antimony compounds	4,438	252,593	18,102	120,945	9,433	3,643,194
Arsenic and arsenic compounds	9,728	149,416	7	1,071	209,716	1,460,728
Barium and barium compounds	250,740	2,084,996	63,171	279,402	14,918	4,668,715
Beryllium and beryllium compounds	0	1,273	230	5	0	8,668
Cadmium and cadmium compounds	250	208,279	98,173	4,105	0	1,146,008
Chromium and chromium compounds	84,896	8,090,368	1,110,653	271,422	412,988	13,835,905
Cobalt and cobalt compounds	1,900	65,263	137,502	14,956	0	970,477
Copper and copper compounds	252,744	3,649,326	379,438	384,045	19,813	15,638,386
Lead and lead compounds	21,502	14,955,787	63,866	44,415	6,600	20,250,579
Manganese and manganese compounds	951,900	12,709,986	2,744,338	693,864	5,153	40,523,581
Mercury and mercury compounds	3,365	13,859	29	5	3	18,683
Nickel and nickel compounds	52,271	1,843,649	295,246	160,194	385,256	7,594,813
Selenium and selenium compounds	0	14,206	4,500	285	0	9,034
Silver and silver compounds	4,270	7,548	5	1,767	0	61,514
Thallium and thallium compounds	0	680	0	0	0	1,000
Vanadium[a] (CAS Number 7440-62-2)	0	801	0	390	0	42,020
Zinc and zinc compounds[a]	2,561,004	99,939,436	465,975	423,059	2,095,539	97,320,367
Total	4,199,008	143,987,466	5,381,235	2,399,930	3,159,419	207,193,672

Note: Off-site Releases from Section 6 (off-site transfers to disposal) of Form R.

[a]Only fume or dust forms are reportable.

[b]"Storage only" (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to "storage only" are included as a form of disposal (off-site release). See Box 2-2.

[c]Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste management code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste treatment code M40; in this report, such amounts have been included in solidification/stabilization of metals and metal compounds.

[d]Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste management code M62) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste management code M61). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste management code M61; in this report, such amounts have been included in transfers of metals and metal compounds to wastewater treatment.

[e]Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

Table 2-12. TRI Off-site Releases of Metals and Metal Compounds, 1997, continued

Chemical	Land Treatment Pounds	Other Land Disposal Pounds	Other Off-site Management Pounds	Transfers to Waste Broker for Disposal Pounds	Unknown[f] Pounds	Total Off-site Releases: Transfers Off-site to Disposal Pounds
Antimony and antimony compounds	7,790	253,794	23,422	63,672	34,720	4,432,103
Arsenic and arsenic compounds	250	43,476	4,150	21,997	0	1,900,539
Barium and barium compounds	109,231	435,947	264,623	158,660	2,225,126	10,555,529
Beryllium and beryllium compounds	0	0	0	167	0	10,343
Cadmium and cadmium compounds	480	11,000	15,720	1,411	5	1,485,431
Chromium and chromium compounds	29,145	650,658	591,147	293,299	56,692	25,427,173
Cobalt and cobalt compounds	41	15,346	7,655	25,150	4,092	1,242,382
Copper and copper compounds	16,545	187,642	6,904,351	1,663,942	52,593	29,148,825
Lead and lead compounds	0	417,505	44,237	384,793	103,666	36,292,950
Manganese and manganese compounds	147,620	3,498,564	234,483	917,183	13,978	62,440,650
Mercury and mercury compounds	0	0	5,817	8,800	0	50,561
Nickel and nickel compounds	11,830	160,133	122,316	244,027	115,968	10,985,703
Selenium and selenium compounds	0	0	7,771	0	0	35,796
Silver and silver compounds	7	274	1	17,316	0	92,702
Thallium and thallium compounds	0	0	0	0	0	1,680
Vanadium[a] (CAS Number 7440-62-2)	0	0	0	0	0	43,211
Zinc and zinc compounds[a]	123,431	1,807,877	474,705	1,946,902	226,741	207,385,036
Total	446,370	7,482,216	8,700,398	5,747,319	2,833,581	391,530,614

Note: Off-site Releases from Section 6 (off-site transfers to disposal) of Form R.

[a]Only fume or dust forms are reportable.

[f]"Unknown" (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as "unknown" transfers are treated as a form of disposal (off-site release).

Table 2-13. Quantities of TRI Metals and Metal Compounds in Waste, 1997

Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
Antimony and antimony compounds	8,899,552	4,791,476	29,269	60,344	1,266,484	633,512	4,707,114	20,387,751	18,326
Arsenic and arsenic compounds	5,352,853	1,245,876	0	355	139,290	1,113,238	5,161,910	13,013,522	1,885,285
Barium and barium compounds	30,469,704	2,121,883	735,764	334,114	7,987,627	1,774,373	15,664,260	59,087,725	2,240,371
Beryllium and beryllium compounds	110,428	158,981	0	0	0	1,657	65,520	336,586	0
Cadmium and cadmium compounds	9,027,946	1,565,571	0	1,501	6,681,712	55,252	2,362,318	19,694,300	66,080
Chromium and chromium compounds	56,898,370	132,895,449	144,221	61,953	1,685,198	6,311,835	49,957,865	247,954,891	1,339,465
Cobalt and cobalt compounds	4,927,303	9,891,672	0	6,773	1,356,795	82,451	1,581,585	17,846,579	1,407
Copper and copper compounds	914,001,397	950,940,364	225,424	3,577,430	83,422,416	6,459,054	67,283,875	2,025,909,960	3,442,336
Lead and lead compounds	556,936,521	347,664,109	328,104	63,386	5,113,409	5,395,447	43,338,187	958,839,163	3,839,062
Manganese and manganese compounds	60,269,170	110,163,098	20,349	35,897	1,809,283	5,859,604	133,536,603	311,694,004	936,905
Mercury and mercury compounds	438,003	46,999	0	0	4,239	13,408	44,964	547,613	20
Nickel and nickel compounds	38,419,220	119,380,709	57,870	62,802	6,050,029	1,688,147	14,723,550	180,382,327	194,915
Selenium and selenium compounds	782,528	9,693	74,135	582	1	10,629	350,475	1,228,043	104,800
Silver and silver compounds	4,167,289	2,316,127	0	29	554,600	5,621	212,189	7,255,855	2,910
Thallium and thallium compounds	0	8	90,406	2	0	328	1,020	91,764	0
Vanadium* (CAS Number 7440-62-2)	358477	21714	0	0	440	1205	172015	553851	128
Zinc and zinc compounds*	132,488,144	318,033,921	664,642	323,753	70,976,284	18,823,298	312,500,391	853,810,433	6,770,655
Total	1,823,546,905	2,001,247,650	2,370,184	4,528,921	187,047,807	48,229,059	651,663,841	4,718,634,367	20,842,665

Note: Data from Section 8 of Form R.
* Only fume or dust forms are reportable.

Quantities of Metals and Metal Compounds Managed in Waste

TRI facilities reported managing a total of 4.72 billion pounds of metals and metal compounds in waste in 1997, as shown in Table 2-13. Copper and its compounds ranked first with 2.03 billion pounds, followed by lead and its compounds (958.8 million pounds) and zinc and its compounds (853.8 million pounds). Together, these chemicals represented 81.3% of all production-related waste of metals and metal compounds.

Most metals and metal compounds in waste were recycled. With on-site recycling of 1.82 billion pounds and off-site recycling of 2.00 billion pounds, this waste management option accounted for 81.1% of total production-related waste management of metals and metal compounds. More than 90% of both copper and lead and their compounds was recycled. In contrast, only about half (52.8%) of the zinc and its compounds in production-related waste was managed by recycling.

For all metals and metal compounds, quantities released on- and off-site totaled 651.7 million pounds, the next largest waste management option for these substances after on- and off-site recycling. More than one third (36.6%) of the zinc and its compounds was reported as quantity released on- and off-site.

OSHA Carcinogens

Some chemicals are listed in TRI because they are either known human carcinogens or suspect carcinogens (see Box 2-8). 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. Table 2-14 shows on- and off-site releases of these chemicals.

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

Under section 313, a chemical does not have to be counted towards threshold determinations and release and other waste management calculations if it is present in a mixture below a certain concentration. This is known as the section 313 *"de minimis"* concentration in mixture. When the section 313 rule was developed, EPA adopted the *de minimis* percentages from the Occupational Safety and Health Administration's (OSHA) Hazard Communication Standards (29 CFR 1910.1900), because much of the information that industry would have relating to chemicals in mixtures would most likely be from the material safety data sheet (MSDS) on that mixture. The OSHA *de minimis* limitation is 0.1% if the chemical is a known or suspect carcinogen by virtue of appearing in one of three sources:

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

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

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

The *de minimis* limitation is 1.0% for chemicals that do not meet the above OSHA carcinogen criteria. The carcinogen designation in the list of chemicals relates to any chemical that the Agency determined met the above OSHA criteria for the 0.1% *de minimis* limitation. Box 2-8 shows the specific bases for which the individual chemical was designated as a known or suspect carcinogen. This list was updated for the *1997 TRI Public Data Release*, based on a review of the NTP, IARC, and OSHA sources.

Certain metal compound categories have two *de minimis* limitations. For example, hexavalent chromium compounds and inorganic arsenic compounds meet the OSHA carcinogen criteria, while trivalent chromium compounds and organic arsenic do not meet the OSHA criteria. These groups are included in Table 2-14, because not all compounds meet the criteria.

On- and Off-site Releases of OSHA Carcinogens

As shown in Table 2-14, TRI facilities reported releases of 247.9 million pounds of OSHA carcinogens, about one-tenth (9.6%) of all TRI on- and off-site releases in 1997. Releases were reported for 115 OSHA carcinogens out of 167 such chemicals on the TRI list. Air emissions of 173.5 million pounds amounted to 70.0% of the total. Dichloromethane and styrene were released in the largest amounts, 48.4 million pounds and 46.5 million pounds, respectively, and air emissions accounted for more than 90% of releases of both chemicals. Releases of these two chemicals represented 38.3% of all OSHA carcinogen releases.

Box 2-8. Basis of OSHA Carcinogen Listing for Individual Chemicals

Chemical	IARC	NTP	OSHA—Z	Chemical	IARC	NTP	OSHA—Z
Acetaldehyde	2B	P	—	2,4-D‡‡	2B	—	—
Acetamide	2B	—	—	2,4-D butoxyethyl ester‡‡	2B	—	—
2-Acetylaminofluorene	—	P	Z	2,4-D butyl ester‡‡	2B	—	—
Acrylamide	2A	P	—	2,4-D chlorocrotyl ester‡‡	2B	—	—
Acrylonitrile	2A	P	Z	2,4-D 2-ethylhexyl ester‡‡	2B	—	—
2-Aminoanthraquinone	—	P	—	2,4-D 2-ethyl-4-methylpentyl ester‡‡	2B	—	—
4-Aminoazobenzene	2B	—	—	2,4-Diaminoanisole	2B	—	—
4-Aminobiphenyl	1	K	Z	2,4-Diaminoanisole sulfate	—	P	—
1-Amino-2-methylanthraquinone	—	P	—	4,4'-Diaminodiphenyl ether	2B	—	—
Amitrole	2B	P	—	2,4-Diaminotoluene	2B	P	—
o-Anisidine	2B	—	—	Diaminotoluene (mixed isomers)	2B	P	—
o-Anisidine hydrochloride	—	P	—	1,2-Dibromo-3-chloropropane	2B	P	Z
Arsenic and inorganic arsenic compounds	1	K††	Z	1,2-Dibromoethane	2A	P	—
Asbestos (friable)	1	K	Z	1,4-Dichlorobenzene	2B	P	—
Atrazine	2B	—	—	Dichlorobenzene (mixed isomers)	2B	P	—
Benzene	1	K	Z	3,3'-Dichlorobenzidine	2B	P	Z
Benzidine	1	K	Z	3,3'-Dichlorobenzidine dihydrochloride	2B	P	—
Benzoic trichloride	2B	P	—	3,3'-Dichlorobenzidine sulfate	2B	P	—
Beryllium and beryllium compounds	1	P††	—	1,2-Dichloroethane	2B	P	—
Bis(chloromethyl)ether	1	K	Z	Dichloromethane	2B	P	—
1,3-Butadiene	2A	P	—	trans-1,3-Dichloropropene	2B	—	—
C.I. Acid Red 114	2B	—	—	1,3-Dichloropropylene	2B	P	—
C.I. Direct Black 38	2A	P	—	Dichlorvos	2B	—	—
C.I. Direct Blue 6	2A	P	—	Diepoxybutane	2B	P	—
C.I. Direct Brown 95	2A	—	—	Di-(2-ethylhexyl)phthalate	2B	P	—
C.I. Food Red 5	2B	—	—	Diethyl sulfate	2A	P	—
C.I. Solvent Yellow 34 (Auramine)	2B	—	—	Diglycidyl resorcinol ether	2B	p	—
Cadmium and cadmium compounds	1	P††	—	Dihydrosafrole	2B	—	—
Carbon tetrachloride	2B	P	—	3,3'-Dimethoxybenzidine	2B	P	—
Chlordane	2B	—	—	3,3'-Dimethoxybenzidine dihydrochloride	2B	P	—
Chlorendic acid	2B	P	—	3,3'-Dimethoxybenzidine hydrochloride	2B	P	—
p-Chloroaniline	2B	—	—	4-Dimethylaminoazobenzene	2B	P	Z
Chloroform	2B	P	—	3,3'-Dimethylbenzidine	2B	P	—
Chloromethyl methyl ether	1	K	Z	3,3'-Dimethylbenzidine dihydrochloride	2B	P	—
3-Chloro-2-methyl-1-propene	—	P	—	3,3'-Dimethylbenzidine dihydrofluoride	2B	P	—
Chlorophenols	2B	—	—	Dimethylcarbamyl chloride	2A	P	—
p-Chloro-o-toluidine	2B	—	—	N,N-Dimethylformamide	2B	—	—
Chromium (VI) compounds	1	K	—	1,1-Dimethylhydrazine	2B	P	—
Cobalt and cobalt compounds	2B	—	—	Dimethyl sulfate	2A	P	—
Creosote	2A	—	—	2,4-Dinitrotoluene	2B	—	—
p-Cresidine	2B	P	—	2,6-Dinitrotoluene	2B	—	—
Cupferron	—	P	—	1,4-Dioxane	2B	P	—

Note: The list of TRI chemicals meeting the OSHA carcinogen standard and, therefore, reported when in a mixture at a concentration level below the de minimus level of 0.1%, has been updated, and this list reflects the update.
IARC: 1—The chemical is carcinogenic to humans; 2A—The chemical is probably carcinogenic to humans; 2B—The chemical is possibly carcinogenic to humans.
NTP: K—The chemical is known to be carcinogenic; P—The chemical may reasonably be anticipated to be carcinogenic.
OSHA: Z—The chemical appears at 29 CFR part 1910 Subpart Z.
†† Certain compounds.
‡‡ Chlorophenoxy herbicides (IARC 2B).

2-8. Basis of OSHA Carcinogen Listing for Individual Chemicals, continued

emical	IARC	NTP	OSHA—Z	Chemical	IARC	NTP	OSHA—Z
-Diphenylhydrazine	—	P	—	Polychlorinated biphenyls (PCBs)	2A	P	—
-D isopropyl ester‡‡	2B	—	—	Polycyclic aromatic compounds (PACs):			
-DP‡‡	2B	—	—	Benz(a)anthracene	2A	P	—
-D propylene glycol butyl ether ester‡‡	2B	—	—	Benzo(b)fluoranthene	2B	P	—
-D sodium salt‡‡	2B	—	—	Benzo(j)fluoranthene	2B	P	—
chlorohydrin	2A	P	—	Benzo(k)fluoranthene	2B	—	—
yl acrylate	2B	P	—	Benzo(rst)pentaphene	2B	—	—
yleneimine	—	—	Z	Benzo(a)pyrene	2A	P	—
ylene oxide	1	P	Z	Dibenz(a,h)acridine	2A	P	—
ylene thiourea	2B	P	—	Dibenz(a,j)acridine	2B	P	—
rmaldehyde	2A	P	Z	Dibenzo(a,h)anthracene	2B	P	—
ptachlor	2B	—	—	7H—Dibenzo(c,g)carbazole	2B	P	—
xachlorobenzene	2B	P	—	Dibenzo(a,e)pyrene	2B	P	—
xamethylphosphoramide	2B	P	—	Dibenzo(a,h)pyrene	2B	P	—
ydrazine	2B	P	—	Dibenzo(a,l)pyrene	2B	P	—
ydrazine sulfate	—	P	—	7,12—Dimethylbenz(a)anthracene	2B	—	—
ad and inorganic lead compounds	2B	—	Z	Indeno[1,2,3—cd]pyrene	2B	P	—
ndane	2B	P	—	5—Methylchrysene	2B	P	—
coprop‡‡	2B	—	—	1—Nitropyrene	2B	—	—
thoxone‡‡	2B	—	—	Potassium bromate	2B	—	—
thoxone sodium salt‡‡	2B	—	—	Propane sultone	2B	P	—
-Methylenebis (2-chloroaniline)	2A	P	—	beta-Propiolactone	2B	P	Z
'-Methylenebis (N,N-dimethyl) benzeneamine	2B	P	—	Propyleneimine	2B	P	—
'-Methylenedianiline	2B	P	Z	Propylene oxide	2B	P	—
chler's ketone	—	P	—	Saccharin (manufacturing)	2B	P	—
stard gas	1	K	—	Safrole	2B	P	—
pha-Naphthylamine	—	—	Z	Sodium o-phenylphenoxide	2B	—	—
ta-Naphthylamine	1	K	Z	Styrene	2B	—	—
ckel	2B	P	—	Styrene oxide	2A	—	—
ckel compounds	1	P††	—	Tetrachloroethylene	2B	P	—
trilotriacetic acid	—	P	—	Thioacetamide	2B	P	—
trobenzene	2B	—	—	4,4'-Thiodianiline	2B	P	—
-Nitrobiphenyl	—	—	Z	Thiourea	2B	P	—
trofen ‡	2B	P	—	Toluene-2,4-diisocyanate	2B	P	—
trogen mustard	2A	—	—	Toluene-2,6-diisocyanate	2B	P	—
-Nitropropane	2B	P	—	Toluene diisocyanate (mixed isomers)	2B	P	—
-Nitrosodi-n-butylamine	2B	P	—	o-Toluidine	2B	P	—
-Nitrosodiethylamine	2A	P	—	o-Toluidine hydrochloride	—	P	—
-Nitrosodimethylamine	2A	P	Z	Toxaphene	2B	P	—
-Nitrosodi-n-propylamine	2B	P	—	Trichloroethylene	2A	—	—
-Nitroso-N-ethylurea	2A	P	—	2,4,6-Trichlorophenol	2B	P	—
-Nitroso-N-methylurea	2A	P	—	1,2,3-Trichloropropane	2A	—	—
-Nitrosomethylvinylamine	2B	P	—	Tris(2,3-dibromopropyl)phosphate	2A	P	—
-Nitrosomorpholine	2B	P	—	Trypan blue	2B	—	—
-Nitrosonornicotine	2B	P	—	Urethane	2B	P	—
-Nitrosopiperidine	2B	P	—	Vinyl acetate	2B	—	—
entachlorophenol	2B	—	—	Vinyl bromide	2A	—	—
enytoin	2B	P	—	Vinyl chloride	1	K	Z
olybrominated biphenyls (PBBs)	2B	P	—	2,6-Xylidine	2B	—	—

te: The list of TRI chemicals meeting the OSHA carcinogen standard and, therefore, reported when in a mixture at a concentration level below the de minimus level of 1%, has been updated, and this list reflects the update.

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

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

SHA: Z—The chemical appears at 29 CFR part 1910 Subpart Z.

‡ Certain compounds.

‡ Chlorophenoxy herbicdes (IARC 2B).

Table 2-14. TRI On-site and Off-site Releases of OSHA Carcinogens, 1997

		On-site Releases					
					Underground Injection		On-site Land Releases
CAS Number	Chemical	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Class I Wells Pounds	Class II-V Wells Pounds	RCRA Subtitle C Landfills Pounds
75-07-0	Acetaldehyde	1,546,521	11,189,528	223,370	371,576	0	98
60-35-5	Acetamide	250	0	1	1,863,202	0	0
79-06-1	Acrylamide	5,440	11,838	6,355	7,074,021	0	305,545
107-13-1	Acrylonitrile	288,966	935,603	1,229	4,031,900	0	47
60-09-3	4-Aminoazobenzene	0	0	0	6	0	0
92-67-1	4-Aminobiphenyl	0	0	0	0	0	0
90-04-0	o-Anisidine	1,389	72	76	0	0	0
7440-38-2	Arsenic	11,167	40,392	679	0	0	500
1332-21-4	Asbestos (friable)	353	6,902	2	0	0	0
1912-24-9	Atrazine	3,948	31,171	2,242	418	0	0
71-43-2	Benzene	3,064,782	5,688,418	11,464	362,350	750	834
98-07-7	Benzoic trichloride	5,915	152	0	0	0	0
7440-41-7	Beryllium	36	780	27	0	0	580
--	Beryllium compounds	0	365	1	0	0	0
542-88-1	Bis(chloromethyl) ether	4	3	0	0	0	0
106-99-0	1,3-Butadiene	1,535,616	1,175,119	2,552	1,000	0	0
7440-43-9	Cadmium	660	1,716	521	0	0	665
--	Cadmium compounds	9,311	54,901	1,934	52	0	49,460
56-23-5	Carbon tetrachloride	121,135	236,364	315	32,958	0	0
115-28-6	Chlorendic acid	0	49	0	0	0	0
106-47-8	p-Chloroaniline	15,295	37	869	0	0	0
67-66-3	Chloroform	2,435,839	4,769,557	164,654	26,954	0	106
107-30-2	Chloromethyl methyl ether	2,079	2,076	5	0	0	0
563-47-3	3-Chloro-2-methyl-1-propene	145	25,837	0	0	0	0
--	Chlorophenols	1,957	2,822	16	92,980	0	0
6459-94-5	C.I. Acid Red 114	0	0	0	0	0	0
7440-48-4	Cobalt	19,725	15,229	2,164	40	0	0
--	Cobalt compounds	4,475	26,931	34,650	44,624	0	33,197
8001-58-9	Creosote	491,542	797,457	8,452	0	0	26,055
120-71-8	p-Cresidine	1,427	1,600	0	0	0	0
135-20-6	Cupferron	0	0	0	0	0	0
94-75-7	2,4-D (acetic acid)	2,184	2,807	59	250	0	250
1929-73-3	2,4-D butoxyethyl ester	250	250	0	0	0	0
94-80-4	2,4-D butyl ester	0	1	0	0	0	0
1928-43-4	2,4-D 2-Ethylhexyl ester	2,084	3,522	0	0	0	0
101-80-4	4,4'-Diaminodiphenyl ether	15	9	360	0	0	0
95-80-7	2,4-Diaminotoluene	211	1,747	0	0	0	0
25376-45-8	Diaminotoluene (mixed isomers)	6,632	4,822	556	27,000	0	0
106-93-4	1,2-Dibromoethane	8,146	1,561	4	10	0	0
106-46-7	1,4-Dichlorobenzene	119,122	143,144	1,728	2,000	0	0
25321-22-6	Dichlorobenzene (mixed isomers)	264	15,010	0	0	0	0
91-94-1	3,3'-Dichlorobenzidine	5	250	0	0	0	0
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0	0	0	0	0	0
64969-34-2	3,3'-Dichlorobenzidine sulfate	0	0	0	0	0	0
107-06-2	1,2-Dichloroethane	332,725	584,039	1,826	4,549	0	0
75-09-2	Dichloromethane	16,374,955	31,290,200	9,492	528,026	0	259
10061-02-6	trans-1,3-Dichloropropene	445	23	0	0	0	0
542-75-6	1,3-Dichloropropylene	8,093	728	67	0	0	0
62-73-7	Dichlorvos	255	250	5	0	0	0
117-81-7	Di-(2-ethylhexyl) phthalate	62,161	173,340	583	0	0	66
64-67-5	Diethyl sulfate	7,293	126	0	0	0	0
101-90-6	Diglycidyl resorcinol ether	10	10	0	0	0	0

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

able 2-14. TRI On-site and Off-site Releases of OSHA Carcinogens, 1997, continued

CAS Number	Chemical	On-site Releases: On-site Land Releases: Other Landfills Pounds	On-site Land Releases: Land Treatment Pounds	On-site Land Releases: Surface Impoundments Pounds	On-site Releases: Other Disposal Pounds	Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
75-07-0	Acetaldehyde	108,531	7,179	2,363	5	13,449,171	5,483	13,454,654
60-35-5	Acetamide	0	0	0	0	1,863,453	0	1,863,453
79-06-1	Acrylamide	0	0	0	0	7,403,199	26,290	7,429,489
107-13-1	Acrylonitrile	265	10	250	255	5,258,525	4,879	5,263,404
60-09-3	4-Aminoazobenzene	0	0	0	0	6	0	6
92-67-1	4-Aminobiphenyl	0	0	0	0	0	0	0
90-04-0	o-Anisidine	0	0	0	0	1,537	4	1,541
7440-38-2	Arsenic	3,652	2	22	6,110	62,524	530,960	593,484
1332-21-4	Asbestos (friable)	486,500	0	0	28,000	521,757	4,329,603	4,851,360
1912-24-9	Atrazine	0	388,928	0	0	426,707	166,947	593,654
71-43-2	Benzene	872	3,294	283	57,192	9,190,239	83,518	9,273,757
98-07-7	Benzoic trichloride	0	0	0	0	6,067	520	6,587
7440-41-7	Beryllium	55,500	5	38	0	56,966	5,741	62,707
--	Beryllium compounds	390	0	0	0	756	4,602	5,358
542-88-1	Bis(chloromethyl) ether	0	0	0	0	7	0	7
106-99-0	1,3-Butadiene	0	287	0	7	2,714,581	6,600	2,721,181
7440-43-9	Cadmium	251	117	867	6,704	11,501	135,195	146,696
--	Cadmium compounds	33,226	750	483,399	421,260	1,054,293	1,350,236	2,404,529
56-23-5	Carbon tetrachloride	63	32	0	40	390,907	18,947	409,854
115-28-6	Chlorendic acid	0	0	0	0	49	0	49
106-47-8	p-Chloroaniline	0	0	5	0	16,206	0	16,206
67-66-3	Chloroform	4,918	1,896	604	0	7,404,528	14,498	7,419,026
107-30-2	Chloromethyl methyl ether	0	0	0	0	4,160	54	4,214
563-47-3	3-Chloro-2-methyl-1-propene	0	0	0	0	25,982	0	25,982
--	Chlorophenols	0	0	0	0	97,775	839	98,614
6459-94-5	C.I. Acid Red 114	0	0	0	0	0	0	0
7440-48-4	Cobalt	1,115	652	15	7,212	46,152	685,258	731,410
--	Cobalt compounds	80,311	2,797	171,972	342,777	741,734	557,124	1,298,858
8001-58-9	Creosote	0	0	0	1,875	1,325,381	2,301,965	3,627,346
120-71-8	p-Cresidine	0	0	0	0	3,027	2,100	5,127
135-20-6	Cupferron	0	0	0	0	0	0	0
94-75-7	2,4-D (acetic acid)	0	0	0	5	5,555	6,616	12,171
1929-73-3	2,4-D butoxyethyl ester	0	0	0	0	500	0	500
94-80-4	2,4-D butyl ester	0	0	0	0	1	0	1
1928-43-4	2,4-D 2-Ethylhexyl ester	0	0	0	0	5,606	2,036	7,642
101-80-4	4,4'-Diaminodiphenyl ether	0	0	0	0	384	58	442
95-80-7	2,4-Diaminotoluene	0	0	0	0	1,958	0	1,958
25376-45-8	Diaminotoluene (mixed isomers)	0	0	0	8	39,018	284,524	323,542
106-93-4	1,2-Dibromoethane	0	1	0	0	9,722	5,116	14,838
106-46-7	1,4-Dichlorobenzene	1,800	0	0	160	267,954	289	268,243
25321-22-6	Dichlorobenzene (mixed isomers)	0	0	0	0	15,274	9	15,283
91-94-1	3,3'-Dichlorobenzidine	0	0	0	0	255	7,400	7,655
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0	0	0	0	0	0	0
64969-34-2	3,3'-Dichlorobenzidine sulfate	0	0	0	0	0	0	0
107-06-2	1,2-Dichloroethane	0	0	0	27	923,166	120,476	1,043,642
75-09-2	Dichloromethane	2,200	12	0	8,709	48,213,853	226,085	48,439,938
10061-02-6	trans-1,3-Dichloropropene	0	0	0	0	468	3	471
542-75-6	1,3-Dichloropropylene	0	0	0	0	8,888	0	8,888
62-73-7	Dichlorvos	0	0	0	0	510	0	510
117-81-7	Di-(2-ethylhexyl) phthalate	70,812	126	0	5	307,093	995,038	1,302,131
64-67-5	Diethyl sulfate	0	0	0	0	7,419	0	7,419
101-90-6	Diglycidyl resorcinol ether	0	0	0	0	20	0	20

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

Table 2-14. TRI On-site and Off-site Releases of OSHA Carcinogens, 1997, continued

CAS Number	Chemical	On-site Releases					
					Underground Injection		On-site Land Releases
		Fugitive or Nonpoint Air Emissions	Stack or Point Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
94-58-6	Dihydrosafrole	500	5	0	0	0	0
119-90-4	3,3'-Dimethoxybenzidine	0	0	0	0	0	0
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	0	0	0	0	0	0
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	0	0	0	0	0	0
79-44-7	Dimethylcarbamyl chloride	3	115	0	0	0	0
68-12-2	N,N-Dimethylformamide	315,017	1,030,948	45,694	730,005	0	750
57-14-7	1,1-Dimethyl hydrazine	751	151	0	0	0	0
77-78-1	Dimethyl sulfate	4,303	196	0	0	0	0
121-14-2	2,4-Dinitrotoluene	1,798	3	90	0	0	0
606-20-2	2,6-Dinitrotoluene	437	1	24	0	0	0
123-91-1	1,4-Dioxane	43,031	98,231	196,272	0	0	0
120-36-5	2,4-DP	7	250	0	0	0	0
2702-72-9	2,4-D sodium salt	0	0	0	0	0	0
106-89-8	Epichlorohydrin	220,224	94,025	9,304	0	0	1
140-88-5	Ethyl acrylate	68,574	114,547	159	0	0	0
151-56-4	Ethyleneimine	0	6	0	0	0	0
75-21-8	Ethylene oxide	272,532	653,838	3,634	15,147	0	0
96-45-7	Ethylene thiourea	5	281	0	0	0	0
50-00-0	Formaldehyde	1,675,452	9,859,116	246,857	9,905,754	0	28
118-74-1	Hexachlorobenzene	125	29	276	139	0	0
302-01-2	Hydrazine	8,094	3,565	12	0	0	0
10034-93-2	Hydrazine sulfate	0	0	0	110,000	0	0
7439-92-1	Lead	110,461	314,427	14,718	0	0	177,574
58-89-9	Lindane	43	11	5	0	0	0
93-65-2	Mecoprop	270	1,005	0	0	0	0
94-74-6	Methoxone	255	500	0	0	0	250
101-14-4	4,4'-Methylenebis(2-chloroaniline)	2,256	10	0	0	0	0
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	0	0	0	0	0	0
101-77-9	4,4'-Methylenedianiline	8,182	1,039	86	15,050	0	0
90-94-8	Michler's ketone	0	401	0	0	0	0
134-32-7	alpha-Naphthylamine	0	0	0	0	0	0
7440-02-0	Nickel	162,785	248,773	24,911	25,642	0	12,688
--	Nickel compounds	78,599	275,015	93,440	116,434	0	117,245
139-13-9	Nitrilotriacetic acid	0	0	7,474	2,400	0	0
98-95-3	Nitrobenzene	23,483	40,831	299	638,059	0	7
79-46-9	2-Nitropropane	13,961	9,766	2,789	0	0	0
87-86-5	Pentachlorophenol	1,966	5,082	952	0	0	28,000
57-41-0	Phenytoin	0	1	0	0	0	0
--	Polybrominated biphenyls	0	0	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	0	0	0	0	0	6,794
--	Polycyclic aromatic compounds	115,825	379,411	1,652	0	0	673
7758-01-2	Potassium bromate	250	5	0	0	0	0
1120-71-4	Propane sultone	0	0	0	0	0	0
75-55-8	Propyleneimine	190	40	0	0	0	0
75-56-9	Propylene oxide	196,218	347,385	22,961	11,700	0	0
81-07-2	Saccharin (manufacturing)	150	21	0	0	0	0
94-59-7	Safrole	500	5	0	0	0	0
100-42-5	Styrene	10,826,037	33,300,628	43,954	202,387	0	61,302
96-09-3	Styrene oxide	0	11	0	0	0	0

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

able 2-14. TRI On-site and Off-site Releases of OSHA Carcinogens, 1997, continued

CAS Number	Chemical	On-site Releases: On-site Land Releases: Other Landfills Pounds	On-site Land Releases: Land Treatment Pounds	On-site Land Releases: Surface Impoundments Pounds	On-site Releases: Other Disposal Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
94-58-6	Dihydrosafrole	0	0	0	0	505	0	505
119-90-4	3,3'-Dimethoxybenzidine	0	0	0	0	0	0	0
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	0	0	0	0	0	0	0
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	0	0	0	0	0	0	0
79-44-7	Dimethylcarbamyl chloride	0	0	0	0	118	0	118
68-12-2	N,N-Dimethylformamide	250	0	0	32	2,122,696	292,012	2,414,708
57-14-7	1,1-Dimethyl hydrazine	0	0	0	0	902	437	1,339
77-78-1	Dimethyl sulfate	0	0	0	0	4,499	2,308	6,807
121-14-2	2,4-Dinitrotoluene	0	0	0	0	1,891	0	1,891
606-20-2	2,6-Dinitrotoluene	0	0	0	0	462	0	462
123-91-1	1,4-Dioxane	0	4,609	0	0	342,143	305,787	647,930
120-36-5	2,4-DP	0	0	0	0	257	0	257
2702-72-9	2,4-D sodium salt	0	0	0	0	0	0	0
106-89-8	Epichlorohydrin	2,008	2	0	7,499	333,063	4,016	337,079
140-88-5	Ethyl acrylate	0	0	513	0	183,793	4,821	188,614
151-56-4	Ethyleneimine	0	0	0	0	6	0	6
75-21-8	Ethylene oxide	0	981	0	5	946,137	52	946,189
96-45-7	Ethylene thiourea	0	0	0	0	286	5,657	5,943
50-00-0	Formaldehyde	57,651	5,730	49,388	496	21,800,472	157,083	21,957,555
118-74-1	Hexachlorobenzene	0	0	0	0	569	12,038	12,607
302-01-2	Hydrazine	0	0	0	250	11,921	30,430	42,351
10034-93-2	Hydrazine sulfate	0	0	0	0	110,000	0	110,000
7439-92-1	Lead	397,266	5	101,197	3,553,799	4,669,447	5,827,004	10,496,451
58-89-9	Lindane	0	0	0	0	59	753	812
93-65-2	Mecoprop	0	0	0	5	1,280	250	1,530
94-74-6	Methoxone	0	0	0	0	1,005	4,853	5,858
101-14-4	4,4'-Methylenebis(2-chloroaniline)	0	0	0	0	2,266	0	2,266
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	0	0	0	0	0	0	0
101-77-9	4,4'-Methylenedianiline	0	0	0	0	24,357	16,765	41,122
90-94-8	Michler's ketone	0	0	0	0	401	0	401
134-32-7	alpha-Naphthylamine	0	0	0	0	0	0	0
7440-02-0	Nickel	122,538	2,173	17,048	83,202	699,760	3,872,894	4,572,654
--	Nickel compounds	538,218	5,040	1,167,055	2,541,933	4,932,979	7,112,809	12,045,788
139-13-9	Nitrilotriacetic acid	0	0	0	0	9,874	0	9,874
98-95-3	Nitrobenzene	0	0	0	0	702,679	240	702,919
79-46-9	2-Nitropropane	0	0	0	0	26,516	25	26,541
87-86-5	Pentachlorophenol	5,047	0	0	250	41,297	66,982	108,279
57-41-0	Phenytoin	0	0	0	0	1	12,420	12,421
--	Polybrominated biphenyls	0	0	0	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	0	0	0	0	6,794	980,846	987,640
--	Polycyclic aromatic compounds	5,786	5,339	2,067	1,042	511,795	1,394,568	1,906,363
7758-01-2	Potassium bromate	0	0	0	0	255	0	255
1120-71-4	Propane sultone	0	0	0	0	0	0	0
75-55-8	Propyleneimine	0	0	0	0	230	0	230
75-56-9	Propylene oxide	200	436	0	251	579,151	29,904	609,055
81-07-2	Saccharin (manufacturing)	0	0	0	0	171	1,400	1,571
94-59-7	Safrole	0	0	0	0	505	0	505
100-42-5	Styrene	418,188	8,500	509	48,551	44,910,056	1,583,171	46,493,227
96-09-3	Styrene oxide	0	0	0	0	11	0	11

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

Table 2-14. TRI On-site and Off-site Releases of OSHA Carcinogens, 1997, continued

CAS Number	Chemical	On-site Releases: Fugitive or Nonpoint Air Emissions (Pounds)	Stack or Point Air Emissions (Pounds)	Surface Water Discharges (Pounds)	Underground Injection: Class I Wells (Pounds)	Underground Injection: Class II-V Wells (Pounds)	On-site Land Releases: RCRA Subtitle C Landfills (Pounds)
127-18-4	Tetrachloroethylene	2,741,951	4,143,117	2,282	15,118	0	0
62-56-6	Thiourea	982	44	347	5,000	0	0
584-84-9	Toluene-2,4-diisocyanate	3,673	2,830	5	0	0	0
91-08-7	Toluene-2,6-diisocyanate	1,019	1,781	0	0	0	0
26471-62-5	Toluenediisocyanate (mixed isomers)	19,274	32,530	255	0	0	0
95-53-4	o-Toluidine	32,824	7,667	273	7,440	0	0
79-01-6	Trichloroethylene	8,943,064	8,643,261	563	986	0	0
88-06-2	2,4,6-Trichlorophenol	119	13	27	0	0	0
96-18-4	1,2,3-Trichloropropane	12,561	785	62	0	0	0
51-79-6	Urethane	0	0	0	0	0	0
108-05-4	Vinyl acetate	738,057	2,610,895	2,669	119,320	0	18
593-60-2	Vinyl bromide	130	5,300	0	0	0	0
75-01-4	Vinyl chloride	258,419	661,265	82	370	0	0
87-62-7	2,6-Xylidine	1	51	0	0	0	0
	Subtotal	53,397,185	120,125,971	1,198,386	26,384,867	750	822,992
	Total for All TRI Chemicals	317,233,311	1,014,430,575	218,371,961	219,070,242	443,656	20,472,578

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

Quantities of OSHA Carcinogens Managed in Waste

TRI facilities managed 3.67 billion pounds of OSHA carcinogens in waste in 1997, as shown in Table 2-15. This total represented 14.8% of production-related waste for all TRI chemicals. Three-quarters (73.6%) of the OSHA carcinogens in waste were treated on-site (1.38 billion pounds) or recycled on-site (1.32 billion pounds).

Creosote ranked first among OSHA carcinogens for production-related waste managed with 937.3 million pounds. Most (92.3%) of the creosote was treated on-site—865.4 million pounds. No other OSHA carcinogen exceeded 100 million pounds of on-site treatment.

Vinyl chloride and lead ranked second and third, respectively, among OSHA carcinogens for total production-related waste managed in 1997. The 455.0 million pounds of vinyl chloride in waste included 398.4 million pounds managed by on-site recycling. Production-related waste for lead totaled 279.8 million pounds, and that quantity included 223.5 million pounds recycled on-site. These were the largest amounts of on-site recycling among OSHA carcinogens.

Chemicals Affecting Children's Health

Children are especially vulnerable to toxic chemicals for a number of reasons, including their body weight relative to food and air intake, their behavior (play) patterns that result in the potential for higher outdoor exposures, their developing systems, and their relative inability to identify and protect themselves from exposures that are not obvious threats. For those reasons, parents may wish to use TRI information to identify chemicals that may be of potential concern for their children's development.

Table 2-14. TRI On-site and Off-site Releases of OSHA Carcinogens, 1997, continued

CAS Number	Chemical	On-site Releases: On-site Land Releases: Other Landfills (Pounds)	Land Treatment (Pounds)	Surface Impoundments (Pounds)	Other Disposal (Pounds)	Total On-site Releases (Pounds)	Off-site Releases: Transfers Off-site to Disposal (Pounds)	Total On- and Off-site Releases (Pounds)
127-18-4	Tetrachloroethylene	0	1	5	5,068	6,907,542	24,753	6,932,295
62-56-6	Thiourea	0	0	250	0	6,623	4,212	10,835
584-84-9	Toluene-2,4-diisocyanate	0	0	0	0	6,508	6,178	12,686
91-08-7	Toluene-2,6-diisocyanate	0	0	0	0	2,800	1,360	4,160
26471-62-5	Toluenediisocyanate (mixed isomers)	0	0	0	359	52,418	37,897	90,315
95-53-4	o-Toluidine	0	0	0	5	48,209	3,151	51,360
79-01-6	Trichloroethylene	0	0	0	3,975	17,591,849	176,747	17,768,596
88-06-2	2,4,6-Trichlorophenol	0	0	0	0	159	0	159
96-18-4	1,2,3-Trichloropropane	0	0	0	0	13,408	13	13,421
51-79-6	Urethane	0	0	0	0	0	500	500
108-05-4	Vinyl acetate	1,316	0	831	3	3,473,109	28,974	3,502,083
593-60-2	Vinyl bromide	0	0	0	0	5,430	0	5,430
75-01-4	Vinyl chloride	1	0	0	0	920,137	90,248	1,010,385
87-62-7	2,6-Xylidine	0	0	0	0	52	0	52
	Subtotal	2,398,875	438,904	1,998,681	7,127,076	213,893,687	33,972,571	247,866,258
	Total for All TRI Chemicals	93,639,517	5,794,667	96,952,876	130,044,872	2,116,454,255	461,098,829	2,577,553,084

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

Beginning with the 1995 reporting year, EPA added 286 toxic chemicals to the TRI list. A full one-third of these chemicals were added because of the developmental effects they can cause. These chemicals may cause effects such as structural abnormalities, reduced birth weight, non-viable births (as shown in animal studies) as well as effects upon a growing child. In 1997, on- and off-site releases of these chemicals totaled 11.5 billion pounds. Table 2-16 details the releases of the top 10 of these chemicals. With 6.5 million pounds, the solvent N-methyl-2-pyrrolidone (NMP) ranked first among developmental toxins for total on- and off-site releases. Air emissions, reported by facilities in many industry sectors, constituted the majority of NMP releases, totaling 3.1 million pounds. Two facilities in the chemical manufacturing industry (SIC code 28) reported most of the underground injection of NMP—one reporting 1.8 million pounds and the other 749,000 pounds (both to Class I wells). NMP is used as a solvent, including applications in extraction, separation, and recovery of aromatics.

Nitrate Compounds and Children's Health

Of the chemicals added in the 1995 reporting year, nitrate compounds were released in the greatest amounts in the 1997 reporting year. Since modern water treatment plants are required to monitor and control nitrate levels in drinking water, exposure to these compounds is limited. In addition to causing adverse environmental impacts, nitrates have been linked to infantile methemoglobinemia, or "blue-baby" syndrome. This condition, which occurs in human infants exposed to aqueous solutions of nitrate ion and which can cause damage to developing organs and death, is caused by the reduced capacity of the blood to carry oxygen. Infants 0-3 months of age are the most sensitive population to nitrate-induced methemoglobinemia. This is primarily due to their higher stomach pH which favors the growth of nitrate-reducing bacteria, the immaturity of their metabolic enzyme systems, and reduced capacity of their erythrocytes to reduce methemoglobinemia to hemoglobin. Information concerning this chemical is important to a family's right-to-know.

Table 2-15. Quantities of OSHA Carcinogens in Waste, 1997

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
75-07-0	Acetaldehyde	332,000	33	9,848,731	56,699	15,532,164	1,192,757	13,449,700	40,412,084	10,453
60-35-5	Acetamide	0	0	64,008	145	1	194	1,863,448	1,927,796	0
79-06-1	Acrylamide	2,266	3	86,000	13,306	144,607	219,594	7,427,483	7,893,259	4,010
107-13-1	Acrylonitrile	12,690,465	58,092	5,300,722	198,012	10,143,286	1,170,267	5,329,623	34,890,467	1,602
60-09-3	4-Aminoazobenzene	0	0	0	0	0	76	6	82	0
92-67-1	4-Aminobiphenyl	0	0	0	0	100,000	190	0	100,190	0
90-04-0	o-Anisidine	0	0	1,315	0	3,867	6,925	1,541	13,648	0
7440-38-2	Arsenic	1,546,013	433,597	0	0	69,967	10,075	113,610	2,173,262	15,011
1332-21-4	Asbestos (friable)	195,118	0	0	0	667,313	709,910	5,382,618	6,954,959	273,483
1912-24-9	Atrazine	250	0	0	0	342,091	126,897	806,780	1,276,018	250
71-43-2	Benzene	46,015,599	381,821	60,211,346	1,146,425	47,653,556	2,274,444	9,202,991	166,886,182	62,271
98-07-7	Benzoic trichloride	0	0	0	22,000	210,000	0	6,596	238,596	0
7440-41-7	Beryllium	110,428	120,381	0	0	0	14	61,323	292,146	0
--	Beryllium compounds	0	38,600	0	0	0	1,643	4,197	44,440	0
542-88-1	Bis(chloromethyl) ether	0	0	0	0	6,500	0	7	6,507	0
106-99-0	1,3-Butadiene	5,481,906	14,451,023	40,873,920	57,787	65,299,067	314,610	2,210,086	128,688,399	510,546
7440-43-9	Cadmium	1,090,072	310,225	0	0	33,925	10,497	128,622	1,573,341	0
--	Cadmium compounds	7,937,874	1,255,346	0	1,501	6,647,787	44,755	2,233,696	18,120,959	66,080
56-23-5	Carbon tetrachloride	2,801,998	139,227	983,907	37,782	42,300,623	1,158,420	382,418	47,804,375	11,773
115-28-6	Chlorendic acid	0	0	0	0	0	914	49	963	0
106-47-8	p-Chloroaniline	0	0	46,000	400	0	5,815	16,898	69,113	0
67-66-3	Chloroform	5,675,765	735,446	5,823,214	314,634	16,142,192	1,548,310	7,389,584	37,629,145	17,372
107-30-2	Chloromethyl methyl ether	0	0	0	0	12,823	0	4,227	17,050	0
563-47-3	3-Chloro-2-methyl-1-propene	0	0	0	0	625,186	14,191	25,983	665,360	0
--	Chlorophenols	2,897,377	0	0	100	237,504	5,540	97,871	3,238,392	749
6459-94-5	C.I. Acid Red 114	0	0	0	0	0	0	0	0	0
7440-48-4	Cobalt	4,423,572	7,919,086	0	0	147,031	24,592	277,126	12,791,407	3
--	Cobalt compounds	503,731	1,972,586	0	6,773	1,209,764	57,859	1,304,459	5,055,172	1,404
8001-58-9	Creosote	66,432,245	1,700,000	702,717	67,254	865,430,718	362,602	2,606,664	937,302,200	497,301
120-71-8	p-Cresidine	0	0	0	0	0	32,491	5,127	37,618	0
135-20-6	Cupferron	0	0	2,595	0	0	0	0	2,595	0
94-75-7	2,4-D (acetic acid)	98,184	0	0	0	29,710	46,125	11,467	185,486	191
1929-73-3	2,4-D butoxyethyl ester	0	0	0	0	0	0	349	349	0
94-80-4	2,4-D butyl ester	0	0	92,200	34	9,362	2	1	101,599	0
1928-43-4	2,4-D 2-Ethylhexyl ester	3,982	0	0	0	0	11,151	7,540	22,673	0
101-80-4	4,4'-Diaminodiphenyl ether	0	0	0	0	150	6,272	379	6,801	0
95-80-7	2,4-Diaminotoluene	0	0	0	0	74,135	275	1,747	76,157	0
25376-45-8	Diaminotoluene (mixed isomers)	0	0	2,871,215	2,891,505	534,411	779,888	47,547	7,124,566	280,003
106-93-4	1,2-Dibromoethane	0	0	0	30,740	11,862	645	9,611	52,858	0
106-46-7	1,4-Dichlorobenzene	2,638,810	0	133,690	2,073	1,793	197,383	340,436	3,314,185	38
25321-22-6	Dichlorobenzene (mixed isomers)	0	0	293,565	745	230,056	10,523	15,282	550,171	0
91-94-1	3,3'-Dichlorobenzidine	0	0	0	0	7,400	74,000	7,300	88,700	0
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0	0	0	0	12,378	38,000	0	50,378	0
64969-34-2	3,3'-Dichlorobenzidine sulfate	0	0	0	0	750	3,800	0	4,550	0
107-06-2	1,2-Dichloroethane	50,816,240	17,461,011	47,830,815	420,603	53,835,059	1,741,248	902,553	173,007,529	27,434
75-09-2	Dichloromethane	115,695,827	11,621,741	8,620,172	3,659,871	20,671,899	13,076,828	48,751,274	222,097,612	70,356
10061-02-6	trans-1,3-Dichloropropene	11,000	160	12,144,000	124	6,590	500	465	12,162,839	0
542-75-6	1,3-Dichloropropylene	9,445,000	240	14,000,000	4,320	2,229,589	42,522	8,787	25,730,458	48
62-73-7	Dichlorvos	0	0	0	0	10	50	1,306	1,366	0
117-81-7	Di-(2-ethylhexyl) phthalate	2,840,681	1,699,965	1,298,057	311,076	238,989	257,221	1,120,306	7,766,295	5,272
64-67-5	Diethyl sulfate	0	0	0	3,699,098	2,673	394	4,775	3,706,940	118
101-90-6	Diglycidyl resorcinol ether	0	0	0	800	0	0	15	815	0
94-58-6	Dihydrosafrole	0	0	0	0	0	53	100	153	0
119-90-4	3,3'-Dimethoxybenzidine	0	0	0	0	0	0	0	0	0
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	0	0	0	0	10	0	0	10	0
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	0	0	0	0	0	0	0	0	0
79-44-7	Dimethylcarbamyl chloride	0	0	0	0	25,445	0	118	25,563	0
68-12-2	N,N-Dimethylformamide	7,815,007	268,701	11,766,149	5,590,193	14,497,941	4,913,049	3,176,537	48,027,577	2,555

Note: Data from Section 8 of Form R.

able 2-15. Quantities of OSHA Carcinogens in Waste, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
57-14-7	1,1-Dimethyl hydrazine	0	2	0	1,900	2,314	796	905	5,917	0
77-78-1	Dimethyl sulfate	0	54,525	62,628	0	10,457	2,323	4,223	134,156	0
121-14-2	2,4-Dinitrotoluene	0	1,500	50,182	5,363	35,419	1,500	1,883	95,847	0
606-20-2	2,6-Dinitrotoluene	0	0	477	0	17,119	110	462	18,168	0
123-91-1	1,4-Dioxane	620,000	4	1,269,899	927,524	1,292,021	117,066	725,779	4,952,293	11
120-36-5	2,4-DP	3,000	0	0	0	0	11	9	3,020	192
2702-72-9	2,4-D sodium salt	0	0	0	0	18,993	0	0	18,993	0
106-89-8	Epichlorohydrin	20,870,748	17,715	5,878,951	83,883	6,048,675	1,329,239	317,147	34,546,358	3,583
140-88-5	Ethyl acrylate	390,000	40,206	16,473,174	832,383	329,187	160,956	184,447	18,410,353	285
151-56-4	Ethyleneimine	0	0	0	0	22,000	0	6	22,006	0
75-21-8	Ethylene oxide	70,880	1,610	38,000	7	11,312,884	105,228	598,688	12,127,297	389,284
96-45-7	Ethylene thiourea	780	0	0	0	0	4,170	5,334	10,284	0
50-00-0	Formaldehyde	90,741,776	643,236	14,449,258	411,094	83,203,482	3,436,540	21,883,140	214,768,526	22,015
118-74-1	Hexachlorobenzene	7,100	4	140,000	4,172	1,690,651	21,984	12,622	1,876,533	11
302-01-2	Hydrazine	25	41	0	650	248,339	21,912	32,825	303,792	190
10034-93-2	Hydrazine sulfate	0	0	0	0	1,700	0	110,002	111,702	0
7439-92-1	Lead	223,496,228	44,515,712	272,104	12,544	1,910,946	839,391	8,771,387	279,818,312	108,510
58-89-9	Lindane	84	0	0	0	0	2,790	67	2,941	0
93-65-2	Mecoprop	1,750	0	0	0	740	1,335	551	4,376	96
94-74-6	Methoxone	3,391	0	0	0	0	271	6,361	10,023	96
101-14-4	4,4'-Methylenebis(2-chloroaniline)	0	0	0	2,956	0	7,809	2,004	12,769	0
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	0	0	0	0	0	0	0	0	0
101-77-9	4,4'-Methylenedianiline	3,700	138	960,204	5,478	97,414	71,650	36,244	1,174,828	0
90-94-8	Michler's ketone	0	0	0	230	0	0	401	631	0
134-32-7	alpha-Naphthylamine	0	0	0	0	0	0	0	0	0
7440-02-0	Nickel	29,304,518	87,162,134	26,213	57,392	1,398,988	646,126	3,953,432	122,548,803	4,374
--	Nickel compounds	9,114,702	32,218,575	31,657	5,410	4,651,041	1,042,021	10,770,118	57,833,524	190,541
139-13-9	Nitrilotriacetic acid	0	0	0	0	1,238,653	12,140	9,874	1,260,667	0
98-95-3	Nitrobenzene	1,432,350	0	2,229,827	6,795	1,150,986	1,298,784	704,915	6,823,657	1,520
79-46-9	2-Nitropropane	0	0	1,165,892	837	53,022	5,803	26,516	1,252,070	0
87-86-5	Pentachlorophenol	1,282,753	0	0	7,282	10,928	112,876	31,703	1,445,542	82,213
57-41-0	Phenytoin	0	0	0	0	180	950	13,000	14,130	0
--	Polybrominated biphenyls	0	5,071	0	0	0	0	549	5,620	0
1336-36-3	Polychlorinated biphenyls (PCBs)	0	1,400	0	0	0	62,928	8,994	73,322	981,191
--	Polycyclic aromatic compounds	1,335,135	599,044	7,624,658	56,921	1,147,152	13,441	1,881,453	12,657,804	9,078
7758-01-2	Potassium bromate	0	0	53,129	2	0	0	455	53,586	0
1120-71-4	Propane sultone	0	0	0	0	4,900	120	0	5,020	0
75-55-8	Propyleneimine	0	0	0	0	4,000	0	230	4,230	0
75-56-9	Propylene oxide	1,475,188	0	13,432,224	81,598	13,013,027	624,849	625,866	29,252,752	3,929
81-07-2	Saccharin (manufacturing)	0	0	0	0	10,000	10	1,600	11,610	0
94-59-7	Safrole	0	0	0	0	1	25	100	126	0
100-42-5	Styrene	15,296,876	1,109,081	26,721,098	7,388,173	10,169,393	4,250,300	44,387,903	109,322,824	283,482
96-09-3	Styrene oxide	0	0	30,000	0	0	0	11	30,011	0
127-18-4	Tetrachloroethylene	40,942,533	8,921,720	4,556,500	1,232,892	17,289,521	1,173,229	6,844,562	80,960,957	13,494
62-56-6	Thiourea	4,456	872	0	0	12,779	11,821	9,087	39,015	0
584-84-9	Toluene-2,4-diisocyanate	317	389	0	29,423	1,596	9,715	10,992	52,432	21,320
91-08-7	Toluene-2,6-diisocyanate	79	0	0	2,754	714	2,111	2,750	8,408	439
26471-62-5	Toluenediisocyanate (mixed isomers)	6,300	1,235	16,421,251	39,793	720,297	910,358	56,838	18,156,072	30,757
95-53-4	o-Toluidine	60	0	232,012	48,861	160,399	83,592	48,194	573,118	69
79-01-6	Trichloroethylene	136,927,893	5,812,121	5,788,807	876,284	3,793,003	1,354,282	17,415,699	171,968,089	388,927
88-06-2	2,4,6-Trichlorophenol	0	0	0	0	1,014,286	0	159	1,014,445	0
96-18-4	1,2,3-Trichloropropane	1,500,000	0	680,000	470	1,224,000	8,635,576	13,473	12,053,519	14
51-79-6	Urethane	0	0	0	0	0	0	1,500	1,500	0
108-05-4	Vinyl acetate	827,369	93,926	21,696,559	13,187,593	17,449,172	1,146,917	3,446,620	57,848,156	18,204
593-60-2	Vinyl bromide	0	0	46,470	17	74	1	5,400	51,962	0
75-01-4	Vinyl chloride	398,418,771	82,698	21,752,907	17,663	33,633,983	134,349	957,085	454,997,456	6,426
87-62-7	2,6-Xylidine	0	0	43,038	5,500	11	0	52	48,601	0
	Subtotal	1,321,580,172	241,850,243	385,121,457	43,867,844	1,379,774,631	58,150,916	238,664,245	3,669,009,508	4,418,574
	Total for All TRI Chemicals	7,986,618,922	2,390,787,879	3,805,792,208	525,610,064	7,012,922,513	536,021,338	2,467,643,821	24,725,396,745	37,761,187

Note: Data from Section 8 of Form R.

Table 2-16. TRI On-site and Off-site Releases for Some Developmental Toxins, Added to TRI for 1995 Reporting Year, Top 10 Chemicals for Total Releases, 1997

CAS Number	Chemical	On-site Releases				
		Fugitive or Nonpoint Air Emissions	Stack or Point Air Emissions	Surface Water Discharges	Underground Injection	
					Class I Wells	Class II-V Wells
		Pounds	Pounds	Pounds	Pounds	Pounds
872-50-4	N-Methyl-2-pyrrolidone	843,385	2,281,899	27,896	2,570,958	41,000
108-93-0	Cyclohexanol	66,226	113,397	420	3,616,560	0
--	Nicotine and salts	20,146	414,803	956	0	0
128-04-1	Sodium dimethyldithiocarbamate	12,778	4,906	10	0	0
1918-00-9	Dicamba	250	791	26	65,535	0
122-34-9	Simazine	505	2,434	348	0	0
1689-99-2	Bromoxynil octanoate	1,136	250	0	0	0
333-41-5	Diazinon	26	13,798	15	0	0
759-94-4	Ethyl dipropylthiocarbamate	1,588	620	113	9,501	0
1918-16-7	Propachlor	0	50	0	0	0
	Subtotal	946,040	2,832,948	29,784	6,262,554	41,000
	Total for Developmental Toxins Added to TRI for 1995 Reporting Year	951,767	2,848,683	31,959	6,273,247	41,000

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

Table 2-16. TRI On-site and Off-site Releases for Some Developmental Toxins, Added to TRI for 1995 Reporting Year, Top 10 Chemicals for Total Releases, 1997, continued

CAS Number	Chemical	On-site Releases						Off-site Releases	
		On-site Land Releases							
		RCRA Subtitle C Landfills	Other Landfills	Land Treatment	Surface Impoundments	Other Disposal	Total On-site Releases	Transfers Off-site to Disposal	Total On-and Off-site Releases
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
872-50-4	N-Methyl-2-pyrrolidone	4,841	186,094	4,770	4,447	9,127	5,974,417	528,483	6,502,900
108-93-0	Cyclohexanol	0	0	12	0	0	3,796,615	810	3,797,425
--	Nicotine and salts	0	0	0	0	0	435,905	351,431	787,336
128-04-1	Sodium dimethyldithiocarbamate	0	0	0	0	0	17,694	126,741	144,435
1918-00-9	Dicamba	0	0	0	0	0	66,602	2,180	68,782
122-34-9	Simazine	0	0	0	0	0	3,287	48,629	51,916
1689-99-2	Bromoxynil octanoate	0	0	0	0	0	1,386	17,990	19,376
333-41-5	Diazinon	0	0	0	0	0	13,839	1,862	15,701
759-94-4	Ethyl dipropylthiocarbamate	0	0	0	0	0	11,822	2,778	14,600
1918-16-7	Propachlor	0	0	0	0	0	50	13,000	13,050
	Subtotal	4,841	186,094	4,782	4,447	9,127	10,321,617	1,093,904	11,415,521
	Total for Developmental Toxins Added to TRI for 1995 Reporting Year	5,091	186,099	4,782	4,447	9,127	10,356,202	1,125,430	11,481,632

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

On- and off-site releases of nitrate compounds reported to TRI in 1997 totaled 197.4 million pounds. This chemical ranked fourth among all TRI chemicals for total releases (see Table 2-9). TRI facilities managed 427.2 million pounds of nitrate compounds in production-related waste; nitrate compounds ranked 18th for total production-related waste (see Table 2-10).

Mercury and Children's Health

Exposure to high levels of mercury has been associated with serious neurological and developmental effects in humans. The fetal nervous system has been found to be more sensitive to mercury toxicity than that of adults. Women of child-bearing age are therefore at greatest risk. Fish consumption dominates the pathway for human and wildlife exposure to mercury. While most United States consumers need not be concerned about their exposure to mercury, some exposures may be of concern. Those who regularly and frequently consume large amounts of fish -- either marine species that typically have much higher levels of mercury than other seafood, or freshwater fish that have been affected by mercury pollution – are more highly exposed. In its Mercury Study Report to Congress, EPA concluded that between 1% and 3% of women of child-bearing age eat sufficient amounts of fish to be at risk from mercury exposure.

In 1997, on- and off-site releases of mercury and its compounds totaled 73,000 pounds; production-related waste totaled 548,000 pounds (see Tables 2-11 and 2-13). Reporting of mercury and mercury compounds is expected to increase in the 1998 reporting year, as electric utilities and other industry sectors are added to TRI.

Ozone and Children's Health

EPA has also noted that there are special concerns relating to children's exposure to ozone. Children are most at risk from exposure to ozone because: children breathe more air per pound of body weight than adults; children are more susceptible than adults to environmental threats because of their developing respiratory systems; and children are outside most during the summer, when ozone levels are highest. Also, because asthma in children is a growing concern, additional factors must be taken into account in understanding ozone exposure of asthmatic children. Concern has grown recently because children are 25% of the population and comprise 40% of the asthma cases; the asthma death rate is three times as great as it was 20 years ago; African-Americans die from asthma at a rate six times that of Caucasians; and ozone aggravates asthma, increasing use of medication, medical treatment, and visits to emergency clinics.

Ozone releases reported to TRI totaled 776,000 pounds in 1997, all emitted to air. TRI facilities reported production-related waste for this chemical of 3.6 million pounds, including 2.8 million pounds of on-site treatment. (TRI release and waste management data for all chemicals appear in Table 2-20 at the end of this chapter.) In addition to the ozone released directly to the environment, the majority of ozone is formed in the atmosphere as a reaction between nitrogen oxides (NO_x) and volatile organic compounds or VOCs [e.g., methyl isobutyl ketone (MIBK) and methyl ethyl ketone (MEK)] in the presence of sunlight. VOCs result from combustion; evaporation of hydrocarbons, such as gasoline; and emissions from processes employing hydrocarbons, from major sources such as chemical plants to small sources such as dry cleaners and charcoal lighter fluids. NO_x results primarily from combustion and is emitted by utilities, industrial boilers, and automobiles.

Prevention of TRI Chemicals in Waste

As noted earlier in this chapter, the Pollution Prevention Act of 1990 (PPA) requires facilities to report the quantities of TRI chemicals they manage in waste, both on- and off-site. The PPA also requires facilities to provide information about the efforts they have made to reduce or eliminate those quantities.

With the 1991 reporting year, facilities began reporting to TRI information about any source reduction activities they implemented during the year.

Source Reduction

Source reduction activities are undertaken to reduce the amount of a toxic chemical which enters a wastestream or is otherwise released to the environment. By reducing the generation of toxic chemicals in waste, source reduction activities reduce the need to recycle, treat, or dispose of toxic chemicals. Box 2-9 explains source reduction as defined by the PPA.

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

Table 2-17 summarizes source reduction activity reporting by category for 1997. The most frequently reported categories of source reduction activities were good operating practices (9.4% of all forms), process modifications (6.5%), and spill and leak prevention (4.5%). These categories were also the most frequently reported in previous years. More than 4,100 facilities reported at least one source reduction activity, 22.1% of all reporting facilities. They submitted 12,872 forms that indicated at least one source reduction activity, 21.1% of all Form Rs submitted in 1997. Thus, for every Form R indicating source reduction activity in 1997, four did not.

Box 2 - 9. What is Source Reduction

What is Source Reduction?

Through source reduction, risks to people and the environment can be reduced, financial and natural resources can be saved that would otherwise have to be expended on environmental clean-up or pollution control, and industrial processes can become more efficient. Source reduction is defined in the Pollution Prevention Act of 1990 as any practice that:

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

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

Facility Projections of TRI Chemicals in Waste

National Overview

In 1997, facilities reported managing 24.73 billion pounds of TRI chemicals in production-related waste, as summarized in Table 2-3 earlier in this chapter. These facilities projected a 1.2% decrease, to 24.43 billion pounds, by reporting year 1999 (see Table 2-18). Late revisions by two facilities would change the 1997 total for production-related waste managed to 23.85 billion pounds, as noted earlier in this chapter. These revisions would also change the total projected for 1999 to 23.47 billion pounds, a projected decrease of 1.6%.

Reductions of more than 100 million pounds each were expected in on-site recycling (from 7.99 billion pounds to 7.83 billion pounds), quantity released on- and off-site (from 2.47 billion pounds to 2.34 billion pounds), and on-site treatment (from 7.01 billion pounds to 6.90 billion pounds). In percentage terms,

Table 2-17. Facilities and Forms Reporting Source Reduction Activity, by Category, 1997

Source Reduction Activity Categories	Facilities Reporting Source Reduction Activity As Percent of TRI Facilities Reporting Form Rs*		Forms Reporting Source Reduction Activity As Percent of TRI Form Rs*	
	Number	Percent	Number	Percent
Good Operating Practices	2,505	13.3	5,737	9.4
Inventory Control	587	3.1	1,357	2.2
Spill and Leak Prevention	1,087	5.8	2,736	4.5
Raw Material Modifications	1,314	7.0	2,210	3.6
Process Modifications	1,884	10.0	3,972	6.5
Cleaning and Degreasing	600	3.2	892	1.5
Surface Preparation/Finishing	635	3.4	1,234	2.0
Product Modification	491	2.6	904	1.5
Any Source Reduction Activity	4,147	22.1	12,872	21.1

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the above categories because facilities and forms may report more than one source reduction activity.

*Source Reduction Activity reporting is only done using the Form R; Form As do not contain source reduction activity information.

Table 2-18. Current Year and Projected Quantities of TRI Chemicals in Waste, 1997-1999

Waste Management Activity	Current Year 1997 Pounds	Projected 1998 Pounds	Projected 1999 Pounds
Recycled On-site	7,986,618,922	7,794,833,050	7,827,180,611
Recycled Off-site	2,390,787,879	2,356,648,275	2,401,111,687
Energy Recovery On-site *	3,805,792,208	3,862,018,153	3,965,274,628
Energy Recovery Off-site	525,610,064	486,154,779	489,841,732
Treated On-site	7,012,922,513	6,959,462,725	6,904,993,529
Treated Off-site	536,021,338	502,784,443	501,254,860
Quantity Released On- and Off-site	2,467,643,821	2,370,733,085	2,343,743,515
Total Production-related Waste Managed *	24,725,396,745	24,332,634,510	24,433,400,562

Note: Current year and projected year amounts are all taken from Section 8 of Form R for 1997.

*One facility, TPI Petroleum in Ardmore, Oklahoma, reported on-site energy recovery for ethylene of 422,000,000 pounds in 1997 and projected 443,100,000 pounds for 1998 and 465,255,000 pounds for 1999. This facility also reported on-site energy recovery for propylene of 272,000,000 pounds in 1997 and projected 285,600,000 pounds for 1998 and 299,880,000 pounds for 1999. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 198,830,000 pounds in 1997 and projected 213,213,000 pounds for both 1998 and 1999. The facility has since revised all three quantities to 13,000,000 pounds. These revisions change on-site energy recovery to 2,930,962,208 pounds in 1997, 2,933,105,153 pounds projected for 1998, and 2,999,926,628 projected for 1999. Total production-related waste managed changes to 23,850,566,745 pounds in 1997, 23,403,721,510 pounds projected for 1998, and 23,468,052,562 pounds projected for 1999.

the largest projected decreases were 6.8% in off-site energy recovery and 6.5% in off-site treatment, although these represented relatively small absolute reductions.

At the same time, on-site energy recovery was expected to increase from 3.81 billion pounds to 3.97 billion pounds, a projected 4.2% increase. The facility revisions previously described would change projected on-site energy recovery totals to 2.93 billion in 1997 and a projected 3.00 billion in 1999, for a projected increase of 2.4%. For off-site recycling, an increase of 0.4%, from 2.39 billion pounds to 2.40 billion pounds, was projected.

These projections represent little change in how facilities expected to manage TRI chemicals in waste. From 1997 to 1999, quantities released—the least desirable waste management option—would decrease from 10.3% to 10.0% of total production-related waste managed as projected in facilities' submissions to TRI. Taking into account the facility revisions noted throughout this chapter, on-site energy recovery would rise from 12.3% to 12.8%.

These are the largest projected changes in the distribution of waste management methods. Although they constitute a slight positive shift from releases toward a more preferred option, these changes represent little or no progress in improving the management of TRI chemicals in waste.

Projected Waste Management Data by State

Texas, the state with the largest production-related waste managed in 1997, was also the state projecting the largest absolute reduction in production-related waste over the next two years. As shown in Table 2-19, production-related waste in Texas was expected to decrease from 4.17 billion pounds in 1997 to 3.93 billion pounds in 1999. This amounted to a projected 5.8% decrease for 1997 to 1999, compared to a 3.0% increase over the last year (1996 to 1997). North Carolina facilities projected the second-largest reduction, from 803.9 million pounds in 1997 to 668.7 million pounds in 1999. This amounted to a 16.8% decrease expected over the next two years, compared to an 11.8% increase from 1996 to 1997. No other state or territory projected a decrease of more than 100 million pounds from 1997 to 1999.

Pennsylvania ranked first for projected increase in production-related waste, from 917.9 million pounds in 1997 to 1.01 billion pounds in 1999, the only projected increase exceeding 100 million pounds. Pennsylvania's projected 10.4% increase from 1997 to 1999 compares to an 8.4% increase for 1996 to 1997.

Chemical-specific Release and Waste Management Data

Table 2-20 presents on- and off-site releases and waste management data for all reported TRI chemicals for 1997. Pesticides are denoted by an asterisk (*) next to the chemical name. These are chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the U.S.) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-19. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1996-1999

State	Year	Recycled		Energy Recovery		Treated		Quantity Released	Total Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site	On- and Off-site	
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	96	238,148,336	35,101,704	40,674,988	25,087,761	270,928,758	7,936,970	99,477,178	717,355,695
	97	266,066,193	41,610,934	54,993,029	33,306,201	288,994,880	17,224,155	82,908,645	785,104,037
	98	275,134,840	41,455,438	61,218,034	37,770,876	302,026,791	15,023,759	77,815,340	810,445,078
	99	258,312,826	40,915,384	66,850,983	40,248,768	316,666,357	26,051,125	76,223,544	825,268,987
Alaska	96	25,842	235,363	457,493	5,869	1,561,278	1,363	6,906,358	9,193,566
	97	32,133	220,038	456,085	9,423	2,562,157	2,812	4,627,993	7,910,641
	98	34,844	36,500	456,000	53	4,132,367	779	2,395,260	7,055,803
	99	34,844	209,238	456,000	3	4,045,047	779	2,311,607	7,057,518
American Samoa	96	0	0	0	0	0	0	10,500	10,500
	97	0	0	0	0	0	0	12,750	12,750
	98	0	0	0	0	0	0	10,000	10,000
	99	0	0	0	0	0	0	8,800	8,800
Arizona	96	147,955,494	77,562,752	719,450	785,060	6,812,734	10,970,040	46,788,641	291,594,171
	97	201,656,876	54,239,088	1,157,897	832,659	8,843,621	4,915,653	31,292,633	302,938,427
	98	184,975,829	55,179,659	944,634	868,455	9,278,598	4,968,202	27,118,184	283,333,561
	99	207,823,736	52,719,928	961,347	927,022	9,617,863	4,944,483	21,649,923	298,644,302
Arkansas	96	198,396,747	59,035,261	32,913,002	6,328,691	112,720,103	1,061,241	38,843,292	449,298,337
	97	217,902,230	50,501,079	52,342,924	6,085,102	117,185,581	1,064,592	57,077,521	502,159,029
	98	126,270,976	50,018,679	50,537,356	5,706,572	117,349,921	739,673	55,398,399	406,021,576
	99	123,368,652	55,397,604	51,719,435	5,675,131	118,179,545	721,412	66,159,204	421,220,983
California	96	49,768,416	65,626,379	21,633,349	21,655,068	139,326,264	16,623,563	50,896,177	365,529,216
	97	55,746,988	76,635,699	39,353,765	22,087,802	77,309,592	16,729,705	46,419,635	334,283,186
	98	52,189,063	72,707,240	29,269,419	9,173,629	71,520,724	16,677,475	42,981,821	294,519,371
	99	53,818,001	74,436,905	29,779,388	8,832,142	73,503,727	18,043,710	48,512,944	306,926,817
Colorado	96	17,578,836	18,139,898	268,767	4,203,242	8,120,225	1,557,536	5,110,865	54,979,369
	97	22,745,533	16,314,398	209,711	6,087,968	9,444,535	1,847,447	5,344,502	61,994,094
	98	27,832,384	19,934,957	255,182	5,872,269	9,499,530	1,420,285	4,675,712	69,490,319
	99	31,523,881	21,640,046	261,182	10,391,738	10,697,058	1,472,619	4,678,476	80,665,000
Connecticut	96	89,558,810	20,505,185	4,443,149	1,562,144	37,366,890	6,797,103	8,361,579	168,594,860
	97	118,391,038	24,579,626	3,400,445	2,809,593	39,959,725	10,289,214	11,102,578	210,532,219
	98	117,839,256	22,463,375	3,411,184	2,479,150	39,864,805	9,899,442	6,659,526	202,616,738
	99	117,799,714	22,784,411	3,517,286	2,498,658	38,996,846	9,864,040	6,302,629	201,763,584
Delaware	96	29,780,181	10,058,476	17,439,115	1,180,844	65,816,453	3,440,749	4,073,325	131,789,143
	97	32,896,062	10,540,245	19,255,280	1,643,031	68,642,233	4,999,545	3,499,696	141,476,092
	98	34,997,612	10,825,257	19,292,014	1,323,496	67,758,291	4,376,018	3,385,605	141,958,293
	99	36,828,255	11,008,548	19,343,814	1,300,778	68,094,777	4,505,464	3,401,622	144,483,258
District of Columbia	96	0	12,000	0	0	1,690	181	9,295	23,166
	97	0	7,500	0	0	303	1	6,617	14,421
	98	0	7,500	0	0	1,503	201	8,017	17,221
	99	0	6,000	0	0	1,462	201	8,014	15,677
Florida	96	132,390,846	15,626,150	17,252,983	2,197,653	103,506,465	12,845,860	76,510,067	360,330,024
	97	142,443,179	15,218,840	32,403,559	4,947,217	108,215,564	13,473,106	82,190,057	398,891,522
	98	151,165,406	18,319,849	31,511,843	3,285,144	220,122,793	10,330,460	81,249,665	515,985,160
	99	150,900,236	18,414,291	31,522,712	2,850,422	112,774,170	9,926,335	79,156,702	405,544,868

Note: Data from Section 8 of Form R for 1997: 96 is prior year, 97 is current year, 98 and 99 are projected years.

Table 2-19. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1996-1999, continued

State	Year	Recycled		Energy Recovery		Treated		Quantity Released	Total Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site	On- and Off-site	
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Georgia	96	258,497,480	41,183,920	47,458,371	10,060,819	153,257,797	4,215,956	59,551,039	574,225,382
	97	289,377,913	56,836,367	52,445,180	11,671,644	165,226,092	4,847,787	70,356,043	650,761,026
	98	263,402,381	57,251,332	53,664,931	11,500,962	170,642,537	4,396,883	68,457,424	629,316,450
	99	263,166,348	60,996,002	55,466,543	12,641,575	178,962,051	4,326,033	65,570,175	641,128,727
Guam	96	0	0	0	0	0	0	0	0
	97	0	0	0	0	0	0	0	0
	98	0	0	0	0	0	0	0	0
	99	0	0	0	0	0	0	0	0
Hawaii	96	6,611	53,077	0	0	3,590,519	2,283	532,633	4,185,123
	97	40,618	45,511	0	616	3,580,530	1,488	449,743	4,118,506
	98	30,553	44,077	0	0	3,586,738	2,086	477,657	4,141,111
	99	30,553	44,079	0	0	3,586,761	856	458,515	4,120,764
Idaho	96	809,960	869,296	26,900	151,474	18,815,043	591,130	14,846,619	36,110,422
	97	2,753,590	1,042,715	28,600	157,375	96,279,582	711,199	16,977,869	117,950,930
	98	2,773,568	1,181,354	30,700	153,699	96,715,319	704,341	16,306,118	117,865,099
	99	2,771,877	1,175,761	33,000	160,261	96,828,881	715,209	16,834,777	118,519,766
Illinois	96	261,676,108	96,438,030	35,408,457	27,468,698	151,553,768	24,254,399	102,469,044	699,268,504
	97	314,553,894	92,981,867	40,497,594	27,325,176	764,811,973	16,187,464	117,532,113	1,373,890,081
	98	343,569,107	89,948,250	35,154,863	24,538,496	640,866,752	13,652,187	114,532,118	1,262,261,773
	99	379,772,540	91,624,864	35,275,127	23,199,350	642,002,893	13,500,814	113,088,318	1,298,463,906
Indiana	96	214,323,760	192,196,136	121,859,205	14,577,099	131,718,685	12,280,013	104,820,666	791,775,564
	97	168,107,111	185,877,776	157,374,206	13,195,301	135,292,880	15,822,349	119,914,250	795,583,873
	98	161,539,808	169,691,291	152,549,801	13,028,527	132,858,350	15,425,927	123,586,261	768,679,965
	99	161,950,395	162,534,787	153,096,214	12,883,795	131,419,711	15,677,077	130,834,609	768,396,588
Iowa	96	138,856,751	26,220,312	1,847,853	2,860,844	26,093,199	10,354,114	33,917,560	240,150,633
	97	152,237,630	32,048,553	1,686,347	3,621,310	25,903,394	10,444,333	31,816,520	257,758,087
	98	147,346,648	32,584,820	1,683,650	3,108,437	30,954,628	10,492,758	31,556,704	257,727,645
	99	147,638,057	33,406,258	1,670,000	2,670,498	31,314,608	11,259,766	32,145,280	260,104,467
Kansas	96	205,658,430	55,205,677	86,409,462	2,735,484	25,258,056	5,293,626	26,137,981	406,698,716
	97	169,145,559	66,696,369	88,572,790	3,503,418	25,239,157	5,387,253	27,931,469	386,476,015
	98	122,578,440	67,113,987	95,562,065	2,743,034	25,760,784	3,759,601	28,095,325	345,613,236
	99	123,796,718	68,649,011	100,130,477	2,814,151	27,622,660	2,410,151	27,274,657	352,697,825
Kentucky	96	259,719,542	45,247,480	62,005,995	9,440,652	119,086,152	9,292,502	43,923,670	548,715,993
	97	326,907,570	50,962,133	58,010,928	7,504,357	142,280,834	10,806,098	42,662,478	639,134,398
	98	356,109,501	51,046,718	67,021,784	7,907,462	143,343,714	9,470,287	35,737,085	670,636,551
	99	385,827,489	53,185,365	66,968,554	8,644,319	141,137,014	9,517,110	35,878,008	701,157,859
Louisiana*	96	723,078,271	51,810,671	358,839,774	15,930,231	819,290,398	8,680,129	183,146,306	2,160,775,780
	97	746,853,862	55,863,841	528,113,029	14,703,797	858,448,408	10,741,231	179,794,155	2,394,518,323
	98	755,816,670	64,552,862	555,333,479	14,987,212	841,955,437	12,568,067	171,276,379	2,416,490,106
	99	754,980,421	69,739,709	574,765,909	15,380,317	835,488,103	11,461,271	169,464,881	2,431,280,611
Maine	96	10,123,083	3,231,274	7,905,993	378,446	64,398,634	379,383	9,138,143	95,554,956
	97	10,624,371	6,281,909	8,327,078	376,338	63,134,599	654,189	9,334,122	98,732,606
	98	5,860,006	5,506,356	8,690,627	368,278	63,939,345	661,704	8,881,756	93,908,072
	99	5,292,796	5,516,136	9,132,877	273,050	64,427,849	665,978	8,773,392	94,082,078

Note: Data from Section 8 of Form R for 1997: 96 is prior year, 97 is current year, 98 and 99 are projected years.

*One facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997 and projected 213,213,000 pounds for both 1998 and 1999. The facility has since revised these quantities to 13,000,000 pounds each. For Louisiana, these revisions change on-site energy recovery to 347,283,029 pounds in 1997, 355,120,479 pounds projected for 1998, and 374,552,909 pounds projected for 1999. Total production-related waste managed in Louisiana changes to 2,213,688,323 pounds in 1997, 2,216,277,106 pounds projected for 1998, and 2,231,067,611 pounds projected for 1999.

Table 2-19. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1996-1999, continued

State	Year	Recycled		Energy Recovery		Treated		Quantity Released	Total Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site	On- and Off-site	
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Maryland	96	18,540,680	4,114,968	13,452,901	1,415,366	32,917,065	7,791,848	12,532,769	90,765,597
	97	13,446,585	5,172,039	15,084,938	1,112,858	29,935,385	9,324,872	13,500,222	87,576,899
	98	13,990,366	6,172,184	15,384,392	780,803	31,403,566	9,426,689	13,145,589	90,303,589
	99	14,967,066	5,501,415	16,921,727	756,696	31,379,712	9,508,667	12,966,560	92,001,843
Massachusetts	96	18,165,666	29,301,573	5,051,745	6,431,634	23,749,511	10,338,761	7,044,444	100,083,334
	97	18,197,626	29,715,353	6,763,717	5,337,558	22,952,311	10,749,906	6,596,628	100,313,099
	98	17,519,318	28,701,588	7,068,632	4,651,385	23,392,693	10,921,992	6,005,900	98,261,508
	99	17,701,931	28,867,675	7,367,913	4,650,478	23,857,366	11,079,050	5,434,012	98,958,425
Michigan	96	224,706,218	105,513,207	86,491,089	71,871,393	84,750,336	38,776,615	88,419,625	700,528,483
	97	378,336,073	128,073,875	83,687,074	67,480,236	89,642,433	38,111,751	80,762,315	866,093,757
	98	450,981,176	120,632,592	85,757,163	64,616,982	90,353,199	32,036,472	77,511,306	921,888,890
	99	469,750,433	122,376,462	88,262,000	63,614,278	89,099,432	31,712,512	64,317,028	929,132,145
Minnesota	96	146,741,482	22,682,606	10,879,979	2,190,126	29,845,240	9,090,943	21,902,441	243,332,817
	97	161,863,212	21,296,995	8,016,186	2,359,251	34,693,861	10,884,199	20,592,140	259,705,844
	98	165,602,709	20,436,218	8,010,722	2,175,596	35,036,443	11,136,822	19,721,354	262,119,864
	99	183,922,358	20,677,236	7,947,221	2,047,702	35,091,782	11,040,716	19,382,251	280,109,266
Mississippi	96	210,421,671	24,170,038	15,514,699	2,621,258	95,820,076	1,354,087	61,269,848	411,171,677
	97	223,048,853	20,316,877	23,640,421	3,957,984	166,301,942	1,660,949	64,275,403	503,202,429
	98	215,506,196	18,290,852	27,472,964	3,644,139	151,393,115	1,391,336	72,100,837	489,799,439
	99	212,340,601	18,574,582	26,697,841	3,665,824	152,307,416	1,199,170	71,372,234	486,157,668
Missouri	96	229,133,539	62,750,478	80,708,193	26,087,552	65,419,238	12,701,978	57,458,863	534,259,841
	97	229,823,661	63,356,210	98,456,987	22,336,016	174,927,067	14,861,872	61,515,495	665,277,308
	98	238,584,045	56,448,235	92,890,656	16,064,221	176,969,682	14,204,210	60,724,259	655,885,308
	99	244,854,548	56,815,318	92,919,654	15,664,996	178,124,901	14,427,422	58,334,948	661,141,787
Montana	96	46,319,148	589,042	2,513,550	25,559	8,610,078	37,460	48,175,693	106,270,530
	97	46,586,065	2,966,505	2,629,689	59,947	9,236,891	18,892	42,177,572	103,675,561
	98	41,005,714	96,311	2,492,100	34,000	9,370,301	14,489	42,054,665	95,067,580
	99	41,005,275	134,311	2,492,100	44,000	9,370,301	16,265	41,529,716	94,591,968
Nebraska	96	18,021,979	18,423,900	1,327,579	400,667	9,234,445	1,261,763	12,296,991	60,967,324
	97	5,730,188	24,885,114	838,327	591,364	9,192,742	1,431,896	13,369,541	56,039,172
	98	2,182,933	24,392,162	589,197	641,723	9,368,442	1,409,941	8,887,594	47,471,992
	99	2,109,979	25,315,421	589,197	679,313	9,552,667	1,411,982	8,666,933	48,325,492
Nevada	96	2,125,559	764,872	0	10,452	8,629,895	39,177	3,702,504	15,272,459
	97	1,923,358	1,101,743	0	101,184	11,123,073	23,990	4,443,474	18,716,822
	98	2,314,077	762,052	0	21,000	11,350,091	14,023	3,713,062	18,174,305
	99	2,314,077	757,252	0	11,200	11,352,810	14,223	3,740,774	18,190,336
New Hampshire	96	16,778,010	12,394,121	1,854,725	229,238	9,710,502	993,909	2,598,305	44,558,810
	97	16,698,742	12,663,886	1,490,392	739,937	10,124,456	962,439	2,702,623	45,382,475
	98	16,578,561	12,338,390	1,566,653	2,181,535	10,135,327	718,378	2,668,378	46,187,222
	99	16,601,394	11,762,501	1,633,542	2,162,783	10,125,220	726,564	2,681,574	45,693,578
New Jersey	96	64,843,303	44,308,078	347,706,044	30,387,301	125,300,814	21,809,723	20,951,807	655,307,070
	97	65,692,010	40,686,255	219,383,087	29,506,963	130,644,642	30,015,188	21,394,926	537,323,071
	98	64,284,401	41,106,286	215,898,411	25,965,511	123,110,516	27,734,798	18,199,156	516,299,079
	99	62,699,243	41,487,518	215,941,339	25,880,288	112,836,162	27,110,993	19,818,737	505,774,280

Note: Data from Section 8 of Form R for 1997: 96 is prior year, 97 is current year, 98 and 99 are projected years.

Table 2-19. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1996-1999, continued

State	Year	Recycled		Energy Recovery		Treated		Quantity Released	Total Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site	On- and Off-site	
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
New Mexico	96	1,510,473	1,060,244	33,800,000	148,320	1,933,276	541,898	44,372,379	83,366,590
	97	1,480,337	1,190,543	26,313,209	147,019	4,017,170	633,512	41,787,552	75,569,342
	98	1,482,684	1,198,125	26,313,209	145,160	4,199,678	532,205	42,095,421	75,966,482
	99	1,483,449	1,363,021	26,313,209	143,390	4,271,283	518,902	42,089,459	76,182,713
New York	96	175,916,891	61,760,010	24,170,625	7,872,346	106,965,235	12,999,212	35,813,575	425,497,894
	97	172,842,264	68,275,239	29,371,265	7,076,667	127,109,643	11,609,888	37,289,240	453,574,206
	98	168,150,294	70,972,866	27,291,602	7,189,407	129,845,857	10,273,577	30,909,855	444,633,458
	99	171,975,410	73,555,269	27,542,573	6,647,898	130,803,772	10,082,022	28,027,879	448,634,823
North Carolina	96	349,842,803	84,714,337	25,996,736	13,523,746	149,977,403	8,562,365	86,752,086	719,369,476
	97	448,336,582	87,204,537	27,818,415	14,017,992	135,606,112	6,261,666	84,658,221	803,903,525
	98	420,296,222	89,998,387	28,223,412	14,656,531	151,026,485	5,529,643	78,543,668	788,274,348
	99	296,970,179	92,736,743	30,777,538	15,293,161	149,590,354	5,467,241	77,825,088	668,660,304
North Dakota	96	43,138	1,020,391	0	21,050	4,223,802	210,664	2,345,481	7,864,526
	97	6,574	596,287	0	31,171	4,446,858	221,419	2,491,558	7,793,867
	98	6,665	596,256	0	29,880	4,342,185	229,892	2,401,283	7,606,161
	99	6,730	596,256	0	29,380	4,344,664	235,250	2,363,660	7,575,940
Ohio	96	366,527,090	188,982,472	96,658,345	37,134,997	150,232,422	35,970,100	151,389,926	1,026,895,352
	97	217,112,974	188,951,868	108,525,378	38,359,015	140,033,290	34,935,397	153,761,315	881,679,237
	98	181,033,291	187,570,068	116,770,065	29,575,471	140,326,345	33,387,278	144,577,984	833,240,502
	99	196,357,878	186,713,112	122,618,788	29,351,988	140,365,794	31,429,551	139,419,630	846,256,741
Oklahoma[b]	96	53,433,555	18,044,086	52,783,667	992,954	16,175,386	1,531,173	25,272,131	168,232,952
	97	44,023,906	36,333,994	694,233,700	1,383,754	35,229,082	2,647,032	24,265,278	838,116,746
	98	38,990,870	34,711,998	728,934,200	1,269,307	36,678,536	2,228,318	22,617,167	865,430,396
	99	37,115,237	35,815,834	765,369,500	1,280,190	37,497,284	3,763,399	22,355,290	903,196,734
Oregon	96	34,054,406	20,305,236	17,274,416	1,193,022	57,409,075	12,202,651	28,078,226	170,517,032
	97	37,958,112	20,003,439	13,964,005	1,336,309	71,513,926	13,852,045	28,787,064	187,414,900
	98	38,060,926	15,860,607	14,105,944	1,368,026	72,865,219	17,832,266	27,132,017	187,225,005
	99	37,726,932	16,021,460	14,072,544	1,421,325	73,755,884	17,453,479	26,373,289	186,824,913
Pennsylvania	96	373,067,680	136,235,050	47,242,949	17,357,922	139,069,495	22,398,525	111,105,633	846,477,254
	97	360,008,264	133,879,998	77,893,692	19,317,617	166,360,441	26,732,395	133,685,107	917,877,514
	98	361,519,945	132,484,805	76,623,585	21,383,625	165,462,867	25,446,534	129,843,068	912,764,429
	99	360,836,248	135,575,823	156,006,303	23,291,874	180,540,520	25,820,379	131,608,780	1,013,679,927
Puerto Rico	96	24,293,358	13,857,440	0	9,932,801	18,657,054	7,371,625	8,132,901	82,245,179
	97	22,957,397	13,834,881	486,257	10,392,249	17,038,395	8,308,705	7,849,122	80,867,006
	98	19,255,092	8,986,462	499,237	11,250,288	16,569,338	9,336,865	7,068,835	72,966,117
	99	17,157,535	8,800,265	483,966	12,310,620	16,980,025	8,878,688	7,074,978	71,686,077
Rhode Island	96	13,297,430	12,475,036	226,972	825,924	6,802,689	718,238	2,281,665	36,627,954
	97	14,512,098	11,704,702	224,327	792,257	7,242,505	726,078	2,036,452	37,238,419
	98	12,746,342	13,017,531	226,433	791,944	7,296,664	480,245	1,909,658	36,468,817
	99	11,938,912	14,881,483	227,033	796,044	7,408,886	388,311	1,823,829	37,464,498
South Carolina	96	267,195,098	90,366,020	73,724,448	8,335,343	109,312,729	8,407,475	55,726,951	613,068,064
	97	449,687,937	302,459,979	65,484,208	14,921,886	116,610,643	14,031,629	55,635,721	1,018,832,003
	98	387,578,607	309,565,638	74,341,397	12,124,189	115,571,754	12,792,300	55,380,067	967,353,952
	99	396,048,839	323,525,604	76,339,316	10,809,239	115,328,533	12,759,855	54,279,066	989,090,452

Note: Data from Section 8 of Form R for 1997: 96 is prior year, 97 is current year, 98 and 99 are projected years.

[b]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 36,250,000 pounds in 1996 and 422,000,000 pounds in 1997, and projected 443,100,000 pounds for 1998 and 465,255,000 pounds for 1999. This facility also reported on-site energy recovery for propylene of 16,300,000 pounds in 1996 and 272,000,000 pounds in 1997 and projected 285,600,000 pounds for 1998 and 299,880,000 pounds for 1999. The facility has since revised these quantities to zero. For Oklahoma, these revisions change on-site energy recovery to 233,667 pounds in 1996, 233,700 pounds in 1997, 234,200 pounds projected for 1998, and 234,500 pounds projected for 1999. Total production-related waste managed in Oklahoma changes to 115,682,952 pounds in 1996, 144,116,746 pounds in 1997, 136,730,396 pounds projected for 1998, and 138,061,734 pounds projected for 1999.

Table 2-19. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1996-1999, continued

State	Year	Recycled		Energy Recovery		Treated		Quantity Released	Total Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site	On- and Off-site	
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
South Dakota	96	30,205,084	509,338	1,050,000	185,382	1,781,258	1,869,580	3,639,018	39,239,660
	97	59,132,065	814,772	1,159,000	247,666	2,689,981	3,801,806	4,142,933	71,988,223
	98	38,656,974	869,500	1,246,000	245,486	2,718,011	3,826,372	4,299,090	51,861,433
	99	38,670,017	722,937	1,334,000	247,288	2,746,020	3,837,712	4,318,684	51,876,658
Tennessee	96	158,035,768	53,284,787	50,001,832	5,517,084	94,497,682	11,495,245	104,036,538	476,868,936
	97	220,492,375	77,421,606	48,945,665	6,293,238	107,647,244	11,420,987	106,232,230	578,453,345
	98	227,162,006	80,906,157	40,390,815	5,507,371	105,675,307	8,971,236	99,714,282	568,327,174
	99	236,237,247	81,676,666	44,345,815	4,939,518	106,574,656	8,586,417	98,126,376	580,486,695
Texas	96	1,267,388,152	169,952,306	822,362,230	75,394,065	1,365,719,875	75,996,925	272,306,898	4,049,120,451
	97	1,086,499,032	158,569,874	984,889,997	82,814,401	1,518,558,745	86,209,030	252,075,456	4,169,616,535
	98	1,100,691,311	142,259,136	970,102,281	81,756,517	1,404,643,479	80,608,114	242,663,151	4,022,723,989
	99	1,086,852,922	143,676,891	900,018,108	78,812,345	1,410,878,213	70,708,993	238,827,750	3,929,775,222
Utah	96	3,902,770	4,182,833	25,599,827	116,190	226,773,781	687,497	83,428,194	344,691,092
	97	1,940,716	1,997,415	25,388,793	139,834	235,120,198	772,988	96,115,730	361,475,674
	98	2,669,428	2,255,280	24,625,500	143,178	236,705,525	763,201	98,541,171	365,703,283
	99	2,613,483	2,419,793	24,625,500	175,892	236,787,797	671,649	99,224,100	366,518,214
Vermont	96	456,815	2,206,359	0	18,572	1,103,104	260,438	391,885	4,437,173
	97	122,855	2,120,867	0	21,898	1,105,112	157,535	436,086	3,964,353
	98	120,125	2,024,575	0	11,010	1,090,894	82,932	469,615	3,799,151
	99	119,425	1,197,575	0	11,560	1,121,076	82,109	491,790	3,023,535
Virgin Islands	96	717,893	96,920	0	46,053	10,248,528	377,449	1,506,138	12,992,981
	97	634,022	220,119	0	2,060	13,384,698	351,827	1,428,702	16,021,428
	98	634,022	220,119	0	2,060	13,384,698	351,827	1,500,141	16,092,867
	99	634,022	220,119	0	2,060	13,384,698	351,827	1,500,141	16,092,867
Virginia	96	180,870,708	21,873,173	27,414,021	6,502,293	299,239,874	18,518,886	57,827,037	612,245,992
	97	175,060,942	19,598,037	35,839,169	10,140,409	311,231,341	22,099,062	58,508,860	632,477,820
	98	152,955,837	18,657,666	37,933,809	9,365,325	369,745,118	21,239,026	53,652,631	663,549,412
	99	161,736,826	18,254,997	39,562,778	9,342,089	370,390,334	21,372,585	53,317,693	673,977,302
Washington	96	85,508,648	11,411,353	18,479,801	834,400	75,171,957	3,664,177	26,414,750	221,485,086
	97	96,663,620	6,416,187	12,166,288	857,072	75,521,856	3,627,965	30,845,848	226,098,836
	98	97,145,769	5,507,940	12,005,234	898,129	73,508,854	4,055,261	31,582,769	224,703,956
	99	103,989,908	9,027,351	12,246,224	900,318	74,474,260	4,204,052	27,904,037	232,746,150
West Virginia	96	120,294,295	5,377,887	10,336,621	7,944,588	144,043,385	6,485,015	30,891,441	325,373,232
	97	116,453,349	7,263,396	41,657,129	6,224,775	110,528,227	6,956,661	24,716,703	313,800,240
	98	121,251,919	6,704,337	43,634,046	5,926,643	112,312,479	6,462,449	24,246,759	320,538,632
	99	125,912,180	6,941,020	45,940,111	6,770,126	116,606,488	6,569,286	23,049,679	331,788,890

Note: Data from Section 8 of Form R for 1997: 96 is prior year, 97 is current year, 98 and 99 are projected years.

Table 2-19. Actual and Projected Quantities of TRI Chemicals in Waste, by State, 1996-1999, continued

State	Year	Recycled		Energy Recovery		Treated		Quantity Released	Total Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site	On- and Off-site	
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Wisconsin	96	53,276,222	57,563,629	12,553,158	22,214,520	110,128,958	15,787,377	38,928,914	310,452,778
	97	57,504,628	62,772,874	12,737,855	17,638,679	117,250,445	16,405,819	38,957,047	323,267,347
	98	62,055,120	72,531,451	14,956,928	16,920,116	126,593,751	14,767,772	37,389,207	345,214,345
	99	64,542,255	70,208,450	15,651,940	16,693,421	137,840,457	14,753,311	37,918,883	357,608,717
Wyoming	96	1,770,770	296,654	62,250	2,910	4,989,220	5,866	9,747,950	16,875,620
	97	3,360,150	417,925	74,591	2,470	4,546,158	62,317	9,355,868	17,819,479
	98	4,353,213	503,000	76,000	2,470	4,837,379	7,845	8,858,790	18,638,697
	99	4,350,733	507,000	76,000	2,470	4,837,379	7,845	8,842,590	18,624,017
Total[a]	96	7,533,759,806	2,094,947,485	2,762,802,708	504,395,107	5,847,666,499	486,836,786	2,432,213,945	21,662,622,336
	97	7,986,618,922	2,390,787,879	3,805,792,208	525,610,064	7,012,922,513	536,021,338	2,467,643,821	24,725,396,745
	98	7,794,833,050	2,356,648,275	3,862,018,153	486,154,779	6,959,462,725	502,784,443	2,370,733,085	24,332,634,510
	99	7,827,180,611	2,401,111,687	3,965,274,628	489,841,732	6,904,993,529	501,254,860	2,343,743,515	24,433,400,562

Note: Data from Section 8 of Form R for 1997: 96 is prior year, 97 is current year, 98 and 99 are projected years.

[a]Revisions by two facilities (in Louisiana and Oklahoma, respectively) change the totals presented in this table as follows: On-site energy recovery changes to 2,710,252,708 pounds in 1996, 2,930,962,208 pounds in 1997, 2,933,105,153 pounds projected for 1998, and 2,999,926,628 pounds projected for 1999. Total production-related waste managed changes to 21,610,072,336 pounds in 1996, 23,850,566,745 pounds in 1997, 23,403,721,510 pounds projected for 1998, and 23,468,052,562 pounds projected for 1999.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997

CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
71751-41-2 *	Abamectin	2	0	9	0	0	0	0	9	0	9
30560-19-1 *	Acephate	7	1,505	0	0	0	0	0	1,505	0	1,505
75-07-0 *	Acetaldehyde	250	12,736,049	223,370	371,576	0	98	118,078	13,449,171	5,483	13,454,654
60-35-5	Acetamide	6	250	1	1,863,202	0	0	0	1,863,453	0	1,863,453
75-05-8	Acetonitrile	100	890,612	7,461	18,894,762	0	58	5	19,792,898	3,084,414	22,877,312
98-86-2 *	Acetophenone	43	179,786	650	499,070	0	0	3,500	683,006	42,552	725,558
62476-59-9 *	Acifluorfen, sodium salt	7	290	253	0	0	0	5	548	570,359	570,907
107-02-8 *	Acrolein	19	81,130	298	71,990	0	0	0	153,418	175	153,593
79-06-1 *	Acrylamide	77	17,278	6,355	7,074,021	0	305,545	0	7,403,199	26,290	7,429,489
79-10-7	Acrylic acid	194	414,885	8,089	6,237,000	0	0	76,151	6,736,125	45,129	6,781,254
107-13-1 *	Acrylonitrile	110	1,224,569	1,229	4,031,900	0	47	780	5,258,525	4,879	5,263,404
15972-60-8 *	Alachlor	3	2,700	290	0	0	0	0	2,990	3,600	6,590
116-06-3 *	Aldicarb	3	386	0	0	0	0	5	391	0	391
28057-48-9	d-trans-Allethrin	1	0	0	0	0	0	0	0	0	0
107-18-6 *	Allyl alcohol	27	53,528	5,226	411,350	0	0	4	470,108	7,245	477,353
107-11-9	Allylamine	3	1,662	0	0	0	0	0	1,662	0	1,662
107-05-1	Allyl chloride	22	78,187	10	0	0	0	0	78,197	503	78,700
7429-90-5 *	Aluminum (fume or dust)	326	1,589,904	42,374	0	0	2,400	2,211,096	3,845,774	8,278,292	12,124,066
1344-28-1	Aluminum oxide (fibrous forms)	51	38,451	755	0	0	14	428,666	467,886	10,338,111	10,805,997
20859-73-8 *	Aluminum phosphide	1	0	0	0	0	0	0	0	0	0
834-12-8 *	Ametryn	4	2,161	42	0	0	0	0	2,203	0	2,203
60-09-3	4-Aminoazobenzene	2	0	0	6	0	0	0	6	0	6
92-67-1	4-Aminobiphenyl	1	0	0	0	0	0	0	0	0	0
7664-41-7 *	Ammonia	2,734	156,148,750	7,023,065	30,953,105	197,387	23,352	3,231,064	197,576,723	2,417,150	199,993,873
62-53-3 *	Aniline	65	285,954	11,228	1,095,429	0	181	1,204	1,393,996	67,266	1,461,262
90-04-0	o-Anisidine	7	1,461	76	0	0	0	0	1,537	4	1,541
104-94-9	p-Anisidine	1	0	0	0	0	0	0	0	0	0
120-12-7	Anthracene	69	94,661	311	0	0	4,739	1,447	101,158	108,190	209,348
7440-36-0	Antimony	126	6,628	14,415	0	0	1,067	26,045	48,155	279,569	327,724
--	Antimony compounds	548	87,141	27,293	12,212	0	211,763	1,008,326	1,346,735	4,152,534	5,499,269
7440-38-2	Arsenic	52	51,559	679	0	0	500	9,786	62,524	530,960	593,484
--	Arsenic compounds	339	148,359	3,454	76,170	0	16,422	5,739,544	5,983,949	1,369,579	7,353,528
1332-21-4 *	Asbestos (friable)	63	7,255	2	0	0	0	514,500	521,757	4,329,603	4,851,360
1912-24-9 *	Atrazine	20	35,119	2,242	418	0	0	388,928	426,707	166,947	593,654
7440-39-3	Barium	73	120,075	25,436	0	0	500	503,789	649,800	874,975	1,524,775
--	Barium compounds	645	458,369	940,587	152,000	0	2,568,999	6,622,808	10,742,763	9,680,554	20,423,317
22781-23-3 *	Bendiocarb	3	0	0	0	0	0	0	0	0	0
1861-40-1 *	Benfluralin	4	1,960	0	0	0	0	0	1,960	8,400	10,360
17804-35-2 *	Benomyl	3	0	0	0	0	0	0	0	0	0
98-87-3	Benzal chloride	3	1,030	1,500	0	0	0	0	2,530	0	2,530
71-43-2 *	Benzene	467	8,753,200	11,464	362,350	750	834	61,641	9,190,239	83,518	9,273,757
98-07-7	Benzoic trichloride	7	6,067	0	0	0	0	0	6,067	520	6,587
98-88-4	Benzoyl chloride	22	17,911	5	0	0	0	0	17,916	1,000	18,916
94-36-0 *	Benzoyl peroxide	58	1,590	250	0	0	0	1,186	3,026	5,794	8,820
100-44-7	Benzyl chloride	45	27,407	2,706	570	0	0	24	30,707	5,924	36,631
7440-41-7	Beryllium	13	816	27	0	0	580	55,543	56,966	5,741	62,707

Note: **On-site Releases** from Section 5 and **Off-site Releases** from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997

	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
71751-41-2 *	Abamectin	0	0	0	0	1,900	131	9	2,040	0
30560-19-1 *	Acephate	20	0	0	0	11,000	11,580	944	23,544	0
75-07-0 *	Acetaldehyde	332,000	33	9,848,731	56,699	15,532,164	1,192,757	13,449,700	40,412,084	10,453
60-35-5	Acetamide	0	0	64,008	145	1	194	1,863,448	1,927,796	0
75-05-8	Acetonitrile	13,116,437	2,215,038	23,490,849	6,631,333	12,681,271	7,690,047	22,804,584	88,629,559	6,264
98-86-2 *	Acetophenone	1,800	5,743	30,262,873	278,450	1,003,454	397,022	747,016	32,696,358	1,078
62476-59-9 *	Acifluorfen, sodium salt	0	0	0	0	310	3,554	570,691	574,555	0
107-02-8 *	Acrolein	0	0	3,772,684	33,413	5,288,092	23	142,204	9,236,416	93
79-06-1 *	Acrylamide	2,266	3	86,000	13,306	144,607	219,594	7,427,483	7,893,259	4,010
79-10-7	Acrylic acid	4,151,368	119,172	31,904,896	3,478,312	28,539,687	879,415	6,690,854	75,763,704	3,162
107-13-1 *	Acrylonitrile	12,690,465	58,092	5,300,722	198,012	10,143,286	1,170,267	5,329,623	34,890,467	1,602
15972-60-8 *	Alachlor	0	0	0	0	44,000	160,000	6,600	210,600	0
116-06-3 *	Aldicarb	0	0	0	0	502	28,107	382	28,991	0
28057-48-9	d-trans-Allethrin	0	0	0	0	0	0	0	0	0
107-18-6 *	Allyl alcohol	110,892	0	1,911,736	798,451	971,358	258,500	475,498	4,526,435	1
107-11-9	Allylamine	0	0	0	1,571	1,547	0	1,662	4,780	0
107-05-1	Allyl chloride	210,000	0	2,403,008	210,974	387,733	298,546	77,167	3,587,428	2,200
7429-90-5 *	Aluminum (fume or dust)	13,981,740	26,584,429	0	91,568	19,350,982	227,033	10,994,583	71,230,335	155
1344-28-1	Aluminum oxide (fibrous forms)	5,050,000	252,140	0	0	14,897	104,877	935,611	6,357,525	200
20859-73-8 *	Aluminum phosphide	0	0	0	0	0	0	0	0	0
834-12-8 *	Ametryn	25	0	0	0	38,200	16,000	1,744	55,969	0
60-09-3	4-Aminoazobenzene	0	0	0	0	0	76	6	82	0
92-67-1	4-Aminobiphenyl	0	0	0	0	100,000	190	0	100,190	0
7664-41-7 *	Ammonia	348,336,500	9,620,303	118,146,876	112,444	290,578,256	16,712,554	194,820,109	978,327,042	714,157
62-53-3 *	Aniline	7,119,031	0	7,637,850	629,784	3,641,784	2,188,848	1,418,107	22,635,404	5,959
90-04-0	o-Anisidine	0	0	1,315	0	3,867	6,925	1,541	13,648	0
104-94-9	p-Anisidine	0	0	0	0	0	0	0	0	0
120-12-7	Anthracene	229,292	7,563	380,721	106,516	294,868	2,989	210,086	1,232,035	1,938
7440-36-0	Antimony	3,873,483	876,978	25,969	49,316	328,072	28,355	320,843	5,503,016	6,339
--	Antimony compounds	5,026,069	3,914,498	3,300	11,028	938,412	605,157	4,386,271	14,884,735	11,987
7440-38-2	Arsenic	1,546,013	433,597	0	0	69,967	10,075	113,610	2,173,262	15,011
--	Arsenic compounds	3,806,840	812,279	0	355	69,323	1,103,163	5,048,300	10,840,260	1,870,274
1332-21-4 *	Asbestos (friable)	195,118	0	0	0	667,313	709,910	5,382,618	6,954,959	273,483
1912-24-9 *	Atrazine	250	0	0	0	342,091	126,897	806,780	1,276,018	250
7440-39-3	Barium	47,730	123,254	593,764	117,119	479,717	10,998	1,404,223	2,776,805	0
--	Barium compounds	30,421,974	1,998,629	142,000	216,995	7,507,910	1,763,375	14,260,037	56,310,920	2,240,371
22781-23-3 *	Bendiocarb	0	0	0	0	0	0	0	0	0
1861-40-1 *	Benfluralin	72,000	0	0	0	1,700	55	10,500	84,255	0
17804-35-2 *	Benomyl	0	0	0	0	374,000	4,002	0	378,002	0
98-87-3	Benzal chloride	0	0	0	130,000	51,100	1,100	2,461	184,661	0
71-43-2 *	Benzene	46,015,599	381,821	60,211,346	1,146,425	47,653,556	2,274,444	9,202,991	166,886,182	62,271
98-07-7	Benzoic trichloride	0	0	0	22,000	210,000	0	6,596	238,596	0
98-88-4	Benzoyl chloride	0	0	0	0	1,974,302	365,304	18,706	2,358,312	111
94-36-0 *	Benzoyl peroxide	22,502	0	0	1	62,392	42,704	8,677	136,276	0
100-44-7	Benzyl chloride	17,000	0	21,472	455,495	277,157	23,534	35,866	830,524	0
7440-41-7	Beryllium	110,428	120,381	0	0	0	14	61,323	292,146	0

Note: Data from Section 8 of Form R.

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Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases: Total Air Emissions	Surface Water Discharges	Underground Injection: Class I Wells	Underground Injection: Class II-V Wells	On-site Land Releases: RCRA Subtitle C Landfills	On-site Land Releases: Other On-site Land Releases	Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
--	Beryllium compounds	7	365	1	0	0	0	390	756	4,602	5,358
82657-04-3 *	Bifenthrin	4	6	0	0	0	0	0	6	0	6
92-52-4 *	Biphenyl	132	595,892	2,771	31,699	0	4,459	245	635,066	48,529	683,595
111-91-1	Bis(2-chloroethoxy) methane	1	1,702	0	4,015	0	1,400	0	7,117	0	7,117
111-44-4 *	Bis(2-chloroethyl) ether	13	1,515	5	0	0	0	0	1,520	0	1,520
542-88-1	Bis(chloromethyl) ether	2	7	0	0	0	0	0	7	0	7
108-60-1	Bis(2-chloro1-methylethyl) ether	2	3,860	0	0	0	0	3	3,863	0	3,863
56-35-9 *	Bis(tributyltin) oxide	2	0	7	0	0	0	50	57	2,280	2,337
10294-34-5	Boron trichloride	7	754	0	0	0	0	0	754	0	754
7637-07-2	Boron trifluoride	25	21,290	0	0	0	0	0	21,290	5	21,295
314-40-9 *	Bromacil	3	10	3,284	0	0	0	0	3,294	0	3,294
7726-95-6 *	Bromine	48	107,808	15	7	0	0	545	108,375	433,404	541,779
35691-65-7 *	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	2	0	0	0	0	0	0	0	0	0
353-59-3	Bromochlorodifluoro-methane (Halon 1211)	3	2,042	0	0	0	0	0	2,042	0	2,042
74-83-9 *	Bromomethane	47	1,876,553	14	244	0	0	6	1,876,817	0	1,876,817
75-63-8	Bromotrifluoromethane (Halon 1301)	6	27,405	0	0	0	0	0	27,405	0	27,405
1689-84-5 *	Bromoxynil	2	506	0	0	0	0	0	506	2,842	3,348
1689-99-2 *	Bromoxynil octanoate	5	1,386	0	0	0	0	0	1,386	17,990	19,376
357-57-3	Brucine	1	0	0	0	0	0	0	0	0	0
106-99-0	1,3-Butadiene	186	2,710,735	2,552	1,000	0	0	294	2,714,581	6,600	2,721,181
141-32-2	Butyl acrylate	158	232,375	7,242	0	0	0	805	240,422	21,150	261,572
71-36-3	n-Butyl alcohol	1,001	21,456,156	79,743	3,122,078	0	286	34,198	24,692,461	188,914	24,881,375
78-92-2 *	sec-Butyl alcohol	120	959,349	11,965	152,939	0	0	10	1,124,263	17,496	1,141,759
75-65-0 *	tert-Butyl alcohol	86	577,415	29,477	980,424	0	0	751	1,588,067	279,582	1,867,649
106-88-7	1,2-Butylene oxide	13	16,001	70	0	0	0	0	16,071	12	16,083
123-72-8 *	Butyraldehyde	33	346,922	362	29,000	0	0	1	376,285	233	376,518
7440-43-9	Cadmium	53	2,376	521	0	0	665	7,939	11,501	135,195	146,696
--	Cadmium compounds	95	64,212	1,934	52	0	49,460	938,635	1,054,293	1,350,236	2,404,529
156-62-7 *	Calcium cyanamide	4	105	0	0	0	0	0	105	0	105
133-06-2 *	Captan	12	6,316	5	5	0	0	0	6,326	391	6,717
63-25-2 *	Carbaryl	18	17,776	12	0	0	5,772	1,796	25,356	16,634	41,990
1563-66-2 *	Carbofuran	4	8,728	1	0	0	0	0	8,729	42	8,771
75-15-0 *	Carbon disulfide	92	50,984,954	28,651	517,565	0	0	5	51,531,175	32,503	51,563,678
56-23-5 *	Carbon tetrachloride	65	357,499	315	32,958	0	0	135	390,907	18,947	409,854
463-58-1	Carbonyl sulfide	77	21,081,227	0	0	0	0	0	21,081,227	0	21,081,227
5234-68-4 *	Carboxin	3	7	0	0	0	0	0	7	142	149
120-80-9	Catechol	135	6,673	22,660	0	0	6	1,824	31,163	337	31,500

Note: **On-site Releases** from Section 5 and **Off-site Releases** from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
--	Beryllium compounds	0	38,600	0	0	0	1,643	4,197	44,440	0
82657-04-3 *	Bifenthrin	0	0	0	0	0	46	6	52	0
92-52-4 *	Biphenyl	290,759	302,713	1,573,135	143,730	4,050,685	834,719	696,431	7,892,172	5,291
111-91-1	Bis(2-chloroethoxy) methane	0	0	0	0	0	0	6,887	6,887	0
111-44-4 *	Bis(2-chloroethyl) ether	0	185,170	468,431	91,738	430,386	243,182	1,061	1,419,968	0
542-88-1	Bis(chloromethyl) ether	0	0	0	0	6,500	0	7	6,507	0
108-60-1	Bis(2-chloro1-methylethyl) ether	13,000,000	0	0	0	11,685,200	0	3,900	24,689,100	1
56-35-9 *	Bis(tributyltin) oxide	0	36,426	0	0	167	180	2,337	39,110	0
10294-34-5	Boron trichloride	7,000	0	0	0	59,600	0	318	66,918	0
7637-07-2	Boron trifluoride	0	0	0	0	497,548	152	21,343	519,043	280
314-40-9 *	Bromacil	0	0	0	0	16,912	19,881	3,313	40,106	0
7726-95-6 *	Bromine	5,438,500	0	0	0	16,973,278	3,199,452	545,537	26,156,767	293
35691-65-7 *	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	0	0	0	0	12,000	7,871	0	19,871	0
353-59-3	Bromochlorodifluoro-methane (Halon 1211)	554,000	0	0	0	0	0	2,053	556,053	0
74-83-9 *	Bromomethane	23,310	0	273,200	280	967,441	0	1,856,305	3,120,536	13,155
75-63-8	Bromotrifluoromethane (Halon 1301)	410,000	0	0	0	0	0	27,410	437,410	316
1689-84-5 *	Bromoxynil	0	0	0	0	0	50	2,611	2,661	0
1689-99-2 *	Bromoxynil octanoate	0	0	0	0	0	167	19,596	19,763	0
357-57-3	Brucine	0	0	0	0	0	0	0	0	0
106-99-0	1,3-Butadiene	5,481,906	14,451,023	40,873,920	57,787	65,299,067	314,610	2,210,086	128,688,399	510,546
141-32-2	Butyl acrylate	110,060	165,089	9,499,188	608,286	3,403,674	91,101	258,068	14,135,466	130
71-36-3	n-Butyl alcohol	10,377,274	3,504,078	28,650,346	7,777,463	35,473,237	4,283,777	24,850,956	114,917,131	28,564
78-92-2 *	sec-Butyl alcohol	138,499	36,291	13,475,118	1,981,948	2,115,036	51,775	1,121,428	18,920,095	57
75-65-0 *	tert-Butyl alcohol	274,074	214,894	49,091,300	11,272,389	2,585,298	1,779,964	1,973,750	67,191,669	8,042
106-88-7	1,2-Butylene oxide	0	0	0	310,195	348,570	264	15,895	674,924	0
123-72-8 *	Butyraldehyde	0	1,200	2,864,034	224,224	2,102,870	297,449	376,908	5,866,685	1
7440-43-9	Cadmium	1,090,072	310,225	0	0	33,925	10,497	128,622	1,573,341	0
--	Cadmium compounds	7,937,874	1,255,346	0	1,501	6,647,787	44,755	2,233,696	18,120,959	66,080
156-62-7 *	Calcium cyanamide	0	8,365	0	0	0	0	101	8,466	0
133-06-2 *	Captan	3,580	0	0	0	9,700	540	6,099	19,919	0
63-25-2 *	Carbaryl	63,043	0	77,740	630	669,175	29,709	13,029	853,326	15,493
1563-66-2 *	Carbofuran	0	0	0	0	3	29,338	8,728	38,069	0
75-15-0 *	Carbon disulfide	24,187,118	442	10,044,054	385,297	27,944,668	271,540	50,848,980	113,682,099	29,778
56-23-5 *	Carbon tetrachloride	2,801,998	139,227	983,907	37,782	42,300,623	1,158,420	382,418	47,804,375	11,773
463-58-1	Carbonyl sulfide	0	0	2,286,198	0	16,734,387	25	21,206,950	40,227,560	0
5234-68-4 *	Carboxin	1,017	0	0	0	0	360	149	1,526	0
120-80-9	Catechol	0	10,813	10,008,900	96,059	4,046,473	61,960	35,836	14,260,041	660

Note: Data from Section 8 of Form R.

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Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
115-28-6	Chlorendic acid	2	49	0	0	0	0	0	49	0	49
90982-32-4 *	Chlorimuron ethyl	2	8	0	0	0	0	0	8	0	8
7782-50-5 *	Chlorine	1,257	64,419,432	301,119	60,595	0	0	73,776	64,854,922	46,946	64,901,868
10049-04-4 *	Chlorine dioxide	126	1,311,372	58	0	0	0	0	1,311,430	0	1,311,430
79-11-8 *	Chloroacetic acid	30	6,125	8	0	0	0	19,746	25,879	500	26,379
4080-31-3 *	1-(3-Chloroallyl)-3,5,7-triaza-1-azonia adamantane chloride	14	549	21	0	0	0	672	1,242	4,804	6,046
106-47-8 *	p-Chloroaniline	4	15,332	869	0	0	0	5	16,206	0	16,206
108-90-7 *	Chlorobenzene	76	962,904	1,217	113,901	0	0	1,550	1,079,572	105,300	1,184,872
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	27	5,964,553	193	0	0	0	0	5,964,746	14,550	5,979,296
75-45-6 *	Chlorodifluoromethane (HCFC-22)	231	8,929,443	3,650	0	0	0	1	8,933,094	73,609	9,006,703
75-00-3	Chloroethane	57	2,532,822	905	0	0	0	0	2,533,727	5,128	2,538,855
67-66-3 *	Chloroform	144	7,205,396	164,654	26,954	0	106	7,418	7,404,528	14,498	7,419,026
74-87-3 *	Chloromethane	98	3,259,431	1,608	186,931	0	0	59	3,448,029	205	3,448,234
107-30-2	Chloromethyl methyl ether	3	4,155	5	0	0	0	0	4,160	54	4,214
563-47-3	3-Chloro-2-methyl-1-propene	3	25,982	0	0	0	0	0	25,982	0	25,982
--	Chlorophenols	6	4,779	16	92,980	0	0	0	97,775	839	98,614
76-06-2 *	Chloropicrin	16	10,147	0	0	0	0	0	10,147	10,700	20,847
126-99-8	Chloroprene	11	996,060	0	94,000	0	0	0	1,090,060	0	1,090,060
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	3	549,113	0	0	0	0	0	549,113	0	549,113
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	20	865,860	5	0	0	0	0	865,865	0	865,865
1897-45-6 *	Chlorothalonil	19	7,914	83	0	0	0	0	7,997	171,838	179,835
75-88-7	2-Chloro-1,1,1-trifluoro ethane (HCFC-133a)	4	23,310	60	0	0	0	0	23,370	80	23,450
75-72-9	Chlorotrifluoromethane (CFC-13)	1	16,900	5	0	0	0	0	16,905	0	16,905
5598-13-0 *	Chlorpyrifos methyl	4	1,000	0	0	0	0	0	1,000	0	1,000
64902-72-3 *	Chlorsulfuron	1	1	0	0	0	0	0	1	0	1
7440-47-3	Chromium	1,845	572,772	11,805	1	0	27,208	426,448	1,038,234	5,962,093	7,000,327
--	Chromium compounds	1,460	387,028	99,497	1,131,559	0	576,612	28,749,821	30,944,517	19,465,080	50,409,597
6459-94-5	C.I. Acid Red 114	2	0	0	0	0	0	0	0	0	0
569-64-2 *	C.I. Basic Green 4	3	15	0	0	0	0	0	15	750	765
989-38-8	C.I. Basic Red 1	1	0	0	0	0	0	0	0	0	0
28407-37-6	C.I. Direct Blue 218	6	10	10	0	0	0	0	20	2,489	2,509
2832-40-8	C.I. Disperse Yellow 3	4	338	29	0	0	0	0	367	593	960
81-88-9	C.I. Food Red 15	2	0	0	0	0	0	0	0	0	0
97-56-3	C.I. Solvent Yellow 3	1	0	0	0	0	0	0	0	0	0

Note: **On-site Releases** from Section 5 and **Off-site Releases** from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
115-28-6	Chlorendic acid	0	0	0	0	0	914	49	963	0
90982-32-4 *	Chlorimuron ethyl	0	0	0	0	0	16,223	8	16,231	0
7782-50-5 *	Chlorine	79,099,777	111,317	0	2,161	229,962,293	1,106,905	64,957,305	375,239,758	40,564
10049-04-4 *	Chlorine dioxide	3,868,805	0	0	0	52,622,530	6,000	1,333,906	57,831,241	2,095
79-11-8 *	Chloroacetic acid	37,000	0	0	0	1,290,589	20,014	6,421	1,354,024	700
4080-31-3 *	1-(3-Chloroallyl)-3,5,7-triaza-1-azonia adamantane chloride	31,708	0	0	0	2,404	15,666	7,105	56,883	0
106-47-8 *	p-Chloroaniline	0	0	46,000	400	0	5,815	16,898	69,113	0
108-90-7 *	Chlorobenzene	5,571,993	1,492,007	6,799,180	1,359,228	10,248,621	3,422,433	1,118,897	30,012,359	3,374
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	0	25,169	0	5,000	272,446	97,136	5,986,413	6,386,164	30,300
75-45-6 *	Chlorodifluoromethane (HCFC-22)	1,787,283	201,044	0	250	469,293	324,199	8,930,366	11,712,435	155,681
75-00-3	Chloroethane	3,923,357	165,400	8,196,910	41,817	31,313,445	576,354	2,536,920	46,754,203	1,888
67-66-3 *	Chloroform	5,675,765	735,446	5,823,214	314,634	16,142,192	1,548,310	7,389,584	37,629,145	17,372
74-87-3 *	Chloromethane	3,181,750	4,750	3,252,115	8,489	6,038,027	318,569	3,357,148	16,160,848	25,468
107-30-2	Chloromethyl methyl ether	0	0	0	0	12,823	0	4,227	17,050	0
563-47-3	3-Chloro-2-methyl-1-propene	0	0	0	0	625,186	14,191	25,983	665,360	0
--	Chlorophenols	2,897,377	0	0	100	237,504	5,540	97,871	3,238,392	749
76-06-2 *	Chloropicrin	2,210	0	0	0	343	1,469	20,781	24,803	14
126-99-8	Chloroprene	0	374,960	1,226,280	2,599	8,601,500	431,665	1,089,960	11,726,964	30
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	0	0	0	0	37,725	0	548,521	586,246	0
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	0	267,438	0	0	34,892	20,753	868,043	1,191,126	0
1897-45-6 *	Chlorothalonil	2,445	0	0	0	18,720	144,424	180,811	346,400	180
75-88-7	2-Chloro-1,1,1-trifluoro ethane (HCFC-133a)	0	0	0	0	8,700	17,158	23,700	49,558	8
75-72-9	Chlorotrifluoromethane (CFC-13)	0	0	0	0	0	0	16,910	16,910	0
5598-13-0 *	Chlorpyrifos methyl	2,000	0	0	0	0	2,233	1,000	5,233	0
64902-72-3 *	Chlorsulfuron	0	0	0	0	0	7,173	1	7,174	0
7440-47-3	Chromium	26,785,710	98,912,248	70,198	310	293,650	850,114	6,903,128	133,815,358	184,283
--	Chromium compounds	30,112,660	33,983,201	74,023	61,643	1,391,548	5,461,721	43,054,737	114,139,533	1,155,182
6459-94-5	C.I. Acid Red 114	0	0	0	0	0	0	0	0	0
569-64-2 *	C.I. Basic Green 4	0	0	0	0	0	998	20	1,018	0
989-38-8	C.I. Basic Red 1	0	0	0	0	0	0	0	0	0
28407-37-6	C.I. Direct Blue 218	2	0	0	0	374	1,531	3,688	5,595	0
2832-40-8	C.I. Disperse Yellow 3	0	0	0	0	0	3,664	960	4,624	0
81-88-9	C.I. Food Red 15	0	0	0	0	0	0	0	0	0
97-56-3	C.I. Solvent Yellow 3	0	0	0	0	0	0	0	0	0

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
7440-48-4	Cobalt	260	34,954	2,164	40	0	0	8,994	46,152	685,258	731,410
--	Cobalt compounds	260	31,406	34,650	44,624	0	33,197	597,857	741,734	557,124	1,298,858
7440-50-8 *	Copper	2,712	892,348	40,457	57,513	0	216,878	1,555,708	2,762,904	18,378,475	21,141,379
--	Copper compounds	1,488	5,488,173	105,892	237,184	0	942,977	37,225,254	43,999,480	10,770,350	54,769,830
8001-58-9 *	Creosote	77	1,288,999	8,452	0	0	26,055	1,875	1,325,381	2,301,965	3,627,346
120-71-8	p-Cresidine	4	3,027	0	0	0	0	0	3,027	2,100	5,127
108-39-4 *	m-Cresol	24	54,374	139	430,000	0	0	0	484,513	2,694	487,207
95-48-7	o-Cresol	24	10,091	40	260,000	0	0	0	270,131	16,440	286,571
106-44-5	p-Cresol	28	51,348	51	263,000	0	110	0	314,509	78,311	392,820
1319-77-3 *	Cresol (mixed isomers)	143	1,669,098	7,693	1,233,058	0	52	2,664	2,912,565	16,381	2,928,946
4170-30-3 *	Crotonaldehyde	7	35,145	1,200	1,400	0	0	0	37,745	0	37,745
98-82-8	Cumene	241	1,474,589	1,343	859	0	3	8,242	1,485,036	18,491	1,503,527
80-15-9	Cumene hydroperoxide	45	71,106	88	300,000	0	0	7,200	378,394	11,251	389,645
135-20-6	Cupferron	1	0	0	0	0	0	0	0	0	0
21725-46-2 *	Cyanazine	5	1,915	415	0	0	0	0	2,330	4,186	6,516
--	Cyanide compounds	228	638,507	65,394	3,752,094	0	1,372	101,819	4,559,186	98,604	4,657,790
1134-23-2 *	Cycloate	3	82	671	71	0	0	0	824	158	982
110-82-7 *	Cyclohexane	371	6,500,730	80,765	322,903	0	18	17,642	6,922,058	51,600	6,973,658
108-93-0 *	Cyclohexanol	27	179,623	420	3,616,560	0	0	12	3,796,615	810	3,797,425
68359-37-5 *	Cyfluthrin	2	0	0	0	0	0	0	0	0	0
94-75-7 *	2,4-D (acetic acid)	19	4,991	59	250	0	250	5	5,555	6,616	12,171
533-74-4 *	Dazomet	16	0	0	0	0	0	0	0	1,850	1,850
53404-60-7 *	Dazomet, sodium salt	2	0	0	0	0	0	0	0	250	250
94-82-6 *	2,4-DB	2	72	0	0	0	0	0	72	0	72
1929-73-3 *	2,4-D butoxyethyl ester	3	500	0	0	0	0	0	500	0	500
94-80-4 *	2,4-D butyl ester	3	1	0	0	0	0	0	1	0	1
1163-19-5	Decabromodiphenyl oxide	135	28,068	2,494	0	0	500	868,794	899,856	707,431	1,607,287
13684-56-5 *	Desmedipham	1	83	0	0	0	0	0	83	0	83
1928-43-4 *	2,4-D 2-Ethylhexyl ester	11	5,606	0	0	0	0	0	5,606	2,036	7,642
101-80-4	4,4'-Diaminodiphenyl ether	3	24	360	0	0	0	0	384	58	442
95-80-7	2,4-Diaminotoluene	3	1,958	0	0	0	0	0	1,958	0	1,958
25376-45-8	Diaminotoluene (mixed isomers)	13	11,454	556	27,000	0	0	8	39,018	284,524	323,542
333-41-5 *	Diazinon	27	13,824	15	0	0	0	0	13,839	1,862	15,701
132-64-9	Dibenzofuran	36	34,770	15	0	0	0	280	35,065	54,220	89,285
106-93-4 *	1,2-Dibromoethane	13	9,707	4	10	0	0	1	9,722	5,116	14,838
124-73-2	Dibromotetrafluoroethane (Halon 2402)	1	10	0	0	0	0	0	10	0	10
84-74-2 *	Dibutyl phthalate	108	39,485	151	160,000	0	91	1,176	200,903	21,072	221,975
1918-00-9 *	Dicamba	7	1,041	26	65,535	0	0	0	66,602	2,180	68,782
99-30-9 *	Dichloran	2	0	0	0	0	0	0	0	0	0
95-50-1 *	1,2-Dichlorobenzene	30	158,412	2,039	5,600	0	704	90	166,845	20,461	187,306
541-73-1	1,3-Dichlorobenzene	7	3,495	818	0	0	0	0	4,313	1	4,314
106-46-7 *	1,4-Dichlorobenzene	23	262,266	1,728	2,000	0	0	1,960	267,954	289	268,243
25321-22-6	Dichlorobenzene (mixed isomers)	7	15,274	0	0	0	0	0	15,274	9	15,283
91-94-1	3,3'-Dichlorobenzidine	1	255	0	0	0	0	0	255	7,400	7,655

Note: **On-site Releases** from Section 5 and **Off-site Releases** from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
7440-48-4	Cobalt	4,423,572	7,919,086	0	0	147,031	24,592	277,126	12,791,407	3
--	Cobalt compounds	503,731	1,972,586	0	6,773	1,209,764	57,859	1,304,459	5,055,172	1,404
7440-50-8 *	Copper	603,925,697	783,470,245	225,424	3,551,787	41,296,581	2,006,069	9,658,847	1,444,134,650	368,800
--	Copper compounds	310,075,700	167,470,119	0	25,643	42,125,835	4,452,985	57,625,028	581,775,310	3,073,536
8001-58-9 *	Creosote	66,432,245	1,700,000	702,717	67,254	865,430,718	362,602	2,606,664	937,302,200	497,301
120-71-8	p-Cresidine	0	0	0	0	0	32,491	5,127	37,618	0
108-39-4 *	m-Cresol	1,740,898	930,000	757,870	16,492	553,372	28,850	491,702	4,519,184	6
95-48-7	o-Cresol	89,071	0	347,145	1,632	234,441	34,727	424,417	1,131,433	5
106-44-5	p-Cresol	91,290	780,000	179,023	102,147	1,272,477	78,718	395,224	2,898,879	103
1319-77-3 *	Cresol (mixed isomers)	339,319	464,967	4,539,730	397,074	9,992,872	275,741	2,888,535	18,898,238	4
4170-30-3 *	Crotonaldehyde	0	0	2,317,000	0	501,900	16	37,545	2,856,461	0
98-82-8	Cumene	17,810,313	104,904	7,920,812	535,057	7,630,812	161,103	1,643,207	35,806,208	8,397
80-15-9	Cumene hydroperoxide	0	0	0	0	513,396	175,021	387,526	1,075,943	1,600
135-20-6	Cupferron	0	0	2,595	0	0	0	0	2,595	0
21725-46-2 *	Cyanazine	0	0	0	10,400	39,000	19,755	6,516	75,671	20,000
--	Cyanide compounds	433,269	51,565	7,191,619	2,442	14,844,831	672,091	4,587,333	27,783,150	4,199
1134-23-2 *	Cycloate	0	0	0	0	64	2,007	980	3,051	0
110-82-7 *	Cyclohexane	55,645,913	131,524	14,303,721	4,463,196	31,267,815	4,105,909	6,774,856	116,692,934	117,376
108-93-0 *	Cyclohexanol	0	19,759	2,020,445	145,035	272,856	100,776	3,843,305	6,402,176	0
68359-37-5 *	Cyfluthrin	0	0	0	0	0	0	0	0	0
94-75-7 *	2,4-D (acetic acid)	98,184	0	0	0	29,710	46,125	11,467	185,486	191
533-74-4 *	Dazomet	0	0	0	0	11,400	621	2,200	14,221	0
53404-60-7 *	Dazomet, sodium salt	0	0	0	0	90	12,072	100	12,262	0
94-82-6 *	2,4-DB	35	0	0	0	0	23	73	131	0
1929-73-3 *	2,4-D butoxyethyl ester	0	0	0	0	0	0	349	349	0
94-80-4 *	2,4-D butyl ester	0	0	92,200	34	9,362	2	1	101,599	0
1163-19-5	Decabromodiphenyl oxide	289,049	57,236	646	6,602	50,690	370,462	1,646,812	2,421,497	0
13684-56-5 *	Desmedipham	0	0	0	0	0	379	83	462	0
1928-43-4 *	2,4-D 2-Ethylhexyl ester	3,982	0	0	0	0	11,151	7,540	22,673	0
101-80-4	4,4'-Diaminodiphenyl ether	0	0	0	0	150	6,272	379	6,801	0
95-80-7	2,4-Diaminotoluene	0	0	0	0	74,135	275	1,747	76,157	0
25376-45-8	Diaminotoluene (mixed isomers)	0	0	2,871,215	2,891,505	534,411	779,888	47,547	7,124,566	280,003
333-41-5 *	Diazinon	50,419	0	0	0	26,183	33,074	16,258	125,934	0
132-64-9	Dibenzofuran	128,988	960	240,210	16,170	27,823	335	102,426	516,912	6
106-93-4 *	1,2-Dibromoethane	0	0	0	30,740	11,862	645	9,611	52,858	0
124-73-2	Dibromotetrafluoroethane (Halon 2402)	93,800	0	0	0	0	0	10	93,810	0
84-74-2 *	Dibutyl phthalate	32,125	18,084	468,416	205,442	132,864	60,660	249,098	1,166,689	58
1918-00-9 *	Dicamba	0	0	0	0	61	58,850	68,501	127,412	0
99-30-9 *	Dichloran	0	0	0	0	0	0	0	0	0
95-50-1 *	1,2-Dichlorobenzene	39,382,322	2,259,567	1,546,421	787,537	445,251	2,074,144	193,212	46,688,454	4,376
541-73-1	1,3-Dichlorobenzene	2,994	1,180	91,900	31	13	2,473	5,361	103,952	1
106-46-7 *	1,4-Dichlorobenzene	2,638,810	0	133,690	2,073	1,793	197,383	340,436	3,314,185	38
25321-22-6	Dichlorobenzene (mixed isomers)	0	0	293,565	745	230,056	10,523	15,282	550,171	0
91-94-1	3,3'-Dichlorobenzidine	0	0	0	0	7,400	74,000	7,300	88,700	0

Note: Data from Section 8 of Form R.

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Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	17	0	0	0	0	0	0	0	0	0
64969-34-2	3,3'-Dichlorobenzidine sulfate	1	0	0	0	0	0	0	0	0	0
75-27-4	Dichlorobromomethane	1	2,400	0	0	0	0	100	2,500	0	2,500
764-41-0	1,4-Dichloro-2-butene	2	2,650	0	1,800	0	0	0	4,450	0	4,450
1649-08-7	1,2-Dichloro-1,1-difluoro-ethane (HCFC-132b)	1	1,400	60	0	0	0	0	1,460	170	1,630
75-71-8 *	Dichlorodifluoromethane (CFC-12)	61	810,736	43	5,766	0	0	0	816,545	550	817,095
107-06-2 *	1,2-Dichloroethane	78	916,764	1,826	4,549	0	0	27	923,166	120,476	1,043,642
540-59-0	1,2-Dichloroethylene	10	7,772	17	0	0	0	0	7,789	0	7,789
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	234	7,473,102	239	0	0	0	4,970	7,478,311	320,848	7,799,159
75-43-4	Dichlorofluoromethane (HCFC-21)	2	131,260	0	0	0	0	0 0	131,260	8,440	139,700
75-09-2 *	Dichloromethane	804	47,665,155	9,492	528,026	0	259	10,921	48,213,853	226,085	48,439,938
507-55-1	1,3-Dichloro-1,1,2,2,3-penta-fluoropropane (HCFC-225cb)	3	34,811	0	0	0	0	0	34,811	0	34,811
422-56-0	3,3-Dichloro-1,1,1,2,2-penta-fluoropropane (HCFC-225ca)	3	28,251	0	0	0	0	0	28,251	0	28,251
120-83-2	2,4-Dichlorophenol	5	3,296	134	16,020	0	0	0	19,450	0	19,450
78-87-5 *	1,2-Dichloropropane	14	378,454	2,609	0	0	0	30	381,093	12,368	393,461
10061-02-6	trans-1,3-Dichloropropene	3	468	0	0	0	0	0	468	3	471
78-88-6 *	2,3-Dichloropropene	4	914	0	0	0	0	0	914	0	914
542-75-6 *	1,3-Dichloropropylene	11	8,821	67	0	0	0	0	8,888	0	8,888
76-14-2 *	Dichlorotetrafluoroethane (CFC-114)	15	878,128	5	0	0	0	0	878,133	9	878,142
34077-87-7	Dichlorotrifluoroethane	1	1,000	0	0	0	0	0	1,000	0	1,000
354-23-4	1,2-Dichloro-1,1,2-trifluoro-ethane (HCFC-123a)	1	65,575	5	0	0	0	0	65,580	0	65,580
306-83-2	2,2-Dichloro-1,1,1-trifluoro-ethane (HCFC-123)	13	180,046	58	0	0	0	0	180,104	69	180,173
62-73-7 *	Dichlorvos	4	505	5	0	0	0	0	510	0	510
115-32-2 *	Dicofol	6	510	0	0	0	0	0	510	629	1,139
77-73-6	Dicyclopentadiene	80	355,102	19,866	0	0	698	9	375,675	9,410	385,085
111-42-2	Diethanolamine	336	380,549	150,696	11,642	0	0	69,266	612,153	264,071	876,224
117-81-7 *	Di-(2-ethylhexyl) phthalate	298	235,501	583	0	0	66	70,943	307,093	995,038	1,302,131
64-67-5	Diethyl sulfate	36	7,419	0	0	0	0	0	7,419	0	7,419
35367-38-5 *	Diflubenzuron	1	0	0	0	0	0	0	0	0	0
101-90-6	Diglycidyl resorcinol ether	3	20	0	0	0	0	0	20	0	20
94-58-6	Dihydrosafrole	3	505	0	0	0	0	0	505	0	505
–	Diisocyanates	1,220	457,214	260	0	0	16	95,482	552,972	892,666	1,445,638

Note: On-site Releases from Section 5 and Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0	0	0	0	12,378	38,000	0	50,378	0
64969-34-2	3,3'-Dichlorobenzidine sulfate	0	0	0	0	750	3,800	0	4,550	0
75-27-4	Dichlorobromomethane	0	0	0	0	0	0	2,500	2,500	0
764-41-0	1,4-Dichloro-2-butene	1,800,000	0	0	0	3,300,000	300,000	4,450	5,404,450	0
1649-08-7	1,2-Dichloro-1,1-difluoro-ethane (HCFC-132b)	0	0	0	0	107,000	72,000	1,600	180,600	0
75-71-8 *	Dichlorodifluoromethane (CFC-12)	211,228	154,956	0	90	13,617	40,079	817,009	1,236,979	86,550
107-06-2 *	1,2-Dichloroethane	50,816,240	17,461,011	47,830,815	420,603	53,835,059	1,741,248	902,553	173,007,529	27,434
540-59-0	1,2-Dichloroethylene	1,520,000	331,902	1,020,000	0	2,904,290	1,384	7,716	5,785,292	115
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	246,249	131,231	0	840,910	446,481	700,282	7,423,438	9,788,591	1,736
75-43-4	Dichlorofluoromethane (HCFC-21)	0	0	0	0	0	200	141,560	141,760	0
75-09-2 *	Dichloromethane	115,695,827	11,621,741	8,620,172	3,659,871	20,671,899	13,076,828	48,751,274	222,097,612	70,356
507-55-1	1,3-Dichloro-1,1,2,2,3-penta-fluoropropane (HCFC-225cb)	3,600	3,490	0	0	0	1,200	34,811	43,101	0
422-56-0	3,3-Dichloro-1,1,1,2,2-penta-fluoropropane (HCFC-225ca)	2,900	2,850	0	0	0	1,000	28,251	35,001	0
120-83-2	2,4-Dichlorophenol	1,450	0	3	0	315,825	0	19,445	336,723	0
78-87-5 *	1,2-Dichloropropane	38,220,000	3,300	22,160,926	13,021	7,776,117	90,189	390,794	68,654,347	53
10061-02-6	trans-1,3-Dichloropropene	11,000	160	12,144,000	124	6,590	500	465	12,162,839	0
78-88-6 *	2,3-Dichloropropene	9,200,000	0	2,500,000	2,200	280,000	1,500,000	910	13,483,110	20
542-75-6 *	1,3-Dichloropropylene	9,445,000	240	14,000,000	4,320	2,229,589	42,522	8,787	25,730,458	48
76-14-2 *	Dichlorotetrafluoroethane (CFC-114)	89,000	53,493	0	0	1,419,246	194,248	877,909	2,633,896	0
34077-87-7	Dichlorotrifluoroethane	0	0	0	0	716,000	0	968	716,968	0
354-23-4	1,2-Dichloro-1,1,2-trifluoro-ethane (HCFC-123a)	0	0	0	0	0	0	60,585	60,585	5,000
306-83-2	2,2-Dichloro-1,1,1-trifluoro-ethane (HCFC-123)	225,000	0	0	0	194,831	400	179,611	599,842	0
62-73-7 *	Dichlorvos	0	0	0	0	10	50	1,306	1,366	0
115-32-2 *	Dicofol	0	0	0	0	0	928	841	1,769	0
77-73-6	Dicyclopentadiene	494,995	44,544	1,361,269	1,260,622	720,935	92,963	381,775	4,357,103	609
111-42-2	Diethanolamine	13,443	259,960	94,815	25,938	2,211,021	1,829,165	735,408	5,169,750	30,847
117-81-7 *	Di-(2-ethylhexyl) phthalate	2,840,681	1,699,965	1,298,057	311,076	238,989	257,221	1,120,306	7,766,295	5,272
64-67-5	Diethyl sulfate	0	0	0	3,699,098	2,673	394	4,775	3,706,940	118
35367-38-5 *	Diflubenzuron	0	0	0	0	0	40	0	40	0
101-90-6	Diglycidyl resorcinol ether	0	0	0	800	0	0	15	815	0
94-58-6	Dihydrosafrole	0	0	0	0	0	53	100	153	0
--	Diisocyanates	1,558,751	542,822	435,039	701,574	905,529	1,508,455	1,045,303	6,697,473	18,698

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
55290-64-7 *	Dimethipin	1	0	0	0	0	0	0	0	0	0
60-51-5 *	Dimethoate	4	71	0	0	0	0	0	71	0	71
119-90-4	3,3'-Dimethoxybenzidine	1	0	0	0	0	0	0	0	0	0
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	7	0	0	0	0	0	0	0	0	0
124-40-3	Dimethylamine	71	467,039	46,242	18,250	0	0	4,135	535,666	15,016	550,682
2300-66-5 *	Dimethylamine dicamba	3	140	0	0	0	0	0	140	0	140
121-69-7	N,N-Dimethylaniline	21	39,009	1,385	0	0	0	0	40,394	0	40,394
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	1	0	0	0	0	0	0	0	0	0
79-44-7	Dimethylcarbamyl chloride	1	118	0	0	0	0	0	118	0	118
2524-03-0	Dimethyl chlorothiophosphate	3	69	0	6,952	0	0	0	7,021	0	7,021
68-12-2 *	N,N-Dimethylformamide	163	1,345,965	45,694	730,005	0	750	282	2,122,696	292,012	2,414,708
57-14-7 *	1,1-Dimethyl hydrazine	4	902	0	0	0	0	0	902	437	1,339
105-67-9 *	2,4-Dimethylphenol	25	51,895	20	170,000	0	0	0	221,915	1,863	223,778
131-11-3 *	Dimethyl phthalate	97	175,524	636	4,450	0	0	692	181,302	6,389	187,691
77-78-1	Dimethyl sulfate	37	4,499	0	0	0	0	0	4,499	2,308	6,807
99-65-0	m-Dinitrobenzene	1	421	81,587	0	0	451	0	82,459	0	82,459
528-29-0	o-Dinitrobenzene	2	54	1,044	0	0	58	0	1,156	0	1,156
100-25-4	p-Dinitrobenzene	1	14	29	0	0	16	0	59	0	59
88-85-7 *	Dinitrobutyl phenol	5	1,110	23	0	0	0	0	1,133	7,388	8,521
534-52-1 *	4,6-Dinitro-o-cresol	7	101	0	0	0	0	0	101	115,801	115,902
51-28-5 *	2,4-Dinitrophenol	7	422	51,069	0	0	21	0	51,512	0	51,512
121-14-2	2,4-Dinitrotoluene	4	1,801	90	0	0	0	0	1,891	0	1,891
606-20-2	2,6-Dinitrotoluene	1	438	24	0	0	0	0	462	0	462
25321-14-6	Dinitrotoluene (mixed isomers)	6	11,551	63	56,000	0	0	0	67,614	46,491	114,105
123-91-1	1,4-Dioxane	44	141,262	196,272	0	0	0	4,609	342,143	305,787	647,930
122-39-4 *	Diphenylamine	31	69,246	66	17,855	0	0	250	87,417	23,487	110,904
2164-07-0 *	Dipotassium endothall	1	0	0	0	0	0	0	0	0	0
138-93-2 *	Disodium cyanodithioimido-carbonate	5	0	0	0	0	0	0	0	0	0
330-54-1 *	Diuron	10	2,060	257	0	0	0	0	2,317	2,637	4,954
120-36-5 *	2,4-DP	3	257	0	0	0	0	0	257	0	257
2702-72-9 *	2,4-D sodium salt	1	0	0	0	0	0	0	0	0	0
106-89-8 *	Epichlorohydrin	77	314,249	9,304	0	0	1	9,509	333,063	4,016	337,079
13194-48-4 *	Ethoprop	6	26	0	0	0	0	132,926	132,952	0	132,952
110-80-5	2-Ethoxyethanol	25	130,062	1	0	0	33	0	130,096	500	130,596
140-88-5	Ethyl acrylate	94	183,121	159	0	0	0	513	183,793	4,821	188,614
100-41-4	Ethylbenzene	1,005	8,730,416	5,739	559,425	255	43	151,926	9,447,804	71,872	9,519,676
541-41-3	Ethyl chloroformate	4	4,017	5	0	0	0	5	4,027	0	4,027
759-94-4 *	Ethyl dipropylthiocarbamate	4	2,208	113	9,501	0	0	0	11,822	2,778	14,600
74-85-1 *	Ethylene	305	30,269,807	927	2,632	0	0	110	30,273,476	1,459	30,274,935
--	Ethylenebisdithiocarbamic acid, salts and esters	6	571	0	0	0	0	0	571	600	1,171

Note: On-site Releases from Section 5 and **Off-site Releases** from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
55290-64-7 *	Dimethipin	0	0	0	0	0	0	0	0	0
60-51-5 *	Dimethoate	243	0	0	0	0	598	912	1,753	0
119-90-4	3,3'-Dimethoxybenzidine	0	0	0	0	0	0	0	0	0
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	0	0	0	0	10	0	0	10	0
124-40-3	Dimethylamine	503,203	0	126,268	1,648	2,676,460	417,279	541,113	4,265,971	8,675
2300-66-5 *	Dimethylamine dicamba	0	0	0	0	0	0	140	140	0
121-69-7	N,N-Dimethylaniline	46,000	0	0	748,779	9,273	217,456	39,824	1,061,332	0
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	0	0	0	0	0	0	0	0	0
79-44-7	Dimethylcarbamyl chloride	0	0	0	0	25,445	0	118	25,563	0
2524-03-0	Dimethyl chlorothiophosphate	0	0	0	0	0	4,806	7,021	11,827	0
68-12-2 *	N,N-Dimethylformamide	7,815,007	268,701	11,766,149	5,590,193	14,497,941	4,913,049	3,176,537	48,027,577	2,555
57-14-7 *	1,1-Dimethyl hydrazine	0	2	0	1,900	2,314	796	905	5,917	0
105-67-9 *	2,4-Dimethylphenol	23,760	67,958	1,319,661	59,659	633,730	21,718	223,980	2,350,466	2
131-11-3 *	Dimethyl phthalate	0	13,624	604,012	27,507	834,023	89,534	179,099	1,747,799	0
77-78-1	Dimethyl sulfate	0	54,525	62,628	0	10,457	2,323	4,223	134,156	0
99-65-0	m-Dinitrobenzene	0	0	0	0	734,287	11,352	82,459	828,098	0
528-29-0	o-Dinitrobenzene	0	0	0	0	103,312	1,452	1,156	105,920	0
100-25-4	p-Dinitrobenzene	0	0	0	0	28,432	396	59	28,887	0
88-85-7 *	Dinitrobutyl phenol	0	0	590,492	0	71,830	1,700	8,232	672,254	0
534-52-1 *	4,6-Dinitro-o-cresol	0	0	1,347,500	1,800	28,000	11,413	116,467	1,505,180	0
51-28-5 *	2,4-Dinitrophenol	0	0	674,605	69,679	1,923,457	1	51,522	2,719,264	0
121-14-2	2,4-Dinitrotoluene	0	1,500	50,182	5,363	35,419	1,500	1,883	95,847	0
606-20-2	2,6-Dinitrotoluene	0	0	477	0	17,119	110	462	18,168	0
25321-14-6	Dinitrotoluene (mixed isomers)	0	0	0	2	213,007	501,414	68,691	783,114	75,831
123-91-1	1,4-Dioxane	620,000	4	1,269,899	927,524	1,292,021	117,066	725,779	4,952,293	11
122-39-4 *	Diphenylamine	2,000,000	619	4,868,832	655,045	52,359	58,800	111,594	7,747,249	1
2164-07-0 *	Dipotassium endothall	0	0	0	0	0	0	0	0	0
138-93-2 *	Disodium cyanodithioimido-carbonate	0	0	0	0	0	0	0	0	0
330-54-1 *	Diuron	250	0	0	0	0	1,032	4,564	5,846	0
120-36-5 *	2,4-DP	3,000	0	0	0	0	11	9	3,020	192
2702-72-9 *	2,4-D sodium salt	0	0	0	0	18,993	0	0	18,993	0
106-89-8 *	Epichlorohydrin	20,870,748	17,715	5,878,951	83,883	6,048,675	1,329,239	317,147	34,546,358	3,583
13194-48-4 *	Ethoprop	0	0	0	0	0	3,820	132,953	136,773	0
110-80-5	2-Ethoxyethanol	1,500	551	697,714	72,295	774,979	151,641	169,665	1,868,345	13,237
140-88-5	Ethyl acrylate	390,000	40,206	16,473,174	832,383	329,187	160,956	184,447	18,410,353	285
100-41-4	Ethylbenzene	30,036,542	6,986,553	35,462,089	11,283,948	14,600,710	1,805,729	9,470,382	109,645,953	29,727
541-41-3	Ethyl chloroformate	0	0	0	0	2,970	0	3,890	6,860	0
759-94-4 *	Ethyl dipropylthiocarbamate	0	0	0	0	4,184	50,685	14,041	68,910	323
74-85-1 *	Ethylene[a]	115,302,995	14,410	1,151,632,258	14,141,146	496,425,339	1,798,509	29,264,637	1,808,579,294	602,721
--	Ethylenebisdithiocarbamic acid, salts and esters	0	0	0	0	0	2,995	1,289	4,284	0

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

[a]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene in 1997. The facility has since revised this quantity to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. For ethylene, on-site energy recovery changes to 548,802,258 pounds and total production-related waste managed changes to 1,205,749,294 pounds.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases: Total Air Emissions	Surface Water Discharges	Underground Injection: Class I Wells	Underground Injection: Class II-V Wells	On-site Land Releases: RCRA Subtitle C Landfills	On-site Land Releases: Other On-site Land Releases	Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
107-21-1 *	Ethylene glycol	1,275	5,529,550	638,973	3,541,494	992	26,906	389,572	10,127,487	1,564,736	11,692,223
151-56-4	Ethyleneimine	1	6	0	0	0	0	0	6	0	6
75-21-8 *	Ethylene oxide	156	926,370	3,634	15,147	0	0	986	946,137	52	946,189
96-45-7 *	Ethylene thiourea	13	286	0	0	0	0	0	286	5,657	5,943
75-34-3	Ethylidene dichloride	6	18,119	3	0	0	0	0	18,122	0	18,122
52-85-7 *	Famphur	1	0	0	0	0	0	0	0	0	0
60168-88-9 *	Fenarimol	1	0	0	0	0	0	0	0	0	0
13356-08-6 *	Fenbutatin oxide	2	3	0	3,420	0	0	0	3,423	0	3,423
72490-01-8 *	Fenoxycarb	1	0	0	0	0	0	0	0	0	0
39515-41-8 *	Fenpropathrin	1	0	0	0	0	0	0	0	0	0
55-38-9 *	Fenthion	1	2	0	0	0	0	0	2	1	3
51630-58-1 *	Fenvalerate	1	1	0	0	0	0	0	1	0	1
69806-50-4 *	Fluazifop butyl	1	0	0	0	0	0	0	0	0	0
2164-17-2 *	Fluometuron	6	695	0	0	0	0	0	695	3,543	4,238
7782-41-4	Fluorine	9	29,785	54,200	0	0	0	0	83,985	0	83,985
51-21-8	Fluorouracil	1	0	0	0	0	250	0	250	250	500
69409-94-5 *	Fluvalinate	1	0	0	0	0	0	0	0	0	0
133-07-3 *	Folpet	8	42	10	0	0	0	0	52	3,836	3,888
72178-02-0	Fomesafen	2	695	1,230	0	0	0	0	1,925	13,182	15,107
50-00-0 *	Formaldehyde	812	11,534,568	246,857	9,905,754	0	28	113,265	21,800,472	157,083	21,957,555
64-18-6 *	Formic acid	272	1,704,989	35,026	11,067,451	0	0	3,536	12,811,002	88,548	12,899,550
76-13-1	Freon 113	50	1,063,709	1,876	0	0	0	0	1,065,585	2,355	1,067,940
--	Glycol ethers	2,010	37,018,415	337,884	5,462	0	806	39,399	37,401,966	948,930	38,350,896
118-74-1 *	Hexachlorobenzene	12	154	276	139	0	0	0	569	12,038	12,607
87-68-3	Hexachloro-1,3-butadiene	7	1,410	9	299	0	0	0	1,718	200	1,918
77-47-4 *	Hexachlorocyclo-pentadiene	4	6,927	3	250	0	0	0	7,180	930	8,110
67-72-1 *	Hexachloroethane	15	1,863	15	659	0	0	0	2,537	4,720	7,257
110-54-3	n-Hexane	787	71,548,453	58,540	13,221	0	265	27,768	71,648,247	297,787	71,946,034
51235-04-2 *	Hexazinone	4	260	3,006	0	0	0	0	3,266	250	3,516
67485-29-4 *	Hydramethylnon	2	20	0	0	0	0	0	20	0	20
302-01-2	Hydrazine	44	11,659	12	0	0	0	250	11,921	30,430	42,351
10034-93-2	Hydrazine sulfate	3	0	0	110,000	0	0	0	110,000	0	110,000
7647-01-0 *	Hydrochloric acid	1,000	59,250,310	1,216	489,005	0	0	48,070	59,788,601	447,822	60,236,423
74-90-8 *	Hydrogen cyanide	50	1,158,784	241	657,902	0	8	0	1,816,935	2,198	1,819,133
7664-39-3 *	Hydrogen fluoride	603	12,422,535	31,680	0	2,879	0	15,047	12,472,141	118,837	12,590,978
123-31-9	Hydroquinone	60	16,649	1,749	303,000	0	0	0	321,398	730	322,128
55406-53-6 *	3-Iodo-2-propynyl butyl-carbamate	18	3,396	21	0	0	0	295	3,712	5,957	9,669
13463-40-6	Iron pentacarbonyl	1	1,461	0	0	0	0	0	1,461	0	1,461
78-84-2	Isobutyraldehyde	20	213,407	1,336	0	0	0	0	214,743	34,992	249,735
25311-71-1 *	Isofenphos	2	500	0	0	0	0	0	500	0	500
67-63-0 *	Isopropyl alcohol (manufacturing)	76	922,901	250	0	0	0	0	923,151	250	923,401
80-05-7	4,4'-Isopropylidenediphenol	116	217,654	3,777	0	0	280,000	10,009	511,440	500,386	1,011,826
77501-63-4 *	Lactofen	3	77	0	0	0	0	0	77	28	105

Note: On-site Releases from Section 5 and Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
107-21-1 *	Ethylene glycol	452,791,021	76,990,931	6,836,406	17,472,536	55,214,574	29,734,918	12,985,925	652,026,311	66,961
151-56-4	Ethyleneimine	0	0	0	0	22,000	0	6	22,006	0
75-21-8 *	Ethylene oxide	70,880	1,610	38,000	7	11,312,884	105,228	598,688	12,127,297	389,284
96-45-7 *	Ethylene thiourea	780	0	0	0	0	4,170	5,334	10,284	0
75-34-3	Ethylidene dichloride	1,300,000	0	807,315	0	3,291,684	75,308	18,109	5,492,416	6
52-85-7 *	Famphur	0	0	0	0	0	2,664	0	2,664	0
60168-88-9 *	Fenarimol	0	0	0	0	0	0	0	0	0
13356-08-6 *	Fenbutatin oxide	0	0	0	0	0	0	1,000	1,000	0
72490-01-8 *	Fenoxycarb	0	0	0	0	0	0	0	0	0
39515-41-8 *	Fenpropathrin	0	0	0	0	0	0	0	0	0
55-38-9 *	Fenthion	5	0	0	0	0	1,000	2	1,007	0
51630-58-1 *	Fenvalerate	0	0	0	0	0	1,000	0	1,000	0
69806-50-4 *	Fluazifop butyl	0	0	0	0	0	0	0	0	0
2164-17-2 *	Fluometuron	0	0	0	0	0	12,784	3,251	16,035	0
7782-41-4	Fluorine	0	0	0	0	19,500	0	83,985	103,485	1
51-21-8	Fluorouracil	1,285	0	0	0	0	0	0	1,285	0
69409-94-5 *	Fluvalinate	0	0	0	0	0	0	0	0	0
133-07-3 *	Folpet	221	0	0	0	1,800	368	3,889	6,278	0
72178-02-0	Fomesafen	0	0	0	0	0	5,847	18,428	24,275	0
50-00-0 *	Formaldehyde	90,741,776	643,236	14,449,258	411,094	83,203,482	3,436,540	21,883,140	214,768,526	22,015
64-18-6 *	Formic acid	862,842	33	5,770,006	2,436,610	145,340,583	3,157,416	13,149,351	170,716,841	119
76-13-1	Freon 113	610,745	139,726	50,633	11,000	191,059,556	299,648	1,065,260	193,236,568	729
--	Glycol ethers	179,203,160	3,777,684	32,394,994	14,032,831	38,143,112	10,724,998	40,420,969	318,697,748	38,155
118-74-1 *	Hexachlorobenzene	7,100	4	140,000	4,172	1,690,651	21,984	12,622	1,876,533	11
87-68-3	Hexachloro-1,3-butadiene	0	4	37,000	0	8,091,000	228,996	1,818	8,358,818	264
77-47-4 *	Hexachlorocyclo-pentadiene	0	0	0	0	284,679	19,055	8,097	311,831	2,400
67-72-1 *	Hexachloroethane	0	3	897,000	103,469	3,209,000	43,379	2,286	4,255,137	4,628
110-54-3	n-Hexane	371,918,727	14,085,860	30,687,478	19,134,402	72,743,563	4,724,666	69,383,458	582,678,154	704,970
51235-04-2 *	Hexazinone	0	0	0	0	3,831	260,835	3,535	268,201	0
67485-29-4 *	Hydramethylnon	0	0	0	0	0	475	10	485	0
302-01-2	Hydrazine	25	41	0	650	248,339	21,912	32,825	303,792	190
10034-93-2	Hydrazine sulfate	0	0	0	0	1,700	0	110,002	111,702	0
7647-01-0 *	Hydrochloric acid	72,162,656	4,211,505	180,000	6,673,069	782,653,538	11,481,225	60,106,472	937,468,465	45,552
74-90-8 *	Hydrogen cyanide	61,391	250	78,124,873	331	28,815,443	4,793	1,816,558	108,823,639	107
7664-39-3 *	Hydrogen fluoride	100,395,164	232,309	0	5,910	120,560,424	3,065,078	12,270,652	236,529,537	113,189
123-31-9	Hydroquinone	710	0	6,034,221	8,232	1,380,026	63,041	320,498	7,806,728	11
55406-53-6 *	3-Iodo-2-propynyl butyl-carbamate	6,954	0	0	7,225	339	158,524	5,317	178,359	0
13463-40-6	Iron pentacarbonyl	0	0	0	0	0	0	1,461	1,461	0
78-84-2	Isobutyraldehyde	0	1,400	1,400,398	575,253	734,068	23,593	249,335	2,984,047	0
25311-71-1 *	Isofenphos	2,000	0	0	0	0	2,000	989	4,989	0
67-63-0 *	Isopropyl alcohol (manufacturing)	1,180,102	148,807	10,069,726	483,057	94,225	86,520	914,339	12,976,776	42
80-05-7	4,4'-Isopropylidenediphenol	98,401	67,350	9,258,664	72,155	1,599,908	137,685	753,985	11,988,148	5,912
77501-63-4 *	Lactofen	72	0	0	0	0	12,840	78	12,990	0

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
7439-92-1	Lead	804	424,888	14,718	0	0	177,574	4,052,267	4,669,447	5,827,004	10,496,451
--	Lead compounds	816	877,637	36,516	263,980	0	1,120,106	12,647,753	14,945,992	30,465,946	45,411,938
58-89-9 *	Lindane	7	54	5	0	0	0	0	59	753	812
330-55-2 *	Linuron	3	10	5	0	0	0	0	15	0	15
554-13-2	Lithium carbonate	33	10,907	255	300	0	3,600	10,100	25,162	234,559	259,721
121-75-5 *	Malathion	21	4,665	5	0	0	0	0	4,670	250	4,920
108-31-6	Maleic anhydride	210	471,855	5	5	0	750	4,770	477,385	9,160	486,545
109-77-3	Malononitrile	3	119	0	104,975	0	0	0	105,094	0	105,094
12427-38-2 *	Maneb	8	11,641	0	0	0	11,641	0	23,282	15,613	38,895
7439-96-5	Manganese	1,659	819,618	147,746	6	6	76,282	9,838,601	10,882,259	16,209,432	27,091,691
--	Manganese compounds	1,181	1,521,980	4,206,997	14,412,830	0	3,234,107	46,936,374	70,312,288	46,231,218	116,543,506
93-65-2	Mecoprop	7	1,275	0	0	0	0	5	1,280	250	1,530
149-30-4 *	2-Mercaptobenzothiazole	31	6,690	1,030	50,000	0	0	0	57,720	207,509	265,229
7439-97-6 *	Mercury	20	11,805	386	0	0	406	7,475	20,072	25,053	45,125
--	Mercury compounds	9	2,626	34	41	0	0	0	2,701	25,508	28,209
150-50-5 *	Merphos	1	169	0	0	0	0	0	169	0	169
126-98-7	Methacrylonitrile	5	943	0	110,190	0	0	0	111,133	0	111,133
137-42-8 *	Metham sodium	10	5,959	3	0	0	0	0	5,962	310	6,272
67-56-1 *	Methanol	2,239	194,376,752	7,019,881	17,621,227	187,607	5,540	957,874	220,168,881	952,260	221,121,141
94-74-6 *	Methoxone	7	755	0	0	0	250	0	1,005	4,853	5,858
72-43-5 *	Methoxychlor	3	0	0	0	0	0	0	0	0	0
109-86-4 *	2-Methoxyethanol	44	1,035,779	16,006	0	0	0	123	1,051,908	1,500	1,053,408
96-33-3	Methyl acrylate	64	184,651	666	15,902	0	0	8,940	210,159	1,657	211,816
1634-04-4	Methyl tert-butyl ether	201	2,626,323	163,716	9,120	7,200	0	124	2,806,483	118,121	2,924,604
79-22-1	Methyl chlorocarbonate	3	3,387	5	0	0	0	5	3,397	0	3,397
101-14-4	4,4'-Methylenebis(2-chloroaniline)	24	2,266	0	0	0	0	0	2,266	0	2,266
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	2	0	0	0	0	0	0	0	0	0
74-95-3	Methylene bromide	5	57,743	0	0	0	0	0	57,743	0	57,743
101-77-9	4,4'-Methylenedianiline	26	9,221	86	15,050	0	0	0	24,357	16,765	41,122
78-93-3 *	Methyl ethyl ketone	1,977	52,974,232	41,781	485,144	5	7,282	152,040	53,660,484	466,246	54,126,730
60-34-4	Methyl hydrazine	4	867	0	0	0	0	0	867	0	867
74-88-4	Methyl iodide	10	121,458	48	3,929	0	0	0	125,435	27	125,462
108-10-1 *	Methyl isobutyl ketone	852	16,005,859	19,146	86,400	0	0	4,089	16,115,494	311,182	16,426,676
624-83-9	Methyl isocyanate	5	488	0	0	0	0	1	489	0	489
556-61-6 *	Methyl isothiocyanate	3	78	0	0	0	0	0	78	0	78
75-86-5	2-Methyllactonitrile	6	5,466	0	62,090	0	0	0	67,556	0	67,556
80-62-6	Methyl methacrylate	276	2,108,671	6,516	140,000	0	0	1,340	2,256,527	184,017	2,440,544
924-42-5	N-Methylolacrylamide	31	4,381	1,308	0	0	0	33	5,722	3,402	9,124
298-00-0 *	Methyl parathion	4	481	0	0	0	0	0	481	0	481
109-06-8	2-Methylpyridine	7	21,742	0	47,000	0	0	0	68,742	21	68,763
872-50-4	N-Methyl-2-pyrrolidone	365	3,125,284	27,896	2,570,958	41,000	4,841	204,438	5,974,417	528,483	6,502,900
21087-64-9 *	Metribuzin	6	359	24	0	0	0	0	383	0	383
7786-34-7 *	Mevinphos	1	0	0	0	0	0	0	0	0	0
90-94-8	Michler's ketone	1	401	0	0	0	0	0	401	0	401
2212-67-1 *	Molinate	3	667	4	0	0	0	0	671	6,437	7,108

Note: On-site Releases from Section 5 and Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7439-92-1	Lead	223,496,228	44,515,712	272,104	12,544	1,910,946	839,391	8,771,387	279,818,312	108,510
--	Lead compounds	333,440,293	303,148,397	56,000	50,842	3,202,463	4,556,056	34,566,800	679,020,851	3,730,552
58-89-9 *	Lindane	84	0	0	0	0	2,790	67	2,941	0
330-55-2 *	Linuron	25	0	0	0	0	0	50	75	0
554-13-2	Lithium carbonate	31,190	0	0	0	1,200	2,400	241,578	276,368	0
121-75-5 *	Malathion	224	0	0	0	0	3,200	3,823	7,247	0
108-31-6	Maleic anhydride	11,053	0	3,673,279	180,626	49,248,507	1,313,924	475,172	54,902,561	4,607
109-77-3	Malononitrile	0	0	0	0	3	690	105,094	105,787	0
12427-38-2 *	Maneb	0	0	0	0	0	3,684	3,972	7,656	23,282
7439-96-5	Manganese	42,094,599	63,013,817	0	460	256,743	471,320	25,457,423	131,294,362	428,218
--	Manganese compounds	18,174,571	47,149,281	20,349	35,437	1,552,540	5,388,284	108,079,180	180,399,642	508,687
93-65-2	Mecoprop	1,750	0	0	0	740	1,335	551	4,376	96
149-30-4 *	2-Mercaptobenzothiazole	3,932	10,538	0	819,814	403,993	11,463	265,831	1,515,571	0
7439-97-6 *	Mercury	398,999	39,661	0	0	4,239	10,606	19,903	473,408	20
--	Mercury compounds	39,004	7,338	0	0	0	2,802	25,061	74,205	0
150-50-5 *	Merphos	0	0	0	0	0	0	169	169	0
126-98-7	Methacrylonitrile	0	0	0	0	394	0	111,133	111,527	0
137-42-8 *	Metham sodium	0	0	0	909	388	4,641	6,921	12,859	507
67-56-1 *	Methanol	652,646,250	19,047,443	338,486,384	92,054,052	960,162,594	131,720,870	226,499,488	2,420,617,081	198,274
94-74-6 *	Methoxone	3,391	0	0	0	0	271	6,361	10,023	96
72-43-5 *	Methoxychlor	0	0	0	0	0	0	0	0	0
109-86-4 *	2-Methoxyethanol	1,274,454	11,150	329,218	1,135,401	2,133,850	1,534,239	1,125,869	7,544,181	1,570
96-33-3	Methyl acrylate	1,034,001	7,822	490,480	402,873	2,513,567	41,418	184,972	4,675,133	0
1634-04-4	Methyl tert-butyl ether	2,346,757	466,198	367,993	2,675,435	3,964,927	848,129	2,908,348	13,577,787	3,817
79-22-1	Methyl chlorocarbonate	0	0	0	0	39,010	0	3,370	42,380	10
101-14-4	4,4'-Methylenebis(2-chloro-aniline)	0	0	0	2,956	0	7,809	2,004	12,769	0
101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzeneamine	0	0	0	0	0	0	0	0	0
74-95-3	Methylene bromide	969,440	0	0	0	0	0	57,743	1,027,183	0
101-77-9	4,4'-Methylenedianiline	3,700	138	960,204	5,478	97,414	71,650	36,244	1,174,828	0
78-93-3 *	Methyl ethyl ketone	53,877,400	19,088,054	77,959,795	41,862,752	70,061,993	5,743,445	54,277,916	322,871,355	205,539
60-34-4	Methyl hydrazine	0	800	0	0	5,584	1,642	504	8,530	1
74-88-4	Methyl iodide	0	0	0	6	9,686	6,704	126,398	142,794	98
108-10-1 *	Methyl isobutyl ketone	65,117,922	11,934,282	30,845,396	16,896,647	13,794,459	1,363,149	16,414,952	156,366,807	9,910
624-83-9	Methyl isocyanate	0	0	0	0	92,534	0	486	93,020	2
556-61-6 *	Methyl isothiocyanate	0	0	0	0	0	191	78	269	0
75-86-5	2-Methyllactonitrile	0	0	0	0	15,270	360	67,525	83,155	0
80-62-6	Methyl methacrylate	1,282,943	51,663	2,433,787	1,959,654	5,787,869	437,999	2,287,796	14,241,711	576
924-42-5	N-Methylolacrylamide	0	0	0	3,553	13,038	50,351	9,125	76,067	1
298-00-0 *	Methyl parathion	0	0	0	0	0	72,300	318	72,618	68,000
109-06-8	2-Methylpyridine	66,000	190,000	30,000	7,818	52,000	25,043	68,935	439,796	840
872-50-4	N-Methyl-2-pyrrolidone	586,566	8,821,400	1,389,250	2,866,773	5,655,591	3,665,480	6,592,639	29,577,699	127
21087-64-9 *	Metribuzin	0	0	0	0	4,895	16,040	225	21,160	0
7786-34-7 *	Mevinphos	0	0	0	0	0	0	0	0	0
90-94-8	Michler's ketone	0	0	0	230	0	0	401	631	0
2212-67-1 *	Molinate	0	0	0	10	2,290	41,234	8,117	51,651	1,287

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
1313-27-5	Molybdenum trioxide	159	222,987	39,645	276,580	0	7,285	56,798	603,295	453,770	1,057,065
76-15-3	Monochloropenta-fluoroethane (CFC-115)	8	188,262	5	0	0	0	0	188,267	0	188,267
88671-89-0 *	Myclobutanil	4	500	0	0	0	0	0	500	0	500
142-59-6 *	Nabam	3	0	0	0	0	0	0	0	0	0
300-76-5 *	Naled	1	0	0	0	0	0	0	0	0	0
91-20-3 *	Naphthalene	533	2,485,690	13,098	187,927	0	12,368	69,836	2,768,919	501,134	3,270,053
134-32-7	alpha-Naphthylamine	2	0	0	0	0	0	0	0	0	0
7440-02-0	Nickel	2,002	411,558	24,911	25,642	0	12,688	224,961	699,760	3,872,894	4,572,654
--	Nickel compounds	959	353,614	93,440	116,434	0	117,245	4,252,246	4,932,979	7,112,809	12,045,788
--	Nicotine and salts	39	434,949	956	0	0	0	0	435,905	351,431	787,336
1929-82-4 *	Nitrapyrin	3	0	0	0	0	0	0	0	0	0
--	Nitrate compounds	916	396,856	148,846,835	40,552,663	250	3,772	3,075,269	192,875,645	4,498,878	197,374,523
7697-37-2 *	Nitric acid	1,767	2,656,400	421,395	18,399,512	0	15,478	302,367	21,795,152	1,881,909	23,677,061
139-13-9	Nitrilotriacetic acid	9	0	7,474	2,400	0	0	0	9,874	0	9,874
100-01-6	p-Nitroaniline	4	12,018	13	0	0	0	0	12,031	0	12,031
99-59-2	5-Nitro-o-anisidine	1	10	0	0	0	0	0	10	0	10
98-95-3 *	Nitrobenzene	14	64,314	299	638,059	0	7	0	702,679	240	702,919
55-63-0	Nitroglycerin	18	10,177	15,622	0	0	0	0	25,799	0	25,799
88-75-5	2-Nitrophenol	4	47	39	0	0	0	0	86	0	86
100-02-7 *	4-Nitrophenol	7	969	0	0	0	0	0	969	0	969
79-46-9 *	2-Nitropropane	3	23,727	2,789	0	0	0	0	26,516	25	26,541
86-30-6	N-Nitrosodiphenylamine	3	10	0	0	0	0	0	10	0	10
156-10-5	p-Nitrosodiphenylamine	2	24	0	0	0	0	0	24	210	234
99-55-8	5-Nitro-o-toluidine	4	20	0	0	0	0	0	20	50	70
27314-13-2 *	Norflurazon	2	7	0	0	0	0	0	7	43,000	43,007
19044-88-3 *	Oryzalin	3	10	0	0	0	0	0	10	0	10
301-12-2 *	Oxydemeton methyl	1	0	0	0	0	0	0	0	0	0
19666-30-9 *	Oxydiazon	5	1,200	0	0	0	0	0	1,200	0	1,200
42874-03-3 *	Oxyfluorfen	3	86	0	0	0	0	0	86	1,308	1,394
10028-15-6	Ozone	39	776,231	0	0	0	0	0	776,231	0	776,231
123-63-7	Paraldehyde	3	35	0	0	0	0	0	35	0	35
1910-42-5 *	Paraquat dichloride	3	500	0	0	0	0	0	500	0	500
56-38-2 *	Parathion	1	0	0	0	0	0	0	0	0	0
1114-71-2 *	Pebulate	2	523	4	0	0	0	0	527	529	1,056
40487-42-1 *	Pendimethalin	5	2,520	42	0	0	0	5	2,567	1,942	4,509
76-01-7 *	Pentachloroethane	5	2,392	11	0	0	0	0	2,403	0	2,403
87-86-5 *	Pentachlorophenol	36	7,048	952	0	0	28,000	5,297	41,297	66,982	108,279
57-33-0	Pentobarbital sodium	1	0	0	0	0	0	0	0	0	0
79-21-0 *	Peracetic acid	21	6,362	10	0	0	0	987	7,359	0	7,359
594-42-3 *	Perchloromethyl mercaptan	3	516	0	0	0	0	0	516	0	516
52645-53-1 *	Permethrin	18	4,607	14	0	0	0	0	4,621	1,019	5,640
85-01-8	Phenanthrene	53	124,720	174	0	0	9,420	26,628	160,942	152,638	313,580
108-95-2 *	Phenol	763	8,697,953	54,206	1,539,987	0	6,513	224,868	10,523,527	1,223,376	11,746,903
26002-80-2 *	Phenothrin	2	0	0	0	0	0	0	0	0	0

Note: On-site Releases from Section 5 and Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
1313-27-5	Molybdenum trioxide	5,870,979	2,415,356	0	0	24,307	572,013	964,067	9,846,722	1,200
76-15-3	Monochloropenta-fluoroethane (CFC-115)	35,000	0	0	0	3,851	4,092	188,268	231,211	0
88671-89-0 *	Myclobutanil	0	0	0	0	0	1,809	220	2,029	0
142-59-6 *	Nabam	0	0	0	0	0	0	0	0	0
300-76-5 *	Naled	0	0	0	0	0	0	0	0	0
91-20-3 *	Naphthalene	11,152,489	217,597	7,706,210	1,020,682	11,452,141	634,640	3,486,068	35,669,827	13,023
134-32-7	alpha-Naphthylamine	0	0	0	0	0	0	0	0	0
7440-02-0	Nickel	29,304,518	87,162,134	26,213	57,392	1,398,988	646,126	3,953,432	122,548,803	4,374
--	Nickel compounds	9,114,702	32,218,575	31,657	5,410	4,651,041	1,042,021	10,770,118	57,833,524	190,541
--	Nicotine and salts	0	82,149	0	0	878,410	311,032	744,317	2,015,908	14,000
1929-82-4 *	Nitrapyrin	0	0	0	0	0	1,255,450	0	1,255,450	0
--	Nitrate compounds	99,267,015	1,600,700	0	271,802	49,691,186	73,381,286	202,947,298	427,159,287	182,840
7697-37-2 *	Nitric acid	28,640,127	2,812,833	27,246	257	306,863,652	16,414,079	22,042,219	376,800,413	115,681
139-13-9	Nitrilotriacetic acid	0	0	0	0	1,238,653	12,140	9,874	1,260,667	0
100-01-6	p-Nitroaniline	0	0	0	0	115	178,165	12,233	190,513	0
99-59-2	5-Nitro-o-anisidine	0	0	0	0	0	0	5	5	0
98-95-3 *	Nitrobenzene	1,432,350	0	2,229,827	6,795	1,150,986	1,298,784	704,915	6,823,657	1,520
55-63-0	Nitroglycerin	18,000	0	0	28,675	219,672	69,222	26,009	361,578	1
88-75-5	2-Nitrophenol	0	0	62,000	0	95,000	34,000	91	191,091	0
100-02-7 *	4-Nitrophenol	0	0	40,372	4	79,013	916,121	991	1,036,501	0
79-46-9 *	2-Nitropropane	0	0	1,165,892	837	53,022	5,803	26,516	1,252,070	0
86-30-6	N-Nitrosodiphenylamine	0	0	0	340,000	72,865	771	10	413,646	1
156-10-5	p-Nitrosodiphenylamine	0	0	7,800	14,890	0	270	1,224	24,184	0
99-55-8	5-Nitro-o-toluidine	0	0	0	0	0	0	70	70	0
27314-13-2 *	Norflurazon	0	0	0	0	0	45,000	7	45,007	0
19044-88-3 *	Oryzalin	0	0	0	0	0	63,000	5	63,005	0
301-12-2 *	Oxydemeton methyl	0	0	0	0	0	0	0	0	0
19666-30-9 *	Oxydiazon	18,000	0	0	0	4,000	305	949	23,254	0
42874-03-3 *	Oxyfluorfen	0	0	0	0	130	23,975	1,386	25,491	0
10028-15-6	Ozone	0	0	52,682	0	2,819,881	0	775,393	3,647,956	0
123-63-7	Paraldehyde	0	0	24,426	10	250,028	0	35	274,499	0
1910-42-5 *	Paraquat dichloride	0	0	0	0	0	106	41	147	0
56-38-2 *	Parathion	0	0	0	0	0	0	0	0	0
1114-71-2 *	Pebulate	0	0	0	0	140	1,439	1,535	3,114	0
40487-42-1 *	Pendimethalin	2,000	0	0	0	160,000	27,000	4,740	193,740	0
76-01-7 *	Pentachloroethane	240,000	0	180,000	0	5,666,697	69,291	2,403	6,158,391	5
87-86-5 *	Pentachlorophenol	1,282,753	0	0	7,282	10,928	112,876	31,703	1,445,542	82,213
57-33-0	Pentobarbital sodium	0	0	0	0	0	0	0	0	0
79-21-0 *	Peracetic acid	0	0	0	0	31,858	7,372	7,345	46,575	0
594-42-3 *	Perchloromethyl mercaptan	0	0	0	0	86,690	8	508	87,206	0
52645-53-1 *	Permethrin	0	0	0	0	292	9,905	6,263	16,460	0
85-01-8	Phenanthrene	266,859	21,574	97,469	108,549	641,029	121,866	329,099	1,586,445	124,890
108-95-2 *	Phenol	48,295,915	113,268	27,801,431	3,364,888	25,562,763	6,277,195	11,471,816	122,887,276	8,962
26002-80-2 *	Phenothrin	0	0	0	0	0	0	0	0	0

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases: Total Air Emissions	On-site Releases: Surface Water Discharges	On-site Releases: Underground Injection: Class I Wells	On-site Releases: Underground Injection: Class II-V Wells	On-site Releases: On-site Land Releases: RCRA Subtitle C Landfills	On-site Releases: On-site Land Releases: Other On-site Land Releases	On-site Releases: Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
95-54-5	1,2-Phenylenediamine	7	514	3,900	0	0	7,568	0	11,982	3	11,985
108-45-2	1,3-Phenylenediamine	21	6,972	104,122	0	0	59,168	6,569	176,831	18,151	194,982
106-50-3	p-Phenylenediamine	10	3,509	504	0	0	2,064	0	6,077	6,930	13,007
90-43-7 *	2-Phenylphenol	15	374	1	0	0	0	250	625	1,131	1,756
57-41-0	Phenytoin	1	1	0	0	0	0	0	1	12,420	12,421
75-44-5	Phosgene	31	21,877	0	0	0	0	3	21,880	0	21,880
7803-51-2 *	Phosphine	6	20,562	0	0	0	365	0	20,927	0	20,927
7664-38-2 *	Phosphoric acid	2,736	1,801,585	43,514,457	13,257	0	5,400	30,222,148	75,556,847	2,734,781	78,291,628
7723-14-0 *	Phosphorus (yellow or white)	55	20,970	3,859	0	0	0	2,581,846	2,606,675	6,291	2,612,966
85-44-9	Phthalic anhydride	161	398,498	183	0	0	0	0	398,681	2,948,099	3,346,780
1918-02-1 *	Picloram	2	2,900	0	0	0	0	0	2,900	0	2,900
88-89-1	Picric acid	9	0	0	110,875	0	0	0	110,875	0	110,875
51-03-6 *	Piperonyl butoxide	8	251	0	0	0	0	0	251	0	251
--	Polybrominated biphenyls	3	0	0	0	0	0	0	0	0	0
--	Polychlorinated alkanes	67	24,888	5,830	0	0	0	0	30,718	34,585	65,303
1336-36-3 *	Polychlorinated biphenyls (PCBs)	6	0	0	0	0	6,794	0	6,794	980,846	987,640
--	Polycyclic aromatic compounds	159	495,236	1,652	0	0	673	14,234	511,795	1,394,568	1,906,363
7758-01-2	Potassium bromate	3	255	0	0	0	0	0	255	0	255
128-03-0 *	Potassium dimethyldithio-carbamate	19	510	750	0	0	0	5	1,265	0	1,265
137-41-7 *	Potassium N-methyldithio-carbamate	7	0	0	0	0	0	0	0	0	0
41198-08-7 *	Profenofos	1	0	0	0	0	0	0	0	0	0
7287-19-6 *	Prometryn	6	933	37	0	0	0	0	970	250	1,220
23950-58-5 *	Pronamide	2	255	0	0	0	0	0	255	0	255
1918-16-7 *	Propachlor	4	50	0	0	0	0	0	50	13,000	13,050
1120-71-4	Propane sultone	1	0	0	0	0	0	0	0	0	0
709-98-8 *	Propanil	3	2,155	750	0	0	0	0	2,905	500	3,405
2312-35-8 *	Propargite	3	260	0	0	0	0	0	260	0	260
107-19-7 *	Propargyl alcohol	17	6,342	600	237,098	0	0	0	244,040	866	244,906
60207-90-1 *	Propiconazole	7	153	0	0	0	0	0	153	0	153
123-38-6 *	Propionaldehyde	21	165,862	39,054	97,161	0	0	0	302,077	43	302,120
114-26-1 *	Propoxur	1	0	0	0	0	0	0	0	0	0
115-07-1	Propylene	357	16,285,889	5,198	2,632	0	0	670	16,294,389	130	16,294,519
75-55-8	Propyleneimine	5	230	0	0	0	0	0	230	0	230
75-56-9 *	Propylene oxide	120	543,603	22,961	11,700	0	0	887	579,151	29,904	609,055
110-86-1 *	Pyridine	43	105,037	545	612,968	0	0	4	718,554	38,319	756,873
91-22-5	Quinoline	24	20,002	25	27,000	0	0	305	47,332	11,582	58,914
106-51-4 *	Quinone	5	4,801	350	0	0	0	0	5,151	0	5,151
82-68-8 *	Quintozene	17	978	0	0	0	0	0	978	364	1,342
76578-14-8 *	Quizalofop-ethyl	2	0	0	0	0	0	0	0	0	0
10453-86-8 *	Resmethrin	2	1	0	0	0	0	0	1	0	1
81-07-2	Saccharin (manufacturing)	2	171	0	0	0	0	0	171	1,400	1,571
94-59-7 *	Safrole	2	505	0	0	0	0	0	505	0	505
7782-49-2 *	Selenium	16	290	58	0	0	580	5	933	6,767	7,700

Note: **On-site Releases** from Section 5 and **Off-site Releases** from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
95-54-5	1,2-Phenylenediamine	0	0	0	0	155,100	17,073	11,985	184,158	0
108-45-2	1,3-Phenylenediamine	720	0	0	1,384	1,025,440	553,136	190,560	1,771,240	0
106-50-3	p-Phenylenediamine	0	0	0	0	331,074	31,958	6,517	369,549	1
90-43-7 *	2-Phenylphenol	0	0	229	0	137,977	816	1,407	140,429	0
57-41-0	Phenytoin	0	0	0	0	180	950	13,000	14,130	0
75-44-5	Phosgene	304	0	9	0	13,946,068	892	21,831	13,969,104	29
7803-51-2 *	Phosphine	0	365	0	0	350,000	0	20,523	370,888	30
7664-38-2 *	Phosphoric acid	453,512,929	4,387,637	2,000	65,620	128,525,343	5,572,441	69,947,907	662,013,877	7,162,494
7723-14-0 *	Phosphorus (yellow or white)	0	238,971	0	0	694,999	13,268	2,612,061	3,559,299	31,014
85-44-9	Phthalic anhydride	301,472	1,456	2,488,912	2,489,429	19,170,287	214,019	537,135	25,202,710	4,606
1918-02-1 *	Picloram	0	0	0	0	70,488	0	2,900	73,388	0
88-89-1	Picric acid	0	0	183,393	56,831	1,354,964	1	110,875	1,706,064	0
51-03-6 *	Piperonyl butoxide	0	0	0	0	0	4,700	157	4,857	0
--	Polybrominated biphenyls	0	5,071	0	0	0	0	549	5,620	0
--	Polychlorinated alkanes	3,183	405,065	55,000	93,658	7,650	463,245	137,965	1,165,766	2,320
1336-36-3 *	Polychlorinated biphenyls (PCBs)	0	1,400	0	0	0	62,928	8,994	73,322	981,191
--	Polycyclic aromatic compounds	1,335,135	599,044	7,624,658	56,921	1,147,152	13,441	1,881,453	12,657,804	9,078
7758-01-2	Potassium bromate	0	0	53,129	2	0	0	455	53,586	0
128-03-0 *	Potassium dimethyldithio-carbamate	0	33,700	0	1	0	132,277	793	166,771	0
137-41-7 *	Potassium N-methyldithio-carbamate	0	0	0	0	10,500	0	0	10,500	0
41198-08-7 *	Profenofos	0	0	0	0	0	0	0	0	0
7287-19-6 *	Prometryn	0	0	0	0	161	816	832	1,809	0
23950-58-5 *	Pronamide	5,400	0	0	0	0	2,466	250	8,116	0
1918-16-7 *	Propachlor	0	0	0	0	0	74,400	50	74,450	0
1120-71-4	Propane sultone	0	0	0	0	4,900	120	0	5,020	0
709-98-8 *	Propanil	0	0	0	0	37	7,200	3,230	10,467	250
2312-35-8 *	Propargite	0	0	0	3,164	0	4,959	85	8,208	0
107-19-7 *	Propargyl alcohol	9	0	269,073	481,890	116,170	28,401	248,946	1,144,489	0
60207-90-1 *	Propiconazole	0	0	0	0	0	30,493	2,054	32,547	0
123-38-6 *	Propionaldehyde	66,000	0	1,146,337	11,939	4,486,626	168,603	302,267	6,181,772	22
114-26-1 *	Propoxur	0	0	0	0	0	0	0	0	0
115-07-1	Propylene[b]	65,774,345	35	718,371,130	2,068	297,708,572	125,675	15,905,795	1,097,887,620	955,453
75-55-8	Propyleneimine	0	0	0	0	4,000	0	230	4,230	0
75-56-9 *	Propylene oxide	1,475,188	0	13,432,224	81,598	13,013,027	624,849	625,866	29,252,752	3,929
110-86-1 *	Pyridine	4,319,946	10,343	2,371,309	101,071	1,104,973	740,334	699,798	9,347,774	1,580
91-22-5	Quinoline	21,380	880	122,120	2,541	114,609	210	61,015	322,755	2
106-51-4 *	Quinone	0	0	190,238	0	365,345	20,662	5,101	581,346	0
82-68-8 *	Quintozene	2,573	0	0	417,048	0	24,119	1,838	445,578	0
76578-14-8 *	Quizalofop-ethyl	0	0	0	0	0	0	1	1	0
10453-86-8 *	Resmethrin	0	0	0	0	0	400	0	400	0
81-07-2	Saccharin (manufacturing)	0	0	0	0	10,000	10	1,600	11,610	0
94-59-7 *	Safrole	0	0	0	0	1	25	100	126	0
7782-49-2 *	Selenium	9,720	0	74,135	582	0	1,001	6,491	91,929	0

Note: Data from Section 8 of Form R.

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[b]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 272,000,000 pounds of propylene in 1997. The facility has since revised this quantity to zero. For propylene, on-site energy recovery changes to 446,371,130 pounds and total production-related waste managed changes to 825,887,620 pounds.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases: Total Air Emissions	Surface Water Discharges	Underground Injection: Class I Wells	Underground Injection: Class II-V Wells	On-site Land Releases: RCRA Subtitle C Landfills	On-site Land Releases: Other On-site Land Releases	Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
--	Selenium compounds	43	82,857	2,374	3,409	0	0	317,509	406,149	29,029	435,178
74051-80-2 *	Sethoxydim	3	0	0	0	0	0	0	0	0	0
7440-22-4 *	Silver	77	7,629	143	0	0	581	5	8,358	40,221	48,579
--	Silver compounds	64	7,918	6,109	156	0	0	40,405	54,588	52,481	107,069
122-34-9 *	Simazine	8	2,939	348	0	0	0	0	3,287	48,629	51,916
26628-22-8 *	Sodium azide	12	24,417	5	0	0	156	0	24,578	28,909	53,487
1982-69-0 *	Sodium dicamba	2	255	0	250	0	0	0	505	0	505
128-04-1 *	Sodium dimethyldithio-carbamate	67	17,684	10	0	0	0	0	17,694	126,741	144,435
7632-00-0 *	Sodium nitrite	372	254,878	481,319	747,000	0	0	192,355	1,675,552	793,104	2,468,656
100-42-5	Styrene	1,507	44,126,665	43,954	202,387	0	61,302	475,748	44,910,056	1,583,171	46,493,227
96-09-3	Styrene oxide	2	11	0	0	0	0	0	11	0	11
7664-93-9 *	Sulfuric acid	894	21,259,394	24,447	113,255	0	0	46,421	21,443,517	668,139	22,111,656
2699-79-8 *	Sulfuryl fluoride	3	428,000	0	0	0	0	0	428,000	0	428,000
34014-18-1 *	Tebuthiuron	2	10	0	0	0	0	0	10	0	10
3383-96-8 *	Temephos	1	0	0	0	0	0	0	0	0	0
5902-51-2 *	Terbacil	2	0	10,318	0	0	0	0	10,318	0	10,318
630-20-6	1,1,1,2-Tetrachloroethane	8	4,938	0	0	0	0	0	4,938	2	4,940
79-34-5 *	1,1,2,2-Tetrachloroethane	14	13,614	0	0	0	0	0	13,614	511	14,125
127-18-4 *	Tetrachloroethylene	372	6,885,068	2,282	15,118	0	0	5,074	6,907,542	24,753	6,932,295
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane	1	19,700	1	0	0	0	0	19,701	0	19,701
961-11-5 *	Tetrachlorvinphos	4	365	5	0	0	0	0	370	3,760	4,130
64-75-5 *	Tetracycline hydrochloride	3	474	0	0	0	0	0	474	1,735	2,209
7696-12-0 *	Tetramethrin	2	0	0	0	0	0	0	0	0	0
7440-28-0	Thallium	3	256	0	0	0	1,000	0	1,256	1,500	2,756
--	Thallium compounds	1	0	0	0	0	0	0	0	180	180
148-79-8 *	Thiabendazole	4	2,520	0	0	0	0	0	2,520	0	2,520
28249-77-6 *	Thiobencarb	2	634	0	0	0	0	0	634	4,935	5,569
59669-26-0 *	Thiodicarb	3	792	0	0	0	250	0	1,042	1,000	2,042
23564-05-8 *	Thiophanate-methyl	9	13,749	0	0	0	13,240	0	26,989	14,318	41,307
62-56-6 *	Thiourea	30	1,026	347	5,000	0	0	250	6,623	4,212	10,835
137-26-8 *	Thiram	61	3,024	16	0	0	5	57	3,102	80,186	83,288
1314-20-1	Thorium dioxide	1	0	0	0	0	0	0	0	0	0
7550-45-0	Titanium tetrachloride	36	21,202	0	0	0	0	0	21,202	37,660	58,862
108-88-3 *	Toluene	3,062	112,938,943	30,998	510,930	2,705	20,962	719,444	114,223,982	1,452,282	115,676,264
584-84-9	Toluene-2,4-diisocyanate	62	6,503	5	0	0	0	0	6,508	6,178	12,686
91-08-7	Toluene-2,6-diisocyanate	30	2,800	0	0	0	0	0	2,800	1,360	4,160
26471-62-5	Toluenediisocyanate (mixed isomers)	174	51,804	255	0	0	0	359	52,418	37,897	90,315
95-53-4	o-Toluidine	22	40,491	273	7,440	0	0	5	48,209	3,151	51,360
43121-43-3 *	Triadimefon	3	0	0	0	0	0	0	0	0	0
2303-17-5 *	Triallate	2	519	0	0	0	0	0	519	14,264	14,783
101200-48-0 *	Tribenuron methyl	1	1	0	0	0	0	0	1	0	1
2155-70-6 *	Tributyltin methacrylate	2	14	3	0	0	0	0	17	0	17

Note: On-site Releases from Section 5 and Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
--	Selenium compounds	772,808	9,693	0	0	1	9,628	343,984	1,136,114	104,800
74051-80-2 *	Sethoxydim	0	0	0	0	0	0	0	0	0
7440-22-4 *	Silver	805,582	1,315,535	0	29	3,635	121	138,036	2,262,938	291
--	Silver compounds	3,361,707	1,000,592	0	0	550,965	5,500	74,153	4,992,917	2,619
122-34-9 *	Simazine	50	0	0	0	77,000	12,480	9,372	98,902	0
26628-22-8 *	Sodium azide	48,963	773,161	0	0	75,278	1,109,199	41,281	2,047,882	106
1982-69-0 *	Sodium dicamba	0	0	0	0	0	4,200	505	4,705	0
128-04-1 *	Sodium dimethyldithio-carbamate	200	287,077	0	0	439,994	849,275	55,140	1,631,686	0
7632-00-0 *	Sodium nitrite	501,890	36,851	0	61,249	14,773,132	3,439,826	2,192,274	21,005,222	65,876
100-42-5	Styrene	15,296,876	1,109,081	26,721,098	7,388,173	10,169,393	4,250,300	44,387,903	109,322,824	283,482
96-09-3	Styrene oxide	0	0	30,000	0	0	0	11	30,011	0
7664-93-9 *	Sulfuric acid	245,755,305	2,206,540	940	20	186,759,219	2,867,753	21,847,891	459,437,668	12,115
2699-79-8 *	Sulfuryl fluoride	0	0	0	0	0	0	428,000	428,000	0
34014-18-1 *	Tebuthiuron	15	0	0	0	1,100	1,200	1	2,316	0
3383-96-8 *	Temephos	0	0	0	0	0	0	0	0	0
5902-51-2 *	Terbacil	0	0	0	0	2,793	33,665	10,318	46,776	0
630-20-6	1,1,1,2-Tetrachloroethane	2,100,000	0	0	301,000	2,933,725	62,211	4,936	5,401,872	0
79-34-5 *	1,1,2,2-Tetrachloroethane	4,908,000	2,458,805	2,416,000	0	7,744,618	135,714	13,545	17,676,682	14
127-18-4 *	Tetrachloroethylene	40,942,533	8,921,720	4,556,500	1,232,892	17,289,521	1,173,229	6,844,562	80,960,957	13,494
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane	6,100	1,820	0	0	0	10	19,700	27,630	0
961-11-5 *	Tetrachlorvinphos	345	0	35,000	49,500	850	0	3,862	89,557	0
64-75-5 *	Tetracycline hydrochloride	0	0	0	0	0	1,750	2,034	3,784	0
7696-12-0 *	Tetramethrin	0	0	0	0	0	0	0	0	0
7440-28-0	Thallium	0	8	90,406	2	0	148	1,020	91,584	0
--	Thallium compounds	0	0	0	0	0	180	0	180	0
148-79-8 *	Thiabendazole	0	0	0	0	0	1,073	2,600	3,673	0
28249-77-6 *	Thiobencarb	147	0	0	0	0	35	5,053	5,235	0
59669-26-0 *	Thiodicarb	160,780	0	0	0	29,309	13,942	1,063	205,094	831
23564-05-8 *	Thiophanate-methyl	9,400	0	0	0	0	6,819	11,755	27,974	26,480
62-56-6 *	Thiourea	4,456	872	0	0	12,779	11,821	9,087	39,015	0
137-26-8 *	Thiram	46,680	40,807	0	1,402	42	22,889	108,595	220,415	0
1314-20-1	Thorium dioxide	6,100	0	0	0	0	0	640	6,740	0
7550-45-0	Titanium tetrachloride	0	148,361	0	5	26,440,106	212,926	58,778	26,860,176	11
108-88-3 *	Toluene	1,119,206,056	28,405,851	216,605,276	88,849,998	217,192,273	19,924,367	113,112,450	1,803,296,271	272,801
584-84-9	Toluene-2,4-diisocyanate	317	389	0	29,423	1,596	9,715	10,992	52,432	21,320
91-08-7	Toluene-2,6-diisocyanate	79	0	0	2,754	714	2,111	2,750	8,408	439
26471-62-5	Toluenediisocyanate (mixed isomers)	6,300	1,235	16,421,251	39,793	720,297	910,358	56,838	18,156,072	30,757
95-53-4	o-Toluidine	60	0	232,012	48,861	160,399	83,592	48,194	573,118	69
43121-43-3 *	Triadimefon	0	0	0	0	0	26	0	26	0
2303-17-5 *	Triallate	0	0	0	0	16,000	91,390	7,962	115,352	0
101200-48-0 *	Tribenuron methyl	0	0	0	0	0	17,581	1	17,582	0
2155-70-6 *	Tributyltin methacrylate	0	0	0	296	0	29,806	27	30,129	0

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20A. TRI On-site and Off-site Releases, by Chemical, 1997, continued

CAS Number	Chemical	Total Forms	On-site Releases: Total Air Emissions	Surface Water Discharges	Underground Injection: Class I Wells	Underground Injection: Class II-V Wells	On-site Land Releases: RCRA Subtitle C Landfills	On-site Land Releases: Other On-site Land Releases	Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
78-48-8 *	S,S,S-Tributyl-trithiophosphate	2	1,611	2	0	0	0	0	1,613	0	1,613
52-68-6 *	Trichlorfon	3	0	0	0	0	0	0	0	0	0
76-02-8	Trichloroacetyl chloride	1	1	0	0	0	0	0	1	0	1
120-82-1 *	1,2,4-Trichlorobenzene	31	150,883	533	5,800	0	0	156,200	313,416	2,632	316,048
71-55-6 *	1,1,1-Trichloroethane	250	3,879,346	195	1,245	0	0	60,167	3,940,953	17,134	3,958,087
79-00-5 *	1,1,2-Trichloroethane	23	296,348	621	0	0	0	0	296,969	113	297,082
79-01-6 *	Trichloroethylene	627	17,586,325	563	986	0	0	3,975	17,591,849	176,747	17,768,596
75-69-4 *	Trichlorofluoromethane (CFC-11)	28	431,631	558	0	0	0	395	432,584	228	432,812
88-06-2 *	2,4,6-Trichlorophenol	1	132	27	0	0	0	0	159	0	159
96-18-4	1,2,3-Trichloropropane	7	13,346	62	0	0	0	0	13,408	13	13,421
57213-69-1 *	Triclopyrtriethyl-ammonium salt	3	22	0	0	0	0	0	22	0	22
121-44-8	Triethylamine	163	1,633,313	18,482	245,917	0	552	29,047	1,927,311	3,946	1,931,257
1582-09-8 *	Trifluralin	21	11,908	5	0	0	0	5	11,918	26,370	38,288
26644-46-2 *	Triforine	1	0	0	0	0	0	0	0	0	0
95-63-6	1,2,4-Trimethylbenzene	830	7,884,672	7,820	9,097	0	0	24,323	7,925,912	148,595	8,074,507
639-58-7 *	Triphenyltin chloride	1	0	0	0	0	0	0	0	0	0
76-87-9 *	Triphenyltin hydroxide	3	3	0	0	0	0	0	3	381	384
51-79-6	Urethane	2	0	0	0	0	0	0	0	500	500
7440-62-2	Vanadium (fume or dust)	20	12,436	708	0	0	1,000	116,510	130,654	43,211	173,865
50471-44-8 *	Vinclozolin	2	0	0	0	0	0	0	0	0	0
108-05-4	Vinyl acetate	188	3,348,952	2,669	119,320	0	18	2,150	3,473,109	28,974	3,502,083
593-60-2	Vinyl bromide	2	5,430	0	0	0	0	0	5,430	0	5,430
75-01-4	Vinyl chloride	43	919,684	82	370	0	0	1	920,137	90,248	1,010,385
75-35-4 *	Vinylidene chloride	23	182,141	412	323	0	0	0	182,876	104	182,980
108-38-3	m-Xylene	63	1,368,270	552	3,980	0	210	12,579	1,385,591	4,535	1,390,126
95-47-6	o-Xylene	76	1,358,782	439	2,896	0	0	251,709	1,613,826	17,524	1,631,350
106-42-3	p-Xylene	42	2,492,320	303	3,027	0	0	32,862	2,528,512	10,602	2,539,114
1330-20-7 *	Xylene (mixed isomers)	2,912	74,361,257	36,604	130,995	2,620	2,207	75,470	74,609,153	723,974	75,333,127
87-62-7 *	2,6-Xylidine	3	52	0	0	0	0	0	52	0	52
7440-66-6 *	Zinc (fume or dust)	411	3,264,646	17,508	1	0	270,093	7,623,348	11,175,596	24,974,649	36,150,245
–	Zinc compounds	2,649	4,700,944	1,203,833	368,483	0	9,827,280	107,468,033	123,568,573	182,410,387	305,978,960
12122-67-7 *	Zineb	1	0	0	0	0	0	0	0	0	0
–	Mixtures and other trade name products	16	150,313	0	0	0	0	9,250	159,563	39,867	199,430
–	Trade secrets	11	14,000	0	0	0	0	0	14,000	0	14,000
	Total	71,670	1,331,663,886	218,371,961	219,070,242	443,656	20,472,578	326,431,932	2,116,454,255	461,098,829	2,577,553,084

Note: On-site Releases from Section 5 and Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 2-20B. TRI Chemicals in Waste, by Chemical, 1997, continued

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
78-48-8 *	S,S,S-Tributyl-trithiophosphate	0	0	0	0	2,754	111	1,671	4,536	0
52-68-6 *	Trichlorfon	0	0	0	0	0	0	0	0	0
76-02-8	Trichloroacetyl chloride	0	0	0	0	0	0	1	1	0
120-82-1 *	1,2,4-Trichlorobenzene	1,152,862	4,572	207,700	36,965	352,037	345,803	172,533	2,272,472	31,168
71-55-6 *	1,1,1-Trichloroethane	37,510,004	721,333	2,211,307	703,916	321,475	378,782	3,831,775	45,678,592	2,703
79-00-5 *	1,1,2-Trichloroethane	28,255,000	12,969,046	9,751,363	82,358	20,447,763	2,599,108	299,040	74,403,678	10,206
79-01-6 *	Trichloroethylene	136,927,893	5,812,121	5,788,807	876,284	3,793,003	1,354,282	17,415,699	171,968,089	388,927
75-69-4 *	Trichlorofluoromethane (CFC-11)	67,669	116,557	12,800	15,138	300,034	236,829	432,963	1,181,990	41
88-06-2 *	2,4,6-Trichlorophenol	0	0	0	0	1,014,286	0	159	1,014,445	0
96-18-4	1,2,3-Trichloropropane	1,500,000	0	680,000	470	1,224,000	8,635,576	13,473	12,053,519	14
57213-69-1 *	Triclopyrtriethyl-salt ammonium	0	0	0	0	33	59	22	114	0
121-44-8	Triethylamine	847,575	826,633	235,817	457,030	3,597,276	603,914	1,968,347	8,536,592	164
1582-09-8 *	Trifluralin	73,000	0	0	0	1,416,990	112,940	21,150	1,624,080	0
26644-46-2 *	Triforine	0	0	0	0	0	0	0	0	0
95-63-6	1,2,4-Trimethylbenzene	12,018,755	1,406,156	4,453,521	2,744,955	16,580,512	742,131	8,118,080	46,064,110	19,489
639-58-7 *	Triphenyltin chloride	0	0	0	0	0	9,987	0	9,987	0
76-87-9 *	Triphenyltin hydroxide	0	0	0	0	33,497	4,146	384	38,027	0
51-79-6	Urethane	0	0	0	0	0	0	1,500	1,500	0
7440-62-2	Vanadium (fume or dust)	358,477	21,714	0	0	440	1,205	172,015	553,851	128
50471-44-8 *	Vinclozolin	0	0	0	0	0	0	0	0	0
108-05-4	Vinyl acetate	827,369	93,926	21,696,559	13,187,593	17,449,172	1,146,917	3,446,620	57,848,156	18,204
593-60-2	Vinyl bromide	0	0	46,470	17	74	1	5,400	51,962	0
75-01-4	Vinyl chloride	398,418,771	82,698	21,752,907	17,663	33,633,983	134,349	957,085	454,997,456	6,426
75-35-4 *	Vinylidene chloride	1,651,035	2	250,000	184,033	6,027,739	73,599	182,993	8,369,401	125
108-38-3	m-Xylene	1,913,415	138,753	1,031,056	202,604	621,697	116,048	1,392,785	5,416,358	6,569
95-47-6	o-Xylene	120,668	56,898	2,964,558	1,082,547	2,001,686	880,772	1,472,204	8,579,333	17,460
106-42-3	p-Xylene	156,443	13,487	4,860,571	14,703	3,481,031	119,088	2,536,264	11,181,587	21,316
1330-20-7 *	Xylene (mixed isomers)	122,408,183	42,050,232	139,297,715	77,876,899	64,130,806	10,457,390	75,793,914	532,015,139	150,541
87-62-7 *	2,6-Xylidine	0	0	43,038	5,500	11	0	52	48,601	0
7440-66-6 *	Zinc (fume or dust)	24,831,821	60,647,618	51,376	62,294	764,655	449,041	35,193,560	122,000,365	250
--	Zinc compounds	107,656,323	257,386,303	613,266	261,459	70,211,629	18,374,257	277,306,831	731,810,068	6,770,405
12122-67-7 *	Zineb	0	0	0	0	0	0	0	0	0
--	Mixtures and other trade name products	0	2,182	3,700	8,282	0	0	188,915	203,079	0
--	Trade secrets	0	0	0	0	0	3,600	14,000	17,600	0
	Total[a]	7,986,618,922	2,390,787,879	3,805,792,208	525,610,064	7,012,922,513	536,021,338	2,467,643,821	24,725,396,745	37,761,187

Note: Data from Section 8 of Form R.

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

[a]Revisions by two facilities to quantities reported for on-site recycling of ethylene and propylene change total on-site energy recovery to 2,930,962,208 pounds and total production-related waste managed to 23,850,566,745 pounds in 1997.

Chapter 3

Year-to-Year Comparison of Toxics Release Inventory Data

This chapter compares TRI data for on- and off-site releases, on-site waste management, and transfers off-site for further waste management for two time periods: The first period reviews data for the last three reporting years (1995, 1996, and 1997), and the second period compares data for the TRI baseline reporting year and recent years (1988 and 1995-1997). Because not all types of data were collected in 1988, this chapter looks at waste management data for the first year that TRI collected such data (1991) and for recent years (1995-1997).

The discussion of "core" chemical lists, in the Introduction below, is important for accurate interpretation of these year-to-year comparisons because of the important changes in TRI over time.

Introduction

Because TRI data are collected annually, they can be used to measure the nation's progress in reducing toxic chemical releases and other waste management activities by manufacturing facilities and federal facilities. This chapter measures such progress on a national, state, and chemical-specific basis. Industry-specific analyses of year-to-year changes in TRI reporting appear in Chapter 4.

Tables in this chapter compare data for 1995 to 1997 to highlight recent changes in reporting. These tables give a three-year view of TRI reporting since the addition of nearly 300 substances in reporting year 1995.

Other tables compare data for 1995 to 1997 with the 1988 baseline data to measure progress since the beginning of TRI. Although 1987 was the first year for TRI reporting, 1988 has been chosen as the baseline year for comparisons because of concerns about the data quality of industry's submissions in the first year.

For waste management activities, progress can be measured from 1991, when such data were first collected by TRI. This section analyzes the actual quantities for previous and current years (1991 and 1995-1997), followed by a comparison of facilities' actual and projected data (1991, 1995-1997 with projections for 1998 and 1999).

Certain TRI reporting requirements have changed since the inception of the program—not only the addition of waste management data in 1991, but also the chemical expansion that nearly doubled the TRI chemical list beginning in the 1995 reporting year. It is important to understand these and other changes and consider their implications when comparing TRI data across years.

"Core" Chemicals for Year-to-Year Comparisons

EPA has the authority both to add chemicals to the TRI reporting list if they meet the statutory toxicity criteria. Conversely, EPA may delete chemicals if they do not meet the toxicity criteria. Since 1987, EPA has deleted a number of chemicals from the list, added others, and modified the reporting requirements for others. The largest expansion was the addition of 286 chemicals and chemical categories for the 1995 reporting year.

Year-to-year comparisons must be based on a consistent set of chemicals to assure that any changes in releases or other waste management do not simply reflect the addition, deletion, or change in definition of reportable chemicals from one year to another. Data in this chapter represent facility reporting only for the "core" chemicals for the years being compared. The set of "core" chemicals differs depending on the base year of comparison.

Three-year Comparisons

Tables comparing data for 1995 through 1997 include all chemicals currently reportable to TRI; there have been no additions or modifications to reporting requirements during this period. Thus, these tables include the nearly 300 chemicals added to TRI beginning with reporting year 1995 in addition to the roughly 300 chemicals that were on the list prior to 1995. Because no chemicals have been added or definitions changed since 1995, the 1997 totals in this chapter for on- and off-site releases, other on-site waste management, transfers off-site for further waste management, and total production-related waste are the same as the totals in Chapter 2.

Baseline Comparisons

Tables for 1988 to 1997 include only chemicals that were reportable in all years from 1988 through 1997. These tables do not include, for example, chemicals added in 1990, 1991, 1994, or 1995. Also for 1989, non-fibrous forms of aluminum oxide were removed from the list. Because of this modification, aluminum oxide is not included in any year-to-year comparison that includes the year 1988. As explained below, the reporting definitions for ammonia, hydrochloric acid, and sulfuric acid have changed, and they therefore are also not included in these tables. These tables summarize reporting for the 1988-1997 "core" chemicals.

Similarly, tables that compare data for 1991 to 1997 do not include chemicals added in 1994 or 1995. These tables analyze TRI data only for the chemicals that were on the TRI list, in the same form, for all years 1991-1997.

Because of this normalization process, done to assure accurate year-to-year comparisons, totals for 1997 in the multi-year baseline tables differ from the 1997 totals in Chapter 2 and in the three-year tables in this chapter.

None of the tables includes any chemical deleted from the TRI list, regardless of the year it was deleted.

TRI data are reported as absolute amounts each year, not as changes in relation to production levels or other factors, such as source reduction activity, that might influence these amounts from year to year. Chapter 4, presenting industry-specific data, takes a very basic look at changes in production as they may relate to increases and decreases in releases and other waste management of TRI chemicals.

Reporting of Ammonia, Hydrochloric Acid, and Sulfuric Acid

As described in Box 3-1, reporting requirements for ammonia have changed. Also, ammonium sulfate and ammonium nitrate are no longer individually listed on TRI. The ammonia portion of these chemicals, however, remains on the TRI list, and the nitrate ion portion of ammonium nitrate is reportable under the nitrate compounds category (added with the 1995 reporting year).

In addition, non-aerosol forms of hydrochloric acid and sulfuric acid have been removed from the list, hydrochloric acid with the 1995 reporting year and sulfuric acid in 1994 (see Box 3-2).

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

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

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

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

Although ammonium sulfate (solution) has been deleted from the list, the aqueous ammonia from this chemical is still reportable under the ammonia listing. To determine the amount of aqueous ammonia from ammonium sulfate (solution) that should be added to the aqueous ammonia totals, the amount of ammonium sulfate (solution) is multiplied by 0.026. This represents 10% of the total aqueous ammonia present in ammonium sulfate (solution) since ammonia (as NH_3) makes up 26% of ammonium sulfate.

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

To determine the quantity of total aqueous ammonia released to surface water, land, or underground injection, data users must multiply the reported quantity by 10. For example, to make use of the quantities reported for aqueous ammonia in any analysis of releases to surface waters, the reported amounts must be converted to total aqueous ammonia values. This is necessary in order to take into account site-specific conditions of pH and temperature which determine the amount of total ammonia that will be present in the more aquatically toxic form. To convert the reported aqueous ammonia values to total ammonia, simply multiply amounts by 10.

Box 3-2. An Explanation of the Modification to the Reporting Requirements for Hydrochloric and Sulfuric Acid

An Explanation of the Modification to the Reporting Requirements for Hydrochloric and Sulfuric Acid

On June 30, 1995, EPA finalized a modification to the listing for sulfuric acid, and on July 25, 1996, EPA finalized the same modification to the listing for hydrochloric acid. These two chemical listings were modified by the addition of the following qualifier: "(acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)." The modification to sulfuric acid was effective for the 1994 reporting year and the modification to hydrochloric acid was effective for the 1995 reporting year. EPA made those modifications in response to petitions to delist the non-aerosol forms of these chemicals. EPA determined that the non-aerosol forms did not meet the listing criteria of EPCRA section 313(d) and therefore granted the petitions. These modifications mean that facilities are no longer required to report releases and transfers of non-aerosol forms of sulfuric and hydrochloric acid under EPA section 313.

These changes in the reporting requirements for sulfuric and hydrochloric acid are reflected in the largest reductions in reported amounts of these chemicals as compared to those published in *TRI Public Data Release* reports prior to the volume for the 1996 reporting year. Most of these reductions result from the fact that solutions of these chemicals that do not become airborne are exempt from reporting. Thus, there are large reductions in the reported amounts released, particularly quantities discharged to surface waters and injected underground and in amounts reported for most types of transfers. Since airborne forms are still covered by these listings, reported fugitive or nonpoint air emissions have not changed as much as other types of releases, and there has been little change in the stack or point air emission totals. In addition to lower reported releases and transfers, some facilities may no longer exceed reporting thresholds for the aerosol forms only and thus may not have to file a report.

Only airborne forms of these chemicals count towards the reporting threshold and release calculations, and releases of their non-aerosol forms are no longer reportable. Because of this modification to the reporting requirements, these chemicals are not included in multi-year comparisons in this chapter (tables with data for 1988 or 1991).

Threshold Changes

Facilities are required to report for a particular chemical only if they meet the manufacture, process, or otherwise use thresholds. The otherwise use threshold has remained 10,000 pounds since the inception of the program. However, the manufacture and process thresholds began at 75,000 pounds for the 1987 reporting year, dropped to 50,000 pounds for 1988, and dropped to 25,000 pounds for 1989 and thereafter. Due in part to these declining thresholds, the number of facilities reporting to TRI and the number of forms filed increased from 1987 to 1988 and again from 1988 to 1989. These threshold changes may have affected the TRI data between 1988 and 1989, but would not affect data after 1989. As discussed in Chapter 1, EPA has proposed lower thresholds for persistent bioaccumulators (PBTs).

As explained in Chapter 1, facilities whose "total annual reportable amount" does not exceed 500 pounds can submit certification statements (Form As) instead of Form Rs (if they do not manufacture, process, or otherwise use more than 1 million pounds of the chemical). This change became effective in reporting year 1995. Form A certification statements identify the facility and chemical, but do not supply any amounts of releases or other waste management. In prior years, facilities were required to report such amounts, and totals for 1988-1994 include these submissions. More than 10,500 Form A certification statements were submitted in 1997—these do not provide release or other waste management data. Thus, some portion of any decrease in reported amounts from 1994 or earlier years would be attributable to the submission of these certification forms. In 1997, with 10,547 Form As and a maximum of 500 pounds of production-related waste managed per form, the total production-related waste managed would, at most, be 5,273,500 pounds higher or an additional 0.02% reported if each Form A represented the full 500 pounds.

Underground Injection and On-site Land Releases

In 1996, TRI began collecting data separately for types of underground injection and for on-site land releases to RCRA subtitle C landfills. Instead of reporting a total for underground injection in Form R's Section 5, facilities began reporting amounts injected into Class I wells separately from amounts injected into underground wells of other classes (II-V). Similarly, RCRA subtitle C landfills were separated out from other types of on-site land releases that are reported in Section 5. Because these releases were not broken out until 1996, they cannot be analyzed separately in the tables in this chapter.

Waste Management

As described in Chapter 2, the Pollution Prevention Act of 1990 added to TRI the collection of waste management data items including: on- and off-site recycling, energy recovery, and treatment, plus quantity released on- and off-site, plus one-time catastrophic or remedial releases (non-production-related waste). Because these data items were not collected until 1991, comparisons cannot be drawn with 1988 data.

New Types of Transfers

Beginning with the 1991 reporting year, facilities were required to report transfers off-site for the purposes of recycling and energy recovery to TRI. Prior to 1991, facilities were required to report only transfers to POTWs and other off-site locations for the purposes of treatment and disposal. Because of this change in the reporting requirements, transfers off-site for further waste management for 1988 are not comparable to such transfers for 1991 and beyond. Comparisons between 1988 and 1997 transfers in this chapter include only those transfer types that were reportable in 1988.

Metals and Metal Compounds

As explained in Chapter 2, TRI began in reporting year 1997 distinguishing metals and metal compounds from other listed chemicals in certain types of off-site transfers. Specifically, metals and metal compounds transferred off-site to solidification/stabilization, to wastewater treatment (excluding POTWs), and to POTWs are also classified as off-site releases. (See Chapter 2, Boxes 2-2 through 2-4.) Although this categorization is new in 1997, comparable transfers of metals and metal compounds in previous years can be identified by the waste treatment codes that applied in those years. Tables in this chapter present such data.

Reasons for Change

Box 3-3 provides reasons that a facility's reported amounts may change from one year to another. Explanations for changes in reported amounts include actual source reduction projects undertaken to reduce a facility's generation of waste of a particular chemical, increases or decreases in production levels, changes in a facility's methods of estimating or calculating reportable amounts (which does not indicate a corresponding change in actual releases and waste management), reporting errors in previous years for which the facility has not filed a revised submission, and others.

Apparent increases and decreases among industries (as seen in Chapter 4) can also result when facilities change the Standard Industrial Classification (SIC) codes that they report from one year to another, reflecting new or discontinued facility operations or indicating a different understanding of how SIC codes relate to the facility's business.

1995-1997 National Overview

On- and Off-site Releases, 1995-1997

Total on- and off-site releases of toxic chemicals to the environment decreased by 38.8 million pounds from 1995 to 1997, as shown in Table 3-1. This net reduction of 1.5% occurred as total on- and off-site releases first declined from 2.62 billion pounds in 1995 to 2.52 billion pounds in 1996 and then increased to 2.58 billion pounds in 1997.

On-site Releases

From 1995 to 1997, on-site releases decreased by 8.2%, a reduction of 187.8 million pounds (see Table 3-1) On-site releases totaled 2.30 billion pounds in 1995 and 2.12 billion pounds in 1997.

Air emissions, the largest type of on-site release in TRI reporting, also showed the largest reduction: from 1.58 billion pounds in 1995 to 1.33 billion pounds in 1997. This 15.7% reduction included decreases in both fugitive emissions (down 19.1%) and point source emissions (down 14.6%). Facilities also reported less underground injection, decreasing from 233.6 million pounds to 219.5 million pounds (a 6.0% reduction).

Surface water discharges and on-site land releases both increased. Surface water discharges rose from 175.8 million pounds in 1995 to 218.4 million pounds in 1997, a 24.2% increase. One facility reporting in SIC code 33, the primary metals industry, reported an increase in surface water discharges of nitrate compounds from 9.8 million pounds in 1995 to 26.0 million pounds in 1997. The facility attributed the increase to increased production and to increased use of nitric acid in a pickling process for production of specialty steels. A facility reporting in SIC code 28, chemical manufacturing, reported an increase in surface water discharges of phosphoric acid from 14.1 million pounds in 1995 to 29.0 million pounds in 1997. This facility attributed its increase in part to the facility's lowering of water levels in ponds, requiring an increase in the releases of water containing phosphoric acid. Large rain events in previous years had filled the ponds to capacity, restricting the facility's capacity. The facility contact indicated that the facility expects releases of phosphoric acid to decline in 1998 to 1995 levels.

On-site land releases increased from 315.6 million pounds in 1995 to 346.9 million pounds in 1997, a 9.9% increase. This included substantial increases in on-site land releases of metal compounds by two primary metals facilities (SIC code 33). One facility reported on-site land releases of 3.1 million pounds of zinc compounds in 1995 and 12.0 million pounds in 1997. Another facility reported increases for four metal compounds: arsenic compounds from 620,000 pounds to 4.2 million pounds; copper compounds from 2.4 million pounds to 9.9 million pounds; lead compounds from 760,000 to 4.5 million pounds; and zinc compounds from 1.6 million pounds to 5.0 million pounds. (The total increase for the facility's reporting of these four metal compounds was 18.2 million pounds.) This facility indicated that it changed its smelting process in June 1995 to reduce sulfur dioxide emissions. From 1996 to 1997, increased production brought about a two-fold increase in production of slag tailings, accounting for about two-thirds of the facility's increase. The facility attributed the rest of the increase to a clean-up process that began in 1996. In this activity, sediment is being removed from old sludge ponds, dried, and relocated to a lined repository on-site that meets RCRA specifications. The clean-up process is excepted to continue for a couple of years.

Box 3-3. Reasons Facility Estimates of Releases and Other Waste Management Change

Reasons Facility Estimates of Releases and Other Waste Management Change

Some reported increases and decreases are real—that is, they reflect changes in the amounts of TRI chemicals actually released or otherwise managed in waste. Other reported increases and decreases are accounting or "paper" changes that do not reflect change in releases or other waste management. Some examples follow.

Real Changes

Source reduction activities, such as process changes, elimination of spills and leaks, inventory control, improved maintenance, chemical substitution, and alternative methods of cleaning and degreasing can cause real reduction in the amount of waste generated and/or managed.

The installation of pollution control equipment does not reduce the amount of waste generated, but may lead to real reductions in TRI chemicals released. However, if the pollution control does not destroy the reported chemical, it may merely shift waste from one type of waste management to another.

Production changes can cause real changes in the quantities of TRI chemicals released or otherwise managed as waste by facilities. Production-related waste is likely to increase when production increases and decrease when production decreases, although the relationship is not necessarily linear.

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

"Paper" Changes

Changes in estimation or calculation techniques can cause a change in the amount reported without a corresponding change in actual quantities released or otherwise managed as waste.

Clarifications of reporting instructions or changes in the way a facility interprets those instructions may cause a change in reported amounts without an actual change in quantities released or otherwise managed as waste.

Changes in the reporting definition of a particular chemical may cause a change in the reported amounts without an actual change in quantities released or otherwise managed as waste. For example, revising the definitions of sulfuric acid and hydrochloric acid to include only aerosol forms, as discussed in Box 3-2, will result in lower reports of releases, when non-aerosol forms are no longer reported.

Similarly, a facility's use of the alternate threshold may result in a reported decrease without an actual reduction in releases if the facility begins to take advantage of the alternate manufacture, process, or otherwise use threshold of more than 1 million pounds. Beginning in the 1995 reporting year, some facilities whose "total annual reportable amount" for a reportable chemical does not exceed 500 pounds may use an alternate manufacture, process, or otherwise use threshold of more than 1 million pounds of the chemical. If they do not exceed this alternate threshold, they no longer need to report amounts of releases or other waste management activities.

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

Table 3-1. Comparison of TRI On-site and Off-site Releases and Transfers for Further Waste Management, 1995-1997

	1995	1996	1997	Change 1995-1997	
	Number	Number	Number	Number	Percent
Total Facilities	22,664	22,047	21,490	-1,174	-5.2
Total Forms	75,371	72,643	71,670	-3,701	-4.9
Form Rs	68,793	65,247	61,123	-7,670	-11.1
Form As	6,578	7,396	10,547	3,969	60.3
	Pounds	Pounds	Pounds	Pounds	Percent
On-site Releases					
Total Air Emissions	1,579,242,325	1,458,785,384	1,331,663,886	-247,578,439	-15.7
Fugitive Air Emissions	392,069,349	350,543,301	317,233,311	-74,836,038	-19.1
Point Source Air Emissions	1,187,172,976	1,108,242,083	1,014,430,575	-172,742,401	-14.6
Surface Water Discharges	175,819,158	179,229,798	218,371,961	42,552,803	24.2
Underground Injection	233,588,328	204,237,312	219,513,898	-14,074,430	-6.0
On-site Land Releases	315,612,588	332,123,472	346,904,510	31,291,922	9.9
Total On-site Releases	2,304,262,399	2,174,375,966	2,116,454,255	-187,808,144	-8.2
Off-site Releases					
Storage Only[a]	2,222,526	1,444,059	6,626,857	4,404,331	198.2
Solidification/Stabilization[b]	26,383,685	57,678,733	144,325,113	117,941,428	447.0
Metals and Metal Compounds Only					
Wastewater Treatment (excluding POTWs)[c]	3,668,502	3,695,289	6,074,558	2,406,056	65.6
Metals and Metal Compounds Only					
Transfers to POTWs[d]	2,516,717	2,416,288	2,399,930	-116,787	-4.6
Metals and Metal Compounds Only					
Underground injection	17,150,771	10,790,626	14,265,756	-2,885,015	-16.8
Landfills/Disposal Surface Impoundments	220,810,041	240,513,813	251,854,306	31,044,265	14.1
Land Treatment	4,694,474	2,198,553	1,264,484	-3,429,990	-73.1
Other Land Disposal	13,535,338	11,402,005	10,314,727	-3,220,611	-23.8
Other Off-site Management	12,709,700	10,632,834	11,994,251	-715,449	-5.6
Transfers to Waste Broker for Disposal	6,794,093	4,715,221	7,377,734	583,641	8.6
Unknown[e]	1,614,459	1,587,429	4,601,113	2,986,654	185.0
Total Off-site Releases (Transfers Off-site to Disposal)	312,100,306	347,074,850	461,098,829	148,998,523	47.7
Total On- and Off-site Releases	2,616,362,705	2,521,450,816	2,577,553,084	-38,809,621	-1.5

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Other On-site Waste Management** from Section 8. **Total Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

[a]"Storage only" (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to "storage only" are included as a form of disposal (off-site release). See Box 2-2.

[b]Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste management code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste management code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 2-3. Reports under code M40 of metals and metal compounds have been included in solidification/stabilization of metals and metal compounds in this report.

[c]Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste management code M62) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste management code M61). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 2-3. Transfers of metals and metal compounds reported under code M61 have been included in transfers of metals and metal compounds to wastewater treatment.

[d]Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

[e]"Unknown" (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as "unknown" transfers are treated as a form of disposal (off-site release).

Table 3-1. Comparison of TRI On-site and Off-site Releases and Transfers for Further Waste Management, 1995-1997, continued

	1995	1996	1997	Change 1995-1997	
	Pounds	Pounds	Pounds	Pounds	Percent
Other On-site Waste Management					
Recycled On-site[f]	11,480,495,719	7,300,051,732	7,986,618,922	-3,493,876,797	-30.4
Energy Recovery On-site[g]	2,822,971,901	2,763,621,173	3,805,792,208	982,820,307	34.8
Treated On-site	7,039,799,031	6,152,076,079	7,012,922,513	-26,876,518	-0.4
Total Other On-site Waste Management[h]	21,343,266,651	16,215,748,984	18,805,333,643	-2,537,933,008	-11.9
Transfers Off-site for Further Waste Management					
Transfers to Recycling	2,449,540,356	2,396,768,626	2,381,458,528	-68,081,828	-2.8
Transfers to Energy Recovery	517,723,420	478,425,908	507,985,556	-9,737,864	-1.9
Transfers to Treatment	250,587,060	226,482,116	258,693,439	8,106,379	3.2
Transfers to POTWs	246,473,037	238,098,609	266,863,876	20,390,839	8.3
Other Off-site Transfers[i]	2,497,236	1,005,865	0	-2,497,236	-100.0
Total Transfers Off-site for Further Waste Management	3,466,821,109	3,340,781,124	3,415,001,399	-51,819,710	-1.5

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Other On-site Waste Management** from Section 8. **Total Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

[f]Seven facilities in the food processing industry (SIC code 20) reported from 500 million pounds to 1 billion pounds each in on-site recycling of n-hexane in 1995, for a total 4,000,192,215 billion pounds. In 1996, these facilities reported no on-site recycling of n-hexane. On their 1996 Form Rs, these facilities also reported zero for on-site recycling of n-hexane for the prior year (1995). However, they have not revised their 1995 Form Rs. Another facility, Shintech Inc. in Freeport, TX, reported on-site recycling of vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 pounds in 1996. The apparent facility errors and the facility revisions change on-site recycling to 7,680,103,504 pounds in 1995 and to 7,543,807,732 pounds in 1996. The change in on-site recycling changes to 306,515,418 pounds or 4.0%.

[g]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. The facility also reported on-site energy recovery for propylene of 12,900,000 pounds in 1995, 16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997. The facility has since revised this quantity to 13,000,000 pounds. These revisions change on-site energy recovery to 2,727,571,901 pounds in 1995,to 2,711,071,173 pounds in 1996, and to 2,930,962,208 pounds in 1997. The change in on-site energy recovery changes to 203,390,307 pounds or 7.5%.

[h]Apparent errors by seven facilities and revisions by three facilities change total other on-site waste management to 17,447,474,436 pounds in 1995, to 16,406,954,984 pounds in 1996, and to 17,930,503,643 pounds in 1997. The change in total other on-site waste management changes to 483,029,207 pounds or 2.8%.

[i]Other Off-site Transfers are transfers reported without a valid waste management code.

Off-site Releases

From 1995 to 1997, off-site releases (transfers to disposal) increased substantially (47.7%) from 312.1 million pounds to 461.1 million pounds. Most of this increase—114.0 million pounds of a 149.0-million-pound increase—occurred from 1996 to 1997.

Transfers of metals and metal compounds to solidification/stabilization contributed the majority of the increase in off-site releases from 1995 to 1997. Such transfers totaled 26.4 million pounds in 1995, 57.7 million pounds in 1996, and 144.3 million pounds in 1997. This amounted to an increase of 117.9 million pounds, or 447.0%, from 1995 to 1997. More widespread awareness of the reporting requirements, as EPA added specific reporting codes for certain transfers of metals and metal compounds in 1997 (see Chapter 2, Box 2-3), may partly explain this increase.

Transfers of all TRI chemicals to landfills/disposal surface impoundments showed the second-largest absolute increase from 1995 to 1997, a 31.0 million pound increase. Landfills/disposal surface impoundments received 220.8 million pounds in 1995 and 251.9 million pounds in 1997, a 14.1% increase.

As seen in Table 3-1, other types of off-site releases increased or decreased by less than 5 million pounds each from 1995 to 1997.

Other On-site Waste Management, 1995-1997

Other on-site waste management reported to TRI decreased from 21.34 billion pounds in 1995 to 18.81 billion pounds in 1997 (see Table 3-1). However, these data reflect large apparent reporting errors, including some facility submissions that were revised after the TRI data were "frozen" for preparation of this report. "TRI Chemicals Managed in Waste, 1995-1997," below, further examines the effects of these reporting errors and revisions. Taking into account the changes and errors, other on-site waste management increased 2.8% from 17.45 billion pounds in 1995 to 17.93 billion pounds in 1997.

Transfers Off-site for Further Waste Management, 1995-1997

Transfers of TRI chemicals off-site for further waste management decreased from 3.47 billion pounds in 1995 to 3.42 billion pounds in 1997, a 1.5% reduction (see Table 3-1). Transfers to recycling decreased from 2.45 billion pounds to 2.38 billion pounds, the largest absolute reduction (68.1 million pounds). Transfers to POTWs increased from 246.5 million pounds to 266.9 million pounds, the largest increase (20.4 million pounds).

Facilities and Forms, 1995-1997

The number of facilities reporting to TRI and the number of forms they submitted both decreased by approximately 5% from 1995 to 1997, as shown in Table 3-1. In 1995, 22,664 facilities reported, declining to 21,490 in 1997. TRI facilities submitted 75,371 forms in 1995 and 71,670 in 1997. However, the number of facilities and forms for 1997 is likely to rise somewhat over time due to late reporting and to the resolution of outstanding data quality problems.

Although the total number of forms decreased, facilities submitted a greater number of Form A certification statements in 1997. Form A submissions, explained above and in Chapter 1, rose from 6,578 in 1995—the first year in which facilities could submit these forms—to 10,547 in 1997. This represented a 60.3% increase in Form A submissions. At the same time, submissions of Form Rs declined from 68,793 in 1995 to 61,123 in 1997, an 11.1% decrease. The increase in Form A submissions may reflect both increasing awareness of the reduced reporting option and an increasing number of facilities meeting the alternative threshold for one or more chemicals.

TRI Chemicals Managed in Waste, 1995-1997

From 1995 to 1997, the quantities of TRI chemicals that facilities managed in production-related waste decreased from 27.49 billion pounds to 24.73 billion pounds. As shown in Table 3-2, this amounted to a 10.0% reduction. However, these quantities include apparent facility errors in on-site recycling and on-site energy recovery data that substantially affect overall totals. These facility reporting issues are described below. Taking into account the errors and changes, production-related waste managed would total 23.59 billion pounds in 1995 and 23.85 billion pounds in 1997, an increase of 1.1%.

As shown in Table 3-2, facilities reported on-site recycling of 11.48 billion pounds in 1995, dropping to 7.30 billion pounds in 1996, and then rising to 7.99 billion pounds in 1997. However, apparent facility errors and late revisions would change this large reduction to an increase. In 1995, seven food processing facilities (Standard Industrial Classification code 20) reported on-site recycling of 500 million to 1 billion pounds each of n-hexane, a chemical added to TRI in the 1995 reporting year. Together, their 1995 on-site recycling of n-hexane totaled 4.00 billion pounds. In 1996 and 1997, these facilities reported no on-site recycling of n-hexane. TRI facilities report production-related waste quantities for both the prior year and current year (along with projections for the following two years). As noted in the *1996 TRI Data Release*[1], these facilities reported on their 1996 TRI Form Rs zero amounts of on-site recycling of n-hexane for the prior year (1995), but did not revise their 1995 submissions. Such changes generally indicate that facilities have revised their interpretation of on-site recycling. Currently, there are no TRI regulatory definitions of recycling, and facilities may use their own interpretations for purposes of reporting to TRI. Some facilities have chosen to restrict their interpretation of on-site recycling to cover a very limited set of activities. Therefore, quantities that may have been reported as amounts undergoing waste management activities in early years are not reported on the Form R in subsequent years and are, thus, not in the TRI database. These changes in interpretations do not represent a change in guidance by EPA on how to report recycling. Because the seven food processing facilities did not revise their 1995 submissions, the large amounts of on-site recycling they reported in 1995 remain in the TRI data.

Furthermore, another facility reported on-site recycling of 200,000 pounds of vinyl chloride in 1995; 244,000 pounds in 1996, and 243.8 million pounds in 1997. This facility revised its 1995 and 1996 submissions after the TRI database was "frozen" for preparation of this report. The revised amounts were 200.0 million pounds in 1995 and 244.0 million pounds in 1996. This revision eliminates an apparent increase for this facility from 1995 to 1997 of 241.8 million pounds in on-site recycling.

Therefore, excluding the 1995 reporting of on-site recycling of n-hexane by the seven food processors and incorporating the revised submission for vinyl chloride, on-site recycling would show an increase from 7.68 billion pounds in 1995 to 7.99 billion pounds in 1997. This would constitute a 4.0% increase from 1995 to 1997, rather than the 30.4% reduction shown in Table 3-2.

On-site energy recovery increased by nearly 1 billion pounds from 1995 to 1997, as shown in Table 3-2, with facilities reporting 2.82 billion pounds in 1995 and 3.81 billion pounds in 1997, an increase of 34.8%. However, one facility that reported combustion for energy recovery of 193.8 million pounds of ethylene in 1997 revised its submission after the TRI data were "frozen" for this report. The facility's revised report for on-site energy recovery of

[1] *1996 Toxics Release Inventory Public Data Release—Ten Years of Right-to-Know: Industry Sector Analyses*, US EPA, Office of Pollution Prevention and Toxics, EPA 745-R-98-018, December 1998.

Table 3-2. Quantities of TRI Chemicals in Waste, 1995-1997

Waste Management Activity	1995 Pounds	1996 Pounds	1997 Pounds
Recycled On-site[a]	11,480,495,719	7,300,051,732	7,986,618,922
Recycled Off-site	2,541,332,998	2,454,579,937	2,390,787,879
Energy Recovery On-site[b]	2,822,971,901	2,763,621,173	3,805,792,208
Energy Recovery Off-site	503,525,690	510,546,386	525,610,064
Treated On-site	7,039,799,031	6,152,076,079	7,012,922,513
Treated Off-site	562,359,889	504,708,015	536,021,338
Quantity Released On- and Off-site	2,536,870,344	2,458,897,799	2,467,643,821
Total Production-related Waste Managed[c]	27,487,355,572	22,144,481,121	24,725,396,745
Non-Production-related Waste Managed	34,042,055	30,970,905	37,761,187

Waste Management Activity	Change 1995-1996 Percent	Change 1996-1997 Percent	Change 1995-1997 Percent
Recycled On-site[a]	-36.4	9.4	-30.4
Recycled Off-site	-3.4	-2.6	-5.9
Energy Recovery On-site[b]	-2.1	37.7	34.8
Energy Recovery Off-site	1.4	3.0	4.4
Treated On-site	-12.6	14.0	-0.4
Treated Off-site	-10.3	6.2	-4.7
Quantity Released On- and Off-site	-3.1	0.4	-2.7
Total Production-related Waste Managed[c]	-19.4	11.7	-10.0
Non-Production-related Waste Managed	-9.0	21.9	10.9

Note: All data taken from Section 8 of Form R for year indicated.

[a]Seven facilities in the food processing industry (SIC code 20) reported from 500 million pounds to 1 billion pounds each in on-site recycling of n-hexane in 1995, for a total 4,000,192,215 billion pounds. In 1996, these facilities reported no on-site recycling of n-hexane. On their 1996 Form Rs, these facilities also reported zero for on-site recycling of n-hexane for the prior year (1995). However, they have not revised their 1995 Form Rs. Another facility, Shintech Inc. in Freeport, TX, reported on-site recycling of vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 pounds in 1996. The apparent facility errors and the facility revisions change on-site recycling to 7,680,103,504 pounds in 1995 and to 7,543,807,732 pounds in 1996. The percentage change in on-site recycling changes to -1.8% for 1995-1996, to 5.9% for 1996-1997, and to 4.0% for 1995-1997.

[b]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. The facility also reported on-site energy recovery for propylene of 12,900,000 pounds in 1995, 16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997. The facility has since revised this quantity to 13,000,000 pounds. These revisions change on-site energy recovery to 2,727,571,901 pounds in 1995, 2,711,071,173 pounds in 1996, and 2,930,962,208 pounds in 1997. The percentage change in on-site energy recovery changes to -0.6% for 1995-1996, to 8.1% for 1996-1997, and to 7.5% for 1995-1997.

[c]Apparent errors by seven facilities and revisions by three facilities change total production-related waste managed to 23,591,563,357 pounds in 1995, 22,335,687,121 pounds in 1996, and 23,850,566,745 pounds in 1997. The percentage change in total production-related waste managed changes to -5.3% for 1995-1996, to 6.8% for 1996-1997, and to 1.1% for 1995-1997.

ethylene totals 13.0 million pounds. This facility thus shows an increase from 1995 to 1997 of 8.5 million pounds instead of 189.3 million pounds. Another facility reported a total of 95.4 million pounds of on-site energy recovery of ethylene and propylene in 1995 and 694.0 million pounds in 1997. This facility also revised its submissions after the cut-off for inclusion in this report, changing its 1995 and 1997 amounts for both chemicals to zero. The revision eliminates an increase of 598.6 million pounds from 1995 to 1997. Taking into account these facility revisions, on-site energy recovery would increase 7.5% from 2.73 billion in 1995 to 2.93 billion in 1997.

Off-site energy recovery also increased, from 503.5 million pounds to 525.6 million pounds, or 4.4%.

All other waste management methods decreased from 1995 to 1997. These included a reduction in off-site recycling from 2.54 billion pounds to 2.39 billion pounds and a reduction in quantity released on- and off-site from 2.54 billion pounds to 2.47 billion pounds. Smaller decreases appeared in both on-site treatment (from 7.04 billion pounds to 7.01 billion pounds) and off-site treatment (from 562.4 million pounds to 536.0 million pounds).

A few facilities have reported substantial changes over time in on-site treatment. Two facilities with the same parent company reported no on-site treatment of creosote until 1996, when each reported a relatively small quantity. From 1996 to 1997, on-site treatment of creosote increased at the two facilities from 3.4 million pounds to 583.9 million pounds, in one case, and from 784,000 pounds to 104.9 million pounds in the other.

Another facility reported 220.8 million pounds of on-site treatment of phosphoric acid in 1995. This facility reported no on-site treatment of phosphoric acid in subsequent years, but instead reported substantial quantities of on-site recycling of the chemical (110.6 million pounds in 1996 and 200.9 million pounds in 1997).

1988 and 1995-1997 National Overview

The "core" chemicals description in the introduction to this chapter explains the differences in coverage of analyses in this section with those in the 1995-1997 section above.

On- and Off-site Releases, 1988 and 1995-1997

For the 1988-1997 "core" chemicals, TRI facilities have reduced their total on- and off-site releases by 42.8% since the 1988 baseline year. As shown in Table 3-3, releases declined from 3.40 billion pounds in 1995 to 1.94 billion pounds in 1997—a decrease of 1.45 billion pounds. Figure 3-1 illustrates the change by type of release.

On-site Releases

Nearly all of the change in total releases was attributable to on-site releases, which constituted more than 87% of the total in 1988, the baseline year. In 1988, facilities reported 2.97 billion pounds of on-site releases. By 1997, on-site releases decreased to 1.51 billion pounds, a reduction of 1.46 billion pounds or 49.2%. (See Table 3-3.)

Air emissions represented the largest component of the reduction in on-site releases of "core" chemicals, falling 55.0% from 2.18 billion pounds in 1988 to just under 1 billion pounds in 1997. Both fugitive and point source emissions contributed to the reduction in air emissions. Fugitive emissions decreased by a greater percentage (64.7%, or 441.0 million pounds) and point source emissions by the larger amount (758.8 million pounds or 50.6%).

Table 3-3. Comparison of TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management, 1988 and 1994-1996

	1988	1995	1996	1997	Change 1988-1997	
	Number	Number	Number	Number	Number	Percent
Total Facilities	20,458	20,605	20,103	19,597	-861	-4.2
Total Forms	62,763	62,586	60,844	60,095	-2,668	-4.3
Form Rs	62,763	57,305	54,835	51,534	-11,229	-17.9
Form As	--	5,281	6,009	8,561	--	--
	Pounds	Pounds	Pounds	Pounds	Pounds	Percent
On-site Releases						
Total Air Emissions	2,182,164,856	1,196,552,574	1,094,173,553	982,349,489	-1,199,815,367	-55.0
Fugitive Air Emissions	681,219,379	305,099,241	268,675,527	240,211,769	-441,007,610	-64.7
Point Source Air Emissions	1,500,945,477	891,453,333	825,498,026	742,137,720	-758,807,757	-50.6
Surface Water Discharges	164,551,897	36,606,449	44,278,020	61,439,148	-103,112,749	-62.7
Underground Injection	161,969,132	139,949,446	118,197,169	126,462,808	-35,506,324	-21.9
On-site Land Releases	459,276,400	304,111,147	323,317,451	338,768,345	-120,508,055	-26.2
Total On-site Releases	2,967,962,285	1,677,219,616	1,579,966,193	1,509,019,790	-1,458,942,495	-49.2
Off-site Releases						
Storage Only[a]	13,834,620	2,060,447	1,229,153	6,359,857	-7,474,763	-54.0
Solidification/Stabilization[b]	29,534,134	26,383,685	57,678,733	144,321,621	114,787,487	388.7
Metals and Metal Compounds Only						
Wastewater Treatment (excluding POTWs)[c]	4,555,460	3,668,502	3,695,289	6,062,266	1,506,806	33.1
Metals and Metal Compounds Only						
Transfers to POTWs[d]	9,569,221	2,516,717	2,416,288	2,399,930	-7,169,291	-74.9
Metals and Metal Compounds Only						
Underground Injection	8,962,004	12,515,674	9,064,936	10,872,188	1,910,184	21.3
Landfills/Disposal Surface Impoundments	267,277,612	210,451,136	221,601,081	232,612,295	-34,665,317	-13.0
Land Treatment	2,786,071	1,142,368	534,853	658,867	-2,127,204	-76.4
Other Land Disposal	9,646,794	11,587,568	6,053,151	7,997,899	-1,648,895	-17.1
Other Off-site Management	39,503,355	10,813,964	9,301,379	10,119,569	-29,383,786	-74.4
Transfers to Waste Broker for Disposal	30,401,909	5,047,986	4,351,938	7,069,318	-23,332,591	-76.7
Unknown[e]	11,833,224	1,518,581	1,492,591	4,376,547	-7,456,677	-63.0
Total Off-site Releases	427,904,404	287,706,628	317,419,392	432,850,357	4,945,953	1.2
Total On- and Off-site Releases	3,395,866,689	1,964,926,244	1,897,385,585	1,941,870,147	-1,453,996,542	-42.8

Note: Does not include delisted chemicals, chemicals added in 1990, 1991, 1994 and 1995, aluminum oxide, ammonia, hydrochloric acid and sulfuric acid. **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Other On-site Waste Management** from Section 8. **Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Form A certification statement reporting began in 1995 reporting year. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year. **Other On-site Waste Management** began in 1991 reporting year.

[a]"Storage only" (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to "storage only" are included as a form of disposal (off-site release). See Box 2-2.

[b]Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste management code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste management code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 2-3. Reports under code M40 of metals and metal compounds have been included in solidification/stabilization of metals and metal compounds in this report.

[c]Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste management code M62) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste management code M61). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 2-3. Transfers of metals and metal compounds reported under code M61 have been included in transfers of metals and metal compounds to wastewater treatment.

[d]Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

[e]"Unknown" (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as "unknown" transfers are treated as a form of disposal (off-site release).

Table 3-3. Comparison of TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management, 1988 and 1994-1996, continued

	1988	1995	1996	1997	Change 1988-1997	
	Pounds	Pounds	Pounds	Pounds	Pounds	Percent
Other On-site Waste Management						
Recycled On-site[f]	--	6,073,265,292	6,188,507,173	6,734,896,573	--	--
Energy Recovery On-site[g]	--	2,674,181,626	2,587,450,531	3,551,929,018	--	--
Treated On-site	--	4,770,448,186	4,426,369,290	4,523,398,161	--	--
Total Other On-site Waste Management[h]	--	13,517,895,104	13,202,326,994	14,810,223,752	--	--
Transfers Off-site for Further Waste Management						
Transfers to Recycling	--	2,389,565,522	2,341,841,917	2,329,692,339	--	--
Transfers to Energy Recovery	--	489,222,790	447,517,006	470,003,572	--	--
Transfers to Treatment	335,109,834	201,314,913	185,584,598	215,350,168	-119,759,666	-35.7
Transfers to POTWs	245,238,468	151,340,511	139,177,537	157,708,721	-87,529,747	-35.7
Other Off-site Transfers[i]	43,473,226	2,218,626	779,132	0	-43,473,226	-100.0
Total Transfers Off-site for Further Waste Management	--	3,233,662,362	3,114,900,190	3,172,754,800	--	--

Note: Does not include delisted chemicals, chemicals added in 1990, 1991, 1994 and 1995, aluminum oxide, ammonia, hydrochloric acid and sulfuric acid. **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Other On-site Waste Management** from Section 8. **Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Form A certification statement reporting began in 1995 reporting year. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year. **Other On-site Waste Management** began in 1991 reporting year.

[f] One facility, Shintech Inc. in Freeport, TX, reported on-site recycling of vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 pounds in 1996. These revisions change on-site recycling to 6,273,065,292 pounds in 1995 and to 6,432,263,173 pounds in 1996.

[g] One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. The facility also reported on-site energy recovery for propylene of 12,900,000 pounds in 1995, 16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997. The facility has since revised this quantity to 13,000,000 pounds. These revisions change on-site energy recovery to 2,578,781,626 pounds in 1995, to 2,534,900,531 pounds in 1996, and to 2,677,099,018 pounds in 1997.

[h] Revisions by three facilities change total other on-site waste management to 13,622,295,104 pounds in 1995, to 13,393,532,994 pounds in 1996, and to 13,935,393,752 pounds in 1997.

[i] Other Off-site Transfers are transfers reported without a valid waste management code.

On-site land releases decreased 120.5 million pounds from 1988 to 1997, the second-largest contribution to the overall reduction in on-site releases. On-site land releases totaled 459.3 million pounds in 1988 and 338.8 million pounds in 1997. However, these releases have increased from 304.1 million pounds since 1995.

In 1988, facilities reported comparable amounts of surface water discharges (164.6 million pounds) and underground injection (162.0 million pounds). Surface water discharges decreased substantially in the earlier years, dropping to 36.6 million pounds by 1995, and have since increased to 61.4 million pounds. This constituted a 62.7% reduction for the full 1988-1997 period, despite the recent increases. In contrast, underground injection declined relatively steadily but more slowly, to 126.5 million pounds in 1997, a 21.9% reduction since 1988.

Off-site Releases

Off-site releases have nearly doubled as a percentage of all releases since 1988 both because of the substantial reductions in on-site releases and because off-site releases have increased in recent years. (Off-site releases represented 12.6% of total on- and off-site releases in 1988, rising to 22.3% in 1997.)

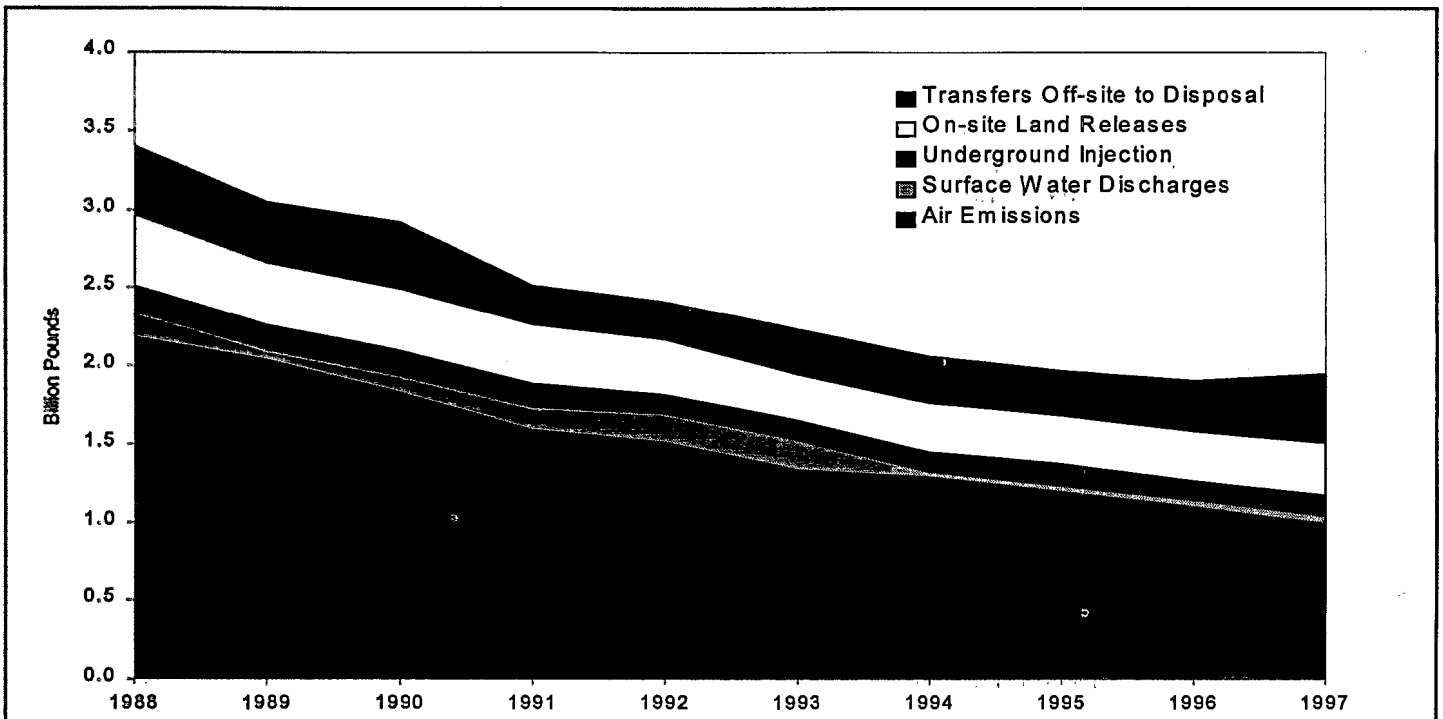

Figure 3-1. Distribution of TRI On-site and Off-site Releases, 1988-1997

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R.
Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs

As shown in Table 3-3, off-site releases (transfers off-site to disposal, including certain types of transfers of metals and metal compounds, explained above and in Chapter 2) decreased from 427.9 million pounds in 1988 to 287.7 million pounds in 1995. However, this total increased to 432.9 million pounds by 1997. The overall change (1988 to 1997) amounted to an increase of 4.9 million pounds or 1.2%. Figure 3-1 also shows the increase in off-site releases in recent years.

Much of the increase in off-site releases occurred in solidification/stabilization of metals and metal compounds in preparation for disposal, which increased from 29.5 million pounds in 1988 to 144.3 million pounds in 1997. (Although reporting codes for these transfers changed in 1997, comparable data can be distinguished using the applicable codes for earlier years.) The resulting increase of 114.8 million pounds amounts to a percentage change of 388.7%.

Off-site underground injection also increased, from nearly 9.0 million pounds in 1988 to 10.9 million pounds in 1997, a 21.3% increase.

Some types of transfers to disposal that show overall reductions from 1988 to 1997 have been increasing since 1995. An example is the reduction of 34.7 million pounds in transfers to landfills/disposal surface impoundments. This reduction consisted of a 56.8 million-pound reduction from 1988 to 1995 and a 22.2 million-pound increase since 1995.

Other On-site Waste Management, 1988 and 1995-1997

TRI did not begin collecting on-site waste management data until 1991. For the 1988-1997 "core" chemicals, Table 3-3 presents on-site waste management data for 1995 through 1997. (Data for

the 1991-1997 "core" chemicals are analyzed in "TRI Chemicals Managed in Waste," later in this chapter.) Other on-site waste management increased from 13.52 billion pounds in 1995 to 14.81 billion pounds in 1997. Information discussed in "TRI Chemicals Managed in Waste, 1995-1997," earlier in this chapter, concerning food processing facilities with large apparent errors in 1995 reporting of on-site recycling of n-hexane does not affect data in Table 3-3 because n-hexane was added to TRI in reporting year 1995. Other facility reporting changes mentioned in "TRI Chemicals Managed in Waste, 1995-1997" do apply. When these changes are taken into account, total other on-site waste management of the "core" chemicals in Table 3-3 increased from 13.62 billion pounds in 1995 to 13.94 billion pounds in 1997.

Taking facility revisions into account, on-site recycling would increase from 6.27 billion pounds in 1995 to 6.73 billion pounds in 1997, and on-site energy recovery would increase from 2.58 billion pounds in 1995 to 2.68 billion pounds in 1997. The facility changes discussed in this chapter do not affect on-site treatment presented in Table 3-3, which decreased from 4.77 billion pounds in 1995 to 4.52 billion pounds in 1997.

Transfers Off-site for Further Waste Management, 1988 and 1995-1997

Reporting of transfers to recycling and energy recovery also did not begin until 1991. As shown in Table 3-3, from 1995 to 1997, transfers to recycling decreased from 2.39 billion pounds to 2.33 billion pounds, and transfers to energy recovery decreased from 489.2 million pounds to 470.0 million pounds. Transfers off-site to treatment and to POTWs both decreased by 35.7% from 1988 to 1997. Transfers to treatment decreased from 335.1 million pounds to 215.4 million pounds, and transfers to POTWs decreased from 245.2 million pounds to 157.7 million pounds.

On- and Off-site Releases by State

Releases by State, 1995-1997

Thirty-five states and territories reported decreases in total on- and off-site releases from 1995 to 1997. Table 3-4 compares the on- and off-site releases reported by each state and territory for 1995-1997.

Although Texas facilities reported the largest total releases in all three years, Texas was also the state with the largest absolute reduction, from 304.3 million pounds in 1995 to 261.7 million pounds in 1997. Alabama ranked second with a reduction from 114.8 million pounds in 1995 to 94.7 million pounds in 1997, a 20.1 million-pound reduction. The state with the third-largest decrease was Michigan, from 102.1 million pounds in 1995 to 85.3 million pounds in 1997, a difference of 16.8 million pounds. While Texas had a greater absolute reduction than either Alabama or Michigan, both Alabama and Michigan showed greater relative reductions: These three states made reductions of 14.0% (Texas), 17.5% (Alabama), and 16.5% (Michigan) from 1995 to 1997.

Three other states also reported reductions of more than 10 million pounds each: California (from 56.5 million pounds to 45.2 million pounds, a 20.1% reduction), New Mexico (from 45.0 million pounds to 34.2 million pounds, or 24.1%), and North Carolina (from 95.6 million pounds to 85.1 million pounds, or 11.0%).

In 20 states and territories, total on- and off-site releases increased from 1995 to 1997, as shown in Table 3-4. The largest increase occurred in Utah—from 78.6 million pounds to 103.7 million pounds. The increase in Utah amounted to 25.1 million pounds, or 31.9%. Arkansas ranked second with total releases rising from 37.8 million pounds to 59.7 million pounds, a 21.9-million-pound increase,

Table 3-4. Change in Total TRI On-site and Off-site Releases, by State, 1995-1997

State	Total On- and Off-site Releases			Change 1995-1997	
	1995	1996	1997		
	Pounds	Pounds	Pounds	Pounds	Percent
Alabama	114,807,068	103,196,031	94,671,279	-20,135,789	-17.5
Alaska	6,840,330	6,908,783	4,617,154	-2,223,176	-32.5
American Samoa	5,300	10,500	12,750	7,450	140.6
Arizona	40,396,303	47,445,509	31,418,499	-8,977,804	-22.2
Arkansas	37,780,514	39,786,535	59,722,263	21,941,749	58.1
California	56,533,155	52,153,616	45,150,612	-11,382,543	-20.1
Colorado	5,307,252	5,273,808	5,147,561	-159,691	-3.0
Connecticut	11,592,757	8,780,575	9,669,680	-1,923,077	-16.6
Delaware	4,645,733	3,762,862	3,506,833	-1,138,900	-24.5
District of Columbia	56,970	9,460	6,615	-50,355	-88.4
Florida	81,474,055	86,409,106	95,418,721	13,944,666	17.1
Georgia	60,854,061	61,867,573	71,881,510	11,027,449	18.1
Guam	3,100	3,000	0	-3,100	-100.0
Hawaii	656,692	540,267	452,405	-204,287	-31.1
Idaho	14,142,973	15,264,017	17,748,578	3,605,605	25.5
Illinois	118,575,390	114,562,379	127,601,051	9,025,661	7.6
Indiana	115,272,923	112,926,145	122,548,030	7,275,107	6.3
Iowa	37,723,908	34,278,645	34,196,111	-3,527,797	-9.4
Kansas	28,982,653	26,639,034	26,732,216	-2,250,437	-7.8
Kentucky	48,418,765	49,659,388	47,301,191	-1,117,574	-2.3
Louisiana	177,710,641	185,595,468	186,038,253	8,327,612	4.7
Maine	11,382,270	9,586,549	9,769,983	-1,612,287	-14.2
Maryland	18,269,513	13,281,767	13,699,344	-4,570,169	-25.0
Massachusetts	10,153,612	8,109,575	7,053,410	-3,100,202	-30.5
Michigan	102,118,319	93,654,977	85,281,920	-16,836,399	-16.5
Minnesota	24,559,273	22,100,820	20,166,465	-4,392,808	-17.9
Mississippi	61,075,877	58,101,938	66,166,071	5,090,194	8.3
Missouri	61,136,510	60,289,398	62,823,986	1,687,476	2.8
Montana	43,931,043	48,493,904	43,352,385	-578,658	-1.3
Nebraska	15,146,601	12,958,876	17,977,975	2,831,374	18.7
Nevada	3,923,017	3,787,560	4,435,113	512,096	13.1
New Hampshire	2,910,550	2,928,482	2,786,933	-123,617	-4.2
New Jersey	19,280,422	19,427,322	20,767,437	1,487,015	7.7
New Mexico	45,032,577	44,347,511	34,171,001	-10,861,576	-24.1
New York	42,856,132	37,275,675	38,585,647	-4,270,485	-10.0
North Carolina	95,583,525	93,772,231	85,066,946	-10,516,579	-11.0
North Dakota	2,932,925	2,325,812	2,422,425	-510,500	-17.4
Ohio	157,284,625	153,198,138	158,675,833	1,391,208	0.9
Oklahoma	30,020,447	26,523,428	24,798,930	-5,221,517	-17.4
Oregon	28,525,196	28,788,297	30,931,561	2,406,365	8.4
Pennsylvania	128,417,884	119,117,801	143,243,520	14,825,636	11.5
Puerto Rico	10,045,726	9,014,860	7,944,176	-2,101,550	-20.9
Rhode Island	3,380,617	2,364,544	2,178,884	-1,201,733	-35.5
South Carolina	59,317,406	57,714,436	58,444,739	-872,667	-1.5
South Dakota	4,086,038	3,730,917	4,216,583	130,545	3.2
Tennessee	110,805,280	106,641,343	106,881,877	-3,923,403	-3.5
Texas	304,333,619	265,287,724	261,709,979	-42,623,640	-14.0
Utah	78,642,834	86,705,010	103,717,225	25,074,391	31.9
Vermont	690,247	491,006	566,695	-123,552	-17.9
Virgin Islands	1,493,257	1,506,143	1,428,697	-64,560	-4.3
Virginia	59,799,318	58,649,180	57,928,069	-1,871,249	-3.1
Washington	29,533,885	28,953,141	31,830,466	2,296,581	7.8
West Virginia	32,145,313	28,920,716	24,770,942	-7,374,371	-22.9
Wisconsin	44,413,744	48,538,910	50,559,397	6,145,653	13.8
Wyoming	11,354,560	9,790,124	9,357,158	-1,997,402	-17.6
Total	2,616,362,705	2,521,450,816	2,577,553,084	-38,809,621	-1.5

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

or 58.1%. Pennsylvania facilities reported 128.4 million pounds in 1995 and 143.2 million pounds in 1997, the third-largest increase. The Pennsylvania increase amounted to 14.8 million pounds, or 11.5%.

Two other states also reported increases of more than 10 million pounds each: Florida (from 81.5 million pounds to 95.4 million pounds, a 17.1% increase) and Georgia (60.9 million pounds to 71.9 million pounds, an 18.1% increase).

Releases by State, 1988 and 1995-1997

A total of 46 states and territories reported reductions in on- and off-site releases from 1988, TRI's baseline year, through 1997. In six states and the District of Columbia, total releases increased from 1988 to 1997. (Two territories, Guam and American Samoa, had no releases in either 1988 or 1997.) Table 3-5 shows total releases for each state and territory for 1988 and 1995-1997.

Of the three states with the largest absolute decreases in releases from 1988 to 1997—Texas, Louisiana, and California—California had the largest relative decrease, a 75.0% reduction. Louisiana recorded the second-largest relative decrease—49.8%—among the three states, and Texas ranked third with a percentage reduction of 44.3%. In absolute terms, Texas facilities reported the largest reduction among all states and territories, with a decrease of 143.0 million pounds (from 322.5 million pounds in 1988 to 179.5 million pounds in 1997). Louisiana ranked second for absolute reduction with a decrease of 125.0 million pounds (from 250.9 million pounds to 125.9 million pounds). California's reduction of 83.1 million pounds (from 110.8 million pounds in 1998 to 27.7 million pounds in 1997) ranked third among all states and territories.

Arkansas facilities reported the largest increase in total releases from 1988 to 1997. Arkansas' on- and off-site releases increased 8.2 million pounds (from 41.2 million pounds in 1988 to 49.4 million pounds in 1997). Montana ranked second with an increase of 6.7 million pounds (from 35.6 million pounds to 42.3 million pounds). The percentage increases in the two states were similar: 19.8% in Arkansas and 18.7% in Montana. In third-ranked Idaho, the increase from 1988 to 1997 was 5.5 million pounds (from 7.4 million pounds to 12.9 million pounds), or 75.4%.

TRI Chemicals Managed in Waste

TRI Chemicals Managed in Waste, 1991 and 1995-1997

Table 3-6 displays waste management data for 1991 and 1995-1997. Quantities of TRI chemicals that facilities managed in production-related waste increased by 2.41 billion pounds, or 13.1%, from 1991 to 1997 for the "core" chemicals that were reportable under the same definitions throughout that period. Total production-related waste managed was 18.44 billion pounds in 1991 and 20.85 billion pounds in 1997. However, these totals include reporting errors by several facilities, described earlier in this chapter. Specifically, one facility revised its 1997 on-site energy recovery of ethylene from 198.8 million pounds to 13.0 million pounds. Similarly, another facility revised its on-site energy recovery of ethylene and propylene from a total of 95.4 million pounds in 1995 and 694.0 million pounds in 1997 to zero in both years. Revisions by these two facilities were made after the TRI database was "frozen" for preparation of this report. Taking into account these facility revisions, total production-related waste managed would increase from 18.44 billion pounds in 1991 to 19.98 billion pounds in 1997, an 8.3% increase instead of the 13.1% increase shown in Table 3-6.

Table 3-5. Change in Total TRI On-site and Off-site Releases, by State, 1988 and 1995-1997

State	Total On- and Off-site Releases				Change 1988-1997	
	1988	1995	1996	1997		
	Pounds	Pounds	Pounds	Pounds	Pounds	Percent
Alabama	111,028,288	100,718,303	89,755,151	80,046,959	-30,981,329	-27.9
Alaska	3,714,569	2,158,743	1,683,698	779,045	-2,935,524	-79.0
American Samoa	0	0	0	0	0	--
Arizona	66,280,900	38,231,015	45,737,079	30,366,082	-35,914,818	-54.2
Arkansas	41,209,082	25,576,608	28,662,356	49,365,915	8,156,833	19.8
California	110,765,549	37,430,835	31,900,026	27,686,738	-83,078,811	-75.0
Colorado	15,743,170	3,498,632	3,187,197	3,140,756	-12,602,414	-80.1
Connecticut	38,695,117	9,077,490	6,923,797	8,039,341	-30,655,776	-79.2
Delaware	8,793,803	2,966,499	2,044,978	1,983,497	-6,810,306	-77.4
District of Columbia	750	56,970	9,460	6,615	5,865	782.0
Florida	61,723,562	52,716,383	52,335,599	57,069,195	-4,654,367	-7.5
Georgia	86,998,757	41,074,678	41,487,132	51,085,205	-35,913,552	-41.3
Guam	0	3,100	3,000	0	0	--
Hawaii	847,805	562,284	448,355	343,620	-504,185	-59.5
Idaho	7,354,669	10,104,545	10,822,282	12,896,810	5,542,141	75.4
Illinois	140,906,729	85,013,831	83,278,784	94,153,116	-46,753,613	-33.2
Indiana	185,247,435	93,917,359	94,092,870	104,991,463	-80,255,972	-43.3
Iowa	43,056,771	21,283,985	18,401,230	20,004,969	-23,051,802	-53.5
Kansas	30,568,775	17,830,664	17,490,154	18,924,948	-11,643,827	-38.1
Kentucky	66,940,117	34,020,056	33,211,448	35,762,162	-31,177,955	-46.6
Louisiana	250,914,798	123,279,321	130,718,359	125,927,705	-124,987,093	-49.8
Maine	15,560,704	6,854,179	5,563,644	6,199,758	-9,360,946	-60.2
Maryland	20,252,075	12,038,219	9,563,975	9,893,353	-10,358,722	-51.1
Massachusetts	32,272,283	8,767,782	6,961,476	6,151,913	-26,120,370	-80.9
Michigan	143,476,016	89,125,716	80,417,075	73,664,255	-69,811,761	-48.7
Minnesota	56,097,826	18,590,234	16,966,956	15,644,824	-40,453,002	-72.1
Mississippi	59,669,849	39,993,712	40,606,994	45,186,893	-14,482,956	-24.3
Missouri	91,212,597	50,532,629	50,090,864	53,527,759	-37,684,838	-41.3
Montana	35,630,465	42,644,621	47,219,566	42,300,684	6,670,219	18.7
Nebraska	17,123,549	11,281,445	8,718,338	13,605,148	-3,518,401	-20.5
Nevada	2,357,318	3,380,326	3,304,135	4,007,911	1,650,593	70.0
New Hampshire	13,975,470	2,237,152	2,209,854	2,283,059	-11,692,411	-83.7
New Jersey	48,472,938	14,062,698	12,751,690	13,704,143	-34,768,795	-71.7
New Mexico	30,427,754	43,436,083	42,722,128	32,484,581	2,056,827	6.8
New York	101,423,370	31,278,717	27,772,551	28,567,093	-72,856,277	-71.8
North Carolina	132,077,721	72,614,012	71,814,874	62,960,213	-69,117,508	-52.3
North Dakota	1,195,540	1,206,639	773,687	794,419	-401,121	-33.6
Ohio	205,909,168	126,540,795	122,794,004	129,906,251	-76,002,917	-36.9
Oklahoma	30,594,900	16,080,076	15,315,963	15,125,370	-15,469,530	-50.6
Oregon	21,647,495	22,293,296	23,625,573	24,607,403	2,959,908	13.7
Pennsylvania	136,379,977	97,080,117	87,337,471	95,904,026	-40,475,951	-29.7
Puerto Rico	12,869,935	8,871,807	7,937,300	7,176,652	-5,693,283	-44.2
Rhode Island	7,821,230	3,152,721	2,214,829	2,030,807	-5,790,423	-74.0
South Carolina	66,139,221	48,953,990	48,336,798	49,627,854	-16,511,367	-25.0
South Dakota	2,393,747	1,904,462	1,400,306	1,321,119	-1,072,628	-44.8
Tennessee	126,833,112	93,862,028	90,190,406	89,830,988	-37,002,124	-29.2
Texas	322,515,374	207,975,140	185,233,013	179,542,240	-142,973,134	-44.3
Utah	123,845,400	69,369,974	77,702,071	96,403,008	-27,442,392	-22.2
Vermont	1,750,190	561,015	321,889	331,282	-1,418,908	-81.1
Virgin Islands	2,592,912	1,235,660	1,232,275	1,184,171	-1,408,741	-54.3
Virginia	112,871,471	41,012,097	39,921,039	40,562,572	-72,308,899	-64.1
Washington	30,756,542	22,616,522	22,219,505	24,587,230	-6,169,312	-20.1
West Virginia	39,665,077	19,809,934	17,527,529	15,141,467	-24,523,610	-61.8
Wisconsin	62,524,196	34,716,561	33,066,022	33,707,244	-28,816,952	-46.1
Wyoming	16,740,621	1,324,584	1,358,830	1,330,316	-15,410,305	-92.1
Total	3,395,866,689	1,964,926,244	1,897,385,585	1,941,870,147	-1,453,996,542	-42.8

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

Table 3-6. Quantities of TRI Chemicals in Waste, 1991 and 1995-1997

Waste Management Activity	1991 Pounds	1995 Pounds	1996 Pounds	1997 Pounds
Recycled On-site[a]	5,985,973,407	6,145,245,573	6,242,868,341	6,817,156,707
Recycled Off-site	1,758,690,008	2,479,796,870	2,399,786,754	2,345,382,758
Energy Recovery On-site[b]	2,959,059,632	2,686,746,098	2,607,216,009	3,573,477,522
Energy Recovery Off-site	444,034,783	478,593,103	484,974,852	482,216,533
Treated On-site	4,366,768,798	4,780,288,913	4,456,052,065	5,393,631,217
Treated Off-site	436,600,143	401,761,876	369,581,534	387,945,400
Quantity Released On- and Off-site	2,487,504,603	1,901,102,367	1,848,081,558	1,851,990,231
Total Production-related Waste Managed[c]	18,438,631,374	18,873,534,800	18,408,561,113	20,851,800,368
Non-Production-related Waste Managed	22,371,864	31,737,153	28,994,000	35,540,726

Waste Management Activity	Change 1995-1996 Percent	Change 1996-1997 Percent	Change 1991-1997 Percent
Recycled On-site[a]	1.6	9.2	13.9
Recycled Off-site	-3.2	-2.3	33.4
Energy Recovery On-site[b]	-3.0	37.1	20.8
Energy Recovery Off-site	1.3	-0.6	8.6
Treated On-site	-6.8	21.0	23.5
Treated Off-site	-8.0	5.0	-11.1
Quantity Released On- and Off-site	-2.8	0.2	-25.5
Total Production-related Waste Managed[c]	-2.5	13.3	13.1
Non-Production-related Waste Managed	-8.6	22.6	58.9

Note: Does not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. All data taken from Section 8 (Current Year) of Form R for year indicated.

[a]One facility, Shintech Inc. in Freeport, TX, reported on-site recycling of vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 pounds in 1996. These revisions change on-site recycling to 6,345,045,573 pounds in 1995 and to 6,486,624,341 pounds in 1996. The percentage change in on-site recycling changes to 2.2% for 1995-1996 and to 5.1% for 1996-1997.

[b]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. The facility also reported on-site energy recovery for propylene of 12,900,000 pounds in 1995,16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997. The facility has since revised this quantity to 13,000,000 pounds. These revisions change on-site energy recovery to 2,591,346,098 pounds in 1995, to 2,554,666,009 pounds in 1996, and to 2,698,647,522 pounds in 1997. The percentage change in on-site energy recovery changes to -1.4% for 1995-1996, to 5.6% for 1996-1997, and to -8.8% for 1991-1997.

[c]Revisions by three facilities change total production-related waste managed to 18,977,934,800 pounds in 1995, to 18,599,767,113 pounds in 1996, and to 19,976,970,368 pounds in 1997. The percent change in total production-related waste managed changes to -2.0% for 1995-1996, to 7.4% for 1996-1997, and to 8.3% for 1991-1997.

(One facility's correction of on-site recycling of vinyl chloride from 200,000 pounds to 200.0 million pounds in 1995 and from 244,000 pounds to 244.0 million pounds in 1996 does not affect the overall increase in on-site recycling from 1991 to 1997. The apparent errors of seven food processing facilities in reporting 4.00 billion pounds of on-site recycling of n-hexane in 1995 do not affect data in Table 3-6 because n-hexane was not reportable in 1991.)

The two facilities' revisions for ethylene and propylene affect on-site energy recovery totals. On-site energy recovery shown in Table 3-6 increased from 2.96 billion pounds in 1991 to 3.57 billion pounds in 1997. Taking into account the facility revisions, on-site energy recovery would decrease from 2.96 billion pounds in 1991 to 2.70 billion pounds in 1997, an 8.8% reduction instead of the 20.8% increase shown in Table 3-6.

Table 3-7. Quantities of TRI Chemicals in Waste, 1991 and 1996-1999

Waste Management Activity	1991		1996		1997		Projected 1998		Projected 1999	
	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent	Pounds	Percent
Recycled On-site[a]	5,985,973,407	32.5	6,242,868,341	33.9	6,817,156,707	32.7	6,550,448,416	32.1	6,587,726,780	32.1
Recycled Off-site	1,758,690,008	9.5	2,399,786,754	13.0	2,345,382,758	11.2	2,315,250,122	11.3	2,358,369,887	11.5
Energy Recovery On-site[b]	2,959,059,632	16.0	2,607,216,009	14.2	3,573,477,522	17.1	3,626,058,263	17.8	3,725,091,138	18.2
Energy Recovery Off-site	444,034,783	2.4	484,974,852	2.6	482,216,533	2.3	443,267,812	2.2	442,720,481	2.2
Treated On-site	4,366,768,798	23.7	4,456,052,065	24.2	5,393,631,217	25.9	5,335,126,988	26.1	5,267,530,256	25.7
Treated Off-site	436,600,143	2.4	369,581,534	2.0	387,945,400	1.9	369,002,354	1.8	373,728,849	1.8
Quantity Released On- and Off-site	2,487,504,603	13.5	1,848,081,558	10.0	1,851,990,231	8.9	1,769,744,900	8.7	1,742,335,340	8.5
Total Production-related Waste Managed[c]	18,438,631,374	100.0	18,408,561,113	100.0	20,851,800,368	100.0	20,408,898,855	100.0	20,497,502,731	100.0

Note: Does not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. Data from Section 8 of Form R. Data for 1991 from 1991 Form R, for 1996 from 1996 Form R, all other years from 1997 Form R.

[a]One facility, Shintech Inc. in Freeport, TX, reported on-site recycling of vinyl chloride of 244,000 pounds in 1996. The facility has since revised this quantity to 244,000,000 pounds. This changes on-site recycling to 6,486,624,341 pounds in 1996.

[b]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 36,250,000 pounds in 1996 and 422,000,000 pounds in 1997 and projected 443,100,000 pounds for 1998 and 465,255,000 pounds for 1999. The facility also reported on-site energy recovery for propylene of 16,300,000 pounds in 1996 and 272,000,000 pounds in 1997 and projected 285,600,000 pounds for 1998 and 299,880,000 pounds for 1999. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997 and projected 213,213,000 pounds for both 1998 and 1999. The facility has since revised these quantities to 13,000,000 pounds for each of the three years. These revisions change on-site energy recovery to 2,554,666,009 pounds in 1996, to 2,698,647,522 pounds in 1997, to 2,697,145,263 pounds projected for 1998, and to 2,759,743,138 pounds projected for 1999.

[c]Revisions by three facilities change total production-related waste managed to 18,599,767,113 pounds in 1996, to 19,976,970,368 pounds in 1997, to 19,479,985,855 pounds projected for 1998, and to 19,532,154,731 pounds projected for 1999. Distribution of waste management activities changes in 1996 to 34.9% recycled on-site, 12.9% recycled off-site, 13.7% energy recovery on-site, 2.6% energy recovery off-site, 24.0% treated on-site, 2.0% treated off-site, and 9.9% quantity released on- and off-site; in 1997 to 34.1% recycled on-site, 11.7% recycled off-site, 13.5% energy recovery on-site, 2.4% energy recovery off-site, 27.0% treated on-site, 1.9% treated off-site, and 9.3% quantity released on- and off-site; for 1998 (projected) to 33.6% recycled on-site, 11.9% recycled off-site, 13.8% energy recovery on-site, 2.3% energy recovery off-site, 27.4% treated on-site, 1.9% treated off-site, and 9.1% quantity released on- and off-site; and for 1999 (projected) to 33.7% recycled on-site, 12.1% recycled off-site, 14.1% energy recovery on-site, 2.3% energy recovery off-site, 27.0% treated on-site, 1.9% treated off-site, and 8.9% quantity released on- and off-site.

The largest absolute increase among waste management types occurred in on-site treatment, which rose from 4.37 billion pounds in 1991 to 5.39 billion pounds in 1997, an increase of 1.03 billion pounds (23.5%). The largest percentage increase occurred in off-site recycling, which increased 33.4% from 1.76 billion pounds in 1991 to 2.35 billion pounds in 1997 (a 831.2-million-pound increase).

Two other waste management practices also showed increases: Facilities reported 5.99 billion pounds of on-site recycling in 1991 and 6.82 billion pounds in 1997, a 13.9% increase. They also reported 444.0 million pounds of off-site energy recovery in 1991 and 482.2 million pounds in 1997, an 8.6% increase.

From 1991 to 1997, quantities released on- and off-site decreased by one-fourth (25.5%) from 2.49 billion pounds to 1.85 billion pounds. The only other reduction was reported in off-site treatment, which declined from 436.6 million pounds to 387.9 million pounds, an 11.1% decrease.

Projected Quantities of TRI Chemicals Managed in Waste, 1991 and 1995-1999

TRI facilities projected relatively small reductions from 1997 levels in the production-related waste they expected to manage through 1999. As shown in Table 3-7, total production-related waste managed was expected to decline from 20.85 billion pounds in 1997 to 20.50 billion pounds in 1999. (These data cover the "core" chemicals that were reportable under the same definitions in years 1991-1997.) Facility revisions discussed throughout this chapter would change these totals to 19.98 billion pounds in 1997 and a projected 19.53 billion pounds in 1999. This would change the overall reduction expected from 1997 to 1999 from a projected 1.7% decrease to a 2.2% decrease.

As discussed in Chapter 2, information required by the Pollution Prevention Act (PPA) of 1990 can help facilities and the public assess progress in pollution prevention and in the management of TRI chemicals in waste. The data can be used to analyze trends in total quantities of TRI chemicals in waste to see if facilities are reducing the amount of waste generated. The data also can be used to examine trends in the quantities of TRI chemicals undergoing each waste management method to see whether facilities are making more environmentally preferable choices as established in the waste management hierarchy.

Taking into account the facility revisions, the quantity released on- and off-site would show a decrease from 13.5% of total production-related waste that facilities managed in 1991 to 9.3% in 1997. This was the largest change in the distribution of waste management methods. Reducing the proportion of TRI chemicals in waste that facilities release indicates improvement in their waste management practices. Releases represent the least desirable outcome in terms of the waste management hierarchy, described in Chapter 2. Facilities projected a small further decrease in quantity released as a percentage of total production-related waste managed, to 8.9% by 1999.

However, facilities projected no significant improvement from 1997 to 1999 in the way they manage TRI chemicals in waste, recycling on-site about one-third (34.1% in 1997 and 33.7% in 1999) of the total and treating on-site about one-quarter (27.0% in both 1997 and 1999) of the total, again taking into account facility revisions previously described. Approximately 14% of total production-related waste managed would be combusted on-site for energy recovery in both years. Percentages in Table 3-7 show that these represent little overall change from the 1991 distribution. The most significant difference from 1991 to 1997 would be an increase in the percentage of production-related waste treated on-site. In the waste management hierarchy, however, treating toxic chemicals in waste is preferable only to releasing them.

Chemical-specific Release and Waste Management Data

Table 3-8 presents on- and off-site releases and waste management data for all TRI chemicals on the current TRI chemical list for which reports have been received in at least one of the years 1988 and 1995-1997. Pesticides are denoted by an asterisk (*) next to the chemical name. These are chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997

CAS Number	Chemical	Year	Total Forms	On-site Releases: Total Air Emissions	On-site Releases: Surface Water Discharges	On-site Releases: Underground Injection	On-site Releases: Releases to Land	On-site Releases: Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
			Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
71751-41-2 *	Abamectin	97	2	0	9	0	0	9	0	9
		96	2	0	10	0	0	10	0	10
		95	2	0	16	0	0	16	0	16
		88	NR	NR	NR	NR	NR	NR	NR	NR
30560-19-1 *	Acephate	97	7	1,505	0	0	0	1,505	0	1,505
		96	5	1,505	0	0	0	1,505	1,400	2,905
		95	5	2,250	0	0	0	2,250	1,000	3,250
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-07-0 *	Acetaldehyde	97	250	12,736,049	223,370	371,576	118,176	13,449,171	5,483	13,454,654
		96	250	12,597,164	198,955	468,662	16,800	13,281,581	2,463	13,284,044
		95	233	13,188,747	227,116	605,886	155,360	14,177,109	1,099	14,178,208
		88	66	6,949,249	98,236	2,219,105	194,958	9,461,548	24,930	9,486,478
60-35-5	Acetamide	97	6	250	1	1,863,202	0	1,863,453	0	1,863,453
		96	3	19	2	1,169,000	0	1,169,021	0	1,169,021
		95	3	8	0	920,000	0	920,008	0	920,008
		88	1	0	0	0	0	0	250	250
75-05-8	Acetonitrile	97	100	890,612	7,461	18,894,762	63	19,792,898	3,084,414	22,877,312
		96	101	1,023,121	11,900	22,826,712	48	23,861,781	548,193	24,409,974
		95	87	1,020,661	7,474	27,836,181	12	28,864,328	10,892	28,875,220
		88	67	2,194,739	42,223	16,739,010	1,790	18,977,762	416,333	19,394,095
98-86-2 *	Acetophenone	97	43	179,786	650	499,070	3,500	683,006	42,552	725,558
		96	42	179,306	734	474,202	2,738	656,980	15,950	672,930
		95	38	205,648	971	629,201	3,369	839,189	19,427	858,616
		88	NR	NR	NR	NR	NR	NR	NR	NR
62476-59-9 *	Acifluorfen, sodium salt	97	7	290	253	0	5	548	570,359	570,907
		96	4	226	7	0	5	238	0	238
		95	4	60	5	0	5	70	0	70
		88	NR	NR	NR	NR	NR	NR	NR	NR
107-02-8 *	Acrolein	97	19	81,130	298	71,990	0	153,418	175	153,593
		96	20	82,276	550	100,360	0	183,186	0	183,186
		95	21	71,302	4	83,465	0	154,771	0	154,771
		88	12	33,652	0	68,950	500	103,102	0	103,102
79-06-1 *	Acrylamide	97	77	17,278	6,355	7,074,021	305,545	7,403,199	26,290	7,429,489
		96	72	11,700	3,653	5,748,154	149,156	5,912,663	301,575	6,214,238
		95	80	19,077	1,929	6,120,154	235	6,141,395	3,083	6,144,478
		88	59	26,019	3,124	2,198,000	756	2,227,899	97,582	2,325,481

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
71751-41-2 *	Abamectin	97	0	0	0	0	1,900	131	9	2,040	0
		96	0	0	0	0	31	78	5	114	5
		95	0	0	0	0	106	5,582	16	5,704	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
30560-19-1 *	Acephate	97	20	0	0	0	11,000	11,580	944	23,544	0
		96	30	0	0	0	176,000	7,240	2,075	185,345	0
		95	10	0	0	0	183,000	15,728	1,409	200,147	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-07-0 *	Acetaldehyde	97	332,000	33	9,848,731	56,699	15,532,164	1,192,757	13,449,700	40,412,084	10,453
		96	178,600	39	12,220,037	144,266	21,749,308	657,436	13,257,781	48,207,467	4,196
		95	97,000	31,820	9,238,985	234,459	14,494,403	1,731,882	14,195,057	40,023,606	1,681
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
60-35-5	Acetamide	97	0	0	64,008	145	1	194	1,863,448	1,927,796	0
		96	0	0	98,900	0	1	184	1,170,002	1,269,087	0
		95	0	0	1,000	0	0	88	920,000	921,088	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-05-8	Acetonitrile	97	13,116,437	2,215,038	23,490,849	6,631,333	12,681,271	7,690,047	22,804,584	88,629,559	6,264
		96	22,263,727	1,736,000	24,163,715	7,124,819	13,290,669	4,802,882	24,401,040	97,782,852	10,624
		95	9,409,962	2,071,150	23,070,787	4,704,330	11,104,608	5,742,679	29,416,530	85,520,046	1,073
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-86-2 *	Acetophenone	97	1,800	5,743	30,262,873	278,450	1,003,454	397,022	747,016	32,696,358	1,078
		96	900	7,286	36,395,314	244,620	1,013,493	46,653	685,319	38,393,585	360
		95	920,000	9,710	23,649,642	301,212	1,313,510	35,062	886,301	27,115,437	517
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
62476-59-9 *	Acifluorfen, sodium salt	97	0	0	0	0	310	3,554	570,691	574,555	0
		96	0	0	0	0	90	674	238	1,002	10
		95	0	0	0	0	600	1,272	65	1,937	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-02-8 *	Acrolein	97	0	0	3,772,684	33,413	5,288,092	23	142,204	9,236,416	93
		96	0	0	3,641,691	27,729	6,126,756	39	175,281	9,971,496	83
		95	4,800	0	3,752,847	43,323	5,168,260	11,361	154,579	9,135,170	85
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-06-1 *	Acrylamide	97	2,266	3	86,000	13,306	144,607	219,594	7,427,483	7,893,259	4,010
		96	307	4	90,400	22,530	137,990	98,399	6,183,656	6,533,286	1,700
		95	4,037	0	820	43,304	314,544	210,283	6,146,220	6,719,208	3,980
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
79-10-7	Acrylic acid	97	194	414,885	8,089	6,237,000	76,151	6,736,125	45,129	6,781,254
		96	185	421,620	3,171	5,168,000	67	5,592,858	56,159	5,649,017
		95	189	527,219	2,648	7,840,000	47	8,369,914	35,421	8,405,335
		88	158	800,046	16,646	22,262,010	15,950	23,094,652	134,139	23,228,791
107-13-1	* Acrylonitrile	97	110	1,224,569	1,229	4,031,900	827	5,258,525	4,879	5,263,404
		96	109	1,294,318	590	3,595,236	302	4,890,446	6,639	4,897,085
		95	105	1,525,446	7,137	5,193,028	618	6,726,229	4,917	6,731,146
		88	113	4,796,161	6,531	4,562,713	2,150	9,367,555	151,450	9,519,005
15972-60-8	* Alachlor	97	3	2,700	290	0	0	2,990	3,600	6,590
		96	2	2,340	330	0	0	2,670	4,100	6,770
		95	3	756	280	0	0	1,036	2,940	3,976
		88	NR	NR	NR	NR	NR	NR	NR	NR
116-06-3	* Aldicarb	97	3	386	0	0	5	391	0	391
		96	4	301	0	0	5	306	0	306
		95	2	3,477	0	0	6	3,483	0	3,483
		88	NR	NR	NR	NR	NR	NR	NR	NR
28057-48-9	d-trans-Allethrin	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
107-18-6	* Allyl alcohol	97	27	53,528	5,226	411,350	4	470,108	7,245	477,353
		96	32	58,620	4,962	374,263	0	437,845	134,595	572,440
		95	31	58,636	6,419	298,801	0	363,856	11,296	375,152
		88	NR	NR	NR	NR	NR	NR	NR	NR
107-11-9	Allylamine	97	3	1,662	0	0	0	1,662	0	1,662
		96	1	0	0	0	0	0	0	0
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
107-05-1	Allyl chloride	97	22	78,187	10	0	0	78,197	503	78,700
		96	20	80,148	9	0	0	80,157	0	80,157
		95	20	52,046	95	0	41	52,182	13	52,195
		88	20	149,369	430	250	200	150,249	747	150,996
7429-90-5	* Aluminum (fume or dust)	97	326	1,589,904	42,374	0	2,213,496	3,845,774	8,278,292	12,124,066
		96	313	1,679,728	48,991	0	2,285,137	4,013,856	6,662,717	10,676,573
		95	320	1,981,028	36,699	250	1,872,483	3,890,460	6,108,552	9,999,012
		88	357	3,681,998	91,518	250	3,177,625	6,951,391	14,368,041	21,319,432

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
79-10-7	Acrylic acid	97	4,151,368	119,172	31,904,896	3,478,312	28,539,687	879,415	6,690,854	75,763,704	3,162
		96	4,427,743	96,856	27,444,635	3,739,497	27,724,837	1,100,149	5,651,111	70,184,828	28,486
		95	3,339,863	34,800	26,544,419	5,033,613	26,793,759	471,790	8,396,905	70,615,149	3,401
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-13-1 *	Acrylonitrile	97	12,690,465	58,092	5,300,722	198,012	10,143,286	1,170,267	5,329,623	34,890,467	1,602
		96	12,680,622	527	3,485,381	316,652	10,465,855	1,053,032	4,914,795	32,916,864	2,592
		95	12,408,043	69,716	3,342,652	666,245	10,633,989	1,125,461	6,765,974	35,012,080	8,105
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
15972-60-8 *	Alachlor	97	0	0	0	0	44,000	160,000	6,600	210,600	0
		96	0	0	0	0	28,000	148,600	6,800	183,400	0
		95	0	0	0	5,481	120,000	217,179	3,930	346,590	30,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
116-06-3 *	Aldicarb	97	0	0	0	0	502	28,107	382	28,991	0
		96	0	0	0	0	505	32,359	324	33,188	0
		95	0	0	0	0	580	20,011	3,472	24,063	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
28057-48-9	d-trans-Allethrin	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-18-6 *	Allyl alcohol	97	110,892	0	1,911,736	798,451	971,358	258,500	475,498	4,526,435	1
		96	120,525	0	822,495	653,085	1,313,506	316,346	452,823	3,678,780	160
		95	189,517	0	1,531,138	363,377	1,404,321	422,499	371,288	4,282,140	131
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-11-9	Allylamine	97	0	0	0	1,571	1,547	0	1,662	4,780	0
		96	0	0	0	2	2	0	0	4	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-05-1	Allyl chloride	97	210,000	0	2,403,008	210,974	387,733	298,546	77,167	3,587,428	2,200
		96	260,000	0	2,300,000	360	504,432	497,841	78,341	3,640,974	84
		95	520,000	0	186,000	1,756	750,979	412,357	51,166	1,922,258	65
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7429-90-5 *	Aluminum (fume or dust)	97	13,981,740	26,584,429	0	91,568	19,350,982	227,033	10,994,583	71,230,335	155
		96	15,384,573	21,724,879	0	88,161	18,105,328	156,758	9,452,933	64,912,632	2,652
		95	15,378,165	24,147,206	0	164,604	15,628,491	332,192	8,050,539	63,701,197	690
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
1344-28-1	Aluminum oxide (fibrous forms)	97	51	38,451	755	0	428,680	467,886	10,338,111	10,805,997
		96	49	108,152	505	0	357,650	466,307	9,213,890	9,680,197
		95	58	133,902	2,805	0	593,000	729,707	2,790,419	3,520,126
		88	NR	NR	NR	NR	NR	NR	NR	NR
20859-73-8 *	Aluminum phosphide	97	1	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
834-12-8 *	Ametryn	97	4	2,161	42	0	0	2,203	0	2,203
		96	4	3,321	59	0	0	3,380	0	3,380
		95	5	836	83	0	5	924	250	1,174
		88	NR	NR	NR	NR	NR	NR	NR	NR
60-09-3	4-Aminoazo-benzene	97	2	0	0	6	0	6	0	6
		96	1	0	0	203	0	203	0	203
		95	1	0	0	64	0	64	0	64
		88	1	0	0	537	0	537	0	537
92-67-1	4-Aminobiphenyl	97	1	0	0	0	0	0	0	0
		96	1	0	0	2	0	2	0	2
		95	1	0	0	2	0	2	0	2
		88	1	10	0	4	0	14	0	14
33089-61-1 *	Amitraz	97	No reports received							
		96	1	0	0	0	0	0	0	0
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
7664-41-7 *	Ammonia	97	2,734	156,148,750	7,023,065	31,150,492	3,254,416	197,576,723	2,417,150	199,993,873
		96	2,820	157,315,279	8,084,104	24,374,638	3,226,185	193,000,206	1,924,662	194,924,868
		95	2,907	158,627,233	9,284,129	23,958,051	5,611,918	197,481,331	1,558,205	199,039,536
		88	NR	NR	NR	NR	NR	NR	NR	NR
62-53-3 *	Aniline	97	65	285,954	11,228	1,095,429	1,385	1,393,996	67,266	1,461,262
		96	68	219,092	16,217	835,298	781	1,071,388	20,321	1,091,709
		95	66	201,467	8,943	1,221,381	4,193	1,435,984	21,546	1,457,530
		88	68	712,769	16,105	3,582,975	12,822	4,324,671	346,206	4,670,877
90-04-0	o-Anisidine	97	7	1,461	76	0	0	1,537	4	1,541
		96	7	1,517	28	0	0	1,545	1	1,546
		95	7	1,031	74	0	0	1,105	3	1,108
		88	6	2,293	285	0	250	2,828	3	2,831

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Release On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
1344-28-1	Aluminum oxide (fibrous forms)	97	5,050,000	252,140	0	0	14,897	104,877	935,611	6,357,525	200
		96	175,000	16,300	0	22,000	3,900	38,695	1,528,879	1,784,774	2
		95	25,100	15,612	0	9,991	21,448	90,428	2,315,663	2,478,242	2
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
20859-73-8 *	Aluminum phosphide	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
834-12-8 *	Ametryn	97	25	0	0	0	38,200	16,000	1,744	55,969	0
		96	0	0	0	0	33,000	19,620	2,341	54,961	0
		95	0	0	0	0	108,500	12,502	256	121,258	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
60-09-3	4-Aminoazo-benzene	97	0	0	0	0	0	76	6	82	0
		96	0	0	0	0	0	99	203	302	0
		95	0	0	0	0	3	0	64	67	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
92-67-1	4-Aminobiphenyl	97	0	0	0	0	100,000	190	0	100,190	0
		96	0	0	0	0	91,000	103	2	91,105	0
		95	0	0	0	0	91,000	0	2	91,002	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
33089-61-1 *	Amitraz	97	No reports received								
		96	0	0	0	0	0	0	0	0	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7664-41-7 *	Ammonia	97	348,336,500	9,620,303	118,146,876	112,444	290,578,256	16,712,554	194,820,109	978,327,042	714,157
		96	331,921,860	8,773,834	38,613,184	67,407	341,639,012	15,911,064	195,187,048	932,113,409	1,064,822
		95	201,942,857	12,037,786	44,641,891	72,879	306,563,524	18,597,950	197,430,169	781,287,056	1,102,315
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
62-53-3 *	Aniline	97	7,119,031	0	7,637,850	629,784	3,641,784	2,188,848	1,418,107	22,635,404	5,959
		96	8,838,234	0	6,189,043	315,069	3,608,917	1,485,999	1,095,812	21,533,074	256
		95	7,243,251	0	7,419,516	354,598	3,746,207	1,266,787	1,455,876	21,486,235	1,147
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
90-04-0	o-Anisidine	97	0	0	1,315	0	3,867	6,925	1,541	13,648	0
		96	0	0	1,465	0	3,992	6,251	1,546	13,254	0
		95	0	0	143	0	14,704	5,100	1,061	21,008	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
104-94-9	p-Anisidine	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	2	5	0	0	0	5	0	5
		88	2	10	250	0	250	510	0	510
120-12-7	Anthracene	97	69	94,661	311	0	6,186	101,158	108,190	209,348
		96	66	64,200	122	0	661	64,983	51,041	116,024
		95	70	81,471	4,943	0	939	87,353	48,140	135,493
		88	139	199,823	4,382	0	10,905	215,110	204,665	419,775
7440-36-0	Antimony	97	126	6,628	14,415	0	27,112	48,155	279,569	327,724
		96	136	12,128	6,308	0	9,480	27,916	380,867	408,783
		95	135	34,418	6,592	0	18,786	59,796	122,672	182,468
		88	152	69,916	11,114	2,100	903,916	987,046	625,682	1,612,728
--	Antimony compounds	97	548	87,141	27,293	12,212	1,220,089	1,346,735	4,152,534	5,499,269
		96	555	102,132	35,586	13,908	2,019,482	2,171,108	4,469,023	6,640,131
		95	554	104,662	33,902	11,332	1,600,694	1,750,590	3,403,528	5,154,118
		88	271	165,790	31,178	9,200	1,935,018	2,141,186	2,280,580	4,421,766
7440-38-2	Arsenic	97	52	51,559	679	0	10,286	62,524	530,960	593,484
		96	90	39,463	533	0	98,758	138,754	140,157	278,911
		95	92	6,852	363	0	27,351	34,566	80,802	115,368
		88	78	7,687	1,282	0	181,267	190,236	65,342	255,578
--	Arsenic compounds	97	339	148,359	3,454	76,170	5,755,966	5,983,949	1,369,579	7,353,528
		96	307	67,985	4,160	61,280	1,930,669	2,064,094	1,315,929	3,380,023
		95	304	83,495	5,048	55,000	1,723,347	1,866,890	1,554,209	3,421,099
		88	274	268,528	6,243	27,400	4,946,184	5,248,355	1,407,110	6,655,465
1332-21-4 *	Asbestos (friable)	97	63	7,255	2	0	514,500	521,757	4,329,603	4,851,360
		96	72	5,260	2	0	466,509	471,771	4,154,312	4,626,083
		95	74	5,950	1	0	131,404	137,355	4,860,165	4,997,520
		88	146	48,496	10,699	0	2,111,880	2,171,075	12,135,707	14,306,782
1912-24-9 *	Atrazine	97	20	35,119	2,242	418	388,928	426,707	166,947	593,654
		96	20	27,011	1,326	1	614,353	642,691	188,963	831,654
		95	20	22,689	1,656	0	637,036	661,381	101,631	763,012
		88	NR	NR	NR	NR	NR	NR	NR	NR
7440-39-3	Barium	97	73	120,075	25,436	0	504,289	649,800	874,975	1,524,775
		96	65	43,629	2,482	0	318,932	365,043	741,151	1,106,194
		95	74	91,666	6,279	0	227,523	325,468	395,999	721,467
		88	142	266,811	18,650	0	6,721,686	7,007,147	1,883,903	8,891,050

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
104-94-9	p-Anisidine	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	9	9	18	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	97	229,292	7,563	380,721	106,516	294,868	2,989	210,086	1,232,035	1,938
		96	187,266	7,620	112,111	210,016	1,255,761	11,085	104,794	1,888,653	2,319
		95	176,705	20,744	183,121	200,541	1,693,357	5,084	115,722	2,395,274	34,350
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-36-0	Antimony	97	3,873,483	876,978	25,969	49,316	328,072	28,355	320,843	5,503,016	6,339
		96	4,019,028	2,972,838	109,302	35,785	1,218,518	48,827	341,949	8,746,247	15,850
		95	3,831,021	5,603,552	0	1,730	818,680	95,894	126,888	10,477,765	459
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Antimony compounds	97	5,026,069	3,914,498	3,300	11,028	938,412	605,157	4,386,271	14,884,735	11,987
		96	6,201,653	2,801,839	0	56,679	99,918	880,027	5,326,629	15,366,745	442,143
		95	5,373,181	3,310,607	0	50,997	79,188	939,944	4,027,446	13,781,363	27,805
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-38-2	Arsenic	97	1,546,013	433,597	0	0	69,967	10,075	113,610	2,173,262	15,011
		96	1,191,541	751,272	0	0	70,004	22,108	243,304	2,278,229	8,567
		95	1,072,279	189,886	7,700	496	13,030	45,969	65,627	1,394,987	749
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Arsenic compounds	97	3,806,840	812,279	0	355	69,323	1,103,163	5,048,300	10,840,260	1,870,274
		96	3,495,192	365,704	0	177	92,028	1,445,156	2,886,607	8,284,864	189,784
		95	2,445,203	294,539	0	231	227,628	1,302,052	2,883,367	7,153,020	93,383
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1332-21-4 *	Asbestos (friable)	97	195,118	0	0	0	667,313	709,910	5,382,618	6,954,959	273,483
		96	142,589	0	0	0	519,822	260,418	4,253,024	5,175,853	196,000
		95	398,800	0	0	0	1,548,870	1,102	4,280,979	6,229,751	176,195
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1912-24-9 *	Atrazine	97	250	0	0	0	342,091	126,897	806,780	1,276,018	250
		96	59	0	0	0	365,171	148,665	827,033	1,340,928	0
		95	73	0	0	0	556,057	180,643	685,144	1,421,917	17,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	97	47,730	123,254	593,764	117,119	479,717	10,998	1,404,223	2,776,805	0
		96	58,305	115,456	220,321	3,263	75,212	65,880	991,448	1,529,885	650
		95	14,719	197,493	0	102	43,195	37,552	592,939	886,000	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

				On-site Releases					Off-site Releases	
CAS Number	Chemical	Year	Total Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total On-site Releases Pounds	Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
--	Barium compounds	97	645	458,369	940,587	152,000	9,191,807	10,742,763	9,680,554	20,423,317
		96	563	318,425	99,487	0	1,983,887	2,401,799	5,720,310	8,122,109
		95	571	179,117	64,367	0	1,369,522	1,613,006	5,946,842	7,559,848
		88	628	1,027,222	104,302	2,773	5,791,655	6,925,952	17,531,268	24,457,220
22781-23-3 *	Bendiocarb	97	3	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	2	555	0	0	0	555	0	555
		88	NR	NR	NR	NR	NR	NR	NR	NR
1861-40-1 *	Benfluralin	97	4	1,960	0	0	0	1,960	8,400	10,360
		96	7	3,408	0	0	0	3,408	0	3,408
		95	8	2,977	0	0	0	2,977	14,000	16,977
		88	NR	NR	NR	NR	NR	NR	NR	NR
17804-35-2 *	Benomyl	97	3	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
98-87-3	Benzal chloride	97	3	1,030	1,500	0	0	2,530	0	2,530
		96	4	1,166	0	0	0	1,166	0	1,166
		95	4	1,112	0	0	0	1,112	0	1,112
		88	3	5,258	0	0	0	5,258	7,308	12,566
55-21-0	Benzamide	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	1	500	250	250	0	1,000	750	1,750
71-43-2 *	Benzene	97	467	8,753,200	11,464	363,100	62,475	9,190,239	83,518	9,273,757
		96	479	8,285,151	27,364	312,766	51,179	8,676,460	66,246	8,742,706
		95	472	9,411,612	21,290	282,642	18,583	9,734,127	71,391	9,805,518
		88	483	32,341,184	46,732	825,035	126,978	33,339,929	396,880	33,736,809
98-07-7	Benzoic trichloride	97	7	6,067	0	0	0	6,067	520	6,587
		96	7	7,991	16	0	0	8,007	0	8,007
		95	7	6,496	0	0	0	6,496	250	6,746
		88	4	24,963	0	0	0	24,963	9,777	34,740
98-88-4	Benzoyl chloride	97	22	17,911	5	0	0	17,916	1,000	18,916
		96	22	18,703	0	0	0	18,703	2,370	21,073
		95	22	16,749	0	0	0	16,749	1,460	18,209
		88	22	33,014	0	130,000	250	163,264	2,399	165,663

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
--	Barium compounds	97	30,421,974	1,998,629	142,000	216,995	7,507,910	1,763,375	14,260,037	56,310,920	2,240,371
		96	37,282,801	2,571,982	200	230,479	6,891,884	1,620,860	6,832,615	55,430,821	122,512
		95	26,551,729	1,847,515	200	70,062	6,364,467	3,489,203	6,712,309	45,035,485	33,032
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
22781-23-3 *	Bendiocarb	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	560	0	0	0	0	0	560	1,120	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1861-40-1 *	Benfluralin	97	72,000	0	0	0	1,700	55	10,500	84,255	0
		96	74,000	0	0	0	2,500	38,965	2,788	118,253	96
		95	4,205	0	0	0	6,200	175	16,910	27,490	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
17804-35-2 *	Benomyl	97	0	0	0	0	374,000	4,002	0	378,002	0
		96	0	0	0	0	340,000	6,000	0	346,000	0
		95	0	0	0	0	482,000	122,000	0	604,000	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-87-3	Benzal chloride	97	0	0	0	130,000	51,100	1,100	2,461	184,661	0
		96	0	0	0	780,000	110,000	180	1,168	891,348	0
		95	0	0	0	260,000	2,800	0	1,105	263,905	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
55-21-0	Benzamide	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
71-43-2 *	Benzene	97	46,015,599	381,821	60,211,346	1,146,425	47,653,556	2,274,444	9,202,991	166,886,182	62,271
		96	61,731,243	532,734	15,645,404	2,213,297	64,069,916	2,379,191	8,824,104	155,395,889	158,849
		95	49,501,392	420,034	20,222,877	1,579,955	54,035,116	1,974,430	9,795,408	137,529,212	65,951
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-07-7	Benzoic trichloride	97	0	0	0	22,000	210,000	0	6,596	238,596	0
		96	0	0	0	12,000	150,000	44	7,981	170,025	0
		95	0	0	0	3,001	150,000	32	6,242	159,275	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-88-4	Benzoyl chloride	97	0	0	0	0	1,974,302	365,304	18,706	2,358,312	111
		96	0	0	0	138	1,998,467	630,473	21,064	2,650,142	0
		95	0	0	0	80	1,676,545	615,127	18,213	2,309,965	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
94-36-0 *	Benzoyl peroxide	97	58	1,590	250	0	1,186	3,026	5,794	8,820
		96	62	2,019	260	0	1,655	3,934	6,352	10,286
		95	64	2,043	255	0	10,345	12,643	4,760	17,403
		88	50	6,294	0	5,350	36,050	47,694	23,954	71,648
100-44-7	Benzyl chloride	97	45	27,407	2,706	570	24	30,707	5,924	36,631
		96	45	19,442	324	660	173	20,599	4,824	25,423
		95	47	19,664	40	0	247	19,951	3,870	23,821
		88	51	43,329	640	0	500	44,469	9,687	54,156
7440-41-7	Beryllium	97	13	816	27	0	56,123	56,966	5,741	62,707
		96	9	859	31	0	31,240	32,130	4,842	36,972
		95	9	832	26	0	21,250	22,108	7,340	29,448
		88	12	2,763	74	0	37,000	39,837	3,160	42,997
--	Beryllium compounds	97	7	365	1	0	390	756	4,602	5,358
		96	8	395	1	0	16,188	16,584	2,333	18,917
		95	7	360	2	0	23,000	23,362	2,391	25,753
		88	5	862	17	0	12,000	12,879	8,261	21,140
82657-04-3 *	Bifenthrin	97	4	6	0	0	0	6	0	6
		96	3	7	0	0	0	7	0	7
		95	3	10	0	0	5	15	0	15
		88	NR	NR	NR	NR	NR	NR	NR	NR
92-52-4 *	Biphenyl	97	132	595,892	2,771	31,699	4,704	635,066	48,529	683,595
		96	137	659,117	9,779	31,558	29,272	729,726	37,462	767,188
		95	135	744,535	6,242	30,337	71,864	852,978	38,088	891,066
		88	181	1,211,292	88,197	82,760	222,297	1,604,546	227,492	1,832,038
111-91-1	Bis(2-chloro-ethoxy) methane	97	1	1,702	0	4,015	1,400	7,117	0	7,117
		96	1	1,331	0	6,688	542	8,561	0	8,561
		95	1	12,510	0	250	0	12,760	0	12,760
		88	NR	NR	NR	NR	NR	NR	NR	NR
111-44-4 *	Bis(2-chloroethyl) ether	97	13	1,515	5	0	0	1,520	0	1,520
		96	13	3,008	6	0	0	3,014	16	3,030
		95	11	564	3	0	0	567	0	567
		88	8	4,922	1,351	0	0	6,273	0	6,273
542-88-1	Bis(chloromethyl) ether	97	2	7	0	0	0	7	0	7
		96	3	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	2	1	0	0	0	1	0	1

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
94-36-0 *	Benzoyl peroxide	97	22,502	0	0	1	62,392	42,704	8,677	136,276	0
		96	11,580	8,300	0	3,527	43,700	47,483	10,026	124,616	0
		95	4,600	10,800	863	1,520	57,214	42,461	16,769	134,227	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
100-44-7	Benzyl chloride	97	17,000	0	21,472	455,495	277,157	23,534	35,866	830,524	0
		96	19,000	0	20,645	558,986	258,366	3,129	22,894	883,020	500
		95	1,000	0	25,481	430,300	256,947	10,947	21,501	746,176	80
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-41-7	Beryllium	97	110,428	120,381	0	0	0	14	61,323	292,146	0
		96	38,389	92,980	0	0	921	57	34,378	166,725	0
		95	39,689	11,363	0	0	780	423	27,079	79,334	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Beryllium compounds	97	0	38,600	0	0	0	1,643	4,197	44,440	0
		96	0	18,300	0	0	0	1,072	17,594	36,966	0
		95	7	23,880	0	0	0	1,011	24,661	49,559	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
82657-04-3 *	Bifenthrin	97	0	0	0	0	0	46	6	52	0
		96	0	0	0	0	0	48	7	55	0
		95	0	0	0	0	0	10	10	20	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
92-52-4 *	Biphenyl	97	290,759	302,713	1,573,135	143,730	4,050,685	834,719	696,431	7,892,172	5,291
		96	161,010	547,472	1,094,809	248,303	3,058,232	921,835	785,791	6,817,452	10,041
		95	268,053	156,081	1,088,381	346,055	963,993	600,999	904,287	4,327,849	11,635
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloro-ethoxy) methane	97	0	0	0	0	0	0	6,887	6,887	0
		96	0	0	0	0	0	0	8,561	8,561	0
		95	0	0	0	0	0	0	12,796	12,796	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
111-44-4 *	Bis(2-chloroethyl) ether	97	0	185,170	468,431	91,738	430,386	243,182	1,061	1,419,968	0
		96	0	180,000	573,000	407,636	960,300	37,079	2,902	2,160,917	0
		95	0	146,118	302,700	203,775	0	88,893	570	742,056	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
542-88-1	Bis(chloromethyl) ether	97	0	0	0	0	6,500	0	7	6,507	0
		96	0	0	0	0	6,500	0	0	6,500	0
		95	0	0	0	0	13,000	0	0	13,000	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) nd/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
108-60-1	Bis(2-chloro-1-methylethyl) ether	97	2	3,860	0	0	3	3,863	0	3,863
		96	2	4,620	44	0	3	4,667	0	4,667
		95	2	6,130	0	0	0	6,130	0	6,130
		88	2	7,959	30,000	0	0	37,959	0	37,959
56-35-9 *	Bis(tributyltin) oxide	97	2	0	7	0	50	57	2,280	2,337
		96	2	0	16	0	55	71	4,537	4,608
		95	2	0	32	0	0	32	13,873	13,905
		88	NR	NR	NR	NR	NR	NR	NR	NR
10294-34-5	Boron trichloride	97	7	754	0	0	0	754	0	754
		96	6	37	0	0	0	37	0	37
		95	4	5	0	0	0	5	0	5
		88	NR	NR	NR	NR	NR	NR	NR	NR
7637-07-2	Boron trifluoride	97	25	21,290	0	0	0	21,290	5	21,295
		96	25	22,555	0	0	0	22,555	0	22,555
		95	23	18,569	0	0	0	18,569	929	19,498
		88	NR	NR	NR	NR	NR	NR	NR	NR
314-40-9 *	Bromacil	97	3	10	3,284	0	0	3,294	0	3,294
		96	2	6	30,740	0	0	30,746	0	30,746
		95	5	500	27,897	0	0	28,397	0	28,397
		88	NR	NR	NR	NR	NR	NR	NR	NR
7726-95-6 *	Bromine	97	48	107,808	15	7	545	108,375	433,404	541,779
		96	46	77,702	10	7	245,683	323,402	245,117	568,519
		95	43	104,825	880	7	10	105,722	259,882	365,604
		88	NR	NR	NR	NR	NR	NR	NR	NR
35691-65-7 *	1-Bromo-1-(bromomethyl)-1,3-propane-dicarbonitrile	97	2	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
353-59-3	Bromochlorodi-fluoromethane (Halon 1211)	97	3	2,042	0	0	0	2,042	0	2,042
		96	3	4,688	0	0	0	4,688	0	4,688
		95	4	4,811	0	0	0	4,811	0	4,811
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-25-2	Bromoform	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	2	0	8,600	0	0	8,600	0	8,600

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released On- and Off-site Pounds	Total Production-related Waste Managed Pounds	Non-Production-related Waste Managed Pounds
108-60-1	Bis(2-chloro-1-methylethyl) ether	97	13,000,000	0	0	0	11,685,200	0	3,900	24,689,100	1
		96	13,000,000	0	0	0	8,934,000	0	4,700	21,938,700	1
		95	5,200,000	0	8,540,000	0	10,840,000	0	6,100	24,586,100	1
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
56-35-9 *	Bis(tributyltin) oxide	97	0	36,426	0	0	167	180	2,337	39,110	0
		96	0	55,471	0	0	339	0	4,608	60,418	0
		95	0	39,840	0	0	336	0	13,903	54,079	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
10294-34-5	Boron trichloride	97	7,000	0	0	0	59,600	0	318	66,918	0
		96	6,000	0	0	0	6,500	0	37	12,537	0
		95	5,000	0	0	0	200	0	1	5,201	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7637-07-2	Boron trifluoride	97	0	0	0	0	497,548	152	21,343	519,043	280
		96	11	0	0	0	382,165	974	22,811	405,961	71
		95	0	0	0	0	425,701	1,027	17,919	444,647	4
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
314-40-9 *	Bromacil	97	0	0	0	0	16,912	19,881	3,313	40,106	0
		96	0	0	0	0	18,062	29,048	30,746	77,856	0
		95	5	0	0	0	30,687	27,829	27,947	86,468	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7726-95-6 *	Bromine	97	5,438,500	0	0	0	16,973,278	3,199,452	545,537	26,156,767	293
		96	4,662,000	0	0	0	14,057,885	2,831,509	326,754	21,878,148	804
		95	4,960,000	0	0	0	14,808,669	2,924,242	104,745	22,797,656	28
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
35691-65-7 *	1-Bromo-1-(bromomethyl)-1,3-propane-dicarbonitrile	97	0	0	0	0	12,000	7,871	0	19,871	0
		96	0	0	0	0	29,000	7,104	0	36,104	0
		95	0	0	0	0	0	10,957	0	10,957	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
353-59-3	Bromochlorodi--fluoromethane (Halon 1211)	97	554,000	0	0	0	0	0	2,053	556,053	0
		96	674,672	0	0	0	0	0	4,699	679,371	0
		95	282,800	0	0	0	0	0	4,832	287,632	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-25-2	Bromoform	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
74-83-9 *	Bromomethane	97	47	1,876,553	14	244	6	1,876,817	0	1,876,817
		96	51	2,299,843	7	303	6	2,300,159	0	2,300,159
		95	42	2,601,734	14	3,817	0	2,605,565	0	2,605,565
		88	36	2,784,795	0	1,546	0	2,786,341	0	2,786,341
75-63-8	Bromotrifluoro-	97	6	27,405	0	0	0	27,405	0	27,405
	methane	96	6	26,153	0	0	0	26,153	0	26,153
	(Halon 1301)	95	8	33,632	0	0	0	33,632	0	33,632
		88	NR	NR	NR	NR	NR	NR	NR	NR
1689-84-5 *	Bromoxynil	97	2	506	0	0	0	506	2,842	3,348
		96	2	15	0	0	0	15	1,388	1,403
		95	1	6	0	0	0	6	990	996
		88	NR	NR	NR	NR	NR	NR	NR	NR
1689-99-2 *	Bromoxynil	97	5	1,386	0	0	0	1,386	17,990	19,376
	octanoate	96	5	521	0	0	0	521	16,605	17,126
		95	4	500	0	0	0	500	13,569	14,069
		88	NR	NR	NR	NR	NR	NR	NR	NR
357-57-3	Brucine	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
106-99-0	1,3-Butadiene	97	186	2,710,735	2,552	1,000	294	2,714,581	6,600	2,721,181
		96	185	2,768,958	11,001	1,000	263	2,781,222	4,790	2,786,012
		95	185	3,048,679	5,393	0	277	3,054,349	4,892	3,059,241
		88	157	7,004,622	522,504	1,500	7,817	7,536,443	185,398	7,721,841
141-32-2	Butyl acrylate	97	158	232,375	7,242	0	805	240,422	21,150	261,572
		96	158	214,338	712	0	2,165	217,215	50,540	267,755
		95	164	228,768	2,919	0	559	232,246	73,301	305,547
		88	166	411,862	3,528	0	602	415,992	18,766	434,758
71-36-3	n-Butyl alcohol	97	1,001	21,456,156	79,743	3,122,078	34,484	24,692,461	188,914	24,881,375
		96	1,050	23,056,451	61,936	2,452,006	5,134	25,575,527	304,582	25,880,109
		95	1,113	25,717,020	115,353	2,263,357	4,631	28,100,361	286,766	28,387,127
		88	1,109	37,715,221	128,130	3,006,660	175,819	41,025,830	924,519	41,950,349
78-92-2 *	sec-Butyl alcohol	97	120	959,349	11,965	152,939	10	1,124,263	17,496	1,141,759
		96	114	1,251,680	6,920	120,169	490	1,379,259	18,769	1,398,028
		95	113	898,282	6,782	136,172	2,805	1,044,041	18,376	1,062,417
		88	92	1,097,163	122,291	0	2,600	1,222,054	21,351	1,243,405

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
74-83-9 *	Bromomethane	97	23,310	0	273,200	280	967,441	0	1,856,305	3,120,536	13,155
		96	39,200	0	207,750	190	454,397	0	2,300,248	3,001,785	33,425
		95	165,182	0	101,000	380	4,876,073	0	2,578,001	7,720,636	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-63-8	Bromotrifluoro-methane (Halon 1301)	97	410,000	0	0	0	0	0	27,410	437,410	316
		96	343,951	0	0	0	0	0	23,753	367,704	2,327
		95	200,661	0	0	0	0	0	36,155	236,816	805
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1689-84-5 *	Bromoxynil	97	0	0	0	0	0	50	2,611	2,661	0
		96	0	0	0	0	0	203	1,343	1,546	0
		95	0	0	0	0	0	0	996	996	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1689-99-2 *	Bromoxynil octanoate	97	0	0	0	0	0	167	19,596	19,763	0
		96	0	0	0	0	0	1,448	16,726	18,174	0
		95	0	0	0	0	0	173	13,689	13,862	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
357-57-3	Brucine	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-99-0	1,3-Butadiene	97	5,481,906	14,451,023	40,873,920	57,787	65,299,067	314,610	2,210,086	128,688,399	510,546
		96	5,953,022	13,046,362	37,128,076	3,110	61,908,326	92,416	2,715,118	120,846,430	70,362
		95	5,513,939	13,652,736	32,353,920	34,519	57,784,775	96,310	2,877,550	112,313,749	200,544
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
141-32-2	Butyl acrylate	97	110,060	165,089	9,499,188	608,286	3,403,674	91,101	258,068	14,135,466	130
		96	93,695	88,006	1,902,440	308,234	3,155,076	170,631	261,820	5,979,902	24,791
		95	173,995	207,325	4,059,201	1,143,139	4,173,410	228,382	299,618	10,285,070	5,264
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
71-36-3	n-Butyl alcohol	97	10,377,274	3,504,078	28,650,346	7,777,463	35,473,237	4,283,777	24,850,956	114,917,131	28,564
		96	7,350,311	3,125,656	22,248,666	7,926,692	39,455,766	3,146,458	25,802,321	109,055,870	3,630
		95	8,438,943	3,351,225	24,665,663	8,569,241	37,970,936	3,346,704	28,455,353	114,798,065	52,280
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-92-2 *	sec-Butyl alcohol	97	138,499	36,291	13,475,118	1,981,948	2,115,036	51,775	1,121,428	18,920,095	57
		96	472,175	30,095	20,272,772	3,492,855	2,060,170	115,295	1,175,115	27,618,477	527
		95	748,440	24,774	13,041,102	6,275,927	2,249,797	99,596	1,079,508	23,519,144	2,800
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
75-65-0 *	tert-Butyl alcohol	97	86	577,415	29,477	980,424	751	1,588,067	279,582	1,867,649
		96	92	767,202	30,430	1,007,213	758	1,805,603	54,158	1,859,761
		95	91	657,818	20,183	1,082,071	751	1,760,823	30,783	1,791,606
		88	54	1,574,137	14,989	674,798	818	2,264,742	56,502	2,321,244
106-88-7	1,2-Butylene oxide	97	13	16,001	70	0	0	16,071	12	16,083
		96	13	12,697	45	0	0	12,742	12	12,754
		95	15	11,083	1	0	0	11,084	5	11,089
		88	18	99,931	3,500	0	250	103,681	898	104,579
123-72-8 *	Butyraldehyde	97	33	346,922	362	29,000	1	376,285	233	376,518
		96	30	283,630	441	43,344	46	327,461	37	327,498
		95	28	291,440	821	149,783	10	442,054	41	442,095
		88	26	2,218,692	3,812	1,997	31	2,224,532	117,741	2,342,273
7440-43-9	Cadmium	97	53	2,376	521	0	8,604	11,501	135,195	146,696
		96	55	4,786	1,010	0	47,930	53,726	78,102	131,828
		95	47	11,941	458	0	19,856	32,255	90,264	122,519
		88	90	22,430	2,598	0	94,602	119,630	155,313	274,943
--	Cadmium compounds	97	95	64,212	1,934	52	988,095	1,054,293	1,350,236	2,404,529
		96	95	55,440	3,740	82	697,790	757,052	1,042,566	1,799,618
		95	116	53,283	880	109	537,776	592,048	1,734,196	2,326,244
		88	116	118,728	1,549	2,409	294,877	417,563	1,066,648	1,484,211
156-62-7 *	Calcium cyanamide	97	4	105	0	0	0	105	0	105
		96	3	2	0	0	0	2	0	2
		95	5	10	0	0	0	10	0	10
		88	3	12,600	0	0	66,000	78,600	0	78,600
133-06-2 *	Captan	97	12	6,316	5	5	0	6,326	391	6,717
		96	16	12,625	5	5	0	12,635	2,196	14,831
		95	15	7,280	5	0	5	7,290	3,868	11,158
		88	18	14,869	750	5,100	1,000	21,719	12,434	34,153
63-25-2 *	Carbaryl	97	18	17,776	12	0	7,568	25,356	16,634	41,990
		96	21	13,432	54	0	2,935	16,421	3,098	19,519
		95	21	7,824	10	0	1,060	8,894	26,861	35,755
		88	23	7,923	877	0	500	9,300	6,198	15,498
1563-66-2 *	Carbofuran	97	4	8,728	1	0	0	8,729	42	8,771
		96	6	2,589	1	0	0	2,590	0	2,590
		95	7	4,187	3,000	0	250	7,437	250	7,687
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
75-65-0 *	tert-Butyl alcohol	97	274,074	214,894	49,091,300	11,272,389	2,585,298	1,779,964	1,973,750	67,191,669	8,042
		96	437,181	14,684	53,474,091	9,096,077	2,117,278	1,310,991	2,259,440	68,709,742	102
		95	466,023	2,256	64,310,733	27,469,833	2,447,778	1,794,551	2,230,055	98,721,229	2,073
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-88-7	1,2-Butylene oxide	97	0	0	0	310,195	348,570	264	15,895	674,924	0
		96	0	0	46,792	260,307	350,376	20,524	12,770	690,769	0
		95	0	990	0	330,194	329,270	93	10,804	671,351	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
123-72-8 *	Butyraldehyde	97	0	1,200	2,864,034	224,224	2,102,870	297,449	376,908	5,866,685	1
		96	0	16,195	2,757,675	26,850	1,905,739	299,503	327,379	5,333,341	210
		95	0	1,300	2,545,861	22,000	1,982,004	169,714	440,778	5,161,657	7
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	97	1,090,072	310,225	0	0	33,925	10,497	128,622	1,573,341	0
		96	504,123	398,532	0	0	67,708	19,511	112,167	1,102,041	0
		95	1,471,697	538,690	29,191	633	91,725	53,384	74,015	2,259,335	3,911
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Cadmium compounds	97	7,937,874	1,255,346	0	1,501	6,647,787	44,755	2,233,696	18,120,959	66,080
		96	7,832,833	798,133	0	1,613	68,806	65,732	1,672,270	10,439,387	6,322
		95	8,221,108	1,416,852	0	1,082	86,561	141,412	2,202,701	12,069,716	11,697
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
156-62-7 *	Calcium cyanamide	97	0	8,365	0	0	0	0	101	8,466	0
		96	0	0	0	0	0	0	1	1	0
		95	0	0	0	0	0	0	6	6	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
133-06-2 *	Captan	97	3,580	0	0	0	9,700	540	6,099	19,919	0
		96	4,644	0	0	0	9,500	1,119	14,046	29,309	0
		95	5,070	0	0	0	9,834	1,072	7,479	23,455	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
63-25-2 *	Carbaryl	97	63,043	0	77,740	630	669,175	29,709	13,029	853,326	15,493
		96	46,896	0	458,932	0	437,614	28,463	13,765	985,670	0
		95	36,618	0	0	0	467,593	7,885	32,697	544,793	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1563-66-2 *	Carbofuran	97	0	0	0	0	3	29,338	8,728	38,069	0
		96	0	0	0	0	3	59,343	2,877	62,223	0
		95	0	0	0	1	3	47,158	8,222	55,384	1
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
75-15-0 *	Carbon disulfide	97	92	50,984,954	28,651	517,565	5	51,531,175	32,503	51,563,678
		96	93	72,782,220	66,555	3,788	270	72,852,833	19,097	72,871,930
		95	90	84,120,530	39,864	3,985	265	84,164,644	2,949	84,167,593
		88	88	124,109,904	39,501	13,400	43,436	124,206,241	58,473	124,264,714
56-23-5 *	Carbon tetrachloride	97	65	357,499	315	32,958	135	390,907	18,947	409,854
		96	64	350,846	215	44,515	0	395,576	9,245	404,821
		95	70	394,176	717	53,966	0	448,859	7,735	456,594
		88	95	3,795,248	15,627	98,050	14,759	3,923,684	49,703	3,973,387
463-58-1	Carbonyl sulfide	97	77	21,081,227	0	0	0	21,081,227	0	21,081,227
		96	72	20,106,987	0	0	0	20,106,987	0	20,106,987
		95	63	17,807,907	0	0	0	17,807,907	0	17,807,907
		88	38	25,954,103	0	0	0	25,954,103	0	25,954,103
5234-68-4 *	Carboxin	97	3	7	0	0	0	7	142	149
		96	3	8	0	0	0	8	384	392
		95	3	8	0	0	0	8	428	436
		88	NR	NR	NR	NR	NR	NR	NR	NR
120-80-9	Catechol	97	135	6,673	22,660	0	1,830	31,163	337	31,500
		96	130	5,306	24,784	0	2,219	32,309	239	32,548
		95	126	3,457	24,747	0	3,729	31,933	563	32,496
		88	113	3,789	320,546	0	84,332	408,667	89,474	498,141
133-90-4 *	Chloramben	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	1	1,418	250	0	0	1,668	1,159	2,827
57-74-9 *	Chlordane	97	No reports received							
		96	1	660	95	0	0	755	0	755
		95	1	823	22	0	0	845	0	845
		88	2	2,698	4	4,262	0	6,964	0	6,964
115-28-6	Chlorendic acid	97	2	49	0	0	0	49	0	49
		96	2	43	0	0	0	43	0	43
		95	1	6	0	0	0	6	0	6
		88	NR	NR	NR	NR	NR	NR	NR	NR
90982-32-4 *	Chlorimuron ethyl	97	2	8	0	0	0	8	0	8
		96	1	1	0	0	0	1	0	1
		95	1	1	0	0	0	1	0	1
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
75-15-0 *	Carbon disulfide	97	24,187,118	442	10,044,054	385,297	27,944,668	271,540	50,848,980	113,682,099	29,778
		96	19,122,418	395	6,776,413	290,280	18,928,988	317,618	73,198,714	118,634,826	41,700
		95	20,874,450	18	5,775,132	368,509	16,592,458	366,465	84,737,695	128,714,727	154,890
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
56-23-5 *	Carbon tetrachloride	97	2,801,998	139,227	983,907	37,782	42,300,623	1,158,420	382,418	47,804,375	11,773
		96	2,073,632	128,701	1,050,017	31,331	41,761,616	1,592,636	391,944	47,029,877	13,782
		95	1,677,422	365,067	317,149	50,068	52,783,870	730,882	436,696	56,361,154	34,522
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
463-58-1	Carbonyl sulfide	97	0	0	2,286,198	0	16,734,387	25	21,206,950	40,227,560	0
		96	0	0	1,805,617	0	15,751,155	5,900	20,222,630	37,785,302	0
		95	0	0	1,508,252	0	14,242,854	16,000	18,652,262	34,419,368	1
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
5234-68-4 *	Carboxin	97	1,017	0	0	0	0	360	149	1,526	0
		96	2,604	0	0	0	0	392	392	3,388	0
		95	2,817	0	0	0	0	402	436	3,655	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
120-80-9	Catechol	97	0	10,813	10,008,900	96,059	4,046,473	61,960	35,836	14,260,041	660
		96	0	0	11,260,377	32,079	3,731,658	27,096	36,688	15,087,898	0
		95	0	0	7,329,290	94,995	1,481,057	54,221	68,220	9,027,783	2,772
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
133-90-4 *	Chloramben	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
57-74-9 *	Chlordane	97	No reports received								
		96	0	0	0	0	4,150	84	755	4,989	0
		95	0	0	0	0	5,150	95	845	6,090	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
115-28-6	Chlorendic acid	97	0	0	0	0	0	914	49	963	0
		96	0	0	0	0	0	553	43	596	0
		95	0	0	0	0	0	488	6	494	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
90982-32-4 *	Chlorimuron ethyl	97	0	0	0	0	0	16,223	8	16,231	0
		96	0	0	0	0	0	36,604	1	36,605	0
		95	0	0	0	0	0	5,838	1	5,839	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
7782-50-5 *	Chlorine	97	1,257	64,419,432	301,119	60,595	73,776	64,854,922	46,946	64,901,868
		96	1,323	66,404,743	466,475	74,196	372,788	67,318,202	21,045	67,339,247
		95	1,373	65,770,630	413,441	74,124	64,095	66,322,290	40,771	66,363,061
		88	1,800	133,085,601	6,622,187	107,624	439,547	140,254,959	1,003,531	141,258,490
10049-04-4 *	Chlorine dioxide	97	126	1,311,372	58	0	0	1,311,430	0	1,311,430
		96	125	1,210,625	0	0	0	1,210,625	0	1,210,625
		95	127	1,303,526	5	0	0	1,303,531	0	1,303,531
		88	122	12,251,050	2,350	0	41,000	12,294,400	41,750	12,336,150
79-11-8 *	Chloroacetic acid	97	30	6,125	8	0	19,746	25,879	500	26,379
		96	29	6,432	2	0	250	6,684	255	6,939
		95	30	6,474	11,121	0	0	17,595	600	18,195
		88	37	26,819	850	10	0	27,679	2,506	30,185
4080-31-3 *	1-(3-Chloroallyl)-3,5,7- triaza-1-azionia-adamantane chloride	97	14	549	21	0	672	1,242	4,804	6,046
		96	9	60	15	0	607	682	4,582	5,264
		95	7	93	10	0	521	624	2,514	3,138
		88	NR	NR	NR	NR	NR	NR	NR	NR
106-47-8 *	p-Chloroaniline	97	4	15,332	869	0	5	16,206	0	16,206
		96	3	144	407	0	5	556	0	556
		95	4	267	827	0	0	1,094	11	1,105
		88	NR	NR	NR	NR	NR	NR	NR	NR
108-90-7 *	Chlorobenzene	97	76	962,904	1,217	113,901	1,550	1,079,572	105,300	1,184,872
		96	76	1,230,686	2,086	68,701	5	1,301,478	106,844	1,408,322
		95	61	1,132,063	1,850	27,405	5	1,161,323	92,582	1,253,905
		88	66	4,375,887	98,354	84,457	4,127	4,562,825	117,624	4,680,449
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	97	27	5,964,553	193	0	0	5,964,746	14,550	5,979,296
		96	28	6,406,031	2,858	0	0	6,408,889	14,450	6,423,339
		95	25	6,954,443	771	6	0	6,955,220	21,600	6,976,820
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-45-6 *	Chlorodifluoro-methane (HCFC-22)	97	231	8,929,443	3,650	0	1	8,933,094	73,609	9,006,703
		96	242	10,094,174	2,538	0	1	10,096,713	54,200	10,150,913
		95	241	12,550,871	2,279	22	1	12,553,173	55,084	12,608,257
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-00-3	Chloroethane	97	57	2,532,822	905	0	0	2,533,727	5,128	2,538,855
		96	54	2,770,560	285	92	0	2,770,937	4,900	2,775,837
		95	54	2,764,049	2,320	0	116	2,766,485	4,400	2,770,885
		88	50	4,887,215	27,448	1,510	1	4,916,174	32,260	4,948,434

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7782-50-5 *	Chlorine	97	79,099,777	111,317	0	2,161	229,962,293	1,106,905	64,957,305	375,239,758	40,564
		96	82,275,726	751,497	4,000	14,348	259,650,832	1,250,183	67,361,102	411,307,688	20,229
		95	84,997,609	1,791,968	499	1,585	220,212,624	1,179,749	66,341,058	374,525,092	13,336
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
10049-04-4 *	Chlorine dioxide	97	3,868,805	0	0	0	52,622,530	6,000	1,333,906	57,831,241	2,095
		96	2,242,600	0	0	0	51,143,368	16,000	1,357,715	54,759,683	10,499
		95	2,446,060	0	0	0	40,375,897	0	1,325,311	44,147,268	3,932
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-11-8 *	Chloroacetic acid	97	37,000	0	0	0	1,290,589	20,014	6,421	1,354,024	700
		96	42,416	0	0	0	1,636,910	124	6,756	1,686,206	550
		95	25,013	0	0	0	1,331,388	2,726	17,712	1,376,839	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
4080-31-3 *	1-(3-Chloroallyl)-3,5,7- triaza-1-azonia-adamantane chloride	97	31,708	0	0	0	2,404	15,666	7,105	56,883	0
		96	9,900	0	0	0	1,080	6,400	5,275	22,655	0
		95	2,700	0	0	0	720	4,700	3,570	11,690	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-47-8 *	p-Chloroaniline	97	0	0	46,000	400	0	5,815	16,898	69,113	0
		96	0	0	0	455	411	9,226	1,367	11,459	0
		95	0	0	0	540	0	120,301	940	121,781	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-90-7 *	Chlorobenzene	97	5,571,993	1,492,007	6,799,180	1,359,228	10,248,621	3,422,433	1,118,897	30,012,359	3,374
		96	5,742,719	1,613,818	2,870,143	607,803	11,519,200	2,860,128	1,363,084	26,576,895	6,589
		95	9,123,869	1,016,982	1,978,757	1,366,145	11,231,684	1,503,368	1,242,672	27,463,477	20,610
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	97	0	25,169	0	5,000	272,446	97,136	5,986,413	6,386,164	30,300
		96	13,140	14,000	0	21	154,810	42,968	6,439,262	6,664,201	24,480
		95	52,560	0	0	320	304,070	26,330	6,933,797	7,317,077	459
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-45-6 *	Chlorodifluoro-methane (HCFC-22)	97	1,787,283	201,044	0	250	469,293	324,199	8,930,366	11,712,435	155,681
		96	4,647,033	229,798	0	721	556,776	296,699	10,036,817	15,767,844	160,267
		95	2,374,126	242,086	0	27,002	401,771	258,992	12,445,343	15,749,320	190,653
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-00-3	Chloroethane	97	3,923,357	165,400	8,196,910	41,817	31,313,445	576,354	2,536,920	46,754,203	1,888
		96	3,909,753	154,153	12,244,253	39,686	28,988,635	496,976	2,771,665	48,605,121	15,434
		95	2,321,094	155,726	13,500,359	45,855	28,073,797	491,378	2,770,574	47,358,783	8,570
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
67-66-3 *	Chloroform	97	144	7,205,396	164,654	26,954	7,524	7,404,528	14,498	7,419,026
		96	158	9,353,768	341,066	45,387	7,735	9,747,956	38,868	9,786,824
		95	160	10,275,914	330,352	33,276	4,297	10,643,839	6,636	10,650,475
		88	169	25,988,609	1,114,965	36,000	68,647	27,208,221	143,124	27,351,345
74-87-3 *	Chloromethane	97	98	3,259,431	1,608	186,931	59	3,448,029	205	3,448,234
		96	102	4,467,830	803	99,705	80	4,568,418	392	4,568,810
		95	108	4,383,749	57,425	50,198	35	4,491,407	1,557	4,492,964
		88	81	11,567,647	115,985	165,250	0	11,848,882	59,140	11,908,022
107-30-2	Chloromethyl methyl ether	97	3	4,155	5	0	0	4,160	54	4,214
		96	3	2,841	7	0	0	2,848	70	2,918
		95	3	2,865	10	0	0	2,875	70	2,945
		88	4	3,033	0	0	0	3,033	0	3,033
563-47-3	3-Chloro-2-methyl-1-propene	97	3	25,982	0	0	0	25,982	0	25,982
		96	3	23,007	0	0	0	23,007	0	23,007
		95	3	19,859	0	0	0	19,859	0	19,859
		88	NR	NR	NR	NR	NR	NR	NR	NR
--	Chlorophenols	97	6	4,779	16	92,980	0	97,775	839	98,614
		96	6	4,775	13	113,554	0	118,342	2,290	120,632
		95	9	4,997	30	105,687	0	110,714	940	111,654
		88	9	2,573	272	71,554	0	74,399	2	74,401
76-06-2 *	Chloropicrin	97	16	10,147	0	0	0	10,147	10,700	20,847
		96	16	11,773	0	0	0	11,773	216	11,989
		95	15	11,229	0	0	0	11,229	36	11,265
		88	NR	NR	NR	NR	NR	NR	NR	NR
126-99-8	Chloroprene	97	11	996,060	0	94,000	0	1,090,060	0	1,090,060
		96	14	1,070,147	5	120,000	8,640	1,198,792	8,640	1,207,432
		95	14	983,888	0	60,000	5,104	1,048,992	7,102	1,056,094
		88	13	1,948,008	287	68,792	0	2,017,087	0	2,017,087
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	97	3	549,113	0	0	0	549,113	0	549,113
		96	7	596,466	65	0	0	596,531	0	596,531
		95	4	504,553	0	0	0	504,553	0	504,553
		88	NR	NR	NR	NR	NR	NR	NR	NR
2837-89-0	2-Chloro-1,1,1,2-tetra fluoroethane (HCFC-124)	97	20	865,860	5	0	0	865,865	0	865,865
		96	17	904,474	961	0	0	905,435	0	905,435
		95	11	752,215	1,255	0	0	753,470	0	753,470
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
67-66-3 *	Chloroform	97	5,675,765	735,446	5,823,214	314,634	16,142,192	1,548,310	7,389,584	37,629,145	17,372
		96	6,039,162	677,733	8,887,218	188,162	13,454,140	2,486,020	9,647,575	41,380,010	48,414
		95	5,138,816	175,713	17,187,219	103,558	17,351,138	2,061,635	10,608,511	52,626,590	27,205
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
74-87-3 *	Chloromethane	97	3,181,750	4,750	3,252,115	8,489	6,038,027	318,569	3,357,148	16,160,848	25,468
		96	2,999,190	0	4,492,933	6,194	12,991,668	263,121	4,736,604	25,489,710	7,420
		95	2,803,788	650	4,421,896	4,505	14,313,676	240,406	4,482,520	26,267,441	7,916
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-30-2	Chloromethyl methyl ether	97	0	0	0	0	12,823	0	4,227	17,050	0
		96	0	0	0	0	8,220	0	2,917	11,137	0
		95	0	0	0	0	15,900	0	2,909	18,809	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
563-47-3	3-Chloro-2-methyl-1-propene	97	0	0	0	0	625,186	14,191	25,983	665,360	0
		96	0	0	0	0	345,271	52,312	23,007	420,590	0
		95	0	0	0	0	544,134	14,819	19,859	578,812	10
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Chlorophenols	97	2,897,377	0	0	100	237,504	5,540	97,871	3,238,392	749
		96	2,486,786	0	0	670	207,215	8,698	119,475	2,822,844	1,161
		95	2,919,075	0	0	6,400	237,484	26,212	109,847	3,299,018	1,776
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
76-06-2 *	Chloropicrin	97	2,210	0	0	0	343	1,469	20,781	24,803	14
		96	29,902	0	0	64	365	370	11,812	42,513	0
		95	9,981	0	0	54	441	34,387	10,434	55,297	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
126-99-8	Chloroprene	97	0	374,960	1,226,280	2,599	8,601,500	431,665	1,089,960	11,726,964	30
		96	0	280,127	944,336	14,010	7,250,217	268,995	1,198,785	9,956,470	50
		95	0	480,972	26,280	9,105	4,233,572	138,421	1,050,975	5,939,325	515
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	97	0	0	0	0	37,725	0	548,521	586,246	0
		96	0	0	0	0	33,195	0	596,019	629,214	312
		95	0	0	0	0	1,725	0	504,011	505,736	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2837-89-0	2-Chloro-1,1,1,2-tetra fluoroethane (HCFC-124)	97	0	267,438	0	0	34,892	20,753	868,043	1,191,126	0
		96	184,882	226,700	0	0	183,025	39,799	904,800	1,539,206	618
		95	0	239,200	0	0	193,194	35,816	753,296	1,221,506	400
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
1897-45-6 *	Chlorothalonil	97	19	7,914	83	0	0	7,997	171,838	179,835
		96	25	9,346	22	0	1,670	11,038	253,395	264,433
		95	25	7,440	35	0	750	8,225	97,420	105,645
		88	10	28,476	250	0	0	28,726	396,274	425,000
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	97	4	23,310	60	0	0	23,370	80	23,450
		96	3	34,213	0	0	0	34,213	0	34,213
		95	2	35,523	0	0	0	35,523	0	35,523
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-72-9	Chlorotrifluoro-methane (CFC-13)	97	1	16,900	5	0	0	16,905	0	16,905
		96	1	9,350	250	0	0	9,600	0	9,600
		95	1	250	0	0	0	250	0	250
		88	NR	NR	NR	NR	NR	NR	NR	NR
5598-13-0 *	Chlorpyrifos methyl	97	4	1,000	0	0	0	1,000	0	1,000
		96	5	2,010	0	0	3,653	5,663	0	5,663
		95	4	510	0	0	6,000	6,510	0	6,510
		88	NR	NR	NR	NR	NR	NR	NR	NR
64902-72-3 *	Chlorsulfuron	97	1	1	0	0	0	1	0	1
		96	1	1	0	0	0	1	0	1
		95	1	1	0	0	0	1	0	1
		88	NR	NR	NR	NR	NR	NR	NR	NR
7440-47-3	Chromium	97	1,845	572,772	11,805	1	453,656	1,038,234	5,962,093	7,000,327
		96	1,861	445,080	574,396	7	761,711	1,781,194	5,676,360	7,457,554
		95	1,913	411,671	17,220	33	1,106,233	1,535,157	5,533,193	7,068,350
		88	1,250	566,202	75,192	2,249	9,282,766	9,926,409	11,693,176	21,619,585
--	Chromium compounds	97	1,460	387,028	99,497	1,131,559	29,326,433	30,944,517	19,465,080	50,409,597
		96	1,415	369,806	137,732	37,422	26,494,593	27,039,553	14,537,450	41,577,003
		95	1,439	643,539	137,235	60,747	22,180,960	23,022,481	19,971,318	42,993,799
		88	1,210	763,353	326,277	52,653	30,938,106	32,080,389	14,895,062	46,975,451
6459-94-5	C.I. Acid Red 114	97	2	0	0	0	0	0	0	0
		96	No reports received							
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
569-64-2 *	C.I. Basic Green 4	97	3	15	0	0	0	15	750	765
		96	2	5	0	0	0	5	0	5
		95	2	5	0	0	0	5	0	5
		88	6	750	0	0	0	750	250	1,000

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
1897-45-6 *	Chlorothalonil	97	2,445	0	0	0	18,720	144,424	180,811	346,400	180
		96	2,016	148	0	0	25,902	272,955	264,168	565,189	2,469
		95	5,339	0	0	2,294	24,716	139,966	102,279	274,594	1
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	97	0	0	0	0	8,700	17,158	23,700	49,558	8
		96	0	0	0	0	0	16,571	34,298	50,869	0
		95	0	0	0	0	0	0	35,608	35,608	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-72-9	Chlorotrifluoro-methane (CFC-13)	97	0	0	0	0	0	0	16,910	16,910	0
		96	0	0	0	0	0	0	9,500	9,500	0
		95	0	0	0	0	0	0	30	30	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
5598-13-0 *	Chlorpyrifos methyl	97	2,000	0	0	0	0	2,233	1,000	5,233	0
		96	2,692	0	0	0	0	8,775	6,502	17,969	0
		95	400	0	0	0	0	6,095	6,402	12,897	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
64902-72-3 *	Chlorsulfuron	97	0	0	0	0	0	7,173	1	7,174	0
		96	0	0	0	0	0	9,807	1	9,808	0
		95	0	0	0	0	0	3,444	1	3,445	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	97	26,785,710	98,912,248	70,198	310	293,650	850,114	6,903,128	133,815,358	184,283
		96	30,630,739	90,071,592	34,195	1,254	316,631	1,347,530	6,956,459	129,358,400	12,182
		95	29,309,918	99,412,477	9,781,278	51,738	399,607	1,657,703	7,847,861	148,460,582	41,365
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Chromium compounds	97	30,112,660	33,983,201	74,023	61,643	1,391,548	5,461,721	43,054,737	114,139,533	1,155,182
		96	25,719,310	29,726,726	27,254	73,493	5,417,791	3,216,875	39,135,841	103,317,290	867,704
		95	36,626,812	40,398,253	44,280	68,741	94,214,040	3,527,891	38,849,665	213,729,682	1,658,100
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
6459-94-5	C.I. Acid Red 114	97	0	0	0	0	0	0	0	0	0
		96	No reports received								
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
569-64-2 *	C.I. Basic Green 4	97	0	0	0	0	0	998	20	1,018	0
		96	0	0	0	0	100	499	10	609	0
		95	0	0	0	0	110	499	10	619	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
989-38-8	C.I. Basic Red 1	97	1	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	668	668
		95	2	0	0	0	0	0	668	668
		88	No reports received							
28407-37-6	C.I. Direct Blue 218	97	6	10	10	0	0	20	2,489	2,509
		96	4	10	6	0	0	16	1,400	1,416
		95	6	10	6	0	0	16	1,400	1,416
		88	NR	NR	NR	NR	NR	NR	NR	NR
16071-86-6	C.I. Direct Brown 95	97	No reports received							
		96	No reports received							
		95	1	0	0	0	0	0	0	0
		88	No reports received							
2832-40-8	C.I. Disperse Yellow 3	97	4	338	29	0	0	367	593	960
		96	3	452	28	0	0	480	594	1,074
		95	3	450	27	0	0	477	1,061	1,538
		88	1	398	302	0	0	700	899	1,599
81-88-9	C.I. Food Red 15	97	2	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	2	250	0	0	0	250	0	250
97-56-3	C.I. Solvent Yellow 3	97	1	0	0	0	0	0	0	0
		96	No reports received							
		95	1	0	0	0	0	0	0	0
		88	1	250	0	0	0	250	0	250
842-07-9	C.I. Solvent Yellow 14	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	2	0	0	0	0	0	0	0
7440-48-4	Cobalt	97	260	34,954	2,164	40	8,994	46,152	685,258	731,410
		96	255	31,506	4,580	0	64,364	100,450	168,362	268,812
		95	253	34,294	17,300	0	46,482	98,076	221,839	319,915
		88	177	44,005	16,744	0	213,204	273,953	248,089	522,042
--	Cobalt compounds	97	260	31,406	34,650	44,624	631,054	741,734	557,124	1,298,858
		96	240	30,927	27,935	15,917	486,599	561,378	586,016	1,147,394
		95	224	29,093	70,392	22,657	454,624	576,766	299,268	876,034
		88	150	56,410	63,662	18,500	38,960	177,532	300,641	478,173

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.
NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).
NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).
*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
989-38-8	C.I. Basic Red 1	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	40	0	263	668	971	0
		95	0	0	0	54	0	289	668	1,011	0
		88	No reports received								
28407-37-6	C.I. Direct Blue 218	97	2	0	0	0	374	1,531	3,688	5,595	0
		96	0	0	0	0	639	74	4,442	5,155	0
		95	5	0	0	0	619	5,151	1,411	7,186	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
16071-86-6	C.I. Direct Brown 95	97	No reports received								
		96	No reports received								
		95	0	0	0	0	0	0	0	0	0
		88	No reports received								
2832-40-8	C.I. Disperse Yellow 3	97	0	0	0	0	0	3,664	960	4,624	0
		96	0	0	0	0	0	5,886	1,074	6,960	0
		95	0	0	0	0	1,061	5,189	1,410	7,660	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
81-88-9	C.I. Food Red 15	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
97-56-3	C.I. Solvent Yellow 3	97	0	0	0	0	0	0	0	0	0
		96	No reports received								
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
842-07-9	C.I. Solvent Yellow 14	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-48-4	Cobalt	97	4,423,572	7,919,086	0	0	147,031	24,592	277,126	12,791,407	3
		96	3,782,710	7,031,616	0	0	147,007	52,132	307,041	11,320,506	0
		95	3,577,817	11,784,639	0	1	379,265	85,327	232,604	16,059,653	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Cobalt compounds	97	503,731	1,972,586	0	6,773	1,209,764	57,859	1,304,459	5,055,172	1,404
		96	215,762	1,959,664	0	6,675	1,107,761	92,924	1,107,388	4,490,174	130
		95	222,882	1,573,341	0	6,087	1,394,877	86,932	816,222	4,100,341	4,230
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or ederal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
7440-50-8 *	Copper	97	2,712	892,348	40,457	57,513	1,772,586	2,762,904	18,378,475	21,141,379
		96	2,720	5,037,484	49,771	41,032	3,338,006	8,466,293	13,493,129	21,959,422
		95	2,726	1,208,172	43,261	29,787	1,658,434	2,939,654	14,928,480	17,868,134
		88	1,970	1,525,311	115,641	15,651	10,466,175	12,122,778	17,288,955	29,411,733
--	Copper compounds	97	1,488	5,488,173	105,892	237,184	38,168,231	43,999,480	10,770,350	54,769,830
		96	1,436	1,095,598	75,768	298,693	47,636,870	49,106,929	8,503,303	57,610,232
		95	1,420	2,019,686	85,774	264,852	40,760,958	43,131,270	9,071,879	52,203,149
		88	1,042	3,157,209	185,292	165,957	29,683,607	33,192,065	14,132,348	47,324,413
8001-58-9 *	Creosote	97	77	1,288,999	8,452	0	27,930	1,325,381	2,301,965	3,627,346
		96	80	924,873	9,120	0	710	934,703	7,333,126	8,267,829
		95	85	928,376	8,427	0	500	937,303	2,595,570	3,532,873
		88	NR	NR	NR	NR	NR	NR	NR	NR
120-71-8	p-Cresidine	97	4	3,027	0	0	0	3,027	2,100	5,127
		96	5	3,465	0	0	0	3,465	0	3,465
		95	5	4,606	0	0	0	4,606	2,200	6,806
		88	6	7,080	250	0	750	8,080	4,700	12,780
108-39-4 *	m-Cresol	97	24	54,374	139	430,000	0	484,513	2,694	487,207
		96	27	41,224	1,633	520,000	0	562,857	1,473	564,330
		95	29	48,000	1,675	680,000	0	729,675	3,218	732,893
		88	15	18,432	283	0	455	19,170	13,503	32,673
95-48-7	o-Cresol	97	24	10,091	40	260,000	0	270,131	16,440	286,571
		96	19	8,291	845	440,000	0	449,136	4,257	453,393
		95	23	12,425	82	590,000	0	602,507	5,257	607,764
		88	28	89,793	448	0	1,667	91,908	12,458	104,366
106-44-5	p-Cresol	97	28	51,348	51	263,000	110	314,509	78,311	392,820
		96	29	41,796	825	262,500	361	305,482	13,462	318,944
		95	30	45,433	1,066	342,500	0	388,999	3,168	392,167
		88	18	640,703	1,143	152,000	62,291	856,137	643	856,780
1319-77-3 *	Cresol (mixed isomers)	97	143	1,669,098	7,693	1,233,058	2,716	2,912,565	16,381	2,928,946
		96	146	1,717,361	10,234	711,056	1,969	2,440,620	20,245	2,460,865
		95	153	1,606,560	15,011	648,882	2,350	2,272,803	47,059	2,319,862
		88	110	779,105	6,764	1,804,060	4,512	2,594,441	483,488	3,077,929
4170-30-3 *	Crotonaldehyde	97	7	35,145	1,200	1,400	0	37,745	0	37,745
		96	7	57,653	1,600	61,900	0	121,153	0	121,153
		95	7	101,579	680	391,500	0	493,759	0	493,759
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7440-50-8 *	Copper	97	603,925,697	783,470,245	225,424	3,551,787	41,296,581	2,006,069	9,658,847	1,444,134,650	368,800
		96	710,144,737	774,457,246	123,097	47,018	39,936,554	1,693,773	12,978,701	1,539,381,126	69,590
		95	607,914,418	778,338,567	506	42,073	41,198,595	1,776,837	11,340,847	1,440,611,843	91,982
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Copper compounds	97	310,075,700	167,470,119	0	25,643	42,125,835	4,452,985	57,625,028	581,775,310	3,073,536
		96	188,123,141	207,809,632	0	19,548	5,817,034	1,582,760	56,073,403	459,425,518	1,619,905
		95	215,002,488	188,618,241	0	31,078	60,463,597	2,459,760	49,520,858	516,096,022	1,323,102
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
8001-58-9 *	Creosote	97	66,432,245	1,700,000	702,717	67,254	865,430,718	362,602	2,606,664	937,302,200	497,301
		96	48,219,156	0	5,500	60,613	19,634,028	399,015	4,168,219	72,486,531	4,754,445
		95	64,447,471	2,180	6,100	94,871	163,131	298,027	3,208,184	68,219,964	322,988
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
120-71-8	p-Cresidine	97	0	0	0	0	0	32,491	5,127	37,618	0
		96	0	0	0	0	0	40,697	3,465	44,162	193
		95	0	0	0	0	0	51,611	6,806	58,417	3,400
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-39-4 *	m-Cresol	97	1,740,898	930,000	757,870	16,492	553,372	28,850	491,702	4,519,184	6
		96	2,104,414	820,002	789,240	38,925	229,581	27,824	568,609	4,578,595	41
		95	2,309,373	1,500,001	615,425	17,910	329,024	91,159	737,708	5,600,600	151
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-48-7	o-Cresol	97	89,071	0	347,145	1,632	234,441	34,727	424,417	1,131,433	5
		96	97,068	2	299,260	53,685	196,840	52,445	453,584	1,152,884	39
		95	171,098	76	304,801	321	184,032	125,072	606,682	1,392,082	116
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-44-5	p-Cresol	97	91,290	780,000	179,023	102,147	1,272,477	78,718	395,224	2,898,879	103
		96	90,880	500,002	430,589	116,622	468,502	409,214	320,100	2,335,909	410
		95	137,136	900,001	454,288	58,641	226,234	985,208	393,474	3,154,982	100
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1319-77-3 *	Cresol (mixed isomers)	97	339,319	464,967	4,539,730	397,074	9,992,872	275,741	2,888,535	18,898,238	4
		96	502,345	388,441	4,601,076	517,292	14,766,970	252,573	2,420,547	23,449,244	15
		95	1,052,270	187,427	5,045,270	637,169	8,558,967	1,143,472	2,203,525	18,828,100	6,809
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
4170-30-3 *	Crotonaldehyde	97	0	0	2,317,000	0	501,900	16	37,545	2,856,461	0
		96	0	0	22,600	0	571,700	0	120,873	715,173	0
		95	0	0	0	0	202,400	0	498,820	701,220	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
98-82-8	Cumene	97	241	1,474,589	1,343	859	8,245	1,485,036	18,491	1,503,527
		96	243	1,639,968	1,052	3,267	6,850	1,651,137	10,275	1,661,412
		95	237	1,876,779	1,490	9,403	1,102	1,888,774	70,457	1,959,231
		88	118	5,239,958	3,201	30,165	8,591	5,281,915	83,287	5,365,202
80-15-9	Cumene hydroperoxide	97	45	71,106	88	300,000	7,200	378,394	11,251	389,645
		96	40	46,826	26	180,169	6,300	233,321	11,147	244,468
		95	43	72,898	68	280,000	3,400	356,366	9,725	366,091
		88	40	192,523	1,784	371,000	250	565,557	22,944	588,501
135-20-6	Cupferron	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	4	920	0	0	0	920	0	920
21725-46-2 *	Cyanazine	97	5	1,915	415	0	0	2,330	4,186	6,516
		96	7	1,915	421	0	0	2,336	2,695	5,031
		95	5	991	492	0	0	1,483	2,527	4,010
		88	NR	NR	NR	NR	NR	NR	NR	NR
--	Cyanide compounds	97	228	638,507	65,394	3,752,094	103,191	4,559,186	98,604	4,657,790
		96	227	849,455	108,844	3,477,384	97,938	4,533,621	284,436	4,818,057
		95	239	1,074,717	89,466	4,429,640	18,580	5,612,403	149,438	5,761,841
		88	393	1,248,012	195,244	3,707,326	107,208	5,257,790	581,408	5,839,198
1134-23-2 *	Cycloate	97	3	82	671	71	0	824	158	982
		96	2	49	1	2	0	52	28	80
		95	3	26	1,108	16	0	1,150	242	1,392
		88	NR	NR	NR	NR	NR	NR	NR	NR
110-82-7 *	Cyclohexane	97	371	6,500,730	80,765	322,903	17,660	6,922,058	51,600	6,973,658
		96	363	6,889,400	23,605	314,855	5,802	7,233,662	107,136	7,340,798
		95	364	8,086,710	19,108	238,200	10,809	8,354,827	105,429	8,460,256
		88	303	13,984,542	20,071	334,471	38,190	14,377,274	211,575	14,588,849
108-93-0 *	Cyclohexanol	97	27	179,623	420	3,616,560	12	3,796,615	810	3,797,425
		96	23	200,001	122	3,630,080	74	3,830,277	3,221	3,833,498
		95	24	170,168	154	3,623,000	0	3,793,322	70	3,793,392
		88	NR	NR	NR	NR	NR	NR	NR	NR
68359-37-5 *	Cyfluthrin	97	2	0	0	0	0	0	0	0
		96	3	26	0	0	350	376	0	376
		95	2	10	0	0	0	10	0	10
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
98-82-8	Cumene	97	17,810,313	104,904	7,920,812	535,057	7,630,812	161,103	1,643,207	35,806,208	8,397
		96	16,076,751	130,250	9,440,498	1,029,651	10,335,977	134,929	1,716,887	38,864,943	13,234
		95	17,285,493	60,160	6,815,013	1,380,577	6,411,952	169,307	2,048,364	34,170,866	2,265
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
80-15-9	Cumene hydroperoxide	97	0	0	0	0	513,396	175,021	387,526	1,075,943	1,600
		96	0	0	0	12	550,669	177,787	249,443	977,911	0
		95	0	0	0	6	482,755	21,434	375,758	879,953	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
135-20-6	Cupferron	97	0	0	2,595	0	0	0	0	2,595	0
		96	0	0	679	0	0	90	0	769	0
		95	0	0	0	0	0	5,648	0	5,648	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
21725-46-2 *	Cyanazine	97	0	0	0	10,400	39,000	19,755	6,516	75,671	20,000
		96	0	0	0	0	39,000	24,351	5,508	68,859	0
		95	0	0	0	0	545,000	8,100	3,887	556,987	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Cyanide compounds	97	433,269	51,565	7,191,619	2,442	14,844,831	672,091	4,587,333	27,783,150	4,199
		96	588,476	29,182	120,114	22	10,953,335	600,541	4,686,097	16,977,767	50,694
		95	664,976	32,526	19,000	3,523	9,107,604	713,792	5,684,283	16,225,704	6,215
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1134-23-2 *	Cycloate	97	0	0	0	0	64	2,007	980	3,051	0
		96	0	0	0	0	0	1,006	80	1,086	0
		95	0	0	0	0	2,000	6,001	1,346	9,347	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
110-82-7 *	Cyclohexane	97	55,645,913	131,524	14,303,721	4,463,196	31,267,815	4,105,909	6,774,856	116,692,934	117,376
		96	61,439,379	500,775	8,021,506	3,065,988	33,947,355	1,909,190	7,236,590	116,120,783	46,227
		95	54,774,021	1,585,367	10,345,060	5,145,025	23,810,493	1,250,210	8,408,537	105,318,713	123,181
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-93-0 *	Cyclohexanol	97	0	19,759	2,020,445	145,035	272,856	100,776	3,843,305	6,402,176	0
		96	0	0	1,405,718	67,364	208,684	134,247	3,870,276	5,686,289	0
		95	0	0	677,199	9,673	153,667	13,076	3,838,896	4,692,511	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
68359-37-5 *	Cyfluthrin	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	1,110	1,233	386	2,729	0
		95	0	0	0	0	989	890	20	1,899	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms	On-site Releases: Total Air Emissions	On-site Releases: Surface Water Discharges	On-site Releases: Underground Injection	On-site Releases: Releases to Land	On-site Releases: Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
			Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
94-75-7 *	2,4-D (acetic acid)	97	19	4,991	59	250	255	5,555	6,616	12,171
		96	22	5,989	832	0	255	7,076	6,017	13,093
		95	27	6,888	1,083	250	4,325	12,546	17,430	29,976
		88	28	7,020	549	3,789	38,000	49,358	68,422	117,780
533-74-4 *	Dazomet	97	16	0	0	0	0	0	1,850	1,850
		96	11	648	197	0	0	845	4,900	5,745
		95	11	1,042	230	0	0	1,272	2,578	3,850
		88	NR	NR	NR	NR	NR	NR	NR	NR
53404-60-7 *	Dazomet, sodium salt	97	2	0	0	0	0	0	250	250
		96	2	0	0	0	0	0	250	250
		95	2	0	0	0	0	0	250	250
		88	NR	NR	NR	NR	NR	NR	NR	NR
94-82-6 *	2,4-DB	97	2	72	0	0	0	72	0	72
		96	2	720	0	0	0	720	0	720
		95	2	750	0	0	0	750	0	750
		88	NR	NR	NR	NR	NR	NR	NR	NR
1929-73-3 *	2,4-D butoxyethyl ester	97	3	500	0	0	0	500	0	500
		96	2	663	0	0	0	663	0	663
		95	3	510	0	0	0	510	0	510
		88	NR	NR	NR	NR	NR	NR	NR	NR
94-80-4 *	2,4-D butyl ester	97	3	1	0	0	0	1	0	1
		96	No reports received							
		95	1	3	0	0	0	3	0	3
		88	NR	NR	NR	NR	NR	NR	NR	NR
1163-19-5	Decabromo-dihenyl oxide	97	135	28,068	2,494	0	869,294	899,856	707,431	1,607,287
		96	137	45,608	3,675	0	200,838	250,121	644,939	895,060
		95	138	39,283	3,846	11	204,248	247,388	697,615	945,003
		88	58	29,604	500	292	21,450	51,846	555,181	607,027
13684-56-5 *	Desmedipham	97	1	83	0	0	0	83	0	83
		96	2	15	0	0	0	15	0	15
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
1928-43-4 *	2,4-D 2-Ethylhexyl ester	97	11	5,606	0	0	0	5,606	2,036	7,642
		96	11	3,225	5	0	0	3,230	2,077	5,307
		95	11	2,765	250	0	0	3,015	3,131	6,146
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
94-75-7 *	2,4-D (acetic acid)	97	98,184	0	0	0	29,710	46,125	11,467	185,486	191
		96	78,758	0	0	0	25,360	22,156	11,874	138,148	191
		95	29,200	0	0	0	23,780	24,490	27,595	105,065	6,186
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
533-74-4 *	Dazomet	97	0	0	0	0	11,400	621	2,200	14,221	0
		96	0	0	3	0	15,261	3,100	6,045	24,409	71
		95	0	0	0	0	20,110	1,178	3,542	24,830	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
53404-60-7 *	Dazomet, sodium salt	97	0	0	0	0	90	12,072	100	12,262	0
		96	0	0	0	0	130	13,962	140	14,232	0
		95	0	0	0	0	56	7,807	0	7,863	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
94-82-6 *	2,4-DB	97	35	0	0	0	0	23	73	131	0
		96	0	0	0	0	0	556	270	826	0
		95	0	0	0	0	0	217	290	507	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1929-73-3 *	2,4-D butoxyethyl ester	97	0	0	0	0	0	0	349	349	0
		96	0	0	0	0	0	3,256	363	3,619	0
		95	0	0	0	0	0	1,600	318	1,918	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
94-80-4 *	2,4-D butyl ester	97	0	0	92,200	34	9,362	2	1	101,599	0
		96	No reports received								
		95	0	0	0	0	600	0	3	603	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1163-19-5	Decabromo-dihenyl oxide	97	289,049	57,236	646	6,602	50,690	370,462	1,646,812	2,421,497	0
		96	902,477	112,091	0	4,731	48,973	337,078	894,511	2,299,861	98
		95	992,673	144,205	0	18,686	32,138	322,935	928,854	2,439,491	3,794
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
13684-56-5 *	Desmedipham	97	0	0	0	0	0	379	83	462	0
		96	0	0	0	0	0	492	15	507	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1928-43-4 *	2,4-D 2-Ethylhexyl ester	97	3,982	0	0	0	0	11,151	7,540	22,673	0
		96	4,701	0	0	0	0	14,780	4,764	24,245	0
		95	36,531	0	0	0	0	10,318	5,468	52,317	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
615-05-4	2,4-Diamino-anisole	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	1	0	0	0	0	0	0	0
39156-41-7	2,4-Diamino-anisole sulfate	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	1	0	0	0	0	0	0	0
101-80-4	4,4'-Diamino-diphenyl ether	97	3	24	360	0	0	384	58	442
		96	3	16	182	0	0	198	53	251
		95	3	23	359	0	0	382	120	502
		88	5	216	585	0	0	801	142	943
95-80-7	2,4-Diamino-toluene	97	3	1,958	0	0	0	1,958	0	1,958
		96	1	1,575	0	0	0	1,575	0	1,575
		95	5	500	0	0	0	500	0	500
		88	2	2,988	250	0	0	3,238	0	3,238
25376-45-8	Diaminotoluene (mixed isomers)	97	13	11,454	556	27,000	8	39,018	284,524	323,542
		96	13	17,249	590	7,600	10	25,449	23,286	48,735
		95	11	9,594	5,522	7,050	55	22,221	28,625	50,846
		88	13	21,097	3,288	174,000	295	198,680	289,591	488,271
333-41-5 *	Diazinon	97	27	13,824	15	0	0	13,839	1,862	15,701
		96	35	12,737	21	0	0	12,758	1,250	14,008
		95	31	3,245	8	0	0	3,253	1,560	4,813
		88	NR	NR	NR	NR	NR	NR	NR	NR
132-64-9	Dibenzofuran	97	36	34,770	15	0	280	35,065	54,220	89,285
		96	36	39,254	62	0	265	39,581	28,986	68,567
		95	37	18,704	2,843	0	220	21,767	19,824	41,591
		88	110	71,093	1,510	0	9,929	82,532	181,799	264,331
106-93-4 *	1,2-Dibromoethane	97	13	9,707	4	10	1	9,722	5,116	14,838
		96	14	8,710	7	24	1	8,742	0	8,742
		95	19	12,372	306	0	256	12,934	3	12,937
		88	34	63,342	1,011	6,882	259	71,494	27,924	99,418
124-73-2	Dibromotetra-fluoroethane (Halon 2402)	97	1	10	0	0	0	10	0	10
		96	1	10	0	0	0	10	0	10
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
615-05-4	2,4-Diamino-anisole	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
39156-41-7	2,4-Diamino-anisole sulfate	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
101-80-4	4,4'-Diamino-diphenyl ether	97	0	0	0	0	150	6,272	379	6,801	0
		96	0	0	0	0	140	10,025	195	10,360	0
		95	0	0	0	0	4,929	380,289	377	385,595	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-80-7	2,4-Diamino-toluene	97	0	0	0	0	74,135	275	1,747	76,157	0
		96	0	0	0	0	66,836	279	1,575	68,690	0
		95	0	0	0	0	7,192	29,774	655	37,621	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
25376-45-8	Diaminotoluene (mixed isomers)	97	0	0	2,871,215	2,891,505	534,411	779,888	47,547	7,124,566	280,003
		96	0	0	4,731,680	2,749,895	442,162	1,145,550	48,567	9,117,854	460
		95	0	0	755,917	386,996	362,357	1,923,183	48,109	3,476,562	3,550
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
333-41-5 *	Diazinon	97	50,419	0	0	0	26,183	33,074	16,258	125,934	0
		96	43,105	0	0	0	107,961	11,649	13,736	176,451	0
		95	21,330	0	0	1	66,150	7,596	4,355	99,432	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	97	128,988	960	240,210	16,170	27,823	335	102,426	516,912	6
		96	179,552	3,767	190	102	491,323	4,116	54,894	733,944	1,492
		95	70,546	25,036	113	176	405,125	1,471	37,508	539,975	13,217
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-93-4 *	1,2-Dibromoethane	97	0	0	0	30,740	11,862	645	9,611	52,858	0
		96	0	0	0	3,300	11,202	27,431	8,597	50,530	3,300
		95	0	0	60	17	34,174	72,467	11,740	118,458	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
124-73-2	Dibromotetra-fluoroethane (Halon 2402)	97	93,800	0	0	0	0	0	10	93,810	0
		96	96,000	0	0	0	0	0	10	96,010	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
84-74-2 *	Dibutyl phthalate	97	108	39,485	151	160,000	1,267	200,903	21,072	221,975
		96	116	73,794	452	180,000	1,364	255,610	25,217	280,827
		95	124	104,500	3,981	390,000	1,402	499,883	25,920	525,803
		88	126	204,058	14,339	350,000	6,395	574,792	113,068	687,860
1918-00-9 *	Dicamba	97	7	1,041	26	65,535	0	66,602	2,180	68,782
		96	9	1,059	132	59,200	0	60,391	0	60,391
		95	6	12,580	250	113,600	0	126,430	0	126,430
		88	NR	NR	NR	NR	NR	NR	NR	NR
99-30-9 *	Dichloran	97	2	0	0	0	0	0	0	0
		96	4	10	0	0	0	10	0	10
		95	4	10	0	0	0	10	0	10
		88	NR	NR	NR	NR	NR	NR	NR	NR
95-50-1 *	1,2-Dichloro-benzene	97	30	158,412	2,039	5,600	794	166,845	20,461	187,306
		96	29	287,352	5,324	4,900	384	297,960	17,759	315,719
		95	27	271,522	3,789	26,000	11,521	312,832	28,228	341,060
		88	45	530,535	11,624	20,000	13,354	575,513	38,266	613,779
541-73-1	1,3-Dichloro-benzene	97	7	3,495	818	0	0	4,313	1	4,314
		96	6	5,118	897	0	0	6,015	0	6,015
		95	6	7,528	526	0	0	8,054	0	8,054
		88	6	15,282	1,281	0	0	16,563	290	16,853
106-46-7 *	1,4-Dichloro-benzene	97	23	262,266	1,728	2,000	1,960	267,954	289	268,243
		96	25	236,502	1,881	2,000	480	240,863	0	240,863
		95	24	242,372	1,287	0	3,100	246,759	3,328	250,087
		88	24	1,891,419	6,153	4,000	1,300	1,902,872	750	1,903,622
25321-22-6	Dichlorobenzene (mixed isomers)	97	7	15,274	0	0	0	15,274	9	15,283
		96	7	14,047	0	0	0	14,047	10	14,057
		95	9	5,443	0	0	0	5,443	9	5,452
		88	15	163,684	40	0	0	163,724	19,672	183,396
91-94-1	3,3'-Dichloro-benzidine	97	1	255	0	0	0	255	7,400	7,655
		96	1	2	0	0	0	2	5,550	5,552
		95	3	11	0	0	0	11	2,400	2,411
		88	14	255	752	0	0	1,007	209,785	210,792
612-83-9	3,3'-Dichloro-benzidine dihydrochloride	97	17	0	0	0	0	0	0	0
		96	16	5	0	0	0	5	0	5
		95	13	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

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Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
84-74-2 *	Dibutyl phthalate	97	32,125	18,084	468,416	205,442	132,864	60,660	249,098	1,166,689	58
		96	46,139	13,221	333,566	123,509	144,041	97,798	310,427	1,068,701	0
		95	51,458	26,123	1,060,538	172,397	314,761	115,184	385,723	2,126,184	173,700
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1918-00-9 *	Dicamba	97	0	0	0	0	61	58,850	68,501	127,412	0
		96	895	0	0	0	95	26	60,123	61,139	48
		95	510	0	0	0	0	29	126,662	127,201	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
99-30-9 *	Dichloran	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	55	30	10	95	0
		95	0	0	0	0	50	25	10	85	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-50-1 *	1,2-Dichloro-benzene	97	39,382,322	2,259,567	1,546,421	787,537	445,251	2,074,144	193,212	46,688,454	4,376
		96	6,431,032	2,890,984	612,089	584,857	318,912	2,678,549	308,194	13,824,617	15,880
		95	5,527,161	3,626,496	344,610	763,438	172,717	1,999,033	340,946	12,774,401	153
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichloro-benzene	97	2,994	1,180	91,900	31	13	2,473	5,361	103,952	1
		96	1,793	875	0	0	9	2,284	6,041	11,002	4
		95	5,068	1,291	0	0	10	3,989	8,079	18,437	36
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-46-7 *	1,4-Dichloro-benzene	97	2,638,810	0	133,690	2,073	1,793	197,383	340,436	3,314,185	38
		96	4,249,806	0	354,424	12,038	130,406	508,226	241,809	5,496,709	960
		95	705,345	34,882	42,157	11,053	73,030	621,194	248,721	1,736,382	1,606
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
25321-22-6	Dichlorobenzene (mixed isomers)	97	0	0	293,565	745	230,056	10,523	15,282	550,171	0
		96	0	0	595,086	13,325	260,043	20,131	14,028	902,613	0
		95	0	0	266,997	5,165	79,032	3,684	5,452	360,330	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichloro-benzidine	97	0	0	0	0	7,400	74,000	7,300	88,700	0
		96	0	0	0	0	6,000	46,000	5,400	57,400	0
		95	0	0	0	22,000	14,000	1,600	2,701	40,301	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
612-83-9	3,3'-Dichloro-benzidine dihydrochloride	97	0	0	0	0	12,378	38,000	0	50,378	0
		96	0	0	0	0	10,114	100,000	1	110,115	0
		95	0	0	0	0	12,797	22,000	0	34,797	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
64969-34-2	3,3'-Dichloro-benzidine sulfate	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-27-4	Dichlorobromo-methane	97	1	2,400	0	0	100	2,500	0	2,500
		96	1	2,400	0	0	110	2,510	0	2,510
		95	1	2,300	0	0	50	2,350	0	2,350
		88	1	13,440	0	0	0	13,440	0	13,440
764-41-0	1,4-Dichloro-2-butene	97	2	2,650	0	1,800	0	4,450	0	4,450
		96	2	3,110	0	3,400	0	6,510	0	6,510
		95	2	3,950	0	4,500	0	8,450	0	8,450
		88	NR	NR	NR	NR	NR	NR	NR	NR
110-57-6	trans-1,4-Dichloro-2-butene	97	No reports received							
		96	1	137	0	0	0	137	0	137
		95	1	137	0	0	0	137	0	137
		88	NR	NR	NR	NR	NR	NR	NR	NR
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	97	1	1,400	60	0	0	1,460	170	1,630
		96	1	930	20	0	0	950	89	1,039
		95	1	890	20	0	0	910	89	999
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-71-8 *	Dichlorodifluoro-methane (CFC-12)	97	61	810,736	43	5,766	0	816,545	550	817,095
		96	76	1,333,986	80	0	6,070	1,340,136	460	1,340,596
		95	137	3,249,946	17,172	89	0	3,267,207	320	3,267,527
		88	NR	NR	NR	NR	NR	NR	NR	NR
107-06-2 *	1,2-Dichloroethane	97	78	916,764	1,826	4,549	27	923,166	120,476	1,043,642
		96	79	1,044,572	1,848	5,126	250	1,051,796	91,249	1,143,045
		95	81	1,234,397	5,194	24,339	256	1,264,186	23,671	1,287,857
		88	110	4,615,179	40,527	1,452,084	2,166	6,109,956	166,131	6,276,087
540-59-0	1,2-Dichloro-ethylene	97	10	7,772	17	0	0	7,789	0	7,789
		96	9	8,194	37	0	0	8,231	0	8,231
		95	10	8,527	270	0	0	8,797	0	8,797
		88	10	126,478	95	0	1	126,574	87,614	214,188
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	97	234	7,473,102	239	0	4,970	7,478,311	320,848	7,799,159
		96	268	9,825,015	508	0	6,585	9,832,108	221,899	10,054,007
		95	294	11,630,354	580	26	35,767	11,666,727	165,777	11,832,504
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
64969-34-2	3,3'-Dichloro-benzidine sulfate	97	0	0	0	0	750	3,800	0	4,550	0
		96	0	0	0	0	600	6,700	0	7,300	0
		95	0	0	0	0	1,300	2,400	0	3,700	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-27-4	Dichlorobromo-methane	97	0	0	0	0	0	0	2,500	2,500	0
		96	0	0	0	0	0	0	2,500	2,500	0
		95	0	0	0	0	0	0	2,300	2,300	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
764-41-0	1,4-Dichloro-2-butene	97	1,800,000	0	0	0	3,300,000	300,000	4,450	5,404,450	0
		96	1,800,000	0	0	0	3,000,000	320,000	6,510	5,126,510	0
		95	0	0	0	13,000	3,300,000	312,500	8,450	3,633,950	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
110-57-6	trans-1,4-Dichloro-2-butene	97	No reports received								
		96	0	0	0	0	0	0	137	137	0
		95	0	0	0	0	0	0	137	137	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	97	0	0	0	0	107,000	72,000	1,600	180,600	0
		96	0	0	0	0	96,000	37,000	1,000	134,000	0
		95	0	0	0	0	98,000	22,000	1,000	121,000	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-71-8 *	Dichlorodifluoro-methane (CFC-12)	97	211,228	154,956	0	90	13,617	40,079	817,009	1,236,979	86,550
		96	540,671	214,243	0	82	17,016	47,887	1,310,398	2,130,297	19,370
		95	552,377	466,714	408,747	225	126,167	114,628	3,241,865	4,910,723	18,429
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-06-2 *	1,2-Dichloroethane	97	50,816,240	17,461,011	47,830,815	420,603	53,835,059	1,741,248	902,553	173,007,529	27,434
		96	47,818,476	16,882,663	49,048,528	1,129,501	48,491,110	1,041,454	1,027,317	165,439,049	34,071
		95	59,314,824	16,921,135	32,517,232	787,622	74,728,291	1,630,158	1,266,749	187,166,011	23,294
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
540-59-0	1,2-Dichloro-ethylene	97	1,520,000	331,902	1,020,000	0	2,904,290	1,384	7,716	5,785,292	115
		96	620,000	27,151	1,560,000	0	1,828,252	8,701	7,741	4,051,845	250
		95	310,000	5,100	2,871,400	0	4,680,089	1,984	8,761	7,878,334	121
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	97	246,249	131,231	0	840,910	446,481	700,282	7,423,438	9,788,591	1,736
		96	389,753	274,663	0	280,373	2,069,813	1,092,025	10,007,098	14,113,725	6,850
		95	5,429,772	381,393	0	99,548	2,018,829	846,290	11,713,532	20,489,364	38,945
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
75-43-4	Dichlorofluoro-	97	2	131,260	0	0	0	131,260	8,440	139,700
	methane	96	3	145,285	0	0	0	145,285	10,676	155,961
	(HCFC-21)	95	4	173,117	2	0	0	173,119	31,000	204,119
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-09-2 *	Dichloromethane	97	804	47,665,155	9,492	528,026	11,180	48,213,853	226,085	48,439,938
		96	925	53,667,435	10,060	749,507	4,957	54,431,959	167,805	54,599,764
		95	1,003	58,033,908	28,620	1,140,335	2,064	59,204,927	176,467	59,381,394
		88	1,675	129,124,529	349,960	1,478,833	157,156	131,110,478	7,806,328	138,916,806
507-55-1	1,3-Dichloro-	97	3	34,811	0	0	0	34,811	0	34,811
	1,1,2,2,3-penta	96	2	29,000	0	0	0	29,000	0	29,000
	fluoropropane	95	1	255	0	0	0	255	0	255
	(HCFC-225cb)	88	NR	NR	NR	NR	NR	NR	NR	NR
422-56-0	3,3-Dichloro-	97	3	28,251	0	0	0	28,251	0	28,251
	1,1,1,2,2-penta	96	2	24,000	0	0	0	24,000	0	24,000
	fluoropropane	95	1	255	0	0	0	255	0	255
	(HCFC-225ca)	88	NR	NR	NR	NR	NR	NR	NR	NR
120-83-2	2,4-Dichloro-	97	5	3,296	134	16,020	0	19,450	0	19,450
	phenol	96	3	3,117	53	15,390	0	18,560	0	18,560
		95	3	3,580	245	15,900	0	19,725	0	19,725
		88	8	1,403	107	17,700	2	19,212	350	19,562
78-87-5 *	1,2-Dichloro-	97	14	378,454	2,609	0	30	381,093	12,368	393,461
	propane	96	11	514,428	1,855	0	150	516,433	5,330	521,763
		95	11	616,470	4,344	0	20	620,834	1,364	622,198
		88	12	1,395,304	23,785	0	3,400	1,422,489	1,131	1,423,620
10061-02-6	trans-1,3-Dichloro-	97	3	468	0	0	0	468	3	471
	propene	96	2	840	0	0	0	840	0	840
		95	1	256	0	0	0	256	0	256
		88	NR	NR	NR	NR	NR	NR	NR	NR
78-88-6 *	2,3-Dichloro-	97	4	914	0	0	0	914	0	914
	propene	96	4	1,050	19,900	0	0	20,950	0	20,950
		95	5	4,253	0	0	0	4,253	0	4,253
		88	NR	NR	NR	NR	NR	NR	NR	NR
542-75-6 *	1,3-Dichloro-	97	11	8,821	67	0	0	8,888	0	8,888
	propylene	96	11	9,447	1,270	0	0	10,717	0	10,717
		95	11	31,267	193	0	0	31,460	0	31,460
		88	8	54,590	250	0	0	54,840	0	54,840

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
75-43-4	Dichlorofluoro-	97	0	0	0	0	0	200	141,560	141,760	0
	methane	96	0	0	0	0	0	200	152,560	152,760	3,225
	(HCFC-21)	95	0	0	0	7,200	1,586	23,800	204,492	237,078	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-09-2 *	Dichloromethane	97	115,695,827	11,621,741	8,620,172	3,659,871	20,671,899	13,076,828	48,751,274	222,097,612	70,356
		96	112,064,947	12,671,173	5,598,974	3,434,972	23,348,110	12,620,503	54,788,785	224,527,464	230,653
		95	84,922,476	14,094,216	5,240,223	3,382,204	25,614,607	11,808,725	59,355,256	204,417,707	70,359
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
507-55-1	1,3-Dichloro-	97	3,600	3,490	0	0	0	1,200	34,811	43,101	0
	1,1,2,2,3-penta	96	4,841	2,400	0	0	0	1,430	29,000	37,671	0
	fluoropropane	95	100	0	0	0	0	0	400	500	0
	(HCFC-225cb)	88	NA	NA	NA	NA	NA	NA	NA	NA	NA
422-56-0	3,3-Dichloro-	97	2,900	2,850	0	0	0	1,000	28,251	35,001	0
	1,1,1,2,2-penta	96	3,960	1,900	0	0	0	1,170	24,000	31,030	0
	fluoropropane	95	60	0	0	0	0	0	300	360	0
	(HCFC-225ca)	88	NA	NA	NA	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichloro-	97	1,450	0	3	0	315,825	0	19,445	336,723	0
	phenol	96	1,240	0	3	0	420,660	0	18,556	440,459	0
		95	1,460	0	3	0	336,936	0	19,720	358,119	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-87-5 *	1,2-Dichloro-	97	38,220,000	3,300	22,160,926	13,021	7,776,117	90,189	390,794	68,654,347	53
	propane	96	37,213,000	0	22,560,000	0	5,117,425	1,665	521,252	65,413,342	12
		95	56,000,000	0	28,380,000	0	11,573,182	7,768	620,353	96,581,303	1,200
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
10061-02-6	trans-1,3-Dichloro-	97	11,000	160	12,144,000	124	6,590	500	465	12,162,839	0
	propene	96	49,000	0	12,000,000	0	28,000	290	840	12,078,130	0
		95	0	0	11,000,000	0	0	0	250	11,000,250	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-88-6 *	2,3-Dichloro-	97	9,200,000	0	2,500,000	2,200	280,000	1,500,000	910	13,483,110	20
	propene	96	3,800,000	0	2,600,000	0	484,000	360,000	21,396	7,265,396	0
		95	6,100,000	1	4,200,000	0	1,960,000	510,000	4,253	12,774,254	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
542-75-6 *	1,3-Dichloro-	97	9,445,000	240	14,000,000	4,320	2,229,589	42,522	8,787	25,730,458	48
	propylene	96	3,036,700	0	14,000,000	4,724	614,179	53,527	10,680	17,719,810	3
		95	4,892,986	470	11,930,000	123	969,916	2,481	31,694	17,827,670	240
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
76-14-2 *	Dichlorotetra-fluoroethane (CFC-114)	97	15	878,128	5	0	0	878,133	9	878,142
		96	18	846,454	4,936	0	0	851,390	2	851,392
		95	20	1,017,652	4,936	0	0	1,022,588	136	1,022,724
		88	NR	NR	NR	NR	NR	NR	NR	NR
34077-87-7	Dichlorotrifluoro-ethane	97	1	1,000	0	0	0	1,000	0	1,000
		96	1	1,000	0	0	0	1,000	0	1,000
		95	1	1,000	0	0	0	1,000	0	1,000
		88	NR	NR	NR	NR	NR	NR	NR	NR
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	97	1	65,575	5	0	0	65,580	0	65,580
		96	1	69,000	250	0	0	69,250	0	69,250
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	97	13	180,046	58	0	0	180,104	69	180,173
		96	14	229,131	250	0	4	229,385	0	229,385
		95	11	113,006	251	0	0	113,257	0	113,257
		88	NR	NR	NR	NR	NR	NR	NR	NR
62-73-7 *	Dichlorvos	97	4	505	5	0	0	510	0	510
		96	4	255	5	0	0	260	1,228	1,488
		95	4	255	5	0	0	260	250	510
		88	7	1,050	0	0	0	1,050	505	1,555
115-32-2 *	Dicofol	97	6	510	0	0	0	510	629	1,139
		96	4	460	0	0	0	460	250	710
		95	4	750	0	0	0	750	250	1,000
		88	8	1,343	0	0	0	1,343	15,786	17,129
77-73-6	Dicyclopentadiene	97	80	355,102	19,866	0	707	375,675	9,410	385,085
		96	78	295,613	16,949	0	3	312,565	37,220	349,785
		95	70	340,455	5,464	0	475	346,394	6,888	353,282
		88	NR	NR	NR	NR	NR	NR	NR	NR
111-42-2	Diethanolamine	97	336	380,549	150,696	11,642	69,266	612,153	264,071	876,224
		96	333	477,200	143,158	16,211	42,170	678,739	100,667	779,406
		95	346	360,136	287,582	18,502	40,399	706,619	453,857	1,160,476
		88	332	641,588	438,213	238,317	133,456	1,451,574	372,707	1,824,281
117-81-7 *	Di-(2-ethylhexyl) phthalate	97	298	235,501	583	0	71,009	307,093	995,038	1,302,131
		96	311	442,655	279	0	59,612	502,546	1,768,107	2,270,653
		95	313	504,107	872	0	19,705	524,684	3,012,463	3,537,147
		88	303	1,217,313	2,776	3,091	20,748	1,243,928	3,629,163	4,873,091

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
76-14-2 *	Dichlorotetra-	97	89,000	53,493	0	0	1,419,246	194,248	877,909	2,633,896	0
	fluoroethane	96	100,880	200,686	0	0	1,631,367	16,154	859,154	2,808,241	0
	(CFC-114)	95	19,819	14,634	0	0	1,608,479	38,271	1,018,687	2,699,890	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
34077-87-7	Dichlorotrifluoro-	97	0	0	0	0	716,000	0	968	716,968	0
	ethane	96	0	0	0	0	716,409	0	968	717,377	0
		95	0	0	0	0	716,409	0	968	717,377	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
354-23-4	1,2-Dichloro-1,1,2-	97	0	0	0	0	0	0	60,585	60,585	5,000
	trifluoroethane	96	0	0	0	0	0	0	69,500	69,500	0
	(HCFC-123a)	95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
306-83-2	2,2-Dichloro-1,1,1-	97	225,000	0	0	0	194,831	400	179,611	599,842	0
	trifluoroethane	96	253,000	0	0	0	4,916	5,963	209,265	473,144	20,580
	(HCFC-123)	95	253,000	1,304	0	0	18,400	24,465	113,218	410,387	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
62-73-7 *	Dichlorvos	97	0	0	0	0	10	50	1,306	1,366	0
		96	0	0	0	57	10	309	1,429	1,805	0
		95	33	0	0	297	10	536	550	1,426	24
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
115-32-2 *	Dicofol	97	0	0	0	0	0	928	841	1,769	0
		96	19	0	0	0	0	100	210	329	0
		95	150	0	0	0	0	95	282	527	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
77-73-6	Dicyclopentadiene	97	494,995	44,544	1,361,269	1,260,622	720,935	92,963	381,775	4,357,103	609
		96	457,892	189,077	1,890,677	2,358,331	724,443	77,397	345,659	6,043,476	2,969
		95	514,277	128,273	1,782,272	635,023	471,016	201,368	348,235	4,080,464	306
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
111-42-2	Diethanolamine	97	13,443	259,960	94,815	25,938	2,211,021	1,829,165	735,408	5,169,750	30,847
		96	14,024	88,331	56,979	215,448	2,200,634	1,911,690	779,300	5,266,406	360
		95	27,718	145,267	102,766	732,863	2,826,679	1,618,995	1,121,637	6,575,925	25,342
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
117-81-7 *	Di-(2-ethylhexyl)	97	2,840,681	1,699,965	1,298,057	311,076	238,989	257,221	1,120,306	7,766,295	5,272
	phthalate	96	3,361,947	4,018,431	354,639	270,794	290,002	348,640	2,277,019	10,921,472	1,406
		95	2,644,796	4,019,467	100,013	258,725	557,557	357,115	3,647,733	11,585,406	341
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

ote: Data from Section 8 (Current Year) of Form R.
A: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
64-67-5	Diethyl sulfate	97	36	7,419	0	0	0	7,419	0	7,419
		96	32	5,640	0	0	0	5,640	47	5,687
		95	30	6,978	0	0	0	6,978	250	7,228
		88	24	10,627	0	0	250	10,877	0	10,877
35367-38-5 *	Diflubenzuron	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
101-90-6	Diglycidyl resorcinol ether	97	3	20	0	0	0	20	0	20
		96	2	510	0	0	0	510	0	510
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
94-58-6	Dihydrosafrole	97	3	505	0	0	0	505	0	505
		96	3	833	0	0	0	833	0	833
		95	2	255	0	0	0	255	0	255
		88	NR	NR	NR	NR	NR	NR	NR	NR
--	Diisocyanates	97	1,220	457,214	260	0	95,498	552,972	892,666	1,445,638
		96	1,185	757,817	261	0	100,401	858,479	1,359,215	2,217,694
		95	1,068	467,006	1,370	0	31,933	500,309	595,807	1,096,116
		88	NR	NR	NR	NR	NR	NR	NR	NR
55290-64-7 *	Dimethipin	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
60-51-5 *	Dimethoate	97	4	71	0	0	0	71	0	71
		96	6	485	10	0	0	495	0	495
		95	4	270	5	0	250	525	1,500	2,025
		88	NR	NR	NR	NR	NR	NR	NR	NR
119-90-4	3,3'-Dimethoxy-benzidine	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	3	0	0	0	0	0	0	0
		88	No reports received							
20325-40-0	3,3'-Dimethoxy-benzidine dihydrochloride	97	7	0	0	0	0	0	0	0
		96	7	10	0	0	0	10	0	10
		95	5	10	0	0	0	10	0	10
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
64-67-5	Diethyl sulfate	97	0	0	0	3,699,098	2,673	394	4,775	3,706,940	118
		96	0	3,293,100	0	0	4,621	5,579	5,738	3,309,038	30
		95	0	6,400,000	0	415	3,370	4,702	7,131	6,415,618	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
35367-38-5 *	Diflubenzuron	97	0	0	0	0	0	40	0	40	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
101-90-6	Diglycidyl resorcinol ether	97	0	0	0	800	0	0	15	815	0
		96	0	0	0	1,000	0	0	15	1,015	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
94-58-6	Dihydrosafrole	97	0	0	0	0	0	53	100	153	0
		96	0	0	0	0	0	134	428	562	0
		95	0	0	0	0	10	999	0	1,009	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Diisocyanates	97	1,558,751	542,822	435,039	701,574	905,529	1,508,455	1,045,303	6,697,473	18,698
		96	848,302	417,929	91,890	458,857	530,211	1,277,284	2,095,614	5,720,087	69,219
		95	816,798	343,867	143,840	339,058	710,457	1,179,203	1,051,207	4,584,430	4,131
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
55290-64-7 *	Dimethipin	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
60-51-5 *	Dimethoate	97	243	0	0	0	0	598	912	1,753	0
		96	180	0	0	0	0	2,295	262	2,737	0
		95	200	0	0	0	0	242	1,900	2,342	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
119-90-4	3,3'-Dimethoxy-benzidine	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	No reports received								
20325-40-0	3,3'-Dimethoxy-benzidine dihydrochloride	97	0	0	0	0	10	0	0	10	0
		96	0	0	0	0	100	0	10	110	0
		95	0	0	0	0	50	1	10	61	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
124-40-3	Dimethylamine	97	71	467,039	46,242	18,250	4,135	535,666	15,016	550,682
		96	71	466,112	38,367	2,850	4,730	512,059	35,305	547,364
		95	71	455,216	24,990	45,250	3,000	528,456	38,137	566,593
		88	NR	NR	NR	NR	NR	NR	NR	NR
2300-66-5 *	Dimethylamine dicamba	97	3	140	0	0	0	140	0	140
		96	3	585	0	0	5	590	255	845
		95	3	505	0	0	0	505	154	659
		88	NR	NR	NR	NR	NR	NR	NR	NR
121-69-7	N,N-Dimethyl-aniline	97	21	39,009	1,385	0	0	40,394	0	40,394
		96	24	66,293	128	0	0	66,421	0	66,421
		95	21	34,412	388	0	0	34,800	435	35,235
		88	20	98,905	19,967	0	250	119,122	772	119,894
119-93-7	3,3'-Dimethyl-benzidine	97	No reports received							
		96	1	6	25	0	0	31	229	260
		95	No reports received							
		88	No reports received							
612-82-8	3,3'-Dimethyl-benzidine-dihydrochloride	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
79-44-7	Dimethylcarbamyl chloride	97	1	118	0	0	0	118	0	118
		96	No reports received							
		95	No reports received							
		88	No reports received							
2524-03-0	Dimethyl chlorothio-phosphate	97	3	69	0	6,952	0	7,021	0	7,021
		96	3	10	0	0	0	10	0	10
		95	3	10	0	51,677	20	51,707	0	51,707
		88	NR	NR	NR	NR	NR	NR	NR	NR
68-12-2 *	N,N-Dimethyl-formamide	97	163	1,345,965	45,694	730,005	1,032	2,122,696	292,012	2,414,708
		96	148	1,654,918	43,956	1,220,000	1,628	2,920,502	212,291	3,132,793
		95	141	2,352,988	73,106	1,099,000	1,710	3,526,804	286,316	3,813,120
		88	NR	NR	NR	NR	NR	NR	NR	NR
57-14-7 *	1,1-Dimethyl hydrazine	97	4	902	0	0	0	902	437	1,339
		96	5	302	0	0	1	303	425	728
		95	4	299	0	0	0	299	5	304
		88	4	4,323	10	0	0	4,333	8,855	13,188

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
124-40-3	Dimethylamine	97	503,203	0	126,268	1,648	2,676,460	417,279	541,113	4,265,971	8,675
		96	494,604	0	8,000	1,625	2,626,186	313,237	543,576	3,987,228	6
		95	1,095,202	0	21,170	1,800	2,090,541	223,723	564,356	3,996,792	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2300-66-5 *	Dimethylamine dicamba	97	0	0	0	0	0	0	140	140	0
		96	11,863	0	0	0	0	0	1,181	13,044	0
		95	7,981	0	0	0	0	0	803	8,784	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
121-69-7	N,N-Dimethyl-aniline	97	46,000	0	0	748,779	9,273	217,456	39,824	1,061,332	0
		96	48,000	0	0	1,087,051	6,895	174,595	65,805	1,382,346	0
		95	50,535	0	0	745,242	2,154	205,028	104,616	1,107,575	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
119-93-7	3,3'-Dimethyl-benzidine	97	No reports received								
		96	0	0	0	0	2,287	0	260	2,547	0
		95	No reports received								
		88	No reports received								
612-82-8	3,3'-Dimethyl-benzidine-dihydrochloride	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-44-7	Dimethylcarbamyl chloride	97	0	0	0	0	25,445	0	118	25,563	0
		96	No reports received								
		95	No reports received								
		88	No reports received								
2524-03-0	Dimethyl chlorothio-phosphate	97	0	0	0	0	0	4,806	7,021	11,827	0
		96	0	0	0	0	0	0	10	10	0
		95	0	0	0	0	0	0	51,727	51,727	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
68-12-2 *	N,N-Dimethyl-formamide	97	7,815,007	268,701	11,766,149	5,590,193	14,497,941	4,913,049	3,176,537	48,027,577	2,555
		96	5,447,326	309,948	9,633,941	4,104,258	12,111,386	4,360,884	3,788,607	39,756,350	12,338
		95	4,738,418	389,337	8,565,430	3,640,101	14,698,078	2,962,348	3,689,061	38,682,773	245
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
57-14-7 *	1,1-Dimethyl hydrazine	97	0	2	0	1,900	2,314	796	905	5,917	0
		96	0	0	9,215	1	4,237	8,801	726	22,980	7,000
		95	0	57	0	0	3,639	10	302	4,008	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
105-67-9 *	2,4-Dimethy-lphenol	97	25	51,895	20	170,000	0	221,915	1,863	223,778
		96	23	57,674	100	140,000	0	197,774	821	198,595
		95	19	52,797	33	79,000	5	131,835	17	131,852
		88	13	11,588	484	24,703	399	37,174	1,500	38,674
131-11-3 *	Dimethyl phthalate	97	97	175,524	636	4,450	692	181,302	6,389	187,691
		96	75	154,454	551	1,000	8	156,013	3,615	159,628
		95	85	339,087	275	1,000	5	340,367	2,524	342,891
		88	57	535,056	4,335	390	504	540,285	93,358	633,643
77-78-1	Dimethyl sulfate	97	37	4,499	0	0	0	4,499	2,308	6,807
		96	35	5,796	0	0	0	5,796	0	5,796
		95	39	6,432	1	0	0	6,433	0	6,433
		88	33	10,806	610	0	50	11,466	0	11,466
99-65-0	m-Dinitrobenzene	97	1	421	81,587	0	451	82,459	0	82,459
		96	1	421	83,436	0	310	84,167	0	84,167
		95	2	547	84,906	0	1,066	86,519	0	86,519
		88	NR	NR	NR	NR	NR	NR	NR	NR
528-29-0	o-Dinitrobenzene	97	2	54	1,044	0	58	1,156	0	1,156
		96	2	54	1,067	0	40	1,161	0	1,161
		95	3	65	1,086	0	136	1,287	0	1,287
		88	NR	NR	NR	NR	NR	NR	NR	NR
100-25-4	p-Dinitrobenzene	97	1	14	29	0	16	59	0	59
		96	1	15	29	0	11	55	0	55
		95	1	16	30	0	37	83	0	83
		88	NR	NR	NR	NR	NR	NR	NR	NR
88-85-7 *	Dinitrobutyl phenol	97	5	1,110	23	0	0	1,133	7,388	8,521
		96	6	722	3,800	0	0	4,522	13,500	18,022
		95	5	879	2	0	0	881	0	881
		88	NR	NR	NR	NR	NR	NR	NR	NR
534-52-1 *	4,6-Dinitro-o-cresol	97	7	101	0	0	0	101	115,801	115,902
		96	7	100	0	0	0	100	27,820	27,920
		95	5	130	0	4,649	0	4,779	7,220	11,999
		88	10	274	266	0	2	542	46,648	47,190
51-28-5 *	2,4-Dinitrophenol	97	7	422	51,069	0	21	51,512	0	51,512
		96	7	182	65,869	0	0	66,051	2	66,053
		95	4	112	2,000	0	0	2,112	0	2,112
		88	11	20,825	98,692	86,200	257	205,974	110,285	316,259

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
105-67-9 *	2,4-Dimethy-lphenol	97	23,760	67,958	1,319,661	59,659	633,730	21,718	223,980	2,350,466	2
		96	33,354	58,775	1,836,216	90,519	562,773	28,635	198,673	2,808,945	63
		95	37,140	30,368	1,573,273	50,362	397,965	75,967	131,351	2,296,426	24
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
131-11-3 *	Dimethyl phthalate	97	0	13,624	604,012	27,507	834,023	89,534	179,099	1,747,799	0
		96	0	0	225,020	84,850	360,632	68,567	127,131	866,200	0
		95	4,288	800	253,605	69,549	356,058	221,729	342,780	1,248,809	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
77-78-1	Dimethyl sulfate	97	0	54,525	62,628	0	10,457	2,323	4,223	134,156	0
		96	100,000	77,756	0	0	76,354	2	5,095	259,207	0
		95	0	171,230	1	0	352,841	3	5,535	529,610	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
99-65-0	m-Dinitrobenzene	97	0	0	0	0	734,287	11,352	82,459	828,098	0
		96	0	0	0	0	750,922	77	84,167	835,166	0
		95	0	0	0	0	764,156	0	86,519	850,675	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
528-29-0	o-Dinitrobenzene	97	0	0	0	0	103,312	1,452	1,156	105,920	0
		96	0	0	0	0	468,906	10	1,161	470,077	0
		95	0	0	0	0	444,156	0	1,287	445,443	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
100-25-4	p-Dinitrobenzene	97	0	0	0	0	28,432	396	59	28,887	0
		96	0	0	0	0	29,076	3	55	29,134	0
		95	0	0	0	0	29,589	0	83	29,672	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
88-85-7 *	Dinitrobutyl phenol	97	0	0	590,492	0	71,830	1,700	8,232	672,254	0
		96	0	0	267,404	0	7,701	330	18,012	293,447	0
		95	0	0	263,629	0	34,226	110	881	298,846	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
534-52-1 *	4,6-Dinitro-o-cresol	97	0	0	1,347,500	1,800	28,000	11,413	116,467	1,505,180	0
		96	0	0	1,446,612	0	29,000	12,866	3,638	1,492,116	0
		95	0	0	844,907	410	18,000	13,950	7,365	884,632	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
51-28-5 *	2,4-Dinitrophenol	97	0	0	674,605	69,679	1,923,457	1	51,522	2,719,264	0
		96	0	0	319,777	1	1,207,434	0	65,903	1,593,115	0
		95	0	0	556,712	9	1,160,000	220	2,103	1,719,044	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

			On-site Releases					Off-site Releases	
CAS Number	Chemical	Year	Total Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total On-site Releases Pounds	Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
121-14-2	2,4-Dinitrotoluene	97	4	1,801	90	0	0	1,891	0	1,891
		96	4	1,891	349	0	0	2,240	0	2,240
		95	4	1,874	231	0	0	2,105	94	2,199
		88	13	93,257	12,055	106,400	14,961	226,673	124,281	350,954
606-20-2	2,6-Dinitrotoluene	97	1	438	24	0	0	462	0	462
		96	1	472	94	0	0	566	0	566
		95	1	469	126	0	0	595	0	595
		88	7	87,597	957	27,000	0	115,554	30,882	146,436
25321-14-6	Dinitrotoluene (mixed isomers)	97	6	11,551	63	56,000	0	67,614	46,491	114,105
		96	5	14,815	586	33,000	0	48,401	121	48,522
		95	6	14,811	284	17,000	0	32,095	6	32,101
		88	NR	NR	NR	NR	NR	NR	NR	NR
39300-45-3 *	Dinocap	97	No reports received							
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
123-91-1	1,4-Dioxane	97	44	141,262	196,272	0	4,609	342,143	305,787	647,930
		96	49	120,869	226,998	0	5,409	353,276	479,388	832,664
		95	54	223,144	216,689	0	5,736	445,569	352,996	798,565
		88	73	612,633	203,320	0	11,702	827,655	10,954	838,609
122-39-4 *	Diphenylamine	97	31	69,246	66	17,855	250	87,417	23,487	110,904
		96	24	46,777	205	15,532	0	62,514	11,382	73,896
		95	23	43,356	200	9,060	65	52,681	34,338	87,019
		88	NR	NR	NR	NR	NR	NR	NR	NR
2164-07-0 *	Dipotassium endothall	97	1	0	0	0	0	0	0	0
		96	2	43	0	0	0	43	0	43
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
136-45-8 *	Dipropyl iso-cinchomeronate	97	No reports received							
		96	1	250	0	0	0	250	0	250
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
138-93-2 *	Disodium-cyanodithioimido-carbonate	97	5	0	0	0	0	0	0	0
		96	3	0	0	0	0	0	0	0
		95	3	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
121-14-2	2,4-Dinitrotoluene	97	0	1,500	50,182	5,363	35,419	1,500	1,883	95,847	0
		96	0	7,300	51,527	0	35,270	7,300	2,021	103,418	0
		95	0	0	42,345	9	27,115	1,381	2,200	73,050	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	97	0	0	477	0	17,119	110	462	18,168	0
		96	0	0	1,711	0	23,500	26	566	25,803	0
		95	0	0	6,160	1	9,180	118	595	16,054	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
25321-14-6	Dinitrotoluene (mixed isomers)	97	0	0	0	2	213,007	501,414	68,691	783,114	75,831
		96	0	0	0	0	221,517	551,383	48,362	821,262	3,400
		95	0	0	0	9,100	181,321	882,089	32,321	1,104,831	2,500
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
39300-45-3 *	Dinocap	97	No reports received								
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
123-91-1	1,4-Dioxane	97	620,000	4	1,269,899	927,524	1,292,021	117,066	725,779	4,952,293	11
		96	5,592,026	846	3,126,659	1,372,579	1,074,367	176,966	952,090	12,295,533	1,239
		95	74,293	9,124	1,975,960	1,196,352	1,019,104	305,315	790,118	5,370,266	229
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
122-39-4 *	Diphenylamine	97	2,000,000	619	4,868,832	655,045	52,359	58,800	111,594	7,747,249	1
		96	1,200,000	25,549	2,190,000	422,084	38,849	238,942	73,138	4,188,562	1
		95	976,755	11,600	1,100,115	264,471	36,700	669,757	87,920	3,147,318	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2164-07-0 *	Dipotassium endothall	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	12	43	55	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
136-45-8 *	Dipropyl iso-cinchomeronate	97	No reports received								
		96	70	0	0	0	0	0	30	100	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
138-93-2 *	Disodium-cyanodithioimido-carbonate	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
330-54-1 *	Diuron	97	10	2,060	257	0	0	2,317	2,637	4,954
		96	9	1,772	13	0	0	1,785	1,500	3,285
		95	8	2,765	10	0	5	2,780	1,950	4,730
		88	NR	NR	NR	NR	NR	NR	NR	NR
2439-10-3 *	Dodine	97	No reports received							
		96	1	10	0	0	0	10	0	10
		95	1	10	0	0	0	10	0	10
		88	NR	NR	NR	NR	NR	NR	NR	NR
120-36-5 *	2,4-DP	97	3	257	0	0	0	257	0	257
		96	3	512	0	0	5	517	39	556
		95	3	260	0	0	0	260	17	277
		88	NR	NR	NR	NR	NR	NR	NR	NR
2702-72-9 *	2,4-D sodium salt	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
106-89-8 *	Epichlorohydrin	97	77	314,249	9,304	0	9,510	333,063	4,016	337,079
		96	68	348,425	20,735	0	2,205	371,365	4,137	375,502
		95	68	321,450	26,937	0	18,874	367,261	893	368,154
		88	78	707,107	4,917	68,750	2,524	783,298	307	783,605
13194-48-4 *	Ethoprop	97	6	26	0	0	132,926	132,952	0	132,952
		96	6	866	0	0	108,933	109,799	250	110,049
		95	6	506	0	0	174,290	174,796	0	174,796
		88	NR	NR	NR	NR	NR	NR	NR	NR
110-80-5	2-Ethoxyethanol	97	25	130,062	1	0	33	130,096	500	130,596
		96	31	192,462	6	0	0	192,468	250	192,718
		95	40	222,940	891	0	0	223,831	12,595	236,426
		88	110	2,431,310	120,164	0	52	2,551,526	71,142	2,622,668
140-88-5	Ethyl acrylate	97	94	183,121	159	0	513	183,793	4,821	188,614
		96	95	186,791	199	0	516	187,506	32,734	220,240
		95	106	207,444	542	0	523	208,509	10,182	218,691
		88	105	245,982	1,211	0	265	247,458	7,110	254,568
100-41-4	Ethylbenzene	97	1,005	8,730,416	5,739	559,680	151,969	9,447,804	71,872	9,519,676
		96	1,018	9,454,718	6,851	335,932	59,862	9,857,363	95,603	9,952,966
		95	1,025	10,241,242	9,343	475,234	19,174	10,744,993	164,501	10,909,494
		88	564	7,718,781	15,970	72,914	175,180	7,982,845	421,334	8,404,179

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
330-54-1 *	Diuron	97	250	0	0	0	0	1,032	4,564	5,846	0
		96	0	0	0	0	0	3,222	4,414	7,636	10
		95	300	0	0	2	0	5,711	6,568	12,581	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2439-10-3 *	Dodine	97	No reports received								
		96	0	0	0	0	0	360	8	368	0
		95	0	0	0	0	0	270	5	275	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
120-36-5 *	2,4-DP	97	3,000	0	0	0	0	11	9	3,020	192
		96	4,256	0	0	0	0	14	552	4,822	192
		95	5,633	0	0	0	0	11	536	6,180	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2702-72-9 *	2,4-D sodium salt	97	0	0	0	0	18,993	0	0	18,993	0
		96	0	0	0	0	3,956	0	0	3,956	0
		95	0	0	0	0	5,139	0	0	5,139	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-89-8 *	Epichlorohydrin	97	20,870,748	17,715	5,878,951	83,883	6,048,675	1,329,239	317,147	34,546,358	3,583
		96	20,158,532	2	5,863,583	75,040	2,992,269	1,453,853	368,762	30,912,041	16,505
		95	13,263,282	0	4,331,319	171,461	4,191,552	952,542	343,762	23,253,918	20,516
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
13194-48-4 *	Ethoprop	97	0	0	0	0	0	3,820	132,953	136,773	0
		96	3	0	0	0	0	921	109,332	110,256	0
		95	9	0	0	0	0	9,404	174,442	183,855	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
110-80-5	2-Ethoxyethanol	97	1,500	551	697,714	72,295	774,979	151,641	169,665	1,868,345	13,237
		96	6,210	6,581	410,576	169,509	731,710	173,077	171,113	1,668,776	20,424
		95	2,300	1,720	434,164	142,160	1,332,131	438,878	222,188	2,573,541	36,526
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
140-88-5	Ethyl acrylate	97	390,000	40,206	16,473,174	832,383	329,187	160,956	184,447	18,410,353	285
		96	284,024	45,510	7,177,162	791,794	16,524,991	353,726	217,298	25,394,505	23,571
		95	79	32,449	8,159,780	1,356,212	487,840	96,769	217,433	10,350,562	24,056
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
100-41-4	Ethylbenzene	97	30,036,542	6,986,553	35,462,089	11,283,948	14,600,710	1,805,729	9,470,382	109,645,953	29,727
		96	33,063,689	7,242,940	31,512,199	11,075,027	22,228,447	1,904,307	9,914,294	116,940,903	76,716
		95	24,907,594	6,757,634	40,925,948	11,299,949	19,251,248	1,785,143	10,813,225	115,740,741	13,316
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms (Number)	On-site Releases: Total Air Emissions (Pounds)	On-site Releases: Surface Water Discharges (Pounds)	On-site Releases: Underground Injection (Pounds)	On-site Releases: Releases to Land (Pounds)	On-site Releases: Total On-site Releases (Pounds)	Off-site Releases: Transfers Off-site to Disposal (Pounds)	Total On- and Off-site Releases (Pounds)
541-41-3	Ethyl-chloroformate	97	4	4,017	5	0	5	4,027	0	4,027
		96	4	4,741	5	0	5	4,751	0	4,751
		95	3	2,020	5	0	5	2,030	0	2,030
		88	5	13,903	0	0	0	13,903	0	13,903
759-94-4 *	Ethyl dipropyl-thiocarbamate	97	4	2,208	113	9,501	0	11,822	2,778	14,600
		96	3	7,325	2	29	0	7,356	590	7,946
		95	4	2,363	291	373	0	3,027	9,366	12,393
		88	NR	NR	NR	NR	NR	NR	NR	NR
74-85-1 *	Ethylene	97	305	30,269,807	927	2,632	110	30,273,476	1,459	30,274,935
		96	297	35,228,216	25,228	0	8,080	35,261,524	10,845	35,272,369
		95	287	35,197,800	27,574	0	16	35,225,390	1,771	35,227,161
		88	274	50,503,039	15,214	17,203	13,250	50,548,706	11,432	50,560,138
--	Ethylenebisdithio-carbamic acid, salts and esters	97	6	571	0	0	0	571	600	1,171
		96	7	1,124	0	0	0	1,124	3,100	4,224
		95	3	1,630	0	0	0	1,630	0	1,630
		88	NR	NR	NR	NR	NR	NR	NR	NR
107-21-1 *	Ethylene glycol	97	1,275	5,529,550	638,973	3,542,486	416,478	10,127,487	1,564,736	11,692,223
		96	1,295	5,897,858	769,567	7,699,484	430,226	14,797,135	1,866,935	16,664,070
		95	1,306	7,231,755	807,318	12,554,675	850,534	21,444,282	1,469,980	22,914,262
		88	1,455	13,218,339	3,747,561	7,927,570	736,344	25,629,814	2,595,276	28,225,090
151-56-4	Ethyleneimine	97	1	6	0	0	0	6	0	6
		96	1	2	0	0	0	2	0	2
		95	1	3	0	0	0	3	0	3
		88	1	500	0	0	0	500	0	500
75-21-8 *	Ethylene oxide	97	156	926,370	3,634	15,147	986	946,137	52	946,189
		96	162	789,750	4,474	22,200	551	816,975	1,048	818,023
		95	166	856,239	5,230	130,000	2,208	993,677	8,663	1,002,340
		88	202	4,631,734	44,851	11,125	54,700	4,742,410	20,663	4,763,073
96-45-7 *	Ethylene thiourea	97	13	286	0	0	0	286	5,657	5,943
		96	11	518	0	0	0	518	7,501	8,019
		95	11	775	0	0	0	775	19,665	20,440
		88	6	500	0	0	0	500	2,250	2,750
75-34-3	Ethylidene dichloride	97	6	18,119	3	0	0	18,122	0	18,122
		96	6	21,950	11	0	0	21,961	0	21,961
		95	5	40,471	16	0	0	40,487	0	40,487
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
541-41-3	Ethyl-chloroformate	97	0	0	0	0	2,970	0	3,890	6,860	0
		96	0	0	0	0	11,600	0	4,671	16,271	0
		95	0	0	0	0	3,300	0	1,980	5,280	10
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
759-94-4 *	Ethyl dipropyl-thiocarbamate	97	0	0	0	0	4,184	50,685	14,041	68,910	323
		96	0	0	0	0	0	9,610	9,489	19,099	13
		95	0	0	0	0	6,500	33,010	12,476	51,986	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
74-85-1 *	Ethylene[a]	97	115,302,995	14,410	1,151,632,258	14,141,146	496,425,339	1,798,509	29,264,637	1,808,579,294	602,721
		96	194,529,481	13,317	490,573,955	13,028,334	486,817,781	2,112,396	34,743,160	1,221,818,424	715,996
		95	196,803,539	3	485,914,835	10,615,177	495,572,836	2,116,568	34,753,277	1,225,776,235	765,579
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Ethylenebisdithio-carbamic acid, salts and esters	97	0	0	0	0	0	2,995	1,289	4,284	0
		96	0	0	0	0	0	18,882	6,222	25,104	0
		95	0	0	0	0	0	7,250	1,500	8,750	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-21-1 *	Ethylene glycol	97	452,791,021	76,990,931	6,836,406	17,472,536	55,214,574	29,734,918	12,985,925	652,026,311	66,961
		96	378,321,576	90,740,522	6,653,978	17,132,823	57,481,350	22,782,094	17,102,604	590,214,947	2,773,801
		95	366,425,025	101,106,327	5,926,147	13,154,599	65,627,898	34,252,045	22,517,305	609,009,346	305,087
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
151-56-4	Ethyleneimine	97	0	0	0	0	22,000	0	6	22,006	0
		96	0	0	0	0	22,000	0	2	22,002	0
		95	0	0	0	0	34,000	0	3	34,003	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-21-8 *	Ethylene oxide	97	70,880	1,610	38,000	7	11,312,884	105,228	598,688	12,127,297	389,284
		96	116,838	1,471	28,135	0	13,308,313	121,764	810,419	14,386,940	45,077
		95	127,110	307	16,940	0	9,974,486	70,255	990,179	11,179,277	15,962
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
96-45-7 *	Ethylene thiourea	97	780	0	0	0	0	4,170	5,334	10,284	0
		96	0	2,735	0	0	0	2,816	7,694	13,245	0
		95	1	840	0	0	1	6,282	19,877	27,001	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-34-3	Ethylidene dichloride	97	1,300,000	0	807,315	0	3,291,684	75,308	18,109	5,492,416	6
		96	1,300,000	0	140,773	0	2,410,240	18,514	22,034	3,891,561	22
		95	1,300,000	0	92,000	0	1,532,000	19,149	40,156	2,983,305	15,005
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.
[a]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997. The facility has since revised this quantity to 13,000,000 pounds. These revisions change on-site energy recovery for ethylene to 403,414,835 pounds in 1995, to 454,323,955 pounds in 1996, and to 548,802,258 pounds in 1997. Total production-related waste managed for ethylene changes to 1,143,276,235 pounds in 1995, to 1,185,568,424 pounds in 1996, and to 1,205,749,294 pounds in 1997.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms	Total Air Emissions	Surface Water Discharges	Underground Injection	Releases to Land	Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
			Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
52-85-7 *	Famphur	97	1	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
60168-88-9 *	Fenarimol	97	1	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	2	1,000	0	0	0	1,000	0	1,000
		88	NR	NR	NR	NR	NR	NR	NR	NR
13356-08-6 *	Fenbutatin oxide	97	2	3	0	3,420	0	3,423	0	3,423
		96	2	255	0	745	0	1,000	0	1,000
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
72490-01-8 *	Fenoxycarb	97	1	0	0	0	0	0	0	0
		96	No reports received							
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
39515-41-8 *	Fenpropathrin	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
55-38-9 *	Fenthion	97	1	2	0	0	0	2	1	3
		96	1	0	0	0	0	0	1	1
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
51630-58-1 *	Fenvalerate	97	1	1	0	0	0	1	0	1
		96	1	1	0	0	0	1	0	1
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
69806-50-4 *	Fluazifop butyl	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
2164-17-2 *	Fluometuron	97	6	695	0	0	0	695	3,543	4,238
		96	5	987	0	0	0	987	2,505	3,492
		95	6	796	0	0	0	796	2,355	3,151
		88	2	500	0	0	0	500	3,700	4,200

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled On-site Pounds	Recycled Off-site Pounds	Energy Recovery On-site Pounds	Energy Recovery Off-site Pounds	Treated On-site Pounds	Treated Off-site Pounds	Quantity Released On- and Off-site Pounds	Total Production-related Waste Managed Pounds	Non-Production-related Waste Managed Pounds
52-85-7 *	Famphur	97	0	0	0	0	0	2,664	0	2,664	0
		96	0	0	0	0	0	12,242	0	12,242	0
		95	0	0	0	0	0	3,758	0	3,758	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
60168-88-9 *	Fenarimol	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	310	650	960	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
13356-08-6 *	Fenbutatin oxide	97	0	0	0	0	0	0	1,000	1,000	0
		96	0	0	0	0	0	0	1,000	1,000	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
72490-01-8 *	Fenoxycarb	97	0	0	0	0	0	0	0	0	0
		96	No reports received								
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
39515-41-8 *	Fenpropathrin	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
55-38-9 *	Fenthion	97	5	0	0	0	0	1,000	2	1,007	0
		96	7	0	0	0	8	3,272	0	3,287	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
51630-58-1 *	Fenvalerate	97	0	0	0	0	0	1,000	0	1,000	0
		96	0	0	0	0	0	3,994	1	3,995	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
69806-50-4 *	Fluazifop butyl	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2164-17-2 *	Fluometuron	97	0	0	0	0	0	12,784	3,251	16,035	0
		96	0	0	0	0	0	15,628	2,948	18,576	0
		95	0	0	0	2	0	16,900	5,646	22,548	13,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
7782-41-4	Fluorine	97	9	29,785	54,200	0	0	83,985	0	83,985
		96	9	25,460	48,300	0	0	73,760	0	73,760
		95	7	18,319	15,000	0	0	33,319	0	33,319
		88	NR	NR	NR	NR	NR	NR	NR	NR
51-21-8	Fluorouracil	97	1	0	0	0	250	250	250	500
		96	1	0	0	0	250	250	250	500
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
69409-94-5 *	Fluvalinate	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
133-07-3 *	Folpet	97	8	42	10	0	0	52	3,836	3,888
		96	6	303	0	0	0	303	2,444	2,747
		95	5	16	5	0	0	21	1,941	1,962
		88	NR	NR	NR	NR	NR	NR	NR	NR
72178-02-0	Fomesafen	97	2	695	1,230	0	0	1,925	13,182	15,107
		96	2	505	0	0	0	505	2,501	3,006
		95	2	10	0	0	0	10	750	760
		88	NR	NR	NR	NR	NR	NR	NR	NR
50-00-0 *	Formaldehyde	97	812	11,534,568	246,857	9,905,754	113,293	21,800,472	157,083	21,957,555
		96	778	11,492,475	321,829	9,403,275	114,020	21,331,599	329,814	21,661,413
		95	794	11,758,435	274,682	7,313,034	132,415	19,478,566	210,738	19,689,304
		88	821	12,415,188	904,546	9,608,524	494,111	23,422,369	1,409,999	24,832,368
64-18-6 *	Formic acid	97	272	1,704,989	35,026	11,067,451	3,536	12,811,002	88,548	12,899,550
		96	268	2,114,089	84,133	11,001,260	3,010	13,202,492	103,871	13,306,363
		95	260	592,387	15,759	11,492,418	3,205	12,103,769	26,357	12,130,126
		88	NR	NR	NR	NR	NR	NR	NR	NR
76-13-1	Freon 113	97	50	1,063,709	1,876	0	0	1,065,585	2,355	1,067,940
		96	73	1,402,179	786	0	0	1,402,965	1,147	1,404,112
		95	138	2,608,436	3,829	6	0	2,612,271	2,560	2,614,831
		88	1,438	70,382,591	32,894	5,965	27,799	70,449,249	1,924,043	72,373,292
--	Glycol ethers	97	2,010	37,018,415	337,884	5,462	40,205	37,401,966	948,930	38,350,896
		96	2,060	40,779,238	144,061	99,208	65,046	41,087,553	656,456	41,744,009
		95	2,149	44,742,788	183,996	132,064	25,145	45,083,993	771,955	45,855,948
		88	1,615	48,706,006	284,687	362,198	105,185	49,458,076	1,478,290	50,936,366

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.
NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).
NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).
*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7782-41-4	Fluorine	97	0	0	0	0	19,500	0	83,985	103,485	1
		96	0	0	0	0	19,005	0	73,522	92,527	1
		95	0	0	0	0	15,000	0	33,300	48,300	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
51-21-8	Fluorouracil	97	1,285	0	0	0	0	0	0	1,285	0
		96	930	0	0	0	0	0	0	930	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
69409-94-5 *	Fluvalinate	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
133-07-3 *	Folpet	97	221	0	0	0	1,800	368	3,889	6,278	0
		96	0	0	0	0	1,501	234	2,513	4,248	0
		95	0	80	0	0	801	290	1,962	3,133	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
72178-02-0	Fomesafen	97	0	0	0	0	0	5,847	18,428	24,275	0
		96	0	0	0	0	0	0	4,801	4,801	0
		95	0	0	0	0	0	0	200	200	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
50-00-0 *	Formaldehyde	97	90,741,776	643,236	14,449,258	411,094	83,203,482	3,436,540	21,883,140	214,768,526	22,015
		96	87,473,900	42,804	8,429,785	213,655	72,305,821	2,494,150	21,679,742	192,639,857	91,745
		95	75,909,072	56,999	6,758,262	423,718	68,631,079	2,921,365	19,459,502	174,159,997	268,331
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
64-18-6 *	Formic acid	97	862,842	33	5,770,006	2,436,610	145,340,583	3,157,416	13,149,351	170,716,841	119
		96	883,880	48	6,705,732	2,211,708	132,459,697	3,077,914	13,622,256	158,961,235	834
		95	95,200	28	7,215,445	236,018	104,948,398	1,541,252	12,253,610	126,289,951	9
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
76-13-1	Freon 113	97	610,745	139,726	50,633	11,000	191,059,556	299,648	1,065,260	193,236,568	729
		96	692,774	155,047	74,113	54,651	219,059,366	1,111,330	1,386,340	222,533,621	116
		95	2,355,210	916,598	0	103,937	250,260,926	582,924	2,613,238	256,832,833	30,129
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Glycol ethers	97	179,203,160	3,777,684	32,394,994	14,032,831	38,143,112	10,724,998	40,420,969	318,697,748	38,155
		96	195,666,439	3,338,674	43,411,364	16,010,182	28,124,528	10,209,975	42,866,308	339,627,470	5,244
		95	197,150,993	3,599,381	42,690,470	13,395,720	30,637,682	10,313,240	46,720,123	344,508,109	35,258
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
76-44-8 *	Heptachlor	97	No reports received							
		96	1	198	5	0	0	203	0	203
		95	1	203	6	0	0	209	0	209
		88	2	54,295	2	0	0	54,297	0	54,297
118-74-1 *	Hexachloro-benzene	97	12	154	276	139	0	569	12,038	12,607
		96	10	220	274	717	0	1,211	23,449	24,660
		95	9	566	6,458	480	0	7,504	6,975	14,479
		88	9	4,045	4	410	0	4,459	443,541	448,000
87-68-3	Hexachloro-1,3-1,3-butadiene	97	7	1,410	9	299	0	1,718	200	1,918
		96	7	2,381	256	952	0	3,589	310	3,899
		95	7	3,310	661	434	0	4,405	252	4,657
		88	9	2,508	153	220	0	2,881	19,640	22,521
77-47-4 *	Hexachloro-cyclopentadiene	97	4	6,927	3	250	0	7,180	930	8,110
		96	4	7,966	0	250	0	8,216	1,000	9,216
		95	4	8,311	6	250	0	8,567	2,600	11,167
		88	5	78,317	6	2,131	0	80,454	28,470	108,924
67-72-1 *	Hexachloroethane	97	15	1,863	15	659	0	2,537	4,720	7,257
		96	18	3,131	32	2,024	0	5,187	721	5,908
		95	21	14,551	3,330	1,378	0	19,259	1,208	20,467
		88	22	19,077	11	520	1	19,609	128,504	148,113
110-54-3	n-Hexane	97	787	71,548,453	58,540	13,221	28,033	71,648,247	297,787	71,946,034
		96	783	75,041,372	218,238	101,579	24,162	75,385,351	291,798	75,677,149
		95	718	81,786,559	46,402	5,380	11,559	81,849,900	118,199	81,968,099
		88	NR	NR	NR	NR	NR	NR	NR	NR
51235-04-2 *	Hexazinone	97	4	260	3,006	0	0	3,266	250	3,516
		96	4	300	3,075	0	0	3,375	250	3,625
		95	4	760	6,322	0	0	7,082	2,973	10,055
		88	NR	NR	NR	NR	NR	NR	NR	NR
67485-29-4 *	Hydramethylnon	97	2	20	0	0	0	20	0	20
		96	2	10	0	0	0	10	0	10
		95	2	20	0	0	0	20	0	20
		88	NR	NR	NR	NR	NR	NR	NR	NR
302-01-2	Hydrazine	97	44	11,659	12	0	250	11,921	30,430	42,351
		96	45	10,443	23	0	250	10,716	18,549	29,265
		95	46	13,920	3	0	5	13,928	23,504	37,432
		88	55	35,199	2,149	0	29	37,377	24,522	61,899

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
76-44-8 *	Heptachlor	97	No reports received								
		96	0	0	0	0	2,206	16,105	203	18,514	0
		95	0	0	0	0	3,850	851	209	4,910	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
118-74-1 *	Hexachloro-benzene	97	7,100	4	140,000	4,172	1,690,651	21,984	12,622	1,876,533	11
		96	7,100	1	240,000	2,214	2,132,566	42,461	24,301	2,448,643	155
		95	6,200	1	0	0	2,865,008	428,747	18,549	3,318,505	19
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
87-68-3	Hexachloro-1,3-1,3-butadiene	97	0	4	37,000	0	8,091,000	228,996	1,818	8,358,818	264
		96	0	0	66,000	0	6,107,496	279,289	3,007	6,455,792	700
		95	0	13	133,000	0	6,778,662	164,970	4,444	7,081,089	660,211
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
77-47-4 *	Hexachloro-cyclopentadiene	97	0	0	0	0	284,679	19,055	8,097	311,831	2,400
		96	0	0	0	800	246,437	56,248	9,496	312,981	210
		95	0	0	0	0	272,865	24,908	11,083	308,856	76
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
67-72-1 *	Hexachloroethane	97	0	3	897,000	103,469	3,209,000	43,379	2,286	4,255,137	4,628
		96	0	0	939,000	71,034	4,600,732	120,715	4,776	5,736,257	384
		95	4,800	0	1,232,400	75,132	4,875,108	109,188	30,153	6,326,781	129,205
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
110-54-3	n-Hexane[b]	97	371,918,727	14,085,860	30,687,478	19,134,402	72,743,563	4,724,666	69,383,458	582,678,154	704,970
		96	193,283,853	10,713,934	27,567,847	10,388,751	53,064,613	8,221,253	75,006,658	378,246,909	208,302
		95	4,125,699,524	7,007,918	25,426,831	14,614,680	50,030,503	8,044,247	82,208,251	4,313,031,954	80,332
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
51235-04-2 *	Hexazinone	97	0	0	0	0	3,831	260,835	3,535	268,201	0
		96	0	0	0	0	4,091	213,645	3,189	220,925	0
		95	50	0	0	0	6,954	216,172	9,410	232,586	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
67485-29-4 *	Hydramethylnon	97	0	0	0	0	0	475	10	485	0
		96	0	0	0	0	0	0	5	5	0
		95	0	0	0	0	0	3	17	20	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
302-01-2	Hydrazine	97	25	41	0	650	248,339	21,912	32,825	303,792	190
		96	0	101	300	65	338,596	6,117	28,433	373,612	0
		95	300	452	0	0	42,532	8,920	37,196	89,400	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

[b]Seven facilities in the food processing industry (SIC code 20) reported from 500 million pounds to 1 billion pounds each in on-site recycling of n-hexane in 1995, for a total 4,000,192,215 billion pounds. In 1996, these facilities reported no on-site recycling of n-hexane. On their 1996 Form Rs, these facilities also reported zero for on-site recycling of n-hexane for the prior year (1995). However, they have not revised their 1995 Form Rs. The apparent facility errors change on-site recycling of n-hexane to 125,507,309 pounds and total production-related waste to 312,839,739 pounds.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
10034-93-2	Hydrazine sulfate	97	3	0	0	110,000	0	110,000	0	110,000
		96	2	0	0	350,000	0	350,000	0	350,000
		95	3	0	0	260,000	0	260,000	0	260,000
		88	4	1,172	0	355,000	0	356,172	0	356,172
7647-01-0 *	Hydrochloric acid	97	1,000	59,250,310	1,216	489,005	48,070	59,788,601	447,822	60,236,423
		96	1,068	65,507,723	4,980	260,005	23,148	65,795,856	236,994	66,032,850
		95	1,939	69,500,018	6,871	788,214	24,091	70,319,194	2,369,385	72,688,579
		88	NR	NR	NR	NR	NR	NR	NR	NR
74-90-8 *	Hydrogen cyanide	97	50	1,158,784	241	657,902	8	1,816,935	2,198	1,819,133
		96	50	2,386,690	105	528,513	3	2,915,311	1,164	2,916,475
		95	51	2,481,956	763	683,154	3	3,165,876	326	3,166,202
		88	35	1,109,277	2,300	1,737,850	1,761	2,851,188	1,001	2,852,189
7664-39-3 *	Hydrogen fluoride	97	603	12,422,535	31,680	2,879	15,047	12,472,141	118,837	12,590,978
		96	593	12,959,840	10,691	2,620	36,834	13,009,985	173,050	13,183,035
		95	566	11,431,159	8,702	3,845	24,078	11,467,784	1,012,893	12,480,677
		88	535	14,732,294	189,928	250	13,002	14,935,474	3,467,471	18,402,945
123-31-9	Hydroquinone	97	60	16,649	1,749	303,000	0	321,398	730	322,128
		96	57	27,513	2,652	290,000	0	320,165	2,628	322,793
		95	63	17,450	5,093	340,005	43	362,591	4,406	366,997
		88	61	10,334	7,211	375,400	530	393,475	6,835	400,310
55406-53-6 *	3-Iodo-2-propynyl butylcarbamate	97	18	3,396	21	0	295	3,712	5,957	9,669
		96	15	3,630	15	0	292	3,937	6,505	10,442
		95	11	3,959	10	0	265	4,234	12,763	16,997
		88	NR	NR	NR	NR	NR	NR	NR	NR
13463-40-6	Iron pentacarbonyl	97	1	1,461	0	0	0	1,461	0	1,461
		96	1	1,379	0	0	0	1,379	0	1,379
		95	1	1,530	0	0	0	1,530	0	1,530
		88	NR	NR	NR	NR	NR	NR	NR	NR
78-84-2	Isobutyraldehyde	97	20	213,407	1,336	0	0	214,743	34,992	249,735
		96	23	195,073	1,791	2,374	1	199,239	1,000	200,239
		95	24	256,279	752	44,075	47	301,153	0	301,153
		88	15	685,918	773	60	1	686,752	0	686,752
25311-71-1 *	Isofenphos	97	2	500	0	0	0	500	0	500
		96	3	2,175	0	0	1,536	3,711	0	3,711
		95	3	985	0	0	9,000	9,985	0	9,985
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
10034-93-2	Hydrazine sulfate	97	0	0	0	0	1,700	0	110,002	111,702	0
		96	0	0	0	0	0	0	350,000	350,000	0
		95	0	0	0	0	1,900	1,900	260,000	263,800	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7647-01-0 *	Hydrochloric acid	97	72,162,656	4,211,505	180,000	6,673,069	782,653,538	11,481,225	60,106,472	937,468,465	45,552
		96	73,213,533	2,705,503	120,000	11,200	682,348,885	5,400,761	66,664,454	830,464,336	35,959
		95	195,177,725	15,817,005	100,650	1,510	1,056,734,385	26,019,613	71,050,587	1,364,901,475	94,383
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
74-90-8 *	Hydrogen cyanide	97	61,391	250	78,124,873	331	28,815,443	4,793	1,816,558	108,823,639	107
		96	73,467	0	33,847,854	331	27,343,220	4,559	2,919,400	64,188,831	323
		95	72,134	0	33,141,239	70	25,143,135	10,443	3,141,004	61,508,025	27,155
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7664-39-3 *	Hydrogen fluoride	97	100,395,164	232,309	0	5,910	120,560,424	3,065,078	12,270,652	236,529,537	113,189
		96	113,988,246	300,736	0	4,591	103,683,023	2,621,400	12,750,836	233,348,832	17,849
		95	92,471,855	223,187	0	9,201	103,032,344	2,541,891	12,615,590	210,894,068	11,479
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
123-31-9	Hydroquinone	97	710	0	6,034,221	8,232	1,380,026	63,041	320,498	7,806,728	11
		96	962	0	1,298,419	47,928	388,600	132,120	320,614	2,188,643	0
		95	960	0	1,000,833	37,786	512,185	86,342	363,320	2,001,426	43
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
55406-53-6 *	3-Iodo-2-propynyl butylcarbamate	97	6,954	0	0	7,225	339	158,524	5,317	178,359	0
		96	6,193	902	0	284	340	98,410	5,884	112,013	75
		95	1,755	2	0	1	300	62,552	5,151	69,761	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
13463-40-6	Iron pentacarbonyl	97	0	0	0	0	0	0	1,461	1,461	0
		96	0	0	0	0	0	0	1,379	1,379	0
		95	0	0	0	0	0	0	1,379	1,379	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-84-2	Isobutyraldehyde	97	0	1,400	1,400,398	575,253	734,068	23,593	249,335	2,984,047	0
		96	5,109	26,000	2,316,637	493,076	555,954	141,956	199,796	3,738,528	0
		95	0	9,647	1,193,119	567,515	609,409	76,894	300,129	2,756,713	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
25311-71-1 *	Isofenphos	97	2,000	0	0	0	0	2,000	989	4,989	0
		96	9,948	0	0	0	0	3,736	3,842	17,526	0
		95	690	0	0	0	0	9,000	9,690	19,380	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

				On-site Releases					Off-site Releases	
CAS Number	Chemical	Year	Total Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total On-site Releases Pounds	Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
67-63-0 *	Isopropyl alcohol (manufacturing)	97	76	922,901	250	0	0	923,151	250	923,401
		96	67	800,580	0	0	0	800,580	8,296	808,876
		95	71	931,046	0	0	0	931,046	2,577	933,623
		88	91	2,001,397	1,900	0	14	2,003,311	247,039	2,250,350
80-05-7	4,4'-Isopropyl-idenediphenol	97	116	217,654	3,777	0	290,009	511,440	500,386	1,011,826
		96	111	184,027	4,803	25,000	251,387	465,217	324,986	790,203
		95	113	155,599	5,809	82,000	86,697	330,105	425,671	755,776
		88	79	226,926	126,385	0	424,117	777,428	444,560	1,221,988
77501-63-4 *	Lactofen	97	3	77	0	0	0	77	28	105
		96	4	1,462	0	0	0	1,462	250	1,712
		95	2	787	0	0	0	787	250	1,037
		88	NR	NR	NR	NR	NR	NR	NR	NR
7439-92-1	Lead	97	804	424,888	14,718	0	4,229,841	4,669,447	5,827,004	10,496,451
		96	812	616,921	12,748	0	3,482,287	4,111,956	3,323,575	7,435,531
		95	842	728,896	10,595	0	2,361,315	3,100,806	2,565,396	5,666,202
		88	865	1,128,042	61,791	5	6,648,946	7,838,784	12,278,904	20,117,688
--	Lead compounds	97	816	877,637	36,516	263,980	13,767,859	14,945,992	30,465,946	45,411,938
		96	862	1,100,086	50,893	794	12,459,496	13,611,269	20,744,370	34,355,639
		95	840	1,226,844	52,821	912	13,486,182	14,766,759	19,325,293	34,092,052
		88	735	1,554,582	180,368	2,755	20,035,359	21,773,064	15,924,781	37,697,845
58-89-9 *	Lindane	97	7	54	5	0	0	59	753	812
		96	9	510	5	0	250	765	281	1,046
		95	10	510	0	0	0	510	20	530
		88	3	258	0	0	0	258	56	314
330-55-2 *	Linuron	97	3	10	5	0	0	15	0	15
		96	4	15	5	0	0	20	250	270
		95	4	270	5	0	5	280	1,250	1,530
		88	NR	NR	NR	NR	NR	NR	NR	NR
554-13-2	Lithium carbonate	97	33	10,907	255	300	13,700	25,162	234,559	259,721
		96	33	15,178	260	210	12,540	28,188	160,793	188,981
		95	26	14,967	0	0	0	14,967	600,001	614,968
		88	NR	NR	NR	NR	NR	NR	NR	NR
121-75-5 *	Malathion	97	21	4,665	5	0	0	4,670	250	4,920
		96	23	2,605	10	0	0	2,615	5	2,620
		95	21	2,512	0	0	0	2,512	31	2,543
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
67-63-0 *	Isopropyl alcohol (manufacturing)	97	1,180,102	148,807	10,069,726	483,057	94,225	86,520	914,339	12,976,776	42
		96	88,859	10,938	3,274,940	424,241	146,031	52,826	787,933	4,785,768	5
		95	62,894	48,179	2,684,671	92,171	141,356	232,658	737,006	3,998,935	2
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
80-05-7	4,4'-Isopropyl-idenediphenol	97	98,401	67,350	9,258,664	72,155	1,599,908	137,685	753,985	11,988,148	5,912
		96	102,400	1,620	8,712,328	103,356	998,531	76,132	801,365	10,795,732	2,900
		95	56,348	2,377	5,024,865	28,758	824,095	127,796	646,822	6,711,061	121,310
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
77501-63-4 *	Lactofen	97	72	0	0	0	0	12,840	78	12,990	0
		96	13	0	0	0	0	3,856	1,539	5,408	221
		95	100	0	0	0	0	1	520	621	1,044
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	97	223,496,228	44,515,712	272,104	12,544	1,910,946	839,391	8,771,387	279,818,312	108,510
		96	209,173,326	40,321,708	89,267	9,879	2,336,543	1,484,910	6,511,647	259,927,280	56,907
		95	211,273,623	63,511,493	49,836	5,677	1,631,276	1,923,658	4,417,619	282,813,182	36,084
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Lead compounds	97	333,440,293	303,148,397	56,000	50,842	3,202,463	4,556,056	34,566,800	679,020,851	3,730,552
		96	396,536,906	308,960,682	0	66,447	1,321,438	7,550,907	30,983,410	745,419,790	602,191
		95	501,667,398	297,067,373	0	64,595	28,891,307	7,389,316	26,819,652	861,899,641	3,696,880
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
58-89-9 *	Lindane	97	84	0	0	0	0	2,790	67	2,941	0
		96	416	0	0	0	0	1,154	523	2,093	0
		95	326	0	0	0	0	3,206	272	3,804	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
330-55-2 *	Linuron	97	25	0	0	0	0	0	50	75	0
		96	0	0	0	0	0	92	142	234	0
		95	0	0	0	1	0	734	797	1,532	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
554-13-2	Lithium carbonate	97	31,190	0	0	0	1,200	2,400	241,578	276,368	0
		96	35,836	0	0	0	0	4,610	179,986	220,432	0
		95	18,000	0	0	0	2,200	690	167,040	187,930	446,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
121-75-5 *	Malathion	97	224	0	0	0	0	3,200	3,823	7,247	0
		96	204	0	0	0	0	2,782	1,758	4,744	0
		95	197	0	0	0	0	819	1,073	2,089	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

				On-site Releases					Off-site Releases	
CAS Number	Chemical	Year	Total Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total On-site Releases Pounds	Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
108-31-6	Maleic anhydride	97	210	471,855	5	5	5,520	477,385	9,160	486,545
		96	205	575,200	15	10	1,000	576,225	10,666	586,891
		95	209	347,391	18	5	1,406	348,820	14,429	363,249
		88	199	676,778	12,580	240,000	250	929,608	132,148	1,061,756
109-77-3	Malononitrile	97	3	119	0	104,975	0	105,094	0	105,094
		96	3	250	0	475,997	0	476,247	0	476,247
		95	2	0	0	432,956	0	432,956	0	432,956
		88	NR	NR	NR	NR	NR	NR	NR	NR
12427-38-2 *	Maneb	97	8	11,641	0	0	11,641	23,282	15,613	38,895
		96	5	0	0	0	0	0	250	250
		95	6	273	0	0	0	273	2,461	2,734
		88	6	2,265	250	0	0	2,515	5,285	7,800
7439-96-5	Manganese	97	1,659	819,618	147,746	12	9,914,883	10,882,259	16,209,432	27,091,691
		96	1,599	818,083	118,191	8	9,971,860	10,908,142	15,154,659	26,062,801
		95	1,535	680,839	117,032	17	8,279,033	9,076,921	12,724,597	21,801,518
		88	948	1,586,672	321,993	255	20,229,826	22,138,746	20,082,830	42,221,576
--	Manganese compounds	97	1,181	1,521,980	4,206,997	14,412,830	50,170,481	70,312,288	46,231,218	116,543,506
		96	1,044	1,810,245	2,014,241	15,630	40,391,142	44,231,258	32,617,434	76,848,692
		95	1,019	2,897,638	1,519,184	3,590	41,735,058	46,155,470	25,888,561	72,044,031
		88	545	1,801,463	681,469	6,816,070	84,227,842	93,526,844	20,670,921	114,197,765
93-65-2	Mecoprop	97	7	1,275	0	0	5	1,280	250	1,530
		96	7	1,690	0	0	255	1,945	3,896	5,841
		95	9	1,816	0	0	0	1,816	2,304	4,120
		88	NR	NR	NR	NR	NR	NR	NR	NR
149-30-4 *	2-Mercaptobenzo-thiazole	97	31	6,690	1,030	50,000	0	57,720	207,509	265,229
		96	30	10,272	30	52,000	0	62,302	205,531	267,833
		95	28	34,857	5	97,000	260	132,122	376,420	508,542
		88	NR	NR	NR	NR	NR	NR	NR	NR
7439-97-6 *	Mercury	97	20	11,805	386	0	7,881	20,072	25,053	45,125
		96	21	14,181	468	0	537	15,186	13,012	28,198
		95	24	13,155	192	0	1,016	14,363	14,228	28,591
		88	37	22,905	1,397	0	13,279	37,581	258,718	296,299
--	Mercury compounds	97	9	2,626	34	41	0	2,701	25,508	28,209
		96	13	2,916	73	9	0	2,998	29,437	32,435
		95	10	3,156	136	6	0	3,298	207,097	210,395
		88	15	2,376	9	27	0	2,412	17,916	20,328

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
108-31-6	Maleic anhydride	97	11,053	0	3,673,279	180,626	49,248,507	1,313,924	475,172	54,902,561	4,607
		96	6,847	7,307	3,333,344	98,075	36,712,170	1,307,254	577,753	42,042,750	14,386
		95	4,940	0	3,222,121	102,238	38,356,328	1,154,816	355,070	43,195,513	22,336
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
109-77-3	Malononitrile	97	0	0	0	0	3	690	105,094	105,787	0
		96	0	0	0	0	21	0	432,974	432,995	0
		95	0	0	0	0	0	0	432,956	432,956	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
12427-38-2 *	Maneb	97	0	0	0	0	0	3,684	3,972	7,656	23,282
		96	0	0	0	0	0	1,108	214	1,322	0
		95	525	0	0	3	0	8,800	7,861	17,189	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7439-96-5	Manganese	97	42,094,599	63,013,817	0	460	256,743	471,320	25,457,423	131,294,362	428,218
		96	33,022,463	77,040,179	0	936	371,832	1,209,070	24,792,253	136,436,733	167
		95	30,226,342	72,936,715	0	141	173,210	1,781,549	20,945,760	126,063,717	591
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Manganese compounds	97	18,174,571	47,149,281	20,349	35,437	1,552,540	5,388,284	108,079,180	180,399,642	508,687
		96	130,924,965	53,547,313	21,216	221,628	899,859	6,275,071	70,679,103	262,569,155	1,437,910
		95	145,347,982	66,269,857	0	199,783	1,023,502	5,906,367	65,827,970	284,575,461	1,350,500
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
93-65-2	Mecoprop	97	1,750	0	0	0	740	1,335	551	4,376	96
		96	1,972	0	0	0	990	2,322	5,364	10,648	96
		95	15,614	0	0	0	940	1,037	3,659	21,250	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
149-30-4 *	2-Mercaptobenzo-thiazole	97	3,932	10,538	0	819,814	403,993	11,463	265,831	1,515,571	0
		96	5,630	15,023	0	800,000	144,750	12,449	267,204	1,245,056	0
		95	5,405	104,645	0	931,100	128,323	136,948	516,905	1,823,326	630
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7439-97-6 *	Mercury	97	398,999	39,661	0	0	4,239	10,606	19,903	473,408	20
		96	803,882	23,898	0	0	4,114	4,143	24,017	860,054	0
		95	919,909	58,151	0	0	6,307	10,929	17,980	1,013,276	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Mercury compounds	97	39,004	7,338	0	0	0	2,802	25,061	74,205	0
		96	46,348	2,000	0	41	1	7,285	23,920	79,595	260
		95	125,287	0	0	61	0	4,597	25,638	155,583	179,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
150-50-5 *	Merphos	97	1	169	0	0	0	169	0	169
		96	1	200	0	0	0	200	0	200
		95	1	186	0	0	0	186	0	186
		88	NR	NR	NR	NR	NR	NR	NR	NR
126-98-7	Methacrylonitrile	97	5	943	0	110,190	0	111,133	0	111,133
		96	5	945	0	206,110	0	207,055	0	207,055
		95	5	945	0	555,265	0	556,210	0	556,210
		88	NR	NR	NR	NR	NR	NR	NR	NR
137-42-8 *	Metham sodium	97	10	5,959	3	0	0	5,962	310	6,272
		96	13	3,449	4	0	2	3,455	15,937	19,392
		95	11	4,387	1	0	252	4,640	13,050	17,690
		88	NR	NR	NR	NR	NR	NR	NR	NR
67-56-1 *	Methanol	97	2,239	194,376,752	7,019,881	17,808,834	963,414	220,168,881	952,260	221,121,141
		96	2,350	207,006,454	7,387,739	24,318,488	2,042,150	240,754,831	1,412,657	242,167,488
		95	2,453	215,513,863	8,758,485	27,743,642	1,784,406	253,800,396	1,956,997	255,757,393
		88	2,503	259,598,938	17,128,114	26,587,686	11,911,136	315,225,874	15,291,235	330,517,109
94-74-6 *	Methoxone	97	7	755	0	0	250	1,005	4,853	5,858
		96	7	1,032	250	0	250	1,532	4,778	6,310
		95	5	1,261	0	0	0	1,261	1,810	3,071
		88	NR	NR	NR	NR	NR	NR	NR	NR
72-43-5 *	Methoxychlor	97	3	0	0	0	0	0	0	0
		96	3	25	0	0	0	25	0	25
		95	2	0	0	0	0	0	0	0
		88	12	131,031	252	0	258	131,541	8	131,549
109-86-4 *	2-Methoxyethanol	97	44	1,035,779	16,006	0	123	1,051,908	1,500	1,053,408
		96	45	865,483	11,672	0	0	877,155	489	877,644
		95	46	888,228	12,407	0	5	900,640	535	901,175
		88	95	5,899,669	40,520	750	7	5,940,946	57,362	5,998,308
96-33-3	Methyl acrylate	97	64	184,651	666	15,902	8,940	210,159	1,657	211,816
		96	67	187,236	8,145	147	162	195,690	32,136	227,826
		95	71	243,914	5,962	159	0	250,035	865	250,900
		88	61	443,496	1,687	200	30,260	475,643	4,765	480,408
1634-04-4	Methyl tert-butyl ether	97	201	2,626,323	163,716	16,320	124	2,806,483	118,121	2,924,604
		96	203	3,098,928	116,360	177,174	26,569	3,419,031	243,220	3,662,251
		95	184	3,295,852	78,555	15,238	3,800	3,393,445	47,841	3,441,286
		88	90	2,588,247	21,499	14,400	370	2,624,516	4,602	2,629,118

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

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able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
150-50-5 *	Merphos	97	0	0	0	0	0	0	169	169	0
		96	0	0	0	0	0	0	200	200	0
		95	0	0	0	0	0	0	186	186	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
126-98-7	Methacrylonitrile	97	0	0	0	0	394	0	111,133	111,527	0
		96	0	0	0	0	503	0	582,580	583,083	0
		95	0	0	0	0	3,189	0	556,210	559,399	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
137-42-8 *	Metham sodium	97	0	0	0	909	388	4,641	6,921	12,859	507
		96	35,780	0	0	557	1	5,689	17,664	59,691	47
		95	33,520	0	0	0	102	362	15,378	49,362	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
67-56-1 *	Methanol	97	652,646,250	19,047,443	338,486,384	92,054,052	960,162,594	131,720,870	226,499,488	2,420,617,081	198,274
		96	518,042,421	23,125,564	331,883,804	92,165,764	967,524,123	116,418,208	246,641,760	2,295,801,644	212,205
		95	494,203,260	30,646,930	366,619,613	94,822,191	954,344,678	119,500,287	260,279,814	2,320,416,773	295,052
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
94-74-6 *	Methoxone	97	3,391	0	0	0	0	271	6,361	10,023	96
		96	8,591	0	0	0	45	972	6,404	16,012	401
		95	19,510	0	0	0	58	27	3,144	22,739	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
72-43-5 *	Methoxychlor	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	807	11	818	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
109-86-4 *	2-Methoxy-ethanol	97	1,274,454	11,150	329,218	1,135,401	2,133,850	1,534,239	1,125,869	7,544,181	1,570
		96	1,704,300	11,084	146,744	1,304,811	2,181,353	819,884	943,755	7,111,931	1,113
		95	3,925,200	0	240,658	1,885,948	3,353,957	1,228,013	894,703	11,528,479	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
96-33-3	Methyl acrylate	97	1,034,001	7,822	490,480	402,873	2,513,567	41,418	184,972	4,675,133	0
		96	1,010,001	8,368	908,315	313,547	1,479,300	96,048	227,399	4,042,978	2
		95	910,001	40,769	736,924	184,260	2,134,388	114,535	253,968	4,374,845	248
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1634-04-4	Methyl tert-butyl ether	97	2,346,757	466,198	367,993	2,675,435	3,964,927	848,129	2,908,348	13,577,787	3,817
		96	1,693,888	553,776	807,055	1,856,329	2,468,177	1,773,894	3,467,427	12,620,546	202,032
		95	847,718	32,815	228,033	1,360,276	3,014,118	522,838	3,425,508	9,431,306	117,495
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
79-22-1	Methyl chloro-carbonate	97	3	3,387	5	0	5	3,397	0	3,397
		96	3	2,437	5	0	5	2,447	0	2,447
		95	3	2,595	5	0	5	2,605	0	2,605
		88	NR	NR	NR	NR	NR	NR	NR	NR
101-14-4	4,4'-Methylenebis (2-chloroaniline)	97	24	2,266	0	0	0	2,266	0	2,266
		96	23	506	0	0	750	1,256	5	1,261
		95	23	260	0	0	0	260	5	265
		88	8	250	0	0	0	250	0	250
101-61-1	4,4'-Methylenebis (N,N-dimethyl) benzeneamine	97	2	0	0	0	0	0	0	0
		96	2	1	0	0	0	1	0	1
		95	2	10	0	0	0	10	0	10
		88	1	250	0	0	7,000	7,250	1,150	8,400
74-95-3	Methylene bromide	97	5	57,743	0	0	0	57,743	0	57,743
		96	6	99,292	0	0	0	99,292	0	99,292
		95	5	63,091	0	0	0	63,091	0	63,091
		88	9	57,723	0	0	0	57,723	0	57,723
101-77-9	4,4'-Methylene-dianiline	97	26	9,221	86	15,050	0	24,357	16,765	41,122
		96	22	9,762	23	41,120	0	50,905	19,591	70,496
		95	25	10,337	63	23,110	0	33,510	9,423	42,933
		88	31	130,265	2,599	460,250	1,140	594,254	141,538	735,792
78-93-3 *	Methyl ethyl ketone	97	1,977	52,974,232	41,781	485,149	159,322	53,660,484	466,246	54,126,730
		96	2,135	59,957,401	74,989	432,772	119,565	60,584,727	282,531	60,867,258
		95	2,304	69,996,023	65,520	556,607	92,915	70,711,065	217,811	70,928,876
		88	2,533	141,554,636	92,076	255,955	166,597	142,069,264	5,014,725	147,083,989
60-34-4	Methyl hydrazine	97	4	867	0	0	0	867	0	867
		96	3	755	0	0	0	755	0	755
		95	3	500	0	0	0	500	0	500
		88	3	2,927	1	0	0	2,928	1,450	4,378
74-88-4	Methyl iodide	97	10	121,458	48	3,929	0	125,435	27	125,462
		96	8	65,225	0	23,500	0	88,725	3,300	92,025
		95	6	21,618	0	10,000	0	31,618	8,600	40,218
		88	3	8,944	5	250	0	9,199	250	9,449
108-10-1 *	Methyl isobutyl ketone	97	852	16,005,859	19,146	86,400	4,089	16,115,494	311,182	16,426,676
		96	920	18,991,358	22,569	162,000	4,858	19,180,785	40,872	19,221,657
		95	1,018	21,845,594	51,292	158,600	7,041	22,062,527	86,316	22,148,843
		88	1,011	32,035,833	762,108	116,650	31,770	32,946,361	1,966,488	34,912,849

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
79-22-1	Methyl chloro-carbonate	97	0	0	0	0	39,010	0	3,370	42,380	10
		96	0	0	0	0	4,110	0	2,470	6,580	0
		95	0	0	0	0	3,610	0	2,597	6,207	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
101-14-4	4,4'-Methylenebis (2-chloroaniline)	97	0	0	0	2,956	0	7,809	2,004	12,769	0
		96	0	0	0	2,105	0	11,309	219	13,633	0
		95	720	0	0	1,872	36	10,345	37	13,010	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
101-61-1	4,4'-Methylenebis (N,N-dimethyl) benzeneamine	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	1	1	0
		95	0	0	0	0	0	0	10	10	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
74-95-3	Methylene bromide	97	969,440	0	0	0	0	0	57,743	1,027,183	0
		96	1,211,800	0	0	0	270	0	99,292	1,311,362	0
		95	677,059	0	0	0	51,903	979	62,284	792,225	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
101-77-9	4,4'-Methylene-dianiline	97	3,700	138	960,204	5,478	97,414	71,650	36,244	1,174,828	0
		96	2,900	0	217,782	2,202	83,357	57,069	66,005	429,315	0
		95	2,300	0	17,801	17,405	87,919	95,059	35,337	255,821	7
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-93-3 *	Methyl ethyl ketone	97	53,877,400	19,088,054	77,959,795	41,862,752	70,061,993	5,743,445	54,277,916	322,871,355	205,539
		96	61,188,547	20,458,848	92,721,023	42,193,269	69,186,103	5,660,813	60,660,693	352,069,296	22,957
		95	66,104,773	21,169,467	112,461,715	43,627,504	69,349,991	6,329,138	69,954,400	388,996,988	229,484
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
60-34-4	Methyl hydrazine	97	0	800	0	0	5,584	1,642	504	8,530	1
		96	0	0	0	0	3,044	30	407	3,481	0
		95	0	0	0	0	20	5	400	425	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
74-88-4	Methyl iodide	97	0	0	0	6	9,686	6,704	126,398	142,794	98
		96	0	0	1,900	0	341	27	91,961	94,229	85
		95	0	0	140	0	19,376	760	40,187	60,463	59
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-10-1 *	Methyl isobutyl ketone	97	65,117,922	11,934,282	30,845,396	16,896,647	13,794,459	1,363,149	16,414,952	156,366,807	9,910
		96	52,349,128	13,931,441	20,171,448	18,528,963	13,262,621	1,741,967	19,131,845	139,117,413	2,357
		95	52,705,598	16,392,205	26,719,664	18,128,283	17,796,398	1,902,661	22,094,258	155,739,067	49,931
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
624-83-9	Methyl isocyanate	97	5	488	0	0	1	489	0	489
		96	6	1,489	0	0	0	1,489	0	1,489
		95	5	1,658	0	0	0	1,658	0	1,658
		88	12	10,235	0	0	64	10,299	8,400	18,699
556-61-6 *	Methyl-isothiocyanate	97	3	78	0	0	0	78	0	78
		96	3	82	0	0	0	82	0	82
		95	2	72	0	0	0	72	0	72
		88	NR	NR	NR	NR	NR	NR	NR	NR
75-86-5	2-Methyllacto-nitrile	97	6	5,466	0	62,090	0	67,556	0	67,556
		96	6	4,145	0	0	0	4,145	0	4,145
		95	5	3,854	0	0	0	3,854	0	3,854
		88	NR	NR	NR	NR	NR	NR	NR	NR
80-62-6	Methyl-methacrylate	97	276	2,108,671	6,516	140,000	1,340	2,256,527	184,017	2,440,544
		96	267	1,840,216	2,551	160,000	1,072	2,003,839	107,184	2,111,023
		95	267	1,985,297	2,172	120,000	1,056	2,108,525	124,867	2,233,392
		88	218	3,630,569	28,437	327,220	8,119	3,994,345	276,567	4,270,912
924-42-5	N-Methylol-acrylamide	97	31	4,381	1,308	0	33	5,722	3,402	9,124
		96	28	3,114	1,170	0	32	4,316	776	5,092
		95	28	2,835	1,166	0	34	4,035	13	4,048
		88	NR	NR	NR	NR	NR	NR	NR	NR
298-00-0 *	Methyl parathion	97	4	481	0	0	0	481	0	481
		96	6	1,028	0	0	0	1,028	360	1,388
		95	5	1,442	0	0	0	1,442	2,684	4,126
		88	NR	NR	NR	NR	NR	NR	NR	NR
109-06-8	2-Methylpyridine	97	7	21,742	0	47,000	0	68,742	21	68,763
		96	7	73,846	0	65,062	0	138,908	504	139,412
		95	8	89,938	0	61,720	0	151,658	40	151,698
		88	NR	NR	NR	NR	NR	NR	NR	NR
872-50-4	N-Methyl-2-pyrrolidone	97	365	3,125,284	27,896	2,611,958	209,279	5,974,417	528,483	6,502,900
		96	337	2,882,044	52,589	2,907,704	72,849	5,915,186	550,926	6,466,112
		95	266	2,670,018	201,221	779,477	135,050	3,785,766	367,099	4,152,865
		88	NR	NR	NR	NR	NR	NR	NR	NR
21087-64-9 *	Metribuzin	97	6	359	24	0	0	383	0	383
		96	4	1,012	5	0	0	1,017	0	1,017
		95	3	1,936	9	0	0	1,945	0	1,945
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
624-83-9	Methyl isocyanate	97	0	0	0	0	92,534	0	486	93,020	2
		96	0	0	0	0	91,617	3,007	1,476	96,100	4
		95	0	0	0	0	66,939	0	1,658	68,597	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
556-61-6 *	Methyl-isothiocyanate	97	0	0	0	0	0	191	78	269	0
		96	0	0	0	73	0	340	82	495	0
		95	0	0	0	62	0	82	72	216	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-86-5	2-Methyllacto-nitrile	97	0	0	0	0	15,270	360	67,525	83,155	0
		96	0	0	0	0	19,305	0	4,151	23,456	0
		95	0	0	0	0	19,317	0	3,855	23,172	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
80-62-6	Methyl-methacrylate	97	1,282,943	51,663	2,433,787	1,959,654	5,787,869	437,999	2,287,796	14,241,711	576
		96	4,567,223	58,114	2,367,486	1,341,143	4,635,870	429,797	2,045,562	15,445,195	12,636
		95	4,665,497	20,746	2,050,094	1,396,720	5,218,371	732,552	2,152,816	16,236,796	3,234
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
924-42-5	N-Methylol-acrylamide	97	0	0	0	3,553	13,038	50,351	9,125	76,067	1
		96	449	0	0	45,763	14,403	4,728	3,894	69,237	0
		95	360	0	0	294	14,240	4,373	3,087	22,354	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
298-00-0 *	Methyl parathion	97	0	0	0	0	0	72,300	318	72,618	68,000
		96	10	0	0	0	0	2,311	599	2,920	0
		95	29	0	0	0	0	0	3,664	3,693	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
109-06-8	2-Methylpyridine	97	66,000	190,000	30,000	7,818	52,000	25,043	68,935	439,796	840
		96	95,000	180,000	50,000	2,723	52,000	23,163	138,111	540,997	780
		95	53,000	57,000	19,000	470	37,000	98,212	150,962	415,644	930
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
872-50-4	N-Methyl-2-pyrrolidone	97	586,566	8,821,400	1,389,250	2,866,773	5,655,591	3,665,480	6,592,639	29,577,699	127
		96	1,035,645	6,910,278	810,116	2,650,467	5,113,756	3,239,484	6,468,341	26,228,087	1,720
		95	1,477,378	6,508,234	182,638	2,427,956	5,112,812	3,400,462	4,403,703	23,513,183	977
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
21087-64-9 *	Metribuzin	97	0	0	0	0	4,895	16,040	225	21,160	0
		96	0	0	0	0	38,864	13,213	1,017	53,094	0
		95	0	0	0	0	3,502	5,423	3,519	12,444	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

ote: Data from Section 8 (Current Year) of Form R.
A: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) nd/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted se Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
7786-34-7 *	Mevinphos	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
90-94-8	Michler's ketone	97	1	401	0	0	0	401	0	401
		96	No reports received							
		95	1	1,577	0	0	0	1,577	0	1,577
		88	4	1,100	0	0	0	1,100	0	1,100
2212-67-1 *	Molinate	97	3	667	4	0	0	671	6,437	7,108
		96	2	586	1	0	0	587	4,405	4,992
		95	3	695	502	0	0	1,197	6,363	7,560
		88	NR	NR	NR	NR	NR	NR	NR	NR
1313-27-5	Molybdenum-trioxide	97	159	222,987	39,645	276,580	64,083	603,295	453,770	1,057,065
		96	163	190,687	27,504	209,900	60,626	488,717	627,817	1,116,534
		95	158	178,292	27,305	333,730	77,594	616,921	1,013,388	1,630,309
		88	101	111,195	139,021	197,115	97,238	544,569	573,624	1,118,193
76-15-3	Monochloropenta-fluoroethane (CFC-115)	97	8	188,262	5	0	0	188,267	0	188,267
		96	7	70,725	2,155	0	0	72,880	1	72,881
		95	14	275,259	2,854	3	0	278,116	7	278,123
		88	NR	NR	NR	NR	NR	NR	NR	NR
88671-89-0 *	Myclobutanil	97	4	500	0	0	0	500	0	500
		96	2	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
142-59-6 *	Nabam	97	3	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	3	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
300-76-5 *	Naled	97	1	0	0	0	0	0	0	0
		96	2	50	0	0	0	50	0	50
		95	2	50	0	0	0	50	2,200	2,250
		88	NR	NR	NR	NR	NR	NR	NR	NR
91-20-3 *	Naphthalene	97	533	2,485,690	13,098	187,927	82,204	2,768,919	501,134	3,270,053
		96	555	2,921,583	11,836	296,776	301,513	3,531,708	582,717	4,114,425
		95	528	2,685,298	43,311	33,569	32,085	2,794,263	474,106	3,268,369
		88	420	5,165,426	22,518	50,946	123,697	5,362,587	1,359,184	6,721,771

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7786-34-7 *	Mevinphos	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
90-94-8	Michler's ketone	97	0	0	0	230	0	0	401	631	0
		96	No reports received								
		95	0	0	0	436	0	0	1,577	2,013	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2212-67-1 *	Molinate	97	0	0	0	10	2,290	41,234	8,117	51,651	1,287
		96	0	0	0	13	0	156	5,870	6,039	8
		95	0	0	0	0	3,312	128,004	6,450	137,766	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1313-27-5	Molybdenum-trioxide	97	5,870,979	2,415,356	0	0	24,307	572,013	964,067	9,846,722	1,200
		96	6,492,490	2,956,337	0	3,276	31,277	478,671	1,207,616	11,169,667	84
		95	6,210,774	2,453,023	0	3,530	19,964	346,571	1,598,949	10,632,811	21,636
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
76-15-3	Monochloropenta-fluoroethane (CFC-115)	97	35,000	0	0	0	3,851	4,092	188,268	231,211	0
		96	110,000	0	0	0	68,635	14,262	72,881	265,778	0
		95	8,600	2,200	0	0	257,501	24,651	278,151	571,103	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
88671-89-0 *	Myclobutanil	97	0	0	0	0	0	1,809	220	2,029	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
142-59-6 *	Nabam	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	14,218	253	0	14,471	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
300-76-5 *	Naled	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	500	3,200	0	3,700	37
		95	0	0	0	0	1,000	2,600	0	3,600	9
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
91-20-3 *	Naphthalene	97	11,152,489	217,597	7,706,210	1,020,682	11,452,141	634,640	3,486,068	35,669,827	13,023
		96	13,827,289	266,253	5,197,247	3,244,055	10,955,233	709,435	4,068,152	38,267,664	287,833
		95	10,706,885	290,167	5,220,914	1,882,043	8,469,326	1,219,590	3,031,442	30,820,367	351,872
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
134-32-7	alpha-Naphthyl-amine	97	2	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	3	590	101	0	0	691	0	691
7440-02-0	Nickel	97	2,002	411,558	24,911	25,642	237,649	699,760	3,872,894	4,572,654
		96	1,950	382,549	29,616	4,225	232,324	648,714	3,501,377	4,150,091
		95	1,921	316,533	25,171	6,370	367,348	715,422	3,778,766	4,494,188
		88	1,176	452,618	90,386	14,295	1,225,251	1,782,550	7,661,134	9,443,684
--	Nickel compounds	97	959	353,614	93,440	116,434	4,369,491	4,932,979	7,112,809	12,045,788
		96	925	325,006	72,898	86,278	3,782,669	4,266,851	5,428,916	9,695,767
		95	892	264,723	58,450	107,886	2,482,245	2,913,304	5,733,628	8,646,932
		88	579	273,178	132,233	224,968	2,384,594	3,014,973	6,208,727	9,223,700
--	Nicotine and salts	97	39	434,949	956	0	0	435,905	351,431	787,336
		96	33	443,945	881	0	0	444,826	426,142	870,968
		95	26	375,000	755	0	135	375,890	274,712	650,602
		88	NR	NR	NR	NR	NR	NR	NR	NR
1929-82-4 *	Nitrapyrin	97	3	0	0	0	0	0	0	0
		96	2	1	0	0	0	1	0	1
		95	3	7	119,451	0	0	119,458	0	119,458
		88	NR	NR	NR	NR	NR	NR	NR	NR
--	Nitrate compounds	97	916	396,856	148,846,835	40,552,913	3,079,041	192,875,645	4,498,878	197,374,523
		96	850	344,204	125,065,773	39,398,562	3,754,465	168,563,004	2,722,699	171,285,703
		95	766	415,465	128,553,207	47,589,521	3,883,521	180,441,714	5,352,853	185,794,567
		88	NR	NR	NR	NR	NR	NR	NR	NR
7697-37-2 *	Nitric acid	97	1,767	2,656,400	421,395	18,399,512	317,845	21,795,152	1,881,909	23,677,061
		96	1,755	3,120,705	221,524	17,483,972	204,274	21,030,475	1,479,266	22,509,741
		95	1,812	2,357,243	46,591	18,755,717	291,656	21,451,207	4,818,362	26,269,569
		88	1,921	8,278,184	1,380,565	25,485,680	1,330,695	36,475,124	7,929,318	44,404,442
139-13-9	Nitrilotriacetic acid	97	9	0	7,474	2,400	0	9,874	0	9,874
		96	8	10	78	1,500	0	1,588	0	1,588
		95	7	1	34	2,900	0	2,935	0	2,935
		88	14	2,500	5,100	0	5,100	12,700	250	12,950
100-01-6	p-Nitroaniline	97	4	12,018	13	0	0	12,031	0	12,031
		96	5	11,760	50	0	0	11,810	0	11,810
		95	4	11,205	2	0	0	11,207	0	11,207
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
134-32-7	alpha-Naphthyl-amine	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-02-0	Nickel	97	29,304,518	87,162,134	26,213	57,392	1,398,988	646,126	3,953,432	122,548,803	4,374
		96	34,502,015	76,142,803	16,476	30,184	997,141	780,637	3,586,568	116,055,824	2,892
		95	37,931,558	78,106,397	127	768	1,547,891	1,033,883	3,241,070	121,861,694	19,071
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Nickel compounds	97	9,114,702	32,218,575	31,657	5,410	4,651,041	1,042,021	10,770,118	57,833,524	190,541
		96	7,760,725	27,951,302	37,998	1,373	2,675,371	766,240	10,021,487	49,214,496	5,228
		95	14,059,031	33,998,974	0	2,808	5,627,326	1,310,270	7,216,959	62,215,368	332,577
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Nicotine and salts	97	0	82,149	0	0	878,410	311,032	744,317	2,015,908	14,000
		96	8,896	158,695	0	0	846,164	294,892	811,607	2,120,254	0
		95	0	99,383	0	0	275,790	301,170	649,157	1,325,500	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1929-82-4 *	Nitrapyrin	97	0	0	0	0	0	1,255,450	0	1,255,450	0
		96	0	0	0	550	0	130	1	681	0
		95	0	0	0	7,100	0	380	128,628	136,108	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Nitrate compounds	97	99,267,015	1,600,700	0	271,802	49,691,186	73,381,286	202,947,298	427,159,287	182,840
		96	103,278,523	4,593,696	0	98,981	36,843,509	65,938,182	177,503,935	388,256,826	195,054
		95	95,090,268	2,463,043	0	0	26,254,866	59,815,037	189,226,086	372,849,300	110,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7697-37-2 *	Nitric acid	97	28,640,127	2,812,833	27,246	257	306,863,652	16,414,079	22,042,219	376,800,413	115,681
		96	24,081,964	2,407,383	165,558	330	303,255,649	15,601,063	21,802,428	367,314,375	62,094
		95	28,235,834	3,666,454	250,245	255	239,314,648	15,972,367	27,277,730	314,717,533	118,938
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
139-13-9	Nitrilotriacetic acid	97	0	0	0	0	1,238,653	12,140	9,874	1,260,667	0
		96	0	0	0	0	1,017,756	18,000	1,588	1,037,344	0
		95	2,500	0	0	0	969,141	1,872	2,935	976,448	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
100-01-6	p-Nitroaniline	97	0	0	0	0	115	178,165	12,233	190,513	0
		96	0	0	0	0	460	106,200	12,310	118,970	0
		95	0	0	7	0	266	93,016	12,007	105,296	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

			On-site Releases						Off-site Releases	
CAS Number	Chemical	Year	Total Forms Number	Total Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total On-site Releases Pounds	Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
99-59-2	5-Nitro-o-anisidine	97	1	10	0	0	0	10	0	10
		96	1	10	0	0	0	10	0	10
		95	1	10	0	0	0	10	0	10
		88	No reports received							
98-95-3 *	Nitrobenzene	97	14	64,314	299	638,059	7	702,679	240	702,919
		96	13	37,333	951	193,527	46	231,857	3,825	235,682
		95	16	25,524	874	330,344	43	356,785	961	357,746
		88	19	41,279	7,283	819,000	3,538	871,100	69,570	940,670
55-63-0	Nitroglycerin	97	18	10,177	15,622	0	0	25,799	0	25,799
		96	19	22,466	18,508	0	3,781	44,755	3,610	48,365
		95	20	26,077	13,300	0	0	39,377	0	39,377
		88	22	52,383	2,746	0	11,640	66,769	2	66,771
88-75-5	2-Nitrophenol	97	4	47	39	0	0	86	0	86
		96	4	33	51	0	0	84	90	174
		95	4	38	50	0	0	88	0	88
		88	4	33,689	1	0	2	33,692	13,100	46,792
100-02-7 *	4-Nitrophenol	97	7	969	0	0	0	969	0	969
		96	7	935	0	0	0	935	0	935
		95	6	945	0	0	0	945	0	945
		88	7	7,855	0	6,300	7	14,162	70	14,232
79-46-9 *	2-Nitropropane	97	3	23,727	2,789	0	0	26,516	25	26,541
		96	4	34,288	2,790	0	0	37,078	0	37,078
		95	5	31,265	3,000	0	0	34,265	0	34,265
		88	15	389,385	4,300	257,000	0	650,685	4,785	655,470
62-75-9	N-Nitrosodi-methylamine	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	1	0	0	0	0	0	0	0
86-30-6	N-Nitrosodi-phenylamine	97	3	10	0	0	0	10	0	10
		96	3	10	0	0	0	10	0	10
		95	2	10	0	0	0	10	0	10
		88	2	0	27	34,000	0	34,027	0	34,027
156-10-5	p-Nitrosodiphenyl-amine	97	2	24	0	0	0	24	210	234
		96	2	24	0	0	0	24	420	444
		95	2	24	0	0	0	24	520	544
		88	2	15	0	2,000	0	2,015	180	2,195

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.
NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).
NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).
*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
99-59-2	5-Nitro-o-anisidine	97	0	0	0	0	0	0	5	5	0
		96	0	0	0	0	0	0	5	5	0
		95	0	0	0	0	0	0	5	5	0
		88	No reports received								
98-95-3 *	Nitrobenzene	97	1,432,350	0	2,229,827	6,795	1,150,986	1,298,784	704,915	6,823,657	1,520
		96	1,052,450	0	1,781,334	15,880	1,146,582	602,727	230,710	4,829,683	373
		95	1,277,200	0	1,479,583	79,781	1,297,305	639,061	354,550	5,127,480	647
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
55-63-0	Nitroglycerin	97	18,000	0	0	28,675	219,672	69,222	26,009	361,578	1
		96	18,000	0	0	34,441	344,442	15,649	40,974	453,506	0
		95	24,151	0	0	0	428,538	59,598	39,387	551,674	6
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	97	0	0	62,000	0	95,000	34,000	91	191,091	0
		96	0	0	53,000	0	75,000	21,000	179	149,179	0
		95	0	0	28,000	6	120,000	23,311	83	171,400	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
100-02-7 *	4-Nitrophenol	97	0	0	40,372	4	79,013	916,121	991	1,036,501	0
		96	0	0	12,990	1	60,000	476,000	940	549,931	0
		95	0	0	10,469	3	65,000	574,800	950	651,222	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-46-9 *	2-Nitropropane	97	0	0	1,165,892	837	53,022	5,803	26,516	1,252,070	0
		96	0	0	0	50	58,297	12,467	37,076	107,890	0
		95	0	520	140,000	81	63,028	0	34,023	237,652	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
62-75-9	N-Nitrosodi-methylamine	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodi-phenylamine	97	0	0	0	340,000	72,865	771	10	413,646	1
		96	0	0	0	230,000	47,762	120,000	10	397,772	0
		95	0	0	0	0	0	340,000	10	340,010	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
156-10-5	p-Nitrosodiphenyl-amine	97	0	0	7,800	14,890	0	270	1,224	24,184	0
		96	0	0	9,400	17,000	0	180	444	27,024	0
		95	0	0	8,600	15,000	0	65	544	24,209	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

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Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
59-89-2	N-Nitroso-morpholine	97	No reports received							
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	No reports received							
99-55-8	5-Nitro-o-toluidine	97	4	20	0	0	0	20	50	70
		96	4	10	0	0	0	10	30	40
		95	3	5	0	0	0	5	30	35
		88	NR	NR	NR	NR	NR	NR	NR	NR
27314-13-2 *	Norflurazon	97	2	7	0	0	0	7	43,000	43,007
		96	2	8	0	0	0	8	40,000	40,008
		95	2	5	0	0	0	5	54,000	54,005
		88	NR	NR	NR	NR	NR	NR	NR	NR
19044-88-3 *	Oryzalin	97	3	10	0	0	0	10	0	10
		96	2	5	0	0	0	5	0	5
		95	2	5	0	0	0	5	0	5
		88	NR	NR	NR	NR	NR	NR	NR	NR
301-12-2 *	Oxydemeton-methyl	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
19666-30-9 *	Oxydiazon	97	5	1,200	0	0	0	1,200	0	1,200
		96	3	441	0	0	0	441	0	441
		95	3	665	0	0	0	665	0	665
		88	NR	NR	NR	NR	NR	NR	NR	NR
42874-03-3 *	Oxyfluorfen	97	3	86	0	0	0	86	1,308	1,394
		96	3	0	0	0	0	0	0	0
		95	2	87	3	0	0	90	0	90
		88	NR	NR	NR	NR	NR	NR	NR	NR
10028-15-6	Ozone	97	39	776,231	0	0	0	776,231	0	776,231
		96	33	632,989	0	0	0	632,989	0	632,989
		95	29	571,182	0	0	0	571,182	0	571,182
		88	NR	NR	NR	NR	NR	NR	NR	NR
123-63-7	Paraldehyde	97	3	35	0	0	0	35	0	35
		96	3	35	0	0	0	35	0	35
		95	2	33	0	0	0	33	0	33
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
59-89-2	N-Nitroso-morpholine	97	No reports received								
		96	0	0	0	0	0	24,000	0	24,000	0
		95	0	0	0	0	0	0	0	0	0
		88	No reports received								
99-55-8	5-Nitro-o-toluidine	97	0	0	0	0	0	0	70	70	0
		96	0	0	0	0	0	0	40	40	0
		95	0	0	0	0	0	0	35	35	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
27314-13-2 *	Norflurazon	97	0	0	0	0	0	45,000	7	45,007	0
		96	0	0	0	0	0	1,000	40,008	41,008	0
		95	0	0	0	0	0	1,000	54,010	55,010	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
19044-88-3 *	Oryzalin	97	0	0	0	0	0	63,000	5	63,005	0
		96	0	0	0	0	0	52,000	3	52,003	0
		95	0	0	0	0	0	40,000	2	40,002	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
301-12-2 *	Oxydemeton-methyl	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
19666-30-9 *	Oxydiazon	97	18,000	0	0	0	4,000	305	949	23,254	0
		96	13,404	0	0	0	2,600	140	561	16,705	0
		95	3,012	0	0	0	2,400	100	611	6,123	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
42874-03-3 *	Oxyfluorfen	97	0	0	0	0	130	23,975	1,386	25,491	0
		96	0	0	0	0	0	20,181	0	20,181	0
		95	0	0	0	0	130	15,093	90	15,313	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
10028-15-6	Ozone	97	0	0	52,682	0	2,819,881	0	775,393	3,647,956	0
		96	0	0	15,495	0	2,250,019	0	617,890	2,883,404	0
		95	0	0	0	0	2,402,564	0	569,989	2,972,553	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
123-63-7	Paraldehyde	97	0	0	24,426	10	250,028	0	35	274,499	0
		96	0	0	48,566	5	230,000	0	35	278,606	0
		95	0	0	47,460	11	250,000	0	33	297,504	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
1910-42-5 *	Paraquat-dichloride	97	3	500	0	0	0	500	0	500
		96	4	1,000	0	0	0	1,000	5	1,005
		95	4	1,000	0	0	0	1,000	0	1,000
		88	NR	NR	NR	NR	NR	NR	NR	NR
56-38-2 *	Parathion	97	1	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	13	3,265	750	0	250	4,265	3,959	8,224
1114-71-2 *	Pebulate	97	2	523	4	0	0	527	529	1,056
		96	1	500	0	0	0	500	500	1,000
		95	2	507	122	0	0	629	811	1,440
		88	NR	NR	NR	NR	NR	NR	NR	NR
40487-42-1 *	Pendimethalin	97	5	2,520	42	0	5	2,567	1,942	4,509
		96	6	2,230	22	0	890	3,142	0	3,142
		95	5	1,250	250	0	500	2,000	0	2,000
		88	NR	NR	NR	NR	NR	NR	NR	NR
76-01-7 *	Pentachloroethane	97	5	2,392	11	0	0	2,403	0	2,403
		96	6	1,652	22	0	0	1,674	0	1,674
		95	4	1,534	22	0	0	1,556	0	1,556
		88	NR	NR	NR	NR	NR	NR	NR	NR
87-86-5 *	Pentachlorophenol	97	36	7,048	952	0	33,297	41,297	66,982	108,279
		96	38	11,190	8,236	0	3,000	22,426	196,075	218,501
		95	37	6,266	3,146	0	250	9,662	23,942	33,604
		88	55	14,029	2,465	20,000	3,717	40,211	518,105	558,316
57-33-0	Pentobarbital sodium	97	1	0	0	0	0	0	0	0
		96	No reports received							
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
79-21-0 *	Peracetic acid	97	21	6,362	10	0	987	7,359	0	7,359
		96	19	11,555	5	0	812	12,372	0	12,372
		95	24	7,847	15	0	1,144	9,006	0	9,006
		88	8	5,453	55	0	0	5,508	0	5,508
594-42-3 *	Perchloromethyl mercaptan	97	3	516	0	0	0	516	0	516
		96	3	564	0	0	0	564	0	564
		95	2	541	0	0	0	541	0	541
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
1910-42-5 *	Paraquat-dichloride	97	0	0	0	0	0	106	41	147	0
		96	23	100	0	0	0	114	189	426	0
		95	68	0	0	0	0	170	206	444	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
56-38-2 *	Parathion	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1114-71-2 *	Pebulate	97	0	0	0	0	140	1,439	1,535	3,114	0
		96	0	0	0	0	0	0	820	820	0
		95	0	0	0	0	600	4,600	270	5,470	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
40487-42-1 *	Pendimethalin	97	2,000	0	0	0	160,000	27,000	4,740	193,740	0
		96	600	0	0	0	150,000	6,304	3,234	160,138	140
		95	300	0	0	0	190,000	6,774	1,498	198,572	56
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
76-01-7 *	Pentachloroethane	97	240,000	0	180,000	0	5,666,697	69,291	2,403	6,158,391	5
		96	4,150,000	0	390,000	12,300	6,531,742	207,994	1,673	11,293,709	0
		95	0	0	220,000	0	5,972,374	75,431	1,552	6,269,357	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
87-86-5 *	Pentachlorophenol	97	1,282,753	0	0	7,282	10,928	112,876	31,703	1,445,542	82,213
		96	1,232,515	3,011	11,754	10,794	22,743	109,574	161,004	1,551,395	35,148
		95	1,888,603	334	9,151	14,951	6,780	87,462	25,614	2,032,895	7
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
57-33-0	Pentobarbital sodium	97	0	0	0	0	0	0	0	0	0
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-21-0 *	Peracetic acid	97	0	0	0	0	31,858	7,372	7,345	46,575	0
		96	0	0	0	0	4,160	9,964	12,166	26,290	0
		95	13,833	0	0	0	12,884	12,396	8,889	48,002	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
594-42-3 *	Perchloromethyl mercaptan	97	0	0	0	0	86,690	8	508	87,206	0
		96	0	0	0	0	98,690	1	555	99,246	0
		95	0	0	0	0	540	0	541	1,081	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms	On-site Releases: Total Air Emissions	On-site Releases: Surface Water Discharges	On-site Releases: Underground Injection	On-site Releases: Releases to Land	On-site Releases: Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
			Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
52645-53-1 *	Permethrin	97	18	4,607	14	0	0	4,621	1,019	5,640
		96	13	1,495	0	0	0	1,495	1,250	2,745
		95	13	1,299	37	0	250	1,586	751	2,337
		88	NR	NR	NR	NR	NR	NR	NR	NR
85-01-8	Phenanthrene	97	53	124,720	174	0	36,048	160,942	152,638	313,580
		96	48	128,312	103	0	6,316	134,731	89,038	223,769
		95	34	72,383	19	0	4,008	76,410	72,491	148,901
		88	NR	NR	NR	NR	NR	NR	NR	NR
108-95-2 *	Phenol	97	763	8,697,953	54,206	1,539,987	231,381	10,523,527	1,223,376	11,746,903
		96	759	9,567,264	72,808	2,045,370	198,748	11,884,190	1,050,638	12,934,828
		95	753	9,315,425	70,291	3,823,235	171,609	13,380,560	1,279,982	14,660,542
		88	635	10,712,736	259,230	4,661,319	1,882,485	17,515,770	2,536,030	20,051,800
26002-80-2 *	Phenothrin	97	2	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
95-54-5	1,2-Phenylene-diamine	97	7	514	3,900	0	7,568	11,982	3	11,985
		96	7	516	3,000	0	26,940	30,456	8	30,464
		95	7	962	41,100	0	2,176	44,238	31	44,269
		88	NR	NR	NR	NR	NR	NR	NR	NR
108-45-2	1,3-Phenylene-diamine	97	21	6,972	104,122	0	65,737	176,831	18,151	194,982
		96	18	2,718	128,739	0	37,508	168,965	633	169,598
		95	17	6,621	43,343	0	63,153	113,117	80	113,197
		88	NR	NR	NR	NR	NR	NR	NR	NR
106-50-3	p-Phenylene-diamine	97	10	3,509	504	0	2,064	6,077	6,930	13,007
		96	9	3,980	409	0	1,308	5,697	0	5,697
		95	10	4,440	856	0	653	5,949	0	5,949
		88	13	113,890	826	4,716	0	119,432	64,452	183,884
90-43-7 *	2-Phenylphenol	97	15	374	1	0	250	625	1,131	1,756
		96	14	4,107	1	0	250	4,358	1,789	6,147
		95	17	27,063	10	0	5	27,078	5,656	32,734
		88	15	10,630	480	0	0	11,110	250	11,360
57-41-0	Phenytoin	97	1	1	0	0	0	1	12,420	12,421
		96	1	0	0	0	0	0	12,800	12,800
		95	1	0	0	0	0	0	19,300	19,300
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
52645-53-1 *	Permethrin	97	0	0	0	0	292	9,905	6,263	16,460	0
		96	0	0	0	0	177	1,731	2,013	3,921	0
		95	0	0	0	5	651	665	543	1,864	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	97	266,859	21,574	97,469	108,549	641,029	121,866	329,099	1,586,445	124,890
		96	358,644	6,724	611,002	192,492	746,789	123,099	346,079	2,384,829	126,195
		95	162,334	1,190	35,001	197,312	1,107,863	2,410	151,354	1,657,464	42,526
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-95-2 *	Phenol	97	48,295,915	113,268	27,801,431	3,364,888	25,562,763	6,277,195	11,471,816	122,887,276	8,962
		96	40,787,212	80,035	27,466,637	3,633,671	25,549,644	6,910,770	12,806,156	117,234,125	4,338
		95	41,534,425	549,568	28,575,114	3,685,797	35,004,372	6,375,434	14,448,344	130,173,054	72,165
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
26002-80-2 *	Phenothrin	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-54-5	1,2-Phenylene-diamine	97	0	0	0	0	155,100	17,073	11,985	184,158	0
		96	0	0	0	0	136,000	945	30,464	167,409	0
		95	0	0	0	0	499,896	7,316	44,037	551,249	320
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-45-2	1,3-Phenylene-diamine	97	720	0	0	1,384	1,025,440	553,136	190,560	1,771,240	0
		96	1,200	0	0	1,614	1,162,215	147,216	181,585	1,493,830	0
		95	0	0	0	493	617,879	134,176	112,936	865,484	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-50-3	p-Phenylene-diamine	97	0	0	0	0	331,074	31,958	6,517	369,549	1
		96	0	0	0	0	303,611	29,861	6,017	339,489	0
		95	0	0	0	0	364,868	20,082	5,757	390,707	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
90-43-7 *	2-Phenylphenol	97	0	0	229	0	137,977	816	1,407	140,429	0
		96	0	0	92	0	705,215	22,717	4,873	732,897	0
		95	0	0	530	0	1,027,544	2,065	32,590	1,062,729	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
57-41-0	Phenytoin	97	0	0	0	0	180	950	13,000	14,130	0
		96	0	0	0	0	0	50	13,000	13,050	0
		95	0	0	0	0	0	0	19,000	19,000	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
75-44-5	Phosgene	97	31	21,877	0	0	3	21,880	0	21,880
		96	30	16,283	0	5	0	16,288	0	16,288
		95	29	15,894	0	5	0	15,899	0	15,899
		88	37	21,603	500	250	0	22,353	480	22,833
7803-51-2 *	Phosphine	97	6	20,562	0	0	365	20,927	0	20,927
		96	6	20,381	0	0	643	21,024	0	21,024
		95	3	1,491	0	0	0	1,491	0	1,491
		88	NR	NR	NR	NR	NR	NR	NR	NR
7664-38-2 *	Phosphoric acid	97	2,736	1,801,585	43,514,457	13,257	30,227,548	75,556,847	2,734,781	78,291,628
		96	2,729	1,064,714	28,367,983	9,716	31,997,421	61,439,834	2,338,370	63,778,204
		95	2,796	1,254,896	20,402,951	7,340	35,926,629	57,591,816	2,066,261	59,658,077
		88	2,535	1,963,741	122,647,164	53,711	52,615,971	177,280,587	5,303,543	182,584,130
7723-14-0 *	Phosphorus (yellow or white)	97	55	20,970	3,859	0	2,581,846	2,606,675	6,291	2,612,966
		96	50	25,936	3,767	0	2,057,524	2,087,227	21,839	2,109,066
		95	53	28,621	3,661	0	1,871,801	1,904,083	23,650	1,927,733
		88	73	20,608	11,322	0	3,893,674	3,925,604	195,013	4,120,617
85-44-9	Phthalic anhydride	97	161	398,498	183	0	0	398,681	2,948,099	3,346,780
		96	175	427,832	174	0	0	428,006	103,707	531,713
		95	184	604,932	711	0	674	606,317	76,916	683,233
		88	180	549,909	1,040	0	1,265	552,214	3,976,682	4,528,896
1918-02-1 *	Picloram	97	2	2,900	0	0	0	2,900	0	2,900
		96	2	522	0	0	0	522	0	522
		95	2	220	1	0	0	221	0	221
		88	NR	NR	NR	NR	NR	NR	NR	NR
88-89-1	Picric acid	97	9	0	0	110,875	0	110,875	0	110,875
		96	9	0	0	94,031	0	94,031	0	94,031
		95	9	221	0	49,256	0	49,477	0	49,477
		88	5	252	251	1,362,180	250	1,362,933	0	1,362,933
51-03-6 *	Piperonyl butoxide	97	8	251	0	0	0	251	0	251
		96	11	513	14	0	0	527	0	527
		95	12	775	0	0	0	775	750	1,525
		88	NR	NR	NR	NR	NR	NR	NR	NR
--	Polybrominated biphenyls	97	3	0	0	0	0	0	0	0
		96	4	250	0	0	0	250	375	625
		95	2	0	0	0	0	0	0	0
		88	1	250	0	0	0	250	0	250

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
75-44-5	Phosgene	97	304	0	9	0	13,946,068	892	21,831	13,969,104	29
		96	0	0	200	0	17,249,349	2,270	16,230	17,268,049	15
		95	0	0	430,034	0	15,138,316	2,414	15,867	15,586,631	7
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7803-51-2 *	Phosphine	97	0	365	0	0	350,000	0	20,523	370,888	30
		96	0	0	0	0	350,643	0	20,379	371,022	59
		95	0	0	0	0	0	0	2,491	2,491	10
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7664-38-2 *	Phosphoric acid	97	453,512,929	4,387,637	2,000	65,620	128,525,343	5,572,441	69,947,907	662,013,877	7,162,494
		96	310,993,398	8,774,442	8,300	71,813	119,723,686	4,359,331	62,809,373	506,740,343	356,546
			216,200,620	11,790,11	14,792	56,635	355,091,742	5,367,571	55,585,797	644,107,267	3,978,666
		95		0							
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7723-14-0 *	Phosphorus (yellow or white)	97	0	238,971	0	0	694,999	13,268	2,612,061	3,559,299	31,014
		96	300	133,405	0	0	610,526	21,043	2,104,674	2,869,948	16,163
		95	1,091	26,089	0	0	5,052	147,342	1,929,173	2,108,747	1,077
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
85-44-9	Phthalic anhydride	97	301,472	1,456	2,488,912	2,489,429	19,170,287	214,019	537,135	25,202,710	4,606
		96	90,881	1,392	2,098,212	2,520,967	12,577,144	2,757,815	493,045	20,539,456	67,400
		95	421,574	1,317	2,420,922	4,951,573	18,689,501	444,206	670,300	27,599,393	26,158
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1918-02-1 *	Picloram	97	0	0	0	0	70,488	0	2,900	73,388	0
		96	0	0	0	0	26,464	0	522	26,986	0
		95	0	0	0	0	23,208	0	221	23,429	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
88-89-1	Picric acid	97	0	0	183,393	56,831	1,354,964	1	110,875	1,706,064	0
		96	0	0	136,931	0	1,779,450	21,015	94,031	2,031,427	0
		95	0	0	53,393	2	1,261,618	0	49,477	1,364,490	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
51-03-6 *	Piperonyl butoxide	97	0	0	0	0	0	4,700	157	4,857	0
		96	0	0	0	0	9	5,119	527	5,655	0
		95	0	0	0	5	0	16,290	1,099	17,394	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Polybrominated biphenyls	97	0	5,071	0	0	0	0	549	5,620	0
		96	0	4,219	0	0	0	0	505	4,724	0
		95	0	2,720	0	0	0	0	0	2,720	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
--	Polychlorinated alkanes	97	67	24,888	5,830	0	0	30,718	34,585	65,303
		96	71	2,787	8,372	0	687	11,846	89,143	100,989
		95	67	20,945	6,206	0	0	27,151	119,580	146,731
		88	NR	NR	NR	NR	NR	NR	NR	NR
1336-36-3 *	Polychlorinated biphenyls (PCBs)	97	6	0	0	0	6,794	6,794	980,846	987,640
		96	6	255	0	0	9,205	9,460	51,086	60,546
		95	9	0	0	0	0	0	34,432	34,432
		88	121	6	10	0	752	768	488,732	489,500
--	Polycyclic aromatic compounds	97	159	495,236	1,652	0	14,907	511,795	1,394,568	1,906,363
		96	148	462,901	8,184	0	14,459	485,544	1,248,088	1,733,632
		95	146	425,730	4,995	0	32,887	463,612	1,219,471	1,683,083
		88	NR	NR	NR	NR	NR	NR	NR	NR
7758-01-2	Potassium bromate	97	3	255	0	0	0	255	0	255
		96	2	5	0	0	0	5	0	5
		95	1	5	0	0	0	5	0	5
		88	NR	NR	NR	NR	NR	NR	NR	NR
128-03-0 *	Potassium-dimethyldithio-carbamate	97	19	510	750	0	5	1,265	0	1,265
		96	17	180	0	0	0	180	0	180
		95	10	206	5	0	0	211	0	211
		88	NR	NR	NR	NR	NR	NR	NR	NR
137-41-7 *	Potassium-N-methyldithio-carbamate	97	7	0	0	0	0	0	0	0
		96	4	0	0	0	0	0	0	0
		95	3	35	0	0	0	35	0	35
		88	NR	NR	NR	NR	NR	NR	NR	NR
41198-08-7 *	Profenofos	97	1	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
7287-19-6 *	Prometryn	97	6	933	37	0	0	970	250	1,220
		96	8	1,298	27	0	0	1,325	500	1,825
		95	6	1,481	159	0	0	1,640	890	2,530
		88	NR	NR	NR	NR	NR	NR	NR	NR
23950-58-5 *	Pronamide	97	2	255	0	0	0	255	0	255
		96	1	255	0	0	0	255	0	255
		95	1	255	0	0	0	255	0	255
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
--	Polychlorinated alkanes	97	3,183	405,065	55,000	93,658	7,650	463,245	137,965	1,165,766	2,320
		96	17,136	247,793	69,000	229,886	228,286	446,346	119,819	1,358,266	0
		95	79,803	175,674	0	135,332	313,520	478,797	161,681	1,344,807	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1336-36-3 *	Polychlorinated biphenyls (PCBs)	97	0	1,400	0	0	0	62,928	8,994	73,322	981,191
		96	0	0	0	241	0	38,521	13,475	52,237	311,702
		95	0	0	0	0	0	64,494	8,242	72,736	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Polycyclic aromatic compounds	97	1,335,135	599,044	7,624,658	56,921	1,147,152	13,441	1,881,453	12,657,804	9,078
		96	1,135,404	8,743,681	16,190,102	73,443	2,848,079	24,186	1,741,793	30,756,688	16,412
		95	1,472,268	8,515,771	10,281,825	58,948	1,471,546	6,061	1,719,901	23,526,320	22,295
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7758-01-2	Potassium bromate	97	0	0	53,129	2	0	0	455	53,586	0
		96	0	0	0	0	0	0	8	8	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
128-03-0 *	Potassium-dimethyldithio-carbamate	97	0	33,700	0	1	0	132,277	793	166,771	0
		96	0	39,900	0	0	0	148,676	180	188,756	0
		95	0	0	0	0	11,000	161,362	211	172,573	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
137-41-7 *	Potassium-N-methyldithio-carbamate	97	0	0	0	0	10,500	0	0	10,500	0
		96	0	0	0	0	0	43	0	43	0
		95	0	0	0	0	0	0	35	35	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
41198-08-7 *	Profenofos	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	109	0	0	109	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7287-19-6 *	Prometryn	97	0	0	0	0	161	816	832	1,809	0
		96	0	0	0	0	827	57,735	2,074	60,636	0
		95	0	0	0	1	1,314	7,603	4,028	12,946	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
23950-58-5 *	Pronamide	97	5,400	0	0	0	0	2,466	250	8,116	0
		96	8,800	0	0	0	0	650	220	9,670	0
		95	3,700	0	0	0	0	1,200	260	5,160	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
1918-16-7 *	Propachlor	97	4	50	0	0	0	50	13,000	13,050
		96	4	250	0	0	0	250	1,200	1,450
		95	4	331	0	0	0	331	777	1,108
		88	NR	NR	NR	NR	NR	NR	NR	NR
1120-71-4	Propane sultone	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	2	0	0	0	0	0	0	0
709-98-8 *	Propanil	97	3	2,155	750	0	0	2,905	500	3,405
		96	3	3,377	250	0	0	3,627	0	3,627
		95	4	2,357	250	0	0	2,607	3,723	6,330
		88	NR	NR	NR	NR	NR	NR	NR	NR
2312-35-8 *	Propargite	97	3	260	0	0	0	260	0	260
		96	2	260	0	0	0	260	0	260
		95	1	10	0	0	0	10	0	10
		88	NR	NR	NR	NR	NR	NR	NR	NR
107-19-7 *	Propargyl alcohol	97	17	6,342	600	237,098	0	244,040	866	244,906
		96	14	9,278	0	285,166	0	294,444	576	295,020
		95	11	9,885	0	290,680	0	300,565	936	301,501
		88	NR	NR	NR	NR	NR	NR	NR	NR
31218-83-4 *	Propetamphos	97	No reports received							
		96	1	10	0	0	250	260	1,000	1,260
		95	1	500	0	0	0	500	750	1,250
		88	NR	NR	NR	NR	NR	NR	NR	NR
60207-90-1 *	Propiconazole	97	7	153	0	0	0	153	0	153
		96	5	10	0	0	0	10	1,332	1,342
		95	3	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
123-38-6 *	Propionaldehyde	97	21	165,862	39,054	97,161	0	302,077	43	302,120
		96	24	171,008	32,077	74,613	0	277,698	62	277,760
		95	22	213,198	27,012	101,432	0	341,642	0	341,642
		88	15	1,267,839	1,156	930	0	1,269,925	0	1,269,925
114-26-1 *	Propoxur	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	5	5	0	0	0	5	0	5
		88	5	250	0	0	0	250	250	500

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
1918-16-7 *	Propachlor	97	0	0	0	0	0	74,400	50	74,450	0
		96	0	0	0	0	0	8,500	1,400	9,900	0
		95	0	0	0	0	0	7,270	1,237	8,507	14,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1120-71-4	Propane sultone	97	0	0	0	0	4,900	120	0	5,020	0
		96	0	0	0	0	4	0	0	4	0
		95	0	0	0	0	16	0	0	16	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
709-98-8 *	Propanil	97	0	0	0	0	37	7,200	3,230	10,467	250
		96	0	0	0	0	0	1,494	2,987	4,481	30
		95	0	0	0	0	0	402	4,468	4,870	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2312-35-8 *	Propargite	97	0	0	0	3,164	0	4,959	85	8,208	0
		96	0	0	0	3,808	0	12,075	10	15,893	0
		95	0	0	0	544	0	3,723	10	4,277	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
107-19-7 *	Propargyl alcohol	97	9	0	269,073	481,890	116,170	28,401	248,946	1,144,489	0
		96	5	0	211,906	289,857	333,890	38,572	294,676	1,168,906	0
		95	0	0	198,867	344,704	56,027	78,003	301,062	978,663	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
31218-83-4 *	Propetamphos	97	No reports received								
		96	0	0	0	0	0	0	1,032	1,032	0
		95	0	0	0	0	0	0	1,067	1,067	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
60207-90-1 *	Propiconazole	97	0	0	0	0	0	30,493	2,054	32,547	0
		96	0	0	0	0	0	1,719	1,336	3,055	0
		95	0	0	0	0	0	1,026	0	1,026	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
123-38-6 *	Propionaldehyde	97	66,000	0	1,146,337	11,939	4,486,626	168,603	302,267	6,181,772	22
		96	0	0	255,989	18,128	4,446,808	320,752	278,078	5,319,755	0
		95	0	0	898,697	5,565	2,348,789	78,067	337,157	3,668,275	23
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
114-26-1 *	Propoxur	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	1,081	4	1,085	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
115-07-1	Propylene	97	357	16,285,889	5,198	2,632	670	16,294,389	130	16,294,519
		96	352	26,462,498	7,133	0	2,458	26,472,089	2,181	26,474,270
		95	347	27,429,070	4,047	0	169	27,433,286	298	27,433,584
		88	334	32,200,231	10,003	0	0	32,210,234	3,320	32,213,554
75-55-8	Propyleneimine	97	5	230	0	0	0	230	0	230
		96	6	402	0	0	0	402	0	402
		95	7	600	0	0	0	600	0	600
		88	1	500	0	0	0	500	0	500
75-56-9 *	Propylene oxide	97	120	543,603	22,961	11,700	887	579,151	29,904	609,055
		96	121	583,648	45,393	12,141	335	641,517	39,230	680,747
		95	133	844,402	29,934	22,577	4,403	901,316	8,633	909,949
		88	128	3,680,215	112,503	1,113,780	11,630	4,918,128	16,626	4,934,754
110-86-1 *	Pyridine	97	43	105,037	545	612,968	4	718,554	38,319	756,873
		96	40	91,982	908	428,000	1	520,891	775	521,666
		95	40	100,190	830	453,900	4	554,924	321	555,245
		88	31	251,799	2,158	491,775	1,125	746,857	40,699	787,556
91-22-5	Quinoline	97	24	20,002	25	27,000	305	47,332	11,582	58,914
		96	26	23,007	20	32,000	466	55,493	5,072	60,565
		95	23	11,412	20	13,000	405	24,837	3,744	28,581
		88	34	49,350	502	0	896	50,748	6,242	56,990
106-51-4 *	Quinone	97	5	4,801	350	0	0	5,151	0	5,151
		96	5	7,105	500	0	0	7,605	0	7,605
		95	4	7,101	1,500	0	0	8,601	0	8,601
		88	5	11,300	140	0	0	11,440	0	11,440
82-68-8 *	Quintozene	97	17	978	0	0	0	978	364	1,342
		96	14	2,611	0	0	836	3,447	0	3,447
		95	10	1,424	0	0	800	2,224	192	2,416
		88	6	1,064	0	0	0	1,064	12,625	13,689
76578-14-8 *	Quizalofop-ethyl	97	2	0	0	0	0	0	0	0
		96	2	1	0	0	0	1	0	1
		95	2	6	0	0	0	6	0	6
		88	NR	NR	NR	NR	NR	NR	NR	NR
10453-86-8 *	Resmethrin	97	2	1	0	0	0	1	0	1
		96	3	1	0	0	0	1	0	1
		95	2	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
115-07-1	Propylene[c]	97	65,774,345	35	718,371,130	2,068	297,708,572	125,675	15,905,795	1,097,887,620	955,453
		96	60,407,279	13	567,598,551	215,250	306,994,680	278,482	26,490,625	961,984,880	581,893
		95	6,713,304	0	476,153,246	3,132,285	253,061,345	80,239	26,761,734	765,902,153	992,835
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-55-8	Propyleneimine	97	0	0	0	0	4,000	0	230	4,230	0
		96	0	0	0	0	1,734	0	402	2,136	0
		95	0	0	0	0	1,433	0	600	2,033	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-56-9 *	Propylene oxide	97	1,475,188	0	13,432,224	81,598	13,013,027	624,849	625,866	29,252,752	3,929
		96	3,780,004	4	18,451,504	246,613	13,281,899	207,871	878,087	36,845,982	9,074
		95	3,091	0	17,981,778	281,155	14,366,911	191,603	1,142,052	33,966,590	20,197
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
110-86-1 *	Pyridine	97	4,319,946	10,343	2,371,309	101,071	1,104,973	740,334	699,798	9,347,774	1,580
		96	7,426,653	31,550	1,278,558	260,311	886,200	605,897	521,424	11,010,593	1,938
		95	5,974,830	14,008	1,713,719	186,855	348,352	483,295	552,288	9,273,347	1,074
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
91-22-5	Quinoline	97	21,380	880	122,120	2,541	114,609	210	61,015	322,755	2
		96	15,881	2,180	34,656	34,607	90,969	17,039	59,957	255,289	100
		95	1,750	2,243	302,003	22	222,705	16,120	27,181	572,024	252
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-51-4 *	Quinone	97	0	0	190,238	0	365,345	20,662	5,101	581,346	0
		96	0	0	230,508	0	366,115	50,513	7,605	654,741	0
		95	0	0	179,870	1,328	130,500	30,173	8,601	350,472	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
82-68-8 *	Quintozene	97	2,573	0	0	417,048	0	24,119	1,838	445,578	0
		96	884	0	0	221,410	0	398,381	3,535	624,210	0
		95	863	0	0	0	0	759,587	2,251	762,701	110
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
76578-14-8 *	Quizalofop-ethyl	97	0	0	0	0	0	0	1	1	0
		96	0	0	0	0	0	0	1	1	0
		95	0	0	0	0	0	0	5	5	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
10453-86-8 *	Resmethrin	97	0	0	0	0	0	400	0	400	0
		96	0	0	0	0	0	600	1	601	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

[c]One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for propylene of 12,900,000 pounds in 1995, 16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. These revisions change on-site energy recovery for propylene to 463,253,246 pounds in 1995, to 551,298,551 pounds in 1996, and to 446,371,130 pounds in 1997. Total production-related waste managed for propylene changes to 753,002,153 pounds in 1995, to 945,684,880 pounds in 1996, and to 825,887,620 pounds in 1997.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
81-07-2	Saccharin (manufacturing)	97	2	171	0	0	0	171	1,400	1,571
		96	1	243	0	0	0	243	1,200	1,443
		95	1	99	0	0	0	99	1,500	1,599
		88	4	750	0	0	0	750	750	1,500
94-59-7 *	Safrole	97	2	505	0	0	0	505	0	505
		96	2	505	0	0	0	505	0	505
		95	1	255	0	0	0	255	0	255
		88	2	500	0	0	0	500	0	500
7782-49-2 *	Selenium	97	16	290	58	0	585	933	6,767	7,700
		96	12	45	97	0	29	171	7,458	7,629
		95	15	1,450	92	0	23	1,565	3,501	5,066
		88	24	16,282	1,168	0	127,508	144,958	4,367	149,325
--	Selenium compounds	97	43	82,857	2,374	3,409	317,509	406,149	29,029	435,178
		96	38	47,264	2,404	3,100	233,517	286,285	75,633	361,918
		95	40	61,946	2,184	3,640	264,759	332,529	108,874	441,403
		88	18	14,506	250	3,400	45,750	63,906	63,226	127,132
74051-80-2 *	Sethoxydim	97	3	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
7440-22-4 *	Silver	97	77	7,629	143	0	586	8,358	40,221	48,579
		96	76	8,212	149	0	6,306	14,667	24,266	38,933
		95	74	9,297	161	0	250	9,708	14,871	24,579
		88	72	47,988	1,654	0	39,510	89,152	8,482	97,634
--	Silver compounds	97	64	7,918	6,109	156	40,405	54,588	52,481	107,069
		96	64	15,513	8,147	370	45,693	69,723	15,574	85,297
		95	59	15,582	6,284	380	35,325	57,571	7,545	65,116
		88	46	15,406	8,684	250	11,550	35,890	15,803	51,693
122-34-9 *	Simazine	97	8	2,939	348	0	0	3,287	48,629	51,916
		96	5	4,591	93	0	0	4,684	54,457	59,141
		95	7	4,990	232	0	5	5,227	26,231	31,458
		88	NR	NR	NR	NR	NR	NR	NR	NR
26628-22-8 *	Sodium azide	97	12	24,417	5	0	156	24,578	28,909	53,487
		96	14	21,313	268	0	116	21,697	133,449	155,146
		95	14	35,575	200	0	255	36,030	133,837	169,867
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
81-07-2	Saccharin (manufacturing)	97	0	0	0	0	10,000	10	1,600	11,610	0
		96	0	0	0	0	12,000	12	1,500	13,512	0
		95	0	0	0	0	9,700	10	1,600	11,310	74
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
94-59-7 *	Safrole	97	0	0	0	0	1	25	100	126	0
		96	0	0	0	0	4	130	100	234	0
		95	0	0	0	0	1	5	0	6	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7782-49-2 *	Selenium	97	9,720	0	74,135	582	0	1,001	6,491	91,929	0
		96	0	0	0	460	29	6,700	6,910	14,099	0
		95	1,604	4,604	0	0	23	2,271	1,524	10,026	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Selenium compounds	97	772,808	9,693	0	0	1	9,628	343,984	1,136,114	104,800
		96	601,563	2,841	0	4,700	0	32,030	343,931	985,065	2,332
		95	590,805	158,278	0	10	2	48,520	355,030	1,152,645	49,259
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
74051-80-2 *	Sethoxydim	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-22-4 *	Silver	97	805,582	1,315,535	0	29	3,635	121	138,036	2,262,938	291
		96	738,292	810,123	0	0	26,346	1,420	17,306	1,593,487	574
		95	563,590	1,251,487	0	1	87,462	531	17,608	1,920,679	614
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Silver compounds	97	3,361,707	1,000,592	0	0	550,965	5,500	74,153	4,992,917	2,619
		96	638,500	1,106,220	0	0	3,967,716	39,547	80,437	5,832,420	751
		95	327,846	1,064,906	0	0	3,966,504	23,221	56,205	5,438,682	269
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
122-34-9 *	Simazine	97	50	0	0	0	77,000	12,480	9,372	98,902	0
		96	0	0	0	0	32,000	201	57,070	89,271	0
		95	0	0	0	0	150,000	24,000	4,970	178,970	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
26628-22-8 *	Sodium azide	97	48,963	773,161	0	0	75,278	1,109,199	41,281	2,047,882	106
		96	91,031	1,603,566	0	0	78,892	2,222,671	156,664	4,152,824	81
		95	190,310	556,000	0	0	93,341	3,906,934	166,060	4,912,645	110
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
1982-69-0 *	Sodium dicamba	97	2	255	0	250	0	505	0	505
		96	2	755	0	0	0	755	0	755
		95	3	14,350	0	750	0	15,100	0	15,100
		88	NR	NR	NR	NR	NR	NR	NR	NR
128-04-1 *	Sodium dimethyldithio-carbamate	97	67	17,684	10	0	0	17,694	126,741	144,435
		96	58	2,834	10	0	0	2,844	121,595	124,439
		95	61	2,746	20	0	0	2,766	152,357	155,123
		88	NR	NR	NR	NR	NR	NR	NR	NR
7632-00-0 *	Sodium nitrite	97	372	254,878	481,319	747,000	192,355	1,675,552	793,104	2,468,656
		96	353	278,723	935,765	727,000	43,654	1,985,142	483,076	2,468,218
		95	318	301,410	546,683	964,500	81,948	1,894,541	288,424	2,182,965
		88	NR	NR	NR	NR	NR	NR	NR	NR
100-42-5	Styrene	97	1,507	44,126,665	43,954	202,387	537,050	44,910,056	1,583,171	46,493,227
		96	1,509	42,144,134	12,864	228,317	271,498	42,656,813	1,820,641	44,477,454
		95	1,546	41,264,916	4,570	209,945	147,921	41,627,352	2,715,709	44,343,061
		88	1,258	34,299,811	59,069	165	242,941	34,601,986	2,013,696	36,615,682
96-09-3	Styrene oxide	97	2	11	0	0	0	11	0	11
		96	5	31	0	0	0	31	0	31
		95	5	13	0	0	0	13	0	13
		88	6	2,314	0	0	0	2,314	750	3,064
7664-93-9 *	Sulfuric acid	97	894	21,259,394	24,447	113,255	46,421	21,443,517	668,139	22,111,656
		96	1,149	20,825,296	2,296	15,000	57,186	20,899,778	1,380,742	22,280,520
		95	1,570	20,688,128	5,363	30,035	133,212	20,856,738	3,943,359	24,800,097
		88	NR	NR	NR	NR	NR	NR	NR	NR
2699-79-8 *	Sulfuryl fluoride	97	3	428,000	0	0	0	428,000	0	428,000
		96	2	362,000	0	0	0	362,000	0	362,000
		95	2	355,007	0	0	0	355,007	0	355,007
		88	NR	NR	NR	NR	NR	NR	NR	NR
35400-43-2 *	Sulprofos	97	No reports received							
		96	1	0	0	0	0	0	0	0
		95	1	247	0	0	0	247	0	247
		88	NR	NR	NR	NR	NR	NR	NR	NR
34014-18-1 *	Tebuthiuron	97	2	10	0	0	0	10	0	10
		96	1	5	0	0	0	5	0	5
		95	1	5	0	0	0	5	0	5
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
1982-69-0 *	Sodium dicamba	97	0	0	0	0	0	4,200	505	4,705	0
		96	0	0	0	0	0	128	400	528	0
		95	0	0	0	0	0	800	15,200	16,000	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
128-04-1 *	Sodium dimethyldithio-carbamate	97	200	287,077	0	0	439,994	849,275	55,140	1,631,686	0
		96	200	1,791,502	0	0	400,906	619,333	31,656	2,843,597	194
		95	250	199,200	0	0	467,228	510,003	27,474	1,204,155	5,000
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7632-00-0 *	Sodium nitrite	97	501,890	36,851	0	61,249	14,773,132	3,439,826	2,192,274	21,005,222	65,876
		96	267,726	32,731	0	1	7,364,727	3,509,395	2,678,942	13,853,522	6,725
		95	374,426	23,857	0	0	7,259,547	2,773,201	2,784,301	13,215,332	270
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
100-42-5	Styrene	97	15,296,876	1,109,081	26,721,098	7,388,173	10,169,393	4,250,300	44,387,903	109,322,824	283,482
		96	19,920,222	1,185,613	21,544,059	8,304,980	15,032,191	3,127,875	43,181,843	112,296,783	98,031
		95	9,297,615	634,355	20,674,599	9,228,145	14,031,180	4,178,791	43,505,775	101,550,460	170,874
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
96-09-3	Styrene oxide	97	0	0	30,000	0	0	0	11	30,011	0
		96	0	0	35,337	861	0	0	32	36,230	0
		95	0	0	35,337	0	0	0	13	35,350	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7664-93-9 *	Sulfuric acid	97	245,755,305	2,206,540	940	20	186,759,219	2,867,753	21,847,891	459,437,668	12,115
		96	316,449,536	5,936,551	3,600	6,722	370,908,038	2,696,533	23,257,626	719,258,606	15,788
		95	686,586,380	5,723,070	66,777	24,524	635,030,218	11,581,301	22,132,658	1,361,144,928	85,935
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2699-79-8 *	Sulfuryl fluoride	97	0	0	0	0	0	0	428,000	428,000	0
		96	0	0	0	0	0	0	362,000	362,000	0
		95	0	0	0	0	0	0	371,500	371,500	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
35400-43-2 *	Sulprofos	97	No reports received								
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	1,137	0	249	1,386	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
34014-18-1 *	Tebuthiuron	97	15	0	0	0	1,100	1,200	1	2,316	0
		96	1	0	0	0	1,000	1,000	1	2,002	0
		95	1	0	0	0	1,000	1,100	1	2,102	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
3383-96-8 *	Temephos	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
5902-51-2 *	Terbacil	97	2	0	10,318	0	0	10,318	0	10,318
		96	2	0	3,835	0	0	3,835	0	3,835
		95	2	0	4,608	0	0	4,608	0	4,608
		88	NR	NR	NR	NR	NR	NR	NR	NR
630-20-6	1,1,1,2-Tetra-chloroethane	97	8	4,938	0	0	0	4,938	2	4,940
		96	9	6,466	30	0	1	6,497	19	6,516
		95	7	6,026	0	0	0	6,026	2	6,028
		88	NR	NR	NR	NR	NR	NR	NR	NR
79-34-5 *	1,1,2,2-Tetra-chloroethane	97	14	13,614	0	0	0	13,614	511	14,125
		96	13	15,488	130	0	0	15,618	7	15,625
		95	16	8,275	2,222	0	0	10,497	7	10,504
		88	13	43,865	1,903	0	29	45,797	128,750	174,547
127-18-4 *	Tetrachloro-ethylene	97	372	6,885,068	2,282	15,118	5,074	6,907,542	24,753	6,932,295
		96	404	7,826,025	1,561	13,436	5,472	7,846,494	22,071	7,868,565
		95	436	9,608,666	2,407	20,481	6	9,631,560	72,961	9,704,521
		88	747	36,131,980	33,314	72,250	82,144	36,319,688	1,385,378	37,705,066
354-11-0	1,1,1,2-Tetra-chloro-2-fluoro-ethane	97	1	19,700	1	0	0	19,701	0	19,701
		96	No reports received							
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
354-14-3	1,1,2,2-Tetra-chloro-1-fluoro-ethane	97	No reports received							
		96	No reports received							
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
961-11-5 *	Tetrachlorvinphos	97	4	365	5	0	0	370	3,760	4,130
		96	3	365	5	0	0	370	2,030	2,400
		95	4	626	5	0	0	631	4,200	4,831
		88	6	251	0	0	0	251	9,270	9,521
64-75-5 *	Tetracycline hydrochloride	97	3	474	0	0	0	474	1,735	2,209
		96	1	255	0	0	0	255	0	255
		95	2	754	0	0	0	754	112	866
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.
NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).
NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).
*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
3383-96-8 *	Temephos	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
5902-51-2 *	Terbacil	97	0	0	0	0	2,793	33,665	10,318	46,776	0
		96	0	0	0	0	2,983	7,547	3,835	14,365	0
		95	0	0	0	0	5,070	7,558	4,608	17,236	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
630-20-6	1,1,1,2-Tetra-chloroethane	97	2,100,000	0	0	301,000	2,933,725	62,211	4,936	5,401,872	0
		96	2,500,000	0	0	140,000	2,836,903	238,304	9,441	5,724,648	1
		95	2,600,000	0	0	0	3,986,000	379,203	7,356	6,972,559	40
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-34-5 *	1,1,2,2-Tetra-chloroethane	97	4,908,000	2,458,805	2,416,000	0	7,744,618	135,714	13,545	17,676,682	14
		96	4,808,000	2,380,211	924,000	0	11,024,249	248,100	15,585	19,400,145	0
		95	6,200,000	2,233,342	846,600	880	13,754,898	150,324	10,503	23,196,547	40
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
127-18-4 *	Tetrachloro-ethylene	97	40,942,533	8,921,720	4,556,500	1,232,892	17,289,521	1,173,229	6,844,562	80,960,957	13,494
		96	46,896,883	5,966,695	2,647,705	780,979	20,678,019	1,627,880	7,679,803	86,277,964	14,464
		95	46,323,123	6,802,890	8,622,647	779,833	26,279,022	2,285,993	9,604,652	100,698,160	14,443
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
354-11-0	1,1,1,2-Tetra-chloro-2-fluoro-ethane	97	6,100	1,820	0	0	0	10	19,700	27,630	0
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
354-14-3	1,1,2,2-Tetra-chloro-1-fluoro-ethane	97	No reports received								
		96	No reports received								
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
961-11-5 *	Tetrachlorvinphos	97	345	0	35,000	49,500	850	0	3,862	89,557	0
		96	615	0	0	45,000	1,020	3,885	2,142	52,662	0
		95	330	0	0	47,000	1,020	4,244	4,394	56,988	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
64-75-5 *	Tetracycline hydrochloride	97	0	0	0	0	0	1,750	2,034	3,784	0
		96	0	0	0	0	0	400	50	450	0
		95	0	0	0	0	0	1,736	677	2,413	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
7696-12-0 *	Tetramethrin	97	2	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
7440-28-0	Thallium	97	3	256	0	0	1,000	1,256	1,500	2,756
		96	No reports received							
		95	1	255	0	0	755	1,010	195	1,205
		88	No reports received							
--	Thallium compounds	97	1	0	0	0	0	0	180	180
		96	1	0	0	0	0	0	5	5
		95	No reports received							
		88	4	253	0	0	250	503	1,256	1,759
148-79-8 *	Thiabendazole	97	4	2,520	0	0	0	2,520	0	2,520
		96	2	4,830	0	0	0	4,830	0	4,830
		95	3	3,929	0	0	0	3,929	0	3,929
		88	NR	NR	NR	NR	NR	NR	NR	NR
62-55-5	Thioacetamide	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	1	500	0	0	0	500	0	500
28249-77-6 *	Thiobencarb	97	2	634	0	0	0	634	4,935	5,569
		96	2	811	0	0	0	811	4,930	5,741
		95	2	510	0	0	0	510	3,032	3,542
		88	NR	NR	NR	NR	NR	NR	NR	NR
59669-26-0 *	Thiodicarb	97	3	792	0	0	250	1,042	1,000	2,042
		96	3	1,509	0	0	16,282	17,791	250	18,041
		95	2	376	0	0	0	376	500	876
		88	NR	NR	NR	NR	NR	NR	NR	NR
23564-06-9 *	Thiophanate ethyl	97	No reports received							
		96	2	0	0	0	0	0	0	0
		95	No reports received							
		88	NR	NR	NR	NR	NR	NR	NR	NR
23564-05-8 *	Thiophanate-methyl	97	9	13,749	0	0	13,240	26,989	14,318	41,307
		96	6	497	0	0	0	497	1,167	1,664
		95	3	502	0	0	0	502	0	502
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7696-12-0 *	Tetramethrin	97	No reports received								
		96	No reports received								
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-28-0	Thallium	97	4,456	872	0	0	12,779	11,821	9,087	39,015	0
		96	4,665	0	0	0	664	11,023	15,415	31,767	0
		95	7,082	0	0	0	18,535	11,867	10,652	48,136	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Thallium compounds	97	46,680	40,807	0	1,402	42	22,889	108,595	220,415	0
		96	20,552	45,525	0	409	40	8,963	95,495	170,984	0
		95	18,712	31,501	0	5	407	10,622	101,354	162,601	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
148-79-8 *	Thiabendazole	97	6,100	0	0	0	0	0	640	6,740	0
		96	22,000	0	0	0	0	0	2,200	24,200	0
		95	26,000	0	0	0	0	2,600	1	28,601	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
62-55-5	Thioacetamide	97	0	148,361	0	5	26,440,106	212,926	58,778	26,860,176	11
		96	0	136,039	0	1	26,706,771	166,720	64,721	27,074,252	125
		95	0	129,787	0	0	23,836,598	2,928	52,646	24,021,959	11
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
28249-77-6 *	Thiobencarb	97	1,119,206,056	28,405,851	216,605,276	88,849,998	217,192,273	19,924,367	113,112,450	1,803,296,271	272,801
		96	967,406,707	26,796,920	187,671,819	93,084,118	201,517,569	19,645,617	125,879,671	1,622,002,421	628,951
		95	1,006,166,384	25,232,421	214,676,316	78,575,881	192,078,612	19,526,920	144,274,863	1,680,531,397	370,170
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
59669-26-0 *	Thiodicarb	97	317	389	0	29,423	1,596	9,715	10,992	52,432	21,320
		96	547	0	0	27,876	1,107	10,881	5,999	46,410	2,874
		95	427	0	37,664	16,408	3,311	20,201	6,227	84,238	10
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
23564-06-9 *	Thiophanate ethyl	97	79	0	0	2,754	714	2,111	2,750	8,408	439
		96	137	6,417	0	12,222	150	16,908	7,006	42,840	718
		95	107	0	9,416	3,705	652	1,542	7,511	22,933	2
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
23564-05-8 *	Thiophanate-methyl	97	6,300	1,235	16,421,251	39,793	720,297	910,358	56,838	18,156,072	30,757
		96	12,100	0	16,337,483	32,777	5,054,902	525,976	57,598	22,020,836	298
		95	15,224	2,784	5,800,065	60,045	2,876,258	195,978	60,100	9,010,454	11,604
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
79-19-6	Thiosemicarbazide	97	No reports received							
		96	No reports received							
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
62-56-6 *	Thiourea	97	30	1,026	347	5,000	250	6,623	4,212	10,835
		96	25	1,212	339	5,000	250	6,801	2,590	9,391
		95	26	1,630	1,487	5,000	250	8,367	4,269	12,636
		88	26	2,004	16,951	5,940	750	25,645	2,303	27,948
137-26-8 *	Thiram	97	61	3,024	16	0	62	3,102	80,186	83,288
		96	61	3,638	41	0	2,005	5,684	94,421	100,105
		95	60	2,856	50	0	0	2,906	98,617	101,523
		88	NR	NR	NR	NR	NR	NR	NR	NR
1314-20-1	Thorium dioxide	97	1	0	0	0	0	0	0	0
		96	1	1	0	0	0	1	0	1
		95	1	1	0	0	0	1	0	1
		88	3	1,580	0	0	0	1,580	677,549	679,129
7550-45-0	Titanium tetrachloride	97	36	21,202	0	0	0	21,202	37,660	58,862
		96	34	30,851	0	0	0	30,851	34,013	64,864
		95	33	20,299	0	0	0	20,299	32,282	52,581
		88	41	78,668	0	0	1,400	80,068	0	80,068
108-88-3 *	Toluene	97	3,062	112,938,943	30,998	513,635	740,406	114,223,982	1,452,282	115,676,264
		96	3,250	125,995,382	68,730	329,058	438,463	126,831,633	1,057,460	127,889,093
		95	3,454	147,158,510	53,263	310,643	85,801	147,608,217	881,153	148,489,370
		88	4,006	299,954,882	196,957	1,473,666	646,718	302,272,223	9,615,791	311,888,014
584-84-9	Toluene-2,4-diisocyanate	97	62	6,503	5	0	0	6,508	6,178	12,686
		96	61	7,333	0	0	192	7,525	3,586	11,111
		95	64	7,805	0	0	0	7,805	611	8,416
		88	257	165,062	0	0	1,040	166,102	36,178	202,280
91-08-7	Toluene-2,6-diisocyanate	97	30	2,800	0	0	0	2,800	1,360	4,160
		96	33	13,666	0	0	48	13,714	897	14,611
		95	40	3,044	0	0	0	3,044	153	3,197
		88	189	492,192	0	0	510	492,702	9,444	502,146
26471-62-5	Toluene-diisocyanate (mixed isomers)	97	174	51,804	255	0	359	52,418	37,897	90,315
		96	183	45,313	0	0	353	45,666	33,029	78,695
		95	196	48,856	105	0	275	49,236	26,263	75,499
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
79-19-6	Thiosemicarbazide	97	60	0	232,012	48,861	160,399	83,592	48,194	573,118	69
		96	58	0	231,376	78,475	144,527	129,804	35,209	619,449	0
		95	49	0	95,623	139,297	94,846	127,937	34,825	492,577	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
62-56-6 *	Thiourea	97	0	0	0	0	0	26	0	26	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
137-26-8 *	Thiram	97	0	0	0	0	16,000	91,390	7,962	115,352	0
		96	1,107	0	0	0	11,000	110,676	17,507	140,290	18
		95	19,838	0	0	0	93,000	52,830	24,149	189,817	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1314-20-1	Thorium dioxide	97	0	0	0	0	0	17,581	1	17,582	0
		96	0	0	0	0	0	17,387	1	17,388	0
		95	0	0	0	0	0	5,144	1	5,145	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7550-45-0	Titanium tetrachloride	97	No reports received								
		96	No reports received								
		95	0	0	0	0	250	0	23	273	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-88-3 *	Toluene	97	0	0	0	296	0	29,806	27	30,129	0
		96	0	0	0	210	160	23,114	32	23,516	0
		95	0	0	0	25	9,096	4,320	48	13,489	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
584-84-9	Toluene-2,4-diisocyanate	97	0	0	0	0	2,754	111	1,671	4,536	0
		96	0	0	0	0	33,373	116	1,608	35,097	0
		95	0	0	0	0	2,541	316	1,717	4,574	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
91-08-7	Toluene-2,6-diisocyanate	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
26471-62-5	Toluene-diisocyanate (mixed isomers)	97	0	0	0	0	0	0	1	1	0
		96	0	0	0	0	0	0	1	1	0
		95	0	0	0	0	0	0	1	1	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
95-53-4	o-Toluidine	97	22	40,491	273	7,440	5	48,209	3,151	51,360
		96	21	17,581	74	17,450	10	35,115	1,401	36,516
		95	23	12,826	256	22,140	12	35,234	55	35,289
		88	18	46,922	1,902	250	5,024	54,098	670	54,768
43121-43-3 *	Triadimefon	97	3	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
2303-17-5 *	Triallate	97	2	519	0	0	0	519	14,264	14,783
		96	2	589	0	0	0	589	16,509	17,098
		95	2	588	0	0	0	588	24,076	24,664
		88	NR	NR	NR	NR	NR	NR	NR	NR
101200-48-0 *	Tribenuron methyl	97	1	1	0	0	0	1	0	1
		96	1	1	0	0	0	1	0	1
		95	1	1	0	0	0	1	0	1
		88	NR	NR	NR	NR	NR	NR	NR	NR
1983-10-4 *	Tributyltin fluoride	97	No reports received							
		96	No reports received							
		95	1	0	23	0	0	23	0	23
		88	NR	NR	NR	NR	NR	NR	NR	NR
2155-70-6 *	Tributyltin methacrylate	97	2	14	3	0	0	17	0	17
		96	2	14	8	0	0	22	0	22
		95	2	25	23	0	0	48	0	48
		88	NR	NR	NR	NR	NR	NR	NR	NR
78-48-8 *	S,S,S-Tributyltri-thiophosphate	97	2	1,611	2	0	0	1,613	0	1,613
		96	2	1,798	2	0	8	1,808	0	1,808
		95	2	1,730	2	0	0	1,732	0	1,732
		88	NR	NR	NR	NR	NR	NR	NR	NR
52-68-6 *	Trichlorfon	97	3	0	0	0	0	0	0	0
		96	2	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	5	253	0	0	0	253	487	740
76-02-8	Trichloroacetyl chloride	97	1	1	0	0	0	1	0	1
		96	1	1	0	0	0	1	0	1
		95	1	1	0	0	0	1	0	1
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. Off-site Releases include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
95-53-4	o-Toluidine	97	1,152,862	4,572	207,700	36,965	352,037	345,803	172,533	2,272,472	31,168
		96	1,250,136	4,330	44,674	51,634	598,429	263,268	161,996	2,374,467	499
		95	40,745	10,541	2,400	108,129	1,137,925	393,319	183,352	1,876,411	6,386
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
43121-43-3 *	Triadimefon	97	37,510,004	721,333	2,211,307	703,916	321,475	378,782	3,831,775	45,678,592	2,703
		96	39,570,292	1,431,057	860,823	349,711	1,184,611	960,889	8,921,825	53,279,208	72,249
		95	60,016,279	3,739,900	3,487,698	1,052,361	1,108,250	1,340,832	23,366,489	94,111,809	14,146
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2303-17-5 *	Triallate	97	28,255,000	12,969,046	9,751,363	82,358	20,447,763	2,599,108	299,040	74,403,678	10,206
		96	23,529,000	13,086,771	16,834,508	305,332	20,388,250	2,787,417	352,717	77,283,995	772
		95	18,699,000	11,817,647	12,061,000	200,596	24,559,416	3,265,021	275,057	70,877,737	481
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
101200-48-0 *	Tribenuron methyl	97	136,927,893	5,812,121	5,788,807	876,284	3,793,003	1,354,282	17,415,699	171,968,089	388,927
		96	118,562,965	6,773,817	2,050,829	834,045	5,371,947	1,714,273	21,830,647	157,138,523	85,623
		95	154,217,925	8,481,039	2,514,155	1,107,208	5,218,927	2,305,131	25,796,200	199,640,585	221,305
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-10-4 *	Tributyltin fluoride	97	67,669	116,557	12,800	15,138	300,034	236,829	432,963	1,181,990	41
		96	168,213	130,539	0	184,710	5,000	177,358	683,382	1,349,202	370
		95	138,712	227,287	618,422	170,699	4,200	291,955	961,314	2,412,589	1,036
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
2155-70-6 *	Tributyltin methacrylate	97	No reports received								
		96	No reports received								
		95	No reports received								
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-48-8 *	S,S,S-Tributyltri-thiophosphate	97	0	0	0	0	1,014,286	0	159	1,014,445	0
		96	0	0	0	0	1,020,923	0	319	1,021,242	0
		95	0	0	0	0	1,294,115	0	371	1,294,486	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
52-68-6 *	Trichlorfon	97	1,500,000	0	680,000	470	1,224,000	8,635,576	13,473	12,053,519	14
		96	6,100,000	0	690,000	0	1,050,000	9,000,006	8,660	16,848,666	0
		95	88,000	9	460,000	0	1,330,000	10,000,000	12,691	11,890,700	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
76-02-8	Trichloroacetyl chloride	97	0	0	0	0	33	59	22	114	0
		96	0	0	0	0	8	82	6	96	0
		95	0	0	0	0	4	110	3	117	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	On-site Releases: Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
120-82-1 *	1,2,4-Trichloro-benzene	97	31	150,883	533	5,800	156,200	313,416	2,632	316,048
		96	33	157,331	433	750	0	158,514	4,487	163,001
		95	31	168,490	259	12,500	0	181,249	41,648	222,897
		88	56	1,532,913	31,628	7,408	3,073	1,575,022	164,144	1,739,166
71-55-6 *	1,1,1-Trichloro-ethane	97	250	3,879,346	195	1,245	60,167	3,940,953	17,134	3,958,087
		96	403	9,058,864	844	1,354	26,633	9,087,695	35,536	9,123,231
		95	804	23,576,663	1,118	126	38,470	23,616,377	124,363	23,740,740
		88	3,921	180,841,849	95,624	1,000	204,923	181,143,396	5,947,625	187,091,021
79-00-5 *	1,1,2-Trichloro-ethane	97	23	296,348	621	0	0	296,969	113	297,082
		96	22	339,050	516	0	16	339,582	85	339,667
		95	21	280,347	870	0	0	281,217	84	281,301
		88	29	1,741,442	5,303	0	89	1,746,834	19,810	1,766,644
79-01-6 *	Trichloroethylene	97	627	17,586,325	563	986	3,975	17,591,849	176,747	17,768,596
		96	674	21,420,513	541	1,291	9,740	21,432,085	76,327	21,508,412
		95	739	26,084,675	1,477	550	3,577	26,090,279	66,225	26,156,504
		88	953	55,943,736	13,801	390	21,186	55,979,113	1,466,469	57,445,582
75-69-4 *	Trichlorofluoro-methane (CFC-11)	97	28	431,631	558	0	395	432,584	228	432,812
		96	29	701,451	961	0	5,575	707,987	180	708,167
		95	54	957,461	410	22	0	957,893	4,149	962,042
		88	NR	NR	NR	NR	NR	NR	NR	NR
95-95-4 *	2,4,5-Trichloro-phenol	97	No reports received							
		96	No reports received							
		95	No reports received							
		88	1	91	0	0	0	91	20	111
88-06-2 *	2,4,6-Trichloro-phenol	97	1	132	27	0	0	159	0	159
		96	1	291	28	0	0	319	0	319
		95	1	161	210	0	0	371	0	371
		88	3	250	50	12,000	0	12,300	10	12,310
96-18-4	1,2,3-Trichloro-propane	97	7	13,346	62	0	0	13,408	13	13,421
		96	7	8,763	0	0	0	8,763	0	8,763
		95	5	11,081	1,600	0	0	12,681	0	12,681
		88	NR	NR	NR	NR	NR	NR	NR	NR
57213-69-1 *	Triclopyr triethyl-ammonium salt	97	3	22	0	0	0	22	0	22
		96	2	6	0	0	0	6	0	6
		95	1	3	0	0	0	3	0	3
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
120-82-1 *	1,2,4-Trichloro-benzene	97	847,575	826,633	235,817	457,030	3,597,276	603,914	1,968,347	8,536,592	164
		96	227,485	538,476	262,294	402,535	2,439,723	736,524	2,039,710	6,646,747	338
		95	488,423	428,122	34,114	531,959	1,604,455	1,035,880	2,581,959	6,704,912	7
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
71-55-6 *	1,1,1-Trichloro-ethane	97	73,000	0	0	0	1,416,990	112,940	21,150	1,624,080	0
		96	71,149	0	0	0	13,000	135,944	66,479	286,572	87
		95	2,107	0	0	3	99,980	76,583	54,675	233,348	9,312
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-00-5 *	1,1,2-Trichloro-ethane	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	300	890	1,190	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
79-01-6 *	Trichloroethylene	97	12,018,755	1,406,156	4,453,521	2,744,955	16,580,512	742,131	8,118,080	46,064,110	19,489
		96	12,546,910	1,372,375	5,210,638	3,237,002	14,448,909	717,699	7,868,103	45,401,636	17,997
		95	13,773,814	1,473,196	4,617,750	3,031,673	9,489,810	470,849	7,911,229	40,768,321	11,068
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-69-4 *	Trichlorofluoro-methane (CFC-11)	97	0	0	0	0	0	9,987	0	9,987	0
		96	0	0	0	0	1,400	0	0	1,400	0
		95	0	0	0	0	2,555	0	0	2,555	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-95-4 *	2,4,5-Trichloro-phenol	97	0	0	0	0	33,497	4,146	384	38,027	0
		96	0	0	0	0	51,328	340	345	52,013	0
		95	0	0	0	1	109,816	390	401	110,608	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
88-06-2 *	2,4,6-Trichloro-phenol	97	0	0	0	0	0	0	1,500	1,500	0
		96	0	0	0	0	0	175	15,467	15,642	500
		95	0	0	0	0	0	1,165	4,742	5,907	2,500
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
96-18-4	1,2,3-Trichloro-propane	97	358,477	21,714	0	0	440	1,205	172,015	553,851	128
		96	233,249	11,249	282	0	1,105	915	149,168	395,968	0
		95	191,454	54,731	217	0	0	820	188,573	435,795	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
57213-69-1 *	Triclopyr triethyl-ammonium salt	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	1,030	0	1,030	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
121-44-8	Triethylamine	97	163	1,633,313	18,482	245,917	29,599	1,927,311	3,946	1,931,257
		96	161	1,589,645	21,648	287,951	19,011	1,918,255	21,534	1,939,789
		95	152	2,101,652	27,685	309,512	14,010	2,452,859	17,180	2,470,039
		88	NR	NR	NR	NR	NR	NR	NR	NR
1582-09-8 *	Trifluralin	97	21	11,908	5	0	5	11,918	26,370	38,288
		96	21	15,606	87	0	310	16,003	51,678	67,681
		95	23	17,144	92	0	8,250	25,486	24,490	49,976
		88	17	3,277	601	0	0	3,878	40,557	44,435
26644-46-2 *	Triforine	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	2	755	0	0	0	755	0	755
		88	NR	NR	NR	NR	NR	NR	NR	NR
95-63-6	1,2,4-Trimethyl-benzene	97	830	7,884,672	7,820	9,097	24,323	7,925,912	148,595	8,074,507
		96	811	7,677,610	9,582	4,567	29,952	7,721,711	144,334	7,866,045
		95	797	7,689,391	8,434	1,042	43,921	7,742,788	52,201	7,794,989
		88	291	4,265,202	10,088	7,964	61,583	4,344,837	200,616	4,545,453
639-58-7 *	Triphenyltin chloride	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR
76-87-9 *	Triphenyltin hydroxide	97	3	3	0	0	0	3	381	384
		96	3	10	0	0	0	10	250	260
		95	3	21	0	0	0	21	250	271
		88	NR	NR	NR	NR	NR	NR	NR	NR
51-79-6	Urethane	97	2	0	0	0	0	0	500	500
		96	3	12,538	0	0	0	12,538	3,675	16,213
		95	4	124	0	0	0	124	3,750	3,874
		88	11	145,123	0	0	0	145,123	1,350	146,473
7440-62-2	Vanadium (fume or dust)	97	20	12,436	708	0	117,510	130,654	43,211	173,865
		96	17	11,096	4	0	114,316	125,416	23,741	149,157
		95	19	14,649	5	0	144,086	158,740	28,780	187,520
		88	33	17,178	4,704	0	87,296	109,178	93,417	202,595
50471-44-8 *	Vinclozolin	97	2	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	2	0	0	0	0	0	0	0
		88	NR	NR	NR	NR	NR	NR	NR	NR

Note: **On-site Releases** from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
121-44-8	Triethylamine	97	827,369	93,926	21,696,559	13,187,593	17,449,172	1,146,917	3,446,620	57,848,156	18,204
		96	651,835	45,484	13,459,141	11,109,800	19,985,218	2,099,835	5,349,175	52,700,488	15,522
		95	311,385	533,356	15,379,353	6,544,593	19,205,133	9,194,987	5,194,288	56,363,095	14,788
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1582-09-8 *	Trifluralin	97	0	0	46,470	17	74	1	5,400	51,962	0
		96	0	0	0	0	39	0	5,800	5,839	0
		95	0	0	0	0	36	0	54,910	54,946	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
26644-46-2 *	Triforine	97	398,418,771	82,698	21,752,907	17,663	33,633,983	134,349	957,085	454,997,456	6,426
		96	144,257,010	107,927	34,902,139	16,754	34,549,160	57,371	1,037,881	214,928,242	17,672
		95	118,321,038	90,685	23,368,507	20,853	40,034,145	55,842	1,051,733	182,942,803	31,505
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-63-6	1,2,4-Trimethyl-benzene	97	1,651,035	2	250,000	184,033	6,027,739	73,599	182,993	8,369,401	125
		96	1,540,000	26	81,000	141,180	5,944,435	35,456	177,467	7,919,564	163
		95	1,438,000	55	190,253	102,442	6,614,873	85,282	161,353	8,592,258	16,577
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
639-58-7 *	Triphenyltin chloride	97	1,913,415	138,753	1,031,056	202,604	621,697	116,048	1,392,785	5,416,358	6,569
		96	1,413,683	49,353	130,969	81,364	676,808	108,198	1,427,811	3,888,186	97,395
		95	1,917,515	27,006	4,141,480	245,136	3,100,716	131,806	1,132,477	10,696,136	1,431
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
76-87-9 *	Triphenyltin hydroxide	97	120,668	56,898	2,964,558	1,082,547	2,001,686	880,772	1,472,204	8,579,333	17,460
		96	90,138	190,747	14,825,694	783,169	2,138,350	1,018,738	1,417,016	20,463,852	99,712
		95	317,695	59,486	15,563,897	1,847,249	2,213,038	859,260	1,394,318	22,254,943	11,491
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
51-79-6	Urethane	97	156,443	13,487	4,860,571	14,703	3,481,031	119,088	2,536,264	11,181,587	21,316
		96	195,330	3,332	521,427	18,843	1,479,902	119,406	2,916,503	5,254,743	106,184
		95	468,689	8,192	2,168,729	3,563	645,579	8,722	2,945,765	6,249,239	17,280
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
7440-62-2	Vanadium (fume or dust)	97	122,408,183	42,050,232	139,297,715	77,876,899	64,130,806	10,457,390	75,793,914	532,015,139	150,541
		96	111,627,997	45,049,952	146,035,428	80,734,052	57,293,922	9,029,977	84,099,776	533,871,104	63,453
		95	135,218,559	41,448,000	141,797,405	70,095,010	55,509,020	9,878,105	96,642,372	550,588,471	238,629
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
50471-44-8 *	Vinclozolin	97	0	0	43,038	5,500	11	0	52	48,601	0
		96	0	0	36,684	0	0	0	53	36,737	0
		95	0	0	8,000	0	303	258	225	8,786	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.
NA: not applicable (waste management data not required to be reported for 1988 reporting year).
* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
108-05-4	Vinyl acetate	97	188	3,348,952	2,669	119,320	2,168	3,473,109	28,974	3,502,083
		96	184	3,850,101	2,393	300,768	2,834	4,156,096	28,273	4,184,369
		95	155	4,105,652	8,269	783,829	1,717	4,899,467	41,783	4,941,250
		88	146	6,087,497	10,021	2,109,851	18,889	8,226,258	21,811	8,248,069
593-60-2	Vinyl bromide	97	2	5,430	0	0	0	5,430	0	5,430
		96	1	5,840	0	0	0	5,840	0	5,840
		95	2	54,930	0	0	0	54,930	0	54,930
		88	2	4,950	400	0	0	5,350	0	5,350
75-01-4	Vinyl chloride	97	43	919,684	82	370	1	920,137	90,248	1,010,385
		96	47	1,019,992	356	333	1	1,020,682	19,614	1,040,296
		95	48	1,044,665	525	33	1	1,045,224	15,645	1,060,869
		88	53	1,439,189	2,051	53	4,409	1,445,702	4,555	1,450,257
75-35-4 *	Vinylidene chloride	97	23	182,141	412	323	0	182,876	104	182,980
		96	23	177,197	216	0	1	177,414	33	177,447
		95	23	177,509	392	0	0	177,901	260	178,161
		88	21	296,353	3,462	170	429	300,414	44,281	344,695
108-38-3	m-Xylene	97	63	1,368,270	552	3,980	12,789	1,385,591	4,535	1,390,126
		96	60	1,327,486	647	6,962	93,377	1,428,472	3,275	1,431,747
		95	60	1,123,589	892	569	13,838	1,138,888	8,650	1,147,538
		88	68	2,463,043	2,566	0	18,045	2,483,654	107,746	2,591,400
95-47-6	o-Xylene	97	76	1,358,782	439	2,896	251,709	1,613,826	17,524	1,631,350
		96	74	1,243,194	2,515	4,760	88,876	1,339,345	4,611	1,343,956
		95	66	1,329,787	869	569	485	1,331,710	1,152	1,332,862
		88	66	2,241,814	2,786	250	22,461	2,267,311	52,881	2,320,192
106-42-3	p-Xylene	97	42	2,492,320	303	3,027	32,862	2,528,512	10,602	2,539,114
		96	41	2,842,650	489	1,010	88,804	2,932,953	1,114	2,934,067
		95	38	2,923,912	532	569	29,401	2,954,414	1,261	2,955,675
		88	48	5,992,743	3,200	0	49,226	6,045,169	31,108	6,076,277
1330-20-7 *	Xylene (mixed isomers)	97	2,912	74,361,257	36,604	133,615	77,677	74,609,153	723,974	75,333,127
		96	3,107	83,264,700	39,737	132,971	46,792	83,484,200	499,478	83,983,678
		95	3,297	97,317,971	33,834	123,396	101,618	97,576,819	573,672	98,150,491
		88	3,467	158,976,091	204,480	144,728	558,257	159,883,556	6,455,161	166,338,717
87-62-7 *	2,6-Xylidine	97	3	52	0	0	0	52	0	52
		96	2	53	0	0	0	53	0	53
		95	4	275	0	0	0	275	0	275
		88	2	337	1,537	0	0	1,874	0	1,874

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

able 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
108-05-4	Vinyl acetate	97	827,369	93,926	21,696,559	13,187,593	17,449,172	1,146,917	3,446,620	57,848,156	18,204
		96	651,835	45,484	13,459,141	11,109,800	19,985,218	2,099,835	5,349,175	52,700,488	15,522
		95	311,385	533,356	15,379,353	6,544,593	19,205,133	9,194,987	5,194,288	56,363,095	14,788
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
593-60-2	Vinyl bromide	97	0	0	46,470	17	74	1	5,400	51,962	0
		96	0	0	0	0	39	0	5,800	5,839	0
		95	0	0	0	0	36	0	54,910	54,946	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-01-4	Vinyl chloride[d]	97	398,418,771	82,698	21,752,907	17,663	33,633,983	134,349	957,085	454,997,456	6,426
		96	144,257,010	107,927	34,902,139	16,754	34,549,160	57,371	1,037,881	214,928,242	17,672
		95	118,321,038	90,685	23,368,507	20,853	40,034,145	55,842	1,051,733	182,942,803	31,505
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
75-35-4	*Vinylidene chloride	97	1,651,035	2	250,000	184,033	6,027,739	73,599	182,993	8,369,401	125
		96	1,540,000	26	81,000	141,180	5,944,435	35,456	177,467	7,919,564	163
		95	1,438,000	55	190,253	102,442	6,614,873	85,282	161,353	8,592,258	16,577
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-38-3	m-Xylene	97	1,913,415	138,753	1,031,056	202,604	621,697	116,048	1,392,785	5,416,358	6,569
		96	1,413,683	49,353	130,969	81,364	676,808	108,198	1,427,811	3,888,186	97,395
		95	1,917,515	27,006	4,141,480	245,136	3,100,716	131,806	1,132,477	10,696,136	1,431
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-47-6	o-Xylene	97	120,668	56,898	2,964,558	1,082,547	2,001,686	880,772	1,472,204	8,579,333	17,460
		96	90,138	190,747	14,825,694	783,169	2,138,350	1,018,738	1,417,016	20,463,852	99,712
		95	317,695	59,486	15,563,897	1,847,249	2,213,038	859,260	1,394,318	22,254,943	11,491
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-42-3	p-Xylene	97	156,443	13,487	4,860,571	14,703	3,481,031	119,088	2,536,264	11,181,587	21,316
		96	195,330	3,332	521,427	18,843	1,479,902	119,406	2,916,503	5,254,743	106,184
		95	468,689	8,192	2,168,729	3,563	645,579	8,722	2,945,765	6,249,239	17,280
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
1330-20-7	*Xylene (mixed isomers)	97	122,408,183	42,050,232	139,297,715	77,876,899	64,130,806	10,457,390	75,793,914	532,015,139	150,541
		96	111,627,997	45,049,952	146,035,428	80,734,052	57,293,922	9,029,977	84,099,776	533,871,104	63,453
		95	135,218,559	41,448,000	141,797,405	70,095,010	55,509,020	9,878,105	96,642,372	550,588,471	238,629
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
87-62-7	*2,6-Xylidine	97	0	0	43,038	5,500	11	0	52	48,601	0
		96	0	0	36,684	0	0	0	53	36,737	0
		95	0	0	8,000	0	303	258	225	8,786	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: Data from Section 8 (Current Year) of Form R.

NA: not applicable (waste management data not required to be reported for 1988 reporting year).

* Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

[d]One facility, Shintech Inc. in Freeport, TX, reported on-site recycling of vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 pounds in 1996. These revisions change on-site recycling of vinyl chloride to 318,121,038 pounds in 1995 and to 388,013,010 pounds in 1996. Total production-related waste for vinyl chloride changes to 382,742,803 pounds in 1995 and to 458,684,242 pounds in 1996.

Table 3-8A. TRI On-site and Off-site Releases, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Total Forms Number	On-site Releases: Total Air Emissions Pounds	On-site Releases: Surface Water Discharges Pounds	On-site Releases: Underground Injection Pounds	On-site Releases: Releases to Land Pounds	On-site Releases: Total On-site Releases Pounds	Off-site Releases: Transfers Off-site to Disposal Pounds	Total On- and Off-site Releases Pounds
7440-66-6 *	Zinc	97	411	3,264,646	17,508	1	7,893,441	11,175,596	24,974,649	36,150,245
	(fume or dust)	96	406	1,663,539	11,924	0	6,780,313	8,455,776	10,084,804	18,540,580
		95	428	2,014,250	45,130	0	6,402,741	8,462,121	9,610,398	18,072,519
		88	644	3,455,937	849,544	140,010	25,617,365	30,062,856	31,450,587	61,513,443
--	Zinc compounds	97	2,649	4,700,944	1,203,833	368,483	117,295,313	123,568,573	182,410,387	305,978,960
		96	2,595	5,855,198	1,078,813	129,498	116,925,797	123,989,306	136,777,135	260,766,441
		95	2,601	4,648,090	1,071,990	212,844	112,184,154	118,117,078	106,025,477	224,142,555
		88	1,661	7,263,205	1,201,109	109,555	113,364,461	121,938,330	84,369,439	206,307,769
12122-67-7 *	Zineb	97	1	0	0	0	0	0	0	0
		96	1	0	0	0	0	0	0	0
		95	1	0	0	0	0	0	0	0
		88	2	1,250	0	0	0	1,250	2,600	3,850
--	Mixtures and other	97	16	150,313	0	0	9,250	159,563	39,867	199,430
	trade name	96	35	23,938	1,030	0	750	25,718	16,780	42,498
	products	95	30	334,194	3,171	0	0	337,365	4,400	341,765
		88	174	3,450,620	59,210	0	16,099	3,525,929	10,661,927	14,187,856
--	Trade secrets	97	11	14,000	0	0	0	14,000	0	14,000
		96	11	0	0	0	0	0	0	0
		95	12	0	0	0	0	0	0	0
		88	5	0	0	0	0	0	0	0
	Total	97	71,670	1,331,663,886	218,371,961	219,513,898	346,904,510	2,116,454,255	461,098,829	2,577,553,084
		96	72,643	1,458,785,384	179,229,798	204,237,312	332,123,472	2,174,375,966	347,074,850	2,521,450,816
		95	75,371	1,579,242,325	175,819,158	233,588,328	315,612,588	2,304,262,399	312,100,306	2,616,362,705
		88	NA	NA	NA	NA	NA	NA	NA	NA

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Breakdown of Underground Injection and On-site Land Releases (for RCRA Subtitle C landfills) began in 1996 reporting year.

NR: not reportable (chemicals added to the TRI list after 1988 or whose reporting definition has changed since 1988).

NA: not applicable (totals for 1988 are not comparable to those for 1995-1997 because of the changes in the TRI list of chemicals since 1988).

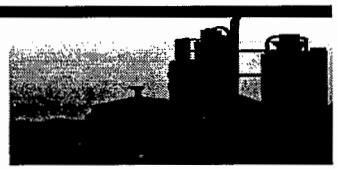
*Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use Pesticides.

Table 3-8B. Quantities of TRI Chemicals in Waste, by Chemical, 1988 and 1995-1997, continued

CAS Number	Chemical	Year	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-Production-related Waste Managed
			On-site	Off-site	On-site	Off-site	On-site	Off-site			
			Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
40-66-6 *	Zinc	97	24,831,821	60,647,618	51,376	62,294	764,655	449,041	35,193,560	122,000,365	250
	(fume	96	25,210,979	75,552,609	0	45,701	2,192,517	4,290,805	14,540,492	121,833,103	35,874
	or dust)	95	27,847,425	78,273,698	0	53,501	1,696,402	6,466,483	10,717,304	125,054,813	35,448
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Zinc	97	107,656,323	257,386,303	613,266	261,459	70,211,629	18,374,257	277,306,831	731,810,068	6,770,405
	compounds	96	114,830,501	249,167,766	102,429	320,602	3,459,741	25,448,835	235,369,328	628,699,202	10,267,861
		95	130,284,610	251,889,772	446,100	392,434	4,162,627	26,637,547	199,198,691	613,011,781	11,143,135
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
22-67-7 *	Zineb	97	0	0	0	0	0	0	0	0	0
		96	0	0	0	0	0	0	0	0	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Mixtures	97	0	2,182	3,700	8,282	0	0	188,915	203,079	0
	and other	96	0	32,871	0	6,200	34,000	11,200	84,215	168,486	100
	trade name	95	8,025	19,282	96,280,793	375,381	72,738,249	294,743	384,186	170,100,659	0
	products	88	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	Trade	97	0	0	0	0	0	3,600	14,000	17,600	0
	secrets	96	0	0	0	0	984	0	0	984	0
		95	0	0	0	0	0	0	0	0	0
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total[e]	97	7,986,618,922	2,390,787,879	3,805,792,208	525,610,064	7,012,922,513	536,021,338	2,467,643,821	24,725,396,745	37,761,187
		96	7,300,051,732	2,454,579,937	2,763,621,173	510,546,386	6,152,076,079	504,708,015	2,458,897,799	22,144,481,121	30,970,905
		95	11,480,495,719	2,541,332,998	2,822,971,901	503,525,690	7,039,799,031	562,359,889	2,536,870,344	27,487,355,572	34,042,055
		88	NA	NA	NA	NA	NA	NA	NA	NA	NA

ote: Data from Section 8 (Current Year) of Form R.
A: not applicable (waste management data not required to be reported for 1988 reporting year).
Chemicals that are currently active ingredients in EPA's Pesticide Product Information System (all pesticide products imported and/or manufactured in the US) and/or ederal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Active Ingredients, including Special Review, Canceled/Denied or Suspended, and Restricted Use esticides.
pparent errors by seven facilities and revisions by one facility changes on-site recycling to 7,680,103,504 pounds in 1995 and to 7,543,807,732 pounds in 1996.
evisions by two facilities change on-site energy recovery to 2,727,571,901 pounds in 1995, to 2,711,071,173 pounds in 1996, and to 2,930,962,208 pounds in 1997.
otal production-related waste managed changes to 23,591,563,357 pounds in 1995, to 22,335,687,121 pounds in 1996, and to 23,850,566,745 pounds in 1997.

Chapter 4



Industry Reporting to the Toxics Release Inventory

This chapter provides an overview of 1997 TRI data by industry sector, for the 20 manufacturing sectors required to report to TRI. As described in Chapter 1, TRI will expand to include seven additional industry sectors beginning with the 1998 reporting year. Box 4-1 lists the manufacturing industries by Standard Industrial Classification (SIC) code. Box 4-2 explains SIC codes and their use in TRI.

This chapter summarizes release and other waste management data by industry for 1997, comparable to the overviews presented in Chapter 2. It then compares the last three reporting years (1995, 1996, and 1997) and compares 1988 with the three recent years. Because some types of data were not collected in 1988, this chapter also reviews waste management data for 1991 and 1995-1997. These multiple-year analyses correspond to overviews presented in Chapter 3. The discussion of "core" chemical lists, in the "Introduction" to Chapter 3, is important for accurate interpretation of these year-to-year comparisons because of the significant changes in TRI over time.

TRI Data by Industry, 1997

In 1997, across all industries, 21,490 facilities submitted 71,670 forms to TRI, as shown in Table 4-1. The chemical manufacturing industry submitted the largest number of forms, 21,044 forms or 29.4% of the total. The fabricated metals industry ranked second with 7,430 forms, and the primary metals industry ranked third with 6,777 forms, both approximately 10% of the total. Facilities that reported more than one SIC code to describe their operations and products (see Box 4-2) submitted the fourth-largest number of forms. This "multiple-codes" group submitted 4,552 forms, 6.4% of the total.

Box 4-1. Standard Industrial Classification (SIC) Codes

Standard Industrial Classification (SIC) Codes

20	**Food and kindred products** Manufacture or processing of foods and beverages for human consumption, and related products, such as manufactured ice, chewing gum, vegetable and animal fats and oils, and prepared feeds for animals and fowls.
21	**Tobacco products** Manufacture of cigarettes, cigars, smoking and chewing tobacco, snuff, and reconstituted tobacco. Stemming and redrying of tobacco. Manufacture of non-tobacco cigarettes.
22	**Textile mill products** Preparation of fiber and subsequent manufacture of yarn, thread, braids, twine, and cordage. Manufacture of broad woven fabrics, narrow woven fabrics, knit fabrics, and carpets and rugs from yarn. Dyeing and finishing of fiber, yarn, fabrics, and knit apparel. Coating, waterproofing or otherwise treating fabrics. Integrated manufacture of knit apparel and other finished articles from yarn. Manufacture of felt goods, lace goods, nonwoven fabrics, and miscellaneous textiles.

Source: Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual,* 1987.

Box 4-1. Standard Industrial Classification (SIC) Codes, continued

23	**Apparel and other finished products made from fabrics and similar materials** Production of clothing. Fabrication of products by cutting and sewing purchased woven or knit textile fabrics and related materials, such as leather, rubberized fabrics, plastics, and furs. Manufacture of clothing by cutting and joining (e.g., by adhesives) material such as paper and nonwoven textiles.
24	**Lumber and wood products, except furniture** Cutting timber and pulpwood. Also, merchant sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills and veneer mills engaged in producing lumber and wood basic materials. Manufacture of finished articles made entirely or mainly of wood or related materials.
25	**Furniture and fixtures** Manufacture of household, office, public building, and restaurant furniture, and office and store fixtures.
26	**Paper and allied products** Manufacture of pulps from wood and other cellulose fibers and from rags. Manufacture of paper and paperboard. Manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes, and envelopes. Manufacture of bags from plastics film and sheet.
27	**Printing, publishing, and allied industries** Printing by one or more common processes, such as letterpress, lithography (including offset), gravure, or screen. Bookbinding, plate making, and other services performed for the printing trade. Publishing newspapers, books, and periodicals (whether or not the establishment also prints them).
28	**Chemicals and allied products** Production of basic chemicals. Manufacture of products by predominantly chemical processes. (Three general classes of products: 1) basic chemicals, such as acids, alkalis, salts, and organic chemicals; 2) chemical products to be used in further manufacture, such as synthetic fibers, plastics materials, dry colors, and pigments; 3) finished chemical products to be used for ultimate consumption, such as drugs, cosmetics, and soaps, or to be used as materials or supplies in other industries, such as paints, fertilizers, and explosives.)
29	**Petroleum refining and related industries** Production of gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking, or other processes. (Establishments also produce aliphatic and aromatic chemicals as byproducts.)
30	**Rubber and miscellaneous plastics products** Manufacture of products, not elsewhere classified, from plastics resins and from natural, synthetic, or reclaimed rubber, gutta percha, balata, or gutta siak. Includes manufacture of tires.
31	**Leather and leather products** Tanning, currying, and finishing hides and skins. Converting leather. Manufacture of finished leather and artificial leather products and some similar products made of other materials.
32	**Stone, clay, glass, and concrete products** Manufacture of flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, and other products from materials taken principally from the earth in the form of stone, clay, and sand. (May include mining and quarrying activities operated by manufacturing establishments in this group.)

Source: Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual,* 1987.

Box 4-1. Standard Industrial Classification (SIC) Codes, continued

33 Primary metal industries
Smelting and refining ferrous and nonferrous metals from ore, pig, or scrap. Rolling, drawing, and alloying metals. Manufacture of castings and other basic metal products. Manufacture of nails, spikes, and insulated wire and cable. Includes production of coke.

34 Fabricated metal products, except machinery and transportation equipment
Fabrication of ferrous and nonferrous metal products, such as metal cans, tinware, hand tools, cutlery, general hardware, non-electric heating apparatus, fabricated structural metal products, metal forgings, metal stampings, ordnance (except vehicles and guided missiles), and a variety of metal and wire products, not elsewhere classified.

35 Industrial and commercial machinery and computer equipment
Manufacture of industrial and commercial machinery and equipment and computers. Manufacture of engines and turbines; farm and garden machinery; construction, mining, and oil field machinery; elevators and conveying equipment; hoists, cranes, monorails, and industrial trucks and tractors; metalworking machinery; special industry machinery; general industrial machinery; computer and peripheral equipment and office machinery; and refrigeration and service industry machinery.

36 Electronic and other electrical equipment and components, except computer equipment
Manufacture of machinery, apparatus, and supplies for the generation, storage, transmission, transformation, and utilization of electrical energy. Manufacture of electricity distribution equipment, electrical industrial apparatus, household appliances, electrical lighting and wiring equipment, radio and television receiving equipment, communications equipment, electronic components and accessories, and other electrical equipment and supplies.

37 Transportation equipment
Manufacture of equipment for transportation of passengers and cargo by land, air, and water. Includes motor vehicles, aircraft, guided missiles, and space vehicles, ships, boats, railroad equipment, and miscellaneous transportation equipment, such as motorcycles, bicycles, and snowmobiles.

38 Measuring, analyzing, and controlling instruments, photographic, medical, and optical goods; watches and clocks.
Manufacture of instruments (including professional and scientific) for measuring, testing, analyzing, and controlling, and their associated sensors and accessories; optical instruments and lenses; surveying and drafting instruments; hydrological, hydrographic, meteorological, and geophysical equipment; search, detection, navigation, and guidance systems and equipment; surgical, medical, and dental instruments, equipment, and supplies; ophthalmic goods; photographic equipment and supplies; and watches and clocks.

39 Miscellaneous manufacturing industries
Manufacture of products not classified in any other major manufacturing group. Includes jewelry, silverware, and plated ware; musical instruments; dolls, toys, games, and sporting athletic goods; pens, pencils, and artists' materials; buttons, costume novelties, and miscellaneous notions; brooms and brushes; caskets; and other miscellaneous products.

Source: Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual,* 1987.

Box 4-2. An Explanation of SIC Codes and TRI

An Explanation of SIC Codes and TRI

SIC codes are the Standard Industrial Classification codes used throughout the federal government to classify economic activity by industry. Facilities in the manufacturing sectors, that is, SIC codes 20 through 39, are required to report to TRI. (As explained in Chapter 1, additional industries will begin reporting with the 1998 reporting year.) Box 4-1 lists the two-digit SIC codes in manufacturing and the primary activities of the industry sectors they designate.

On TRI Form Rs and Form A certification statements, facilities report the four-digit SIC codes that define their operations. A facility might report, for example, SIC code 2873, nitrogenous fertilizers. These industries are grouped into broader categories at the three-digit and two-digit SIC code levels. For example, nitrogenous fertilizers falls into the agricultural chemicals group at the three-digit level (SIC code 287) and the chemicals and allied products major group (SIC code 28). Tables in this chapter present data aggregated at the two-digit level.

Multiple SIC Codes: TRI facilities may report up to six four-digit SIC codes that describe their operations. They submit one Form R or Form A certification statement for each chemical they are reporting. If all the processes or operations that are associated with a facility's releases or other waste management of a TRI chemical can be described by one SIC code, then only one SIC code is reported on the form. If several economic activities, designated by different SIC codes, describe the specific operations at a facility that are associated with releases or other waste management of a TRI chemical, then the facility will report those SIC codes (up to six) on the form it submits for that chemical.

Industrial facilities often conduct inter-related operations. They may, for example, manufacture distinct products using common or related feedstocks. Such products may be classified in similar but separate categories in the Standard Industrial Classification (SIC) system. Thus, many forms submitted to TRI contain more than one industrial classification. When TRI data are analyzed by industry—that is, by SIC code—forms that report more than one SIC code must be categorized separately because they do not fall into the individual industry groups.

The "multiple-codes" category represents forms that report in more than one two-digit SIC code. For example, a facility may refine petroleum (SIC code 29) and then use that feedstock in the manufacture of chemicals (SIC code 28); it will report SIC codes in both of these industries on its TRI forms (such as SIC codes 2911, petroleum refining, and 2869, industrial organic chemicals). On forms with more than one SIC code, any SIC code that is not within manufacturing (that is, not within the SIC code range 20 to 39) is ignored when assigning a form to an industry category. For example, a form with the SIC code 2642 (manufacture of envelopes) and SIC code 5112 (wholesale trade – stationery and office supplies) would be included in SIC code 26.

Federal Facilities: Federal facilities report the SIC codes that describe their activity; these may or may not fall within the manufacturing categories, SIC codes 20 to 39, that have reported to TRI since its inception. (As explained in Chapter 1, additional industries will begin reporting with the 1998 reporting year.) Tables in this chapter incorporate amounts submitted by federal facilities in the SIC codes they reported, just as is done for private sector facilities. In each table, a separate summary of federal facilities' data is presented as well, following the totals.

Table 4-1. TRI Facilities and Forms, by Industry, 1997

SIC Code	Industry	Total Facilities Number	Total Forms Number	Form Rs Number	Form As Number
20	Food	1,987	3,582	2,365	1,217
21	Tobacco	26	87	87	0
22	Textiles	299	661	576	85
23	Apparel	27	57	49	8
24	Lumber	784	1,879	1,240	639
25	Furniture	422	1,092	1,032	60
26	Paper	471	2,561	2,396	165
27	Printing	235	482	470	12
28	Chemicals	3,829	21,044	17,064	3,980
29	Petroleum	387	3,208	2,815	393
30	Plastics	1,813	3,675	3,103	572
31	Leather	82	208	191	17
32	Stone/Clay/Glass	641	1,773	1,469	304
33	Primary Metals	1,926	6,777	5,995	782
34	Fabricated Metals	2,872	7,430	6,647	783
35	Machinery	1,065	2,825	2,507	318
36	Electrical Equip.	1,263	3,119	2,970	149
37	Transportation Equip.	1,265	4,453	4,155	298
38	Measure./Photo.	263	647	566	81
39	Miscellaneous	347	744	637	107
	Multiple codes 20-39	1,246	4,552	4,093	459
	No codes 20-39	240	814	696	118
	Total	21,490	71,670	61,123	10,547
	Federal Facilities	124	346	312	34

Note: Facilities/forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Facilities/forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

On- and Off-site Releases, 1997

On- and off-site releases totaled 2.58 billion pounds in 1997, and two industries reported more than half of that total. As shown in Table 4-2, the chemical manufacturing industry reported 797.5 million pounds of total releases, and the primary metals industry reported 694.7 million pounds. These amounts represented 30.9% and 27.0%, respectively, of all on- and off-site releases reported to TRI, as illustrated in Figure 4-1. The paper products industry ranked third for total on- and off-site releases, behind chemicals and primary metals, with 233.5 million pounds, or 9.1% of the national total.

Three other industry groups reported more than 100 million pounds each: the multiple-codes group ranked fourth among all industries with 137.6 million pounds (5.3%), plastics manufacture ranked fifth with 108.5 million pounds (4.2%), and the transportation equipment industry ranked sixth with 102.1 million pounds (4.0%).

Figure 4-2 displays on- and off-site releases for the industries with the largest total releases.

On-site Releases

The chemicals, primary metals, and paper products industries, which reported the largest total on- and off-site releases in 1997, also reported the largest on-site releases. Table 4-2 also presents on-site releases by industry.

Table 4-2. TRI On-site and Off-site Releases, by Industry, 1997

SIC Code	Industry	On Site-Releases: Fugitive or Nonpoint Air Emissions (Pounds)	Stack or Point Air Emissions (Pounds)	Surface Water Discharges (Pounds)	Underground Injection: Class I Wells (Pounds)	Underground Injection: Class II-V Wells (Pounds)	On-site Land Releases: RCRA Subtitle C Landfills (Pounds)	On-site Land Releases: Other Landfills (Pounds)
20	Food	21,841,987	50,173,613	16,480,043	755	23,655	250	2,696
21	Tobacco	47,631	3,742,429	171,586	0	0	0	0
22	Textiles	3,272,547	14,996,366	349,218	0	0	0	12,139
23	Apparel	76,823	625,205	5,700	0	0	0	46,000
24	Lumber	4,463,041	22,339,485	79,628	0	0	39,070	8,795
25	Furniture	3,415,781	21,401,745	41	0	0	0	27,906
26	Paper	15,568,519	178,214,730	19,026,405	122,027	0	1,159,725	9,369,606
27	Printing	12,200,851	12,317,702	2,260	0	0	0	0
28	Chemicals	85,147,643	257,067,768	106,004,912	215,670,514	132,543	4,392,785	21,618,312
29	Petroleum	25,814,753	24,606,789	11,333,210	2,412,682	113,789	10	40,488
30	Plastics	25,001,040	73,180,951	13,262	1	0	17,766	700,056
31	Leather	695,246	1,971,833	26,338	0	0	0	250
32	Stone/Clay/Glass	2,363,974	29,047,702	51,509	0	0	73,233	2,485,752
33	Primary Metals	33,385,225	98,659,230	47,984,274	846,556	0	13,974,894	55,243,145
34	Fabricated Metals	23,226,751	40,822,562	1,418,490	0	6	155,309	174,081
35	Machinery	6,125,064	11,401,163	25,398	0	0	6,649	308,719
36	Electrical Equip.	5,196,405	13,884,897	1,894,465	3,100	0	293,304	154,717
37	Transportation Equip.	19,521,068	71,107,635	283,829	0	0	110,079	430,857
38	Measure./Photo.	1,211,293	9,675,807	1,343,783	0	0	46	153,395
39	Miscellaneous	2,107,684	7,297,312	1,542	5	0	12,767	3,806
	Multiple codes 20-39	24,578,496	66,767,841	11,579,215	14,602	10	196,888	2,763,815
	No codes 20-39	1,971,489	5,127,810	296,853	0	173,653	39,803	94,982
	Total	317,233,311	1,014,430,575	218,371,961	219,070,242	443,656	20,472,578	93,639,517
	Federal Facilities	2,182,989	1,833,350	1,176,773	0	173,653	702	72,716

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

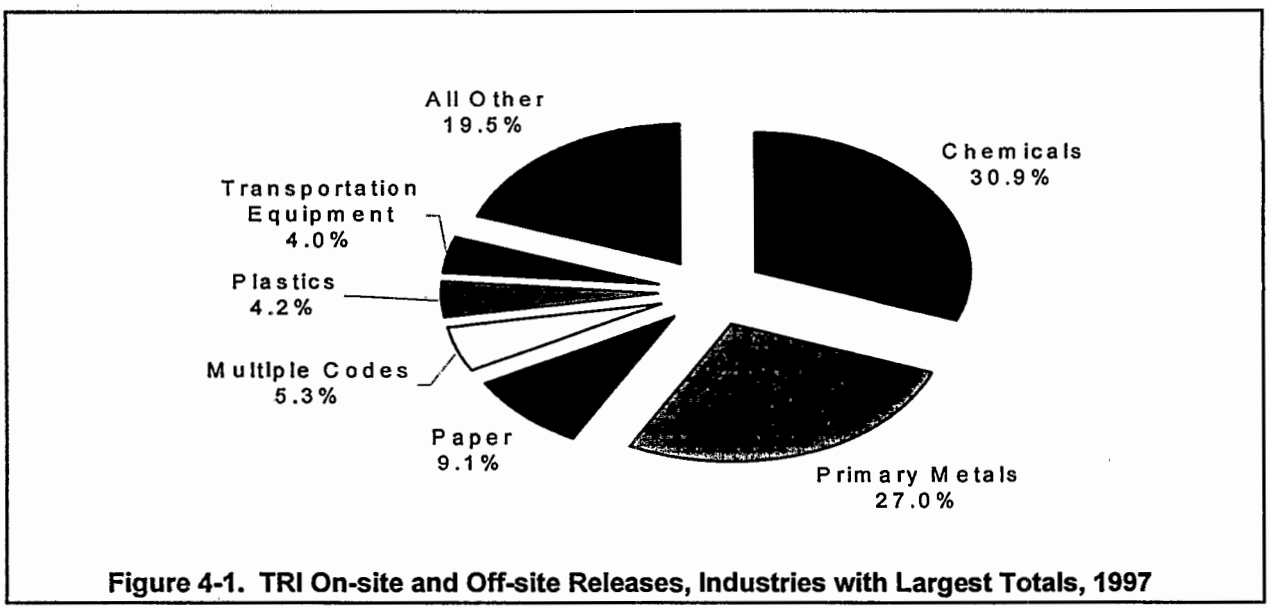


Figure 4-1. TRI On-site and Off-site Releases, Industries with Largest Totals, 1997

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/ stabilization and for wastewater treatment, including to POTWs. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category.

Table 4-2. TRI On-site and Off-site Releases, by Industry, 1997, continued

SIC Code	Industry	On Site-Releases: On-site Land Releases: Land Treatment	On Site-Releases: On-site Land Releases: Surface Impoundments	On Site-Releases: Other Disposal	Total On-site Releases	Off-site Releases: Transfers Off-site to Disposal	Total On- and Off-site Releases
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
20	Food	3,295,815	178,442	43,442	92,040,698	1,527,792	93,568,490
21	Tobacco	0	0	0	3,961,646	387,968	4,349,614
22	Textiles	122,524	67,734	2,088	18,822,616	613,643	19,436,259
23	Apparel	9,887	0	5	763,620	140,912	904,532
24	Lumber	57,461	535	2,125	26,990,140	2,669,283	29,659,423
25	Furniture	0	0	510	24,845,983	267,933	25,113,916
26	Paper	508,756	4,621,199	192,269	228,783,236	4,747,148	233,530,384
27	Printing	0	0	250	24,521,063	122,715	24,643,778
28	Chemicals	791,439	40,220,776	11,601,039	742,647,731	54,849,079	797,496,810
29	Petroleum	82,815	331,352	1,319,014	66,054,902	3,268,549	69,323,451
30	Plastics	750	6,249	170,451	99,090,526	9,375,097	108,465,623
31	Leather	0	10,042	5	2,703,714	2,030,230	4,733,944
32	Stone/Clay/Glass	772	85,010	1,109,708	35,217,660	8,003,691	43,221,351
33	Primary Metals	40,630	50,745,121	105,066,486	405,945,561	288,716,526	694,662,087
34	Fabricated Metals	796	2,804	537,249	66,338,048	29,198,597	95,536,645
35	Machinery	5	5	68,725	17,935,728	4,465,584	22,401,312
36	Electrical Equip.	17,108	434	26,340	21,470,770	12,674,200	34,144,970
37	Transportation Equip.	6	3,704	81,148	91,538,326	10,519,302	102,057,628
38	Measure./Photo.	924	0	57,332	12,442,580	799,306	13,241,886
39	Miscellaneous	0	0	469	9,423,585	818,874	10,242,459
	Multiple codes 20-39	246,564	458,561	5,571,405	112,177,397	25,444,493	137,621,890
	No codes 20-39	618,415	220,908	4,194,812	12,738,725	457,907	13,196,632
	Total	5,794,667	96,952,876	130,044,872	2,116,454,255	461,098,829	2,577,553,084
	Federal Facilities	618,452	1,476	176,546	6,236,657	336,688	6,573,345

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

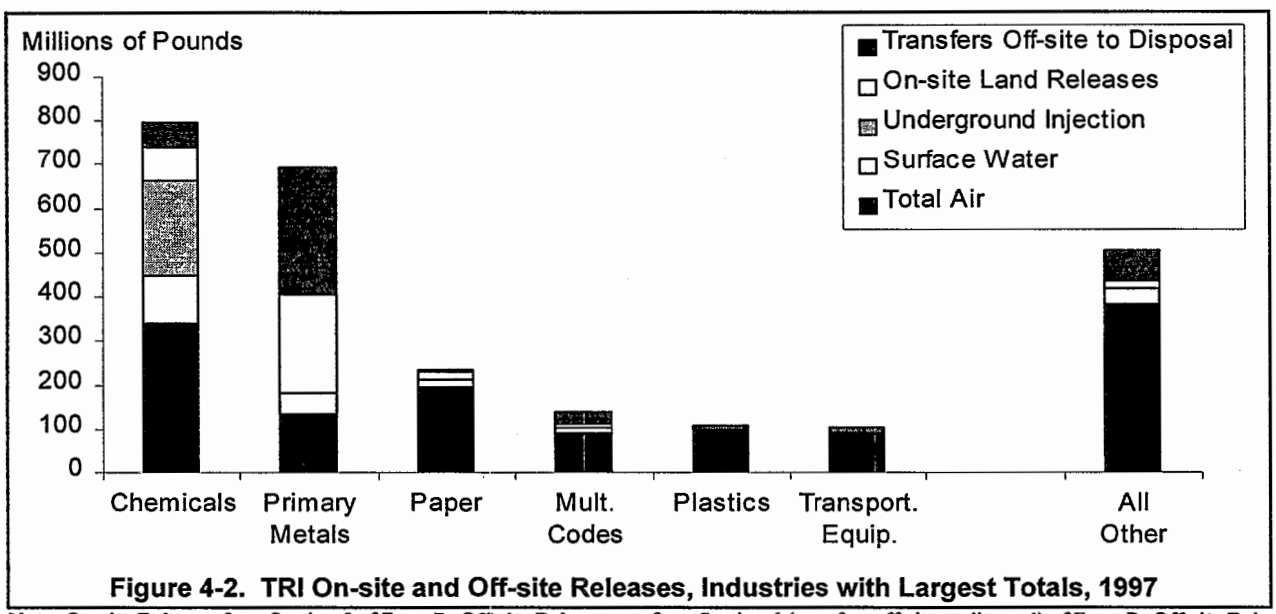


Figure 4-2. TRI On-site and Off-site Releases, Industries with Largest Totals, 1997

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category.

Table 4-3. TRI Off-site Releases (Transfers Off-site to Disposal), 1997

SIC Code	Industry	Storage Only[a] Pounds	Solidification / Stabilization Metals Only[b] Pounds	Wastewater Treatment (Excluding POTWs) Metals Only[c] Pounds	Transfers to POTWs Metals Only[d] Pounds	Underground Injection Pounds
20	Food	37	0	44,155	15,479	6,875
21	Tobacco	0	0	0	279	0
22	Textiles	250	11,142	13,667	181,967	0
23	Apparel	250	0	0	5	0
24	Lumber	21,631	70,528	0	305	1,057
25	Furniture	860	31,985	0	2,585	37,700
26	Paper	91,017	21,949	213,681	148,914	0
27	Printing	3,004	7,844	1,776	4,434	0
28	Chemicals	538,308	6,743,384	3,111,984	450,944	8,948,834
29	Petroleum	1,190	101,242	326	73,576	222,174
30	Plastics	103,671	143,016	18,564	67,248	13,167
31	Leather	4,200	0	25	321,087	0
32	Stone/Clay/Glass	1,342	1,632,156	18,615	30,671	3
33	Primary Metals	3,648,396	120,337,808	544,484	172,507	1,269,373
34	Fabricated Metals	484,159	4,798,354	1,375,846	435,236	3,394,388
35	Machinery	81,397	398,779	38,493	48,453	135,952
36	Electrical Equip.	123,022	1,992,785	212,800	184,131	13,068
37	Transportation Equip.	98,494	828,677	332,468	119,854	82,608
38	Measure./Photo.	14,448	267,740	15,351	6,920	0
39	Miscellaneous	83,626	196,219	708	9,041	0
	Multiple codes 20-39	1,308,918	6,708,373	122,535	122,698	125,729
	No codes 20-39	18,637	33,132	9,080	3,596	14,828
	Total	6,626,857	144,325,113	6,074,558	2,399,930	14,265,756
	Federal Facilities	20,899	26,473	9,060	5,351	0

Note: Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

[a]"Storage only" (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to "storage only" are included as a form of disposal (off-site release). See Box 2-2.

[b]Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste management code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste management code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste management code M40; in this report, such amounts have been included in solidification/stabilization of metals and metal compounds.

[c]Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste management code M62) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste management code M61). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 2-3. Some facilities erroneously reported metals and metal compounds using waste treatment code M61; in this report, such amounts have been included in transfers of metals and metal compounds to wastewater treatment.

[d]Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

The chemical manufacturing industry ranked first for on-site releases with 742.6 million pounds. Chemical industry releases included 342.2 million pounds of air emissions, 106.0 million pounds of surface water discharges, and 215.8 million pounds of underground injection—the largest amounts in these categories. The chemical manufacturing industry's largest releases to air were point source emissions of 67.6 million pounds of ammonia, 37.4 million pounds of carbon disulfide, and 28.5 million pounds of methanol. The industry's discharges to surface waters included 55.2 million pounds of nitrate compounds and 43.5 million pounds of phosphoric acid. The chemicals with the largest amounts of underground injection (to Class I wells) by chemical manufacturing facilities were nitrate compounds (40.6 million pounds) and ammonia (29.0 million pounds).

The primary metals industry ranked second for on-site releases with 405.9 million pounds. The primary metals industry reported 225.1 million pounds of on-site land releases, more than any other industry. Most

Table 4-3. TRI Off-site Releases (Transfers Off-site to Disposal), 1997, continued

SIC Code	Industry	Landfills/ Disposal Surface Impoundments Pounds	Land Treatment Pounds	Other Land Disposal Pounds	Other Off-site Management Pounds	Transfers to Waste Broker for Disposal Pounds	Unknown[c] Pounds	Total Off-site Releases Transfers Off-site to Disposal Pounds
20	Food	766,870	392,585	87,015	166,538	40,084	8,154	1,527,792
21	Tobacco	359,757	428	0	27,504	0	0	387,968
22	Textiles	357,446	6,778	6,564	19,151	3,707	12,971	613,643
23	Apparel	91,357	0	4,300	0	45,000	0	140,912
24	Lumber	1,899,404	17,234	588,294	7,336	22,744	40,750	2,669,283
25	Furniture	6,184	5,082	0	174,590	2,587	6,360	267,933
26	Paper	3,108,148	394,313	586,939	160,427	10,560	11,200	4,747,148
27	Printing	53,896	0	778	6,810	4,615	39,558	122,715
28	Chemicals	29,510,540	229,295	1,385,394	672,653	713,423	2,544,320	54,849,079
29	Petroleum	2,804,198	475	38,988	1,853	16,016	8,511	3,268,549
30	Plastics	8,102,877	61,702	271,340	269,320	214,333	109,859	9,375,097
31	Leather	1,133,125	23,399	250,610	297,700	84	0	2,030,230
32	Stone/Clay/Glass	4,960,160	8,900	26,693	378,999	53,318	892,834	8,003,691
33	Primary Metals	146,739,000	13,570	5,115,099	6,622,727	4,066,803	186,759	288,716,526
34	Fabricated Metals	17,293,884	4,838	223,686	75,820	933,864	178,522	29,198,597
35	Machinery	3,200,135	1,265	254,971	69,586	215,791	20,762	4,465,584
36	Electrical Equip.	7,668,385	10,048	113,763	1,669,165	455,563	231,470	12,674,200
37	Transportation Equip.	8,089,609	10,120	92,939	506,492	216,993	141,048	10,519,302
38	Measure./Photo.	410,159	0	1,217	40,463	39,003	4,005	799,306
39	Miscellaneous	360,878	503	58,124	2,154	97,121	10,500	818,874
	Multiple codes 20-39	14,763,548	82,512	1,206,469	796,490	142,149	65,072	25,444,493
	No codes 20-39	174,746	1,437	1,544	28,473	83,976	88,458	457,907
	Total	251,854,306	1,264,484	10,314,727	11,994,251	7,377,734	4,601,113	461,098,829
	Federal Facilities	120,750	1,437	1,544	8,304	85,275	57,595	336,688

Note: Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs.

[c]"Unknown" (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as "unknown" transfers are treated as a form of disposal (off-site release).

of the sector's on-site land releases consisted of "other disposal" (105.1 million pounds, including 55.3 million pounds of zinc compounds and 25.1 million pounds of copper compounds). Among other on-site release types, the primary metals industry's largest reported amount consisted of point source air emissions of 59.6 million pounds of chlorine.

The paper products sector ranked third for on-site releases with 228.8 million pounds, principally in air emissions (193.8 million pounds). This included point source emissions of 100.3 million pounds of methanol.

Off-site Releases

TRI facilities reported 461.1 million pounds of off-site releases (transfers to disposal) in 1997, also shown in Table 4-2. As explained in Chapter 2, these releases include transfers of metals to solidification/ stabilization, to wastewater treatment (excluding POTWs), and to POTWs. Table 4-3 further examines off-site releases by industry in 1997.

The primary metals industry reported off-site releases totaling 288.7 million pounds, nearly one third (62.6%) of the total. This amount included 146.7 million pounds of listed TRI chemicals, primarily metals, transferred to landfills/disposal surface impoundments and 120.3 million pounds of metals

Table 4-4. Quantities of TRI Chemicals in Waste Managed, by Industry, 1997

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste	Non-Production-related Waste
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
20	Food	325,729,480	5,335,875	95,061	602,320	78,147,090	27,851,681	93,471,906	531,233,413	388,615
21	Tobacco	0	93,600	0	0	1,445,850	325,178	4,304,637	6,169,265	14,000
22	Textiles	20,764,425	1,074,991	5,698,061	2,813,353	14,945,016	4,935,053	19,338,518	69,569,417	34,648
23	Apparel	214,617	46,495	0	180,551	622,967	10,033	894,652	1,969,315	2
24	Lumber	70,340,861	1,184,716	1,526,362	2,630,514	870,838,105	697,659	28,655,168	975,873,385	823,954
25	Furniture	3,828,213	5,923,061	88,403	4,836,849	994,000	685,246	24,573,888	40,929,660	2,829
26	Paper	111,023,736	2,807,269	184,583,363	7,567,597	921,427,552	53,404,981	231,816,069	1,512,630,567	143,175
27	Printing	180,197,708	5,737,458	191,438	3,969,378	74,494,504	541,655	22,828,260	287,960,401	14,644
28	Chemicals[a]	4,564,908,831	231,777,236	1,711,463,218	374,160,776	3,421,351,732	294,683,871	769,274,353	11,367,620,017	14,387,065
29	Petroleum[b]	92,280,999	22,384,373	1,169,379,271	1,301,874	270,655,896	6,814,494	68,647,345	1,631,464,252	493,511
30	Plastics	98,331,322	15,205,892	19,733,069	7,766,282	34,557,194	6,955,267	108,195,710	290,744,736	192,504
31	Leather	1,137,241	302,430	0	72,541	3,561,061	877,610	4,910,980	10,861,863	0
32	Stone/Clay/Glass	126,959,736	3,857,490	547,756,945	11,106,216	17,077,405	3,490,715	40,066,966	750,315,473	1,414,178
33	Primary Metals	1,482,591,924	989,915,832	66,458,149	10,516,299	497,544,711	48,615,436	634,712,628	3,730,354,979	16,247,801
34	Fabricated Metals	187,808,828	352,920,026	15,569,010	13,567,667	112,630,939	15,164,130	83,138,228	780,798,828	355,969
35	Machinery	42,649,677	71,704,447	209,714	2,817,777	11,507,462	5,778,959	21,018,701	155,686,737	358,584
36	Electrical Equip.	134,986,711	341,191,944	12,344,827	7,939,447	81,364,321	17,064,501	33,925,319	628,817,070	1,024,851
37	Transportation Equip.	20,778,948	142,693,618	1,250,526	12,641,076	33,878,678	14,561,569	101,141,024	326,945,439	41,013
38	Measure./Photo.	2,860,670	10,627,777	794,000	1,470,647	45,345,819	3,056,387	13,320,353	77,475,653	2,054
39	Miscellaneous	11,094,491	15,245,255	3,860,960	3,192,911	5,192,715	1,213,492	10,445,676	50,245,500	31,510
	Multiple codes 20-39	505,797,365	139,179,326	56,435,534	18,445,154	504,095,681	28,049,867	132,397,358	1,384,400,285	1,364,278
	No codes 20-39	2,333,139	31,578,768	8,354,297	38,010,835	11,243,815	1,243,554	20,566,082	113,330,490	426,002
	Total[c]	7,986,618,922	2,390,787,879	3,805,792,208	525,610,064	7,012,922,513	536,021,338	2,467,643,821	24,725,396,745	37,761,187
	Federal Facilities	17,036,914	15,434,909	7,085	220,954	5,604,834	716,542	6,455,020	45,476,258	366,371

Note: Data from Section 8 of Form R. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

[a]One facility in SIC code 28, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. In SIC code 28, Chemicals, on-site energy recovery changes to 1,530,633,218 pounds and total production-related waste changes to 11,186,790,017 pounds.

[b]One facility in SIC code 29, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene and 272,000,000 pounds of propylene in 1997. The facility has since revised these quantities to zero. In SIC code 29, Petroleum, on-site energy recovery changes to 475,379,271 pounds and total production-related waste changes to 937,464,252 pounds.

[c]Revisions by two facilities (in SIC codes 28 and 29, respectively) change on-site energy recovery to 2,930,962,208 pounds and total production-related waste to 23,850,566,745 pounds.

and metal compounds transferred to solidification/stabilization. These two types of transfers constituted 92.5% of all off-site releases reported by the primary metals industry. The industry reported transferring 70.6 million pounds of zinc compounds and 22.3 million pounds of zinc (fume or dust) to solidification/stabilization. Zinc compounds was also the chemical with the primary metals industry's largest transfers to landfills/disposal surface impoundments—75.3 million pounds.

The chemical manufacturing industry ranked second for off-site releases in 1997, reporting 54.8 million pounds. This amount represented 11.9% of the total for all industries. The chemical manufacturing industry's largest off-site releases were transfers of 8.9 million pounds of manganese compounds and 3.9 million pounds of lead compounds to landfills/disposal surface impoundments.

Two other industry groups reported more than 25 million pounds each: fabricated metals with 29.2 million pounds (6.3% of the total) and the multiple-codes group with 25.4 million pounds (5.5%).

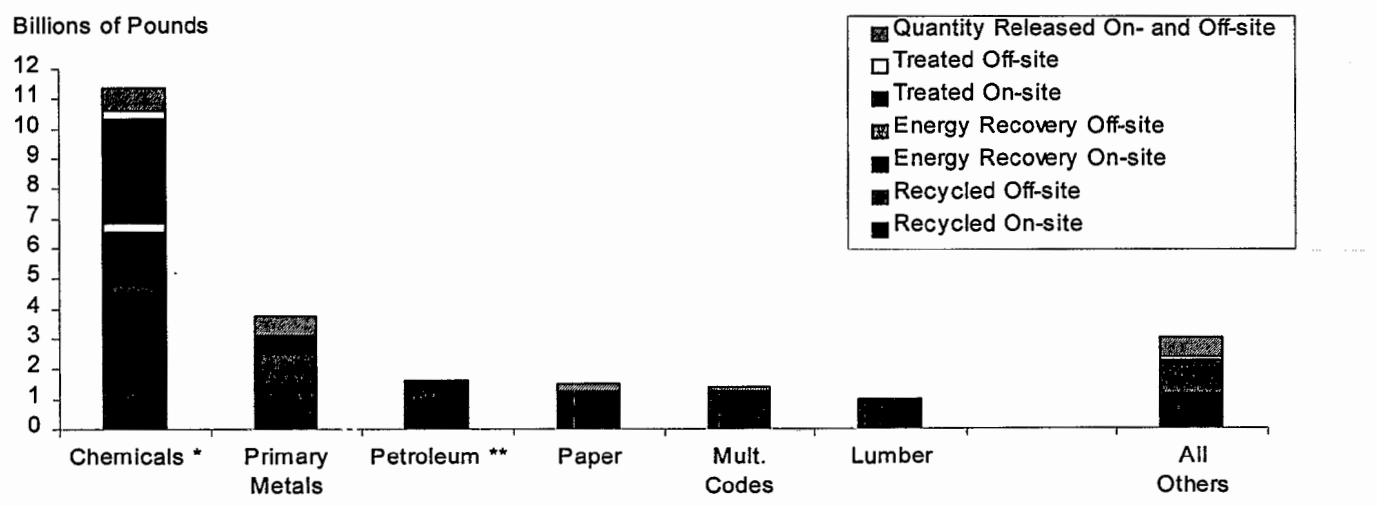


Figure 4-3. Quantities of TRI Chemicals in Waste Managed, Industries with Largest Totals, 1997

Note: Data from Section 8 of Form R. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category.
*One facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. The rank of Chemicals (SIC code 28) remains unchanged.
**One facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene and 272,000,000 pounds of propylene in 1997. The facility has since revised these quantities to zero. Petroleum (SIC code 29) changes in rank from third to sixth.

In both industries, the largest type of transfer was to landfills/disposal surface impoundments: 17.3 million pounds in the fabricated metals industry and 14.8 million pounds on forms reporting multiple SIC codes.

TRI Chemicals Managed in Waste, 1997

Facilities reported managing a total of 24.73 billion pounds of TRI chemicals in waste in 1997, as shown in Table 4-4. Figure 4-3 shows production-related waste reported by the industries with the largest totals. However, two facilities made substantial revisions in reporting of on-site energy recovery after the TRI database was "frozen" for preparation of this report. One facility in SIC code 28 (the chemical manufacturing industry) reported 193.8 million pounds of on-site energy recovery of ethylene in 1997, but subsequently revised this quantity to 13.0 million pounds. A facility in SIC code 29 (the petroleum industry) reported on-site energy recovery of 422.0 million pounds of ethylene and 272.0 million pounds of propylene in 1997. This facility has revised both quantities to zero. Taking these revisions into account, production-related waste managed would total 23.85 billion pounds in 1997.

The chemical manufacturing industry reported managing 11.37 billion pounds of total production-related waste in 1997. With the facility revision for on-site energy recovery of ethylene, the chemical manufacturing industry's total would change to 11.19 billion pounds, still the largest among all industries. The chemical manufacturing industry reported the largest quantities in all waste management categories except off-site recycling. Just over 40% of the chemical manufacturing industry's production-related waste was recycled on-site (4.56 billion pounds), and

approximately 30% was treated on-site (3.42 billion pounds). The revised report by one facility would change the on-site energy recovery total from 1.71 billion pounds to 1.53 billion pounds (approximately 14% of the total).

The primary metals industry ranked second for total production-related waste managed with 3.73 billion pounds (15.1% of the total). On-site recycling accounted for the largest portion of this total, with 1.48 billion pounds (second among all industries behind chemical manufacturing). The primary metals industry reported the largest quantity of off-site recycling (989.9 million pounds). It also reported the second-largest quantity released on- and off-site (634.7 million pounds).

The petroleum industry reported 1.63 billion pounds of production-related waste, third among all industries. The bulk of the petroleum industry's reporting consisted of 1.17 billion pounds of on-site energy recovery. However, as noted earlier, one facility in the petroleum industry reported 694.0 million pounds of on-site energy recovery of ethylene and propylene, but has since revised its forms to zero on-site energy recovery for these chemicals. Taking into account the revisions, the petroleum industry's on-site energy recovery would total 475.4 million pounds and its production-related waste would total 937.5 million pounds. With the revisions, the petroleum industry would rank sixth for total production-related waste managed in 1997.

The paper products industry reported 1.51 billion pounds of production-related waste managed. The majority of the paper products industry's reporting consisted of 921.4 million pounds of on-site treatment, the second-largest quantity reported for on-site treatment.

Production-related waste exceeded 1 billion pounds in one other industry group: the multiple-codes group reported 1.38 billion pounds. On these reporting forms, on-site recycling totaled 505.8 million pounds and on-site treatment totaled 504.1 million pounds, the largest waste management quantities in the multiple-codes group.

Economic Overview, by Industry, 1997

Although TRI data present significant information about toxic chemicals that are released on- and off-site, managed in waste on- and off-site, and transferred off-site for further waste management, they also have limitations. Chapter 1 discusses some of these. One such limitation is that TRI data alone do not distinguish industry-specific factors that influence the chemicals, amounts, and types of releases and other waste management facilities report. Table 4-5 presents two basic economic measures (employment and dollar value of sales, receipts, or shipments) that suggest the relative size of the industrial sectors that report to TRI (additional sectors will begin reporting in 1999 for the 1998 reporting year). Economic analyses make use of data on the value of production (sales, receipts, or shipments) as one way to indicate the size of industrial sectors, because no direct comparison can be drawn among products of the sectors. This value provides a rough common measure between, say, production of 10,000 pairs of shoes and production of 500,000 loaves of bread.

Table 4-5 also includes total production-related waste managed that TRI facilities reported for 1997, to allow approximate comparisons with the economic activity of the industry sectors. Percentages indicate the relative contribution of each industry to total employment and production and to the total quantity of TRI chemicals in production-related waste managed. The ratio of total production-related waste managed to production value (sales, receipts, or shipments), in the last column, compares the reported TRI quantities for each industry with that industry's production level for 1997. Many factors influence the differences in TRI reporting among industries.

Table 4-5. Employees, Sales, and Total Production-related Waste, by Industry, 1997

SIC Code	Industry	Paid Employees		Sales, Receipts, or Shipments		TRI Total Production-related Waste Managed		Production-related Waste Managed per Sales, Receipts, or Shipments
		Number	Percent	($000)	Percent	Pounds	Percent	Pounds per $1,000,000
20	Food	1,567,155	8.9	480,299,707	12.1	531,233,413	2.3	1,106
21	Tobacco	34,464	0.2	36,328,974	0.9	6,169,265	0.0	170
22	Textiles	557,775	3.2	82,763,179	2.1	69,569,417	0.3	841
23	Apparel	840,498	4.8	81,023,419	2.0	1,969,315	0.0	24
24	Lumber	756,934	4.3	111,444,879	2.8	975,873,385	4.2	8,757
25	Furniture	522,893	3.0	62,388,884	1.6	40,929,660	0.2	656
26	Paper	623,799	3.5	159,954,824	4.0	1,512,630,567	6.5	9,457
27	Printing	1,519,824	8.6	206,396,046	5.2	287,960,401	1.2	1,395
28	Chemicals[a]	843,469	4.8	404,400,164	10.2	11,367,620,017	48.9	28,110
29	Petroleum[b]	106,863	0.6	173,414,651	4.4	1,631,464,252	7.0	9,408
30	Plastics	1,031,202	5.8	159,079,133	4.0	290,744,736	1.3	1,828
31	Leather	84,002	0.5	9,940,805	0.3	10,861,863	0.0	1,093
32	Stone/Clay/Glass	509,730	2.9	88,312,387	2.2	750,315,473	3.2	8,496
33	Primary Metals	692,943	3.9	192,924,973	4.9	3,730,354,979	16.1	19,336
34	Fabricated Metals	1,555,670	8.8	233,701,166	5.9	780,798,828	3.4	3,341
35	Machinery	2,001,684	11.4	407,720,628	10.3	155,686,737	0.7	382
36	Electrical Equip.	1,573,893	8.9	345,490,897	8.7	628,817,070	2.7	1,820
37	Transportation Equip.	1,587,091	9.0	520,505,442	13.1	326,945,439	1.4	628
38	Measure./Photo.	832,432	4.7	157,938,963	4.0	77,475,653	0.3	491
39	Miscellaneous	391,656	2.2	50,759,871	1.3	50,245,500	0.2	990
	Total[c]	17,633,977	100.0	3,964,788,992	100.0	23,227,665,970	100.0	5,858

Note: Paid Employees and Sales, Receipts or Shipments from U.S. Census Bureau, *1997 Annual Survey of Manufactures*: http://www.census.gov/epcd/www/advanc2b.htm [accessed March 26, 1999]. These data are preliminary and are subject to change; Includes only establishments with payroll. Data are in current dollars and have not been adjusted for inflation. **Total Production-related Waste Managed** from Section 8 (total of 8.1 through 8.7, Column B) of TRI Form for 1997. **Total Production-related Waste Managed** in this table does not include forms reporting more than one 2-digit SIC code and forms reporting SIC codes outside the 20-39 range.

[a]One facility in SIC code 28, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery of 193,830,000 pounds of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. In SIC code 28, Chemicals, total production-related waste changes to 11,186,790,017 pounds. Production-related waste managed in SIC code 28 as a percentage of TRI total production-related waste changes to 50.0%. The ratio of production-related waste to sales, receipts, or shipments changes to 27,663 pounds per $1,000,000.

[b]One facility in SIC code 29, TPI Petroleum in Ardmore, OK, reported on-site energy recovery of 422,000,000 pounds of ethylene and 272,000,000 pounds of propylene in 1997. The facility has since revised these quantities to zero. In SIC code 29, Petroleum, total production-related waste changes to 937,464,252 pounds. Production-related waste managed in SIC code 28 as a percentage of TRI total production-related waste changes to 4.2%. The ratio of production-related waste to sales, receipts, or shipments changes to 5,406 pounds per $1,000,000.

[c]Revisions by two facilities (in SIC codes 28 and 29, respectively) change total production-related waste to 22,352,835,970 pounds. The ratio of production-related waste to sales, receipts, or shipments changes to 5,638 pounds per $1,000,000.

Relating TRI quantities to the dollar value of each industry's products takes into account one measure of the differences among industries in their level of production in 1997.

In 1997, as shown in Table 4-5, chemical manufacturing accounted for 4.8% of manufacturing employment, 10.2% of the value of manufacturing production (sales, receipts, or shipments), and 48.9% of TRI total production-related waste managed. Chemical manufacturing also had the highest ratio of production-related waste managed to production value (sales, receipts, or shipments), 28,110 pounds per $1 million value. Revisions by one facility, described above, would change the 1997 production-related waste managed by the chemical manufacturing industry from 11.37 billion pounds to 11.19 billion pounds; this would also change the ratio to 27,663 pounds per $1 million. The primary metals industry had the second largest ratio of production-related waste managed to production value, with 19,336 pounds per $1 million, and the paper industry ranked third with 9,457 pounds per $1 million.

Year-by-Year Comparisons, by Industry

Comparisons of TRI data across reporting years are made on the basis of "core" chemicals that were reportable in all years with the same reporting definitions. This assures that apparent increases or decreases from one year to another are not the result of changes in the list of TRI chemicals. Chapter 3 explains the multi-year comparisons; an understanding of these issues is essential for accurate interpretation of the multi-year data presented in this chapter.

Progress is measured from TRI's designated baseline year, 1988, for on-site releases and off-site transfers for treatment and disposal. These are the types that have been collected since TRI began. Additional on- and off-site waste management data, authorized under the federal Pollution Prevention Act of 1990, have been collected since 1991, the baseline year for waste management data.

On- and Off-site Releases, 1995-1997

Table 4-6 summarizes on- and off-site releases by industry for 1995, 1996, and 1997. From 1995 to 1997, total on- and off-site releases decreased from 2.62 billion pounds to 2.58 billion pounds, a reduction of 1.5%. The chemical manufacturing industry, which reported the largest total releases in all three years, also reported the largest absolute reduction, from 846.6 million pounds to 797.5 million pounds. The multiple-codes group ranked second for absolute decreases, from 158.9 million pounds in 1995 to 137.6 million pounds in 1997. The transportation equipment industry reported the third-largest absolute decrease, from 122.6 million pounds to 102.1 million pounds. In percentage terms, the chemical industry reported a 5.8% reduction, the multiple-codes group reported a 13.4% reduction, and the transportation equipment industry reported a 16.8% reduction.

The primary metals industry, which reported the second-largest total in all three years, reported the largest absolute increase in total releases from 1995 to 1997. The primary metals industry reported releases totaling 565.1 million pounds in 1995 and 694.7 million pounds in 1997. The stone, clay, and glass industry ranked second for increases (behind primary metals), increasing from 36.8 million pounds in 1995 to 43.2 million pounds in 1997. The petroleum industry ranked third, increasing from 65.5 million pounds to 69.3 million pounds. In percentage terms, these changes represented a 22.9% increase by the primary metals industry, a 17.6% increase by the stone/clay/glass industry, and a 5.8% increase by the petroleum industry.

Industries recording large percentage changes, as shown in Table 4-6, were among those reporting smaller amounts of total on- and off-site releases. The furniture industry reported the largest percentage reduction—40.8%—from 42.4 million pounds in 1995 to 25.1 million pounds in 1997. The tobacco industry showed the largest percentage increase — 113.8% — from 2.0 million pounds in 1997 to 4.3 million pounds in 1999.

On- and Off-site Releases, 1988 and 1995-1997

From 1988 to 1997, total on- and off-site releases reported to TRI decreased from 3.40 billion pounds to 1.94 billion pounds (or 42.8%), as shown in Table 4-7. All industry sectors recorded reductions in total releases of the 1988-1997 core chemicals.

The chemical manufacturing industry reported 1.06 billion pounds in 1988 and 519.1 million pounds in 1997, the largest absolute reduction among all industries. This amounted to a 50.8% reduction by the chemical manufacturing industry. The multiple-codes group ranked second for absolute decreases, declining from 311.6 million pounds to 106.2 million pounds (a 65.9% reduction).

Table 4-6. Change in Total TRI On-site and Off-site Releases, by Industry, 1995-1997

SIC Code	Industry	Total On-site and Off-site Releases 1995 Pounds	1996 Pounds	1997 Pounds	Change 1995-1996 Percent	1996-1997 Percent	1995-1997 Percent
20	Food	101,364,802	92,316,738	93,568,490	-8.9	1.4	-7.7
21	Tobacco	2,034,129	4,238,197	4,349,614	108.4	2.6	113.8
22	Textiles	18,957,518	17,311,767	19,436,259	-8.7	12.3	2.5
23	Apparel	1,287,784	1,315,708	904,532	2.2	-31.3	-29.8
24	Lumber	36,137,541	37,824,484	29,659,423	4.7	-21.6	-17.9
25	Furniture	42,425,566	36,049,016	25,113,916	-15.0	-30.3	-40.8
26	Paper	239,262,595	229,049,021	233,530,384	-4.3	2.0	-2.4
27	Printing	31,227,811	27,329,846	24,643,778	-12.5	-9.8	-21.1
28	Chemicals	846,556,455	791,685,362	797,496,810	-6.5	0.7	-5.8
29	Petroleum	65,514,109	68,977,064	69,323,451	5.3	0.5	5.8
30	Plastics	126,870,284	116,914,866	108,465,623	-7.8	-7.2	-14.5
31	Leather	4,840,614	4,682,977	4,733,944	-3.3	1.1	-2.2
32	Stone/Clay/Glass	36,767,489	44,140,512	43,221,351	20.1	-2.1	17.6
33	Primary Metals	565,057,273	620,016,346	694,662,087	9.7	12.0	22.9
34	Fabricated Metals	101,212,292	94,398,028	95,536,645	-6.7	1.2	-5.6
35	Machinery	27,174,238	23,299,740	22,401,312	-14.3	-3.9	-17.6
36	Electrical Equip.	41,850,172	37,083,648	34,144,970	-11.4	-7.9	-18.4
37	Transportation Equip.	122,648,556	107,706,539	102,057,628	-12.2	-5.2	-16.8
38	Measure./Photo.	17,728,562	15,559,901	13,241,886	-12.2	-14.9	-25.3
39	Miscellaneous	13,937,669	10,491,612	10,242,459	-24.7	-2.4	-26.5
	Multiple codes 20-39	158,921,133	125,642,654	137,621,890	-20.9	9.5	-13.4
	No codes 20-39	14,586,113	15,416,790	13,196,632	5.7	-14.4	-9.5
	Total	2,616,362,705	2,521,450,816	2,577,553,084	-3.6	2.2	-1.5
	Federal Facilities	9,457,198	7,515,476	6,573,345	-20.5	-12.5	-30.5

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

Two other industries reported decreases of more than 100 million pounds each: The transportation equipment industry reported the third-largest decrease, from 215.0 million pounds to 96.8 million pounds, and the electrical equipment industry reported the fourth-largest decrease, from 134.0 million pounds to 26.2 million pounds. In percentage terms, the transportation equipment industry's total on- and off-site releases decreased 55.0% and the electrical equipment industry's total decreased 80.5%, which was the second largest percentage reduction. The largest percentage reduction (85.7%) was reported in the measuring instruments and photographic equipment industry, which reported 55.8 million pounds in 1988 and 8.0 million pounds in 1997.

TRI Chemicals Managed in Waste, 1991, 1995, 1997-1999

Projected Quantities of TRI Chemicals Managed in Waste, 1997-1999

TRI facilities projected a 1.2% decrease from 24.73 billion pounds of total production-related waste managed in 1997 to 24.43 billion pounds in 1999, as shown in Table 4-8. Revisions by two facilities, previously described, would change these totals to 23.85 billion pounds in 1997 and 23.47 billion pounds projected for 1999, and the percentage change projected for 1997 to 1999 would be a 1.6% reduction. (As described in Chapter 2, on each Form R that it submits, a facility reports actual waste management quantities for the current and prior years and projected quantities for the next two years.)

Table 4-7. Change in Total TRI On-site and Off-site Releases, by Industry, 1988 and 1995-1997

SIC Code	Industry	Total On and Off-site Releases 1988 Pounds	1995 Pounds	1996 Pounds	1997 Pounds	Change 1995-1997 Percent	Change 1988-1997 Percent
20	Food	8,414,635	5,224,392	5,187,430	5,213,000	-0.2	-38.0
21	Tobacco	251,946	95,226	73,425	196,961	106.8	-21.8
22	Textiles	36,875,477	16,021,698	15,150,985	16,941,074	5.7	-54.1
23	Apparel	1,048,961	1,260,746	1,195,289	817,329	-35.2	-22.1
24	Lumber	33,056,013	31,542,259	28,379,176	25,091,620	-20.5	-24.1
25	Furniture	62,412,288	42,164,977	35,799,613	24,892,695	-41.0	-60.1
26	Paper	207,840,633	179,640,320	174,420,174	181,559,981	1.1	-12.6
27	Printing	61,234,598	30,967,327	27,157,182	24,484,493	-20.9	-60.0
28	Chemicals	1,055,611,740	546,643,304	517,845,766	519,129,158	-5.0	-50.8
29	Petroleum	73,096,751	42,990,233	43,893,116	42,850,660	-0.3	-41.4
30	Plastics	158,575,935	113,412,580	104,656,280	95,304,534	-16.0	-39.9
31	Leather	13,699,921	4,407,246	4,253,859	4,208,084	-4.5	-69.3
32	Stone/Clay/Glass	38,754,943	21,956,660	27,142,848	27,586,607	25.6	-28.8
33	Primary Metals	649,920,076	495,602,763	552,228,867	616,157,848	24.3	-5.2
34	Fabricated Metals	163,833,118	94,584,794	81,869,409	81,172,054	-14.2	-50.5
35	Machinery	70,744,411	23,610,134	20,054,081	19,121,806	-19.0	-73.0
36	Electrical Equip.	134,042,669	31,872,667	28,434,289	26,158,202	-17.9	-80.5
37	Transportation Equip.	215,000,245	116,336,180	101,585,633	96,806,810	-16.8	-55.0
38	Measure./Photo.	55,792,611	12,861,302	10,439,046	7,986,611	-37.9	-85.7
39	Miscellaneous	32,750,257	13,354,606	10,064,702	9,804,514	-26.6	-70.1
	Multiple codes 20-39	311,613,892	128,408,482	95,540,801	106,195,233	-17.3	-65.9
	No codes 20-39	11,295,569	11,968,348	12,013,614	10,190,873	-14.9	-9.8
	Total	3,395,866,689	1,964,926,244	1,897,385,585	1,941,870,147	-1.2	-42.8
	Federal Facilities	NA	6,730,862	4,948,596	3,707,932	-44.9	NA

Note: On-site Releases from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.
NA: Federal Facilities not required to report before 1994.

The chemical manufacturing industry, reporting 11.37 billion pounds of production-related waste in 1997, projected the largest absolute reduction. By 1999, the chemical manufacturing industry expected to manage 11.13 billion pounds of production-related waste, a 2.1% decrease. Although one facility in SIC code 28 revised its submission for ethylene after data were "frozen" for preparation of this report, as mentioned earlier in this chapter, the change would not affect the chemical manufacturing industry's rank. The revised totals would be 11.19 billion pounds in 1997 and 10.93 billion pounds projected for 1999, a projected reduction of 2.3%.

The lumber industry projected the second-largest absolute reduction, from 975.9 million pounds in 1997 to 859.4 million pounds in 1999. The multiple-codes group ranked third with a projected decrease from 1.38 billion pounds to 1.34 billion pounds, and the plastics industry ranked fourth, projecting a decrease from 290.7 million pounds to 250.2 million pounds. These represented projected reductions of 11.9% by the lumber industry, 3.1% by the multiple-codes group, and 13.9% by the plastics industry.

The food industry projected the largest absolute increase in production-related waste managed, from 531.2 million pounds in 1997 to 604.1 million pounds in 1999; this was also the largest projected percentage increase, 13.7%. The petroleum industry projected an increase from 1.63 billion pounds to 1.69 billion pounds, but this included projected increases by the facility that has since revised its 1997 submissions for ethylene and propylene, described earlier in this chapter. When this facility's revisions are taken into account, the petroleum industry's projection for production-related waste changes to a reduction from 937.5 million pounds in 1997 to 924.6 million pounds

Table 4-8. Actual and Projected Total Production-related Waste Managed, by Industry, 1997-1999

SIC Code	Industry	Total Production-related Waste Managed				
		Current Year	Projected		Change	
		1997	1998	1999	1997-1998	1997-1999
		Pounds	Pounds	Pounds	Percent	Percent
20	Food	531,233,413	606,170,821	604,063,414	14.1	13.7
21	Tobacco	6,169,265	6,064,073	6,319,100	-1.7	2.4
22	Textiles	69,569,417	59,358,694	55,923,836	-14.7	-19.6
23	Apparel	1,969,315	1,523,946	1,473,373	-22.6	-25.2
24	Lumber	975,873,385	859,058,730	859,372,040	-12.0	-11.9
25	Furniture	40,929,660	38,530,508	39,463,039	-5.9	-3.6
26	Paper	1,512,630,567	1,630,911,269	1,523,721,674	7.8	0.7
27	Printing	287,960,401	264,926,907	287,564,112	-8.0	-0.1
28	Chemicals[a]	11,367,620,017	11,118,034,397	11,128,459,345	-2.2	-2.1
29	Petroleum[b]	1,631,464,252	1,648,150,884	1,689,749,139	1.0	3.6
30	Plastics	290,744,736	244,205,499	250,243,444	-16.0	-13.9
31	Leather	10,861,863	11,818,920	12,182,239	8.8	12.2
32	Stone/Clay/Glass	750,315,473	748,713,163	784,983,639	-0.2	4.6
33	Primary Metals	3,730,354,979	3,688,078,922	3,765,018,476	-1.1	0.9
34	Fabricated Metals	780,798,828	758,735,579	753,476,794	-2.8	-3.5
35	Machinery	155,686,737	128,185,417	126,039,857	-17.7	-19.0
36	Electrical Equip.	628,817,070	631,803,904	653,656,735	0.5	4.0
37	Transportation Equip.	326,945,439	316,804,714	317,835,153	-3.1	-2.8
38	Measure./Photo.	77,475,653	74,807,650	74,320,838	-3.4	-4.1
39	Miscellaneous	50,245,500	50,097,903	50,382,248	-0.3	0.3
	Multiple codes 20-39	1,384,400,285	1,342,335,171	1,341,753,393	-3.0	-3.1
	No codes 20-39	113,330,490	104,317,439	107,398,674	-8.0	-5.2
	Total[c]	24,725,396,745	24,332,634,510	24,433,400,562	-1.6	-1.2
	Federal Facilities	45,476,258	43,598,666	43,830,639	-4.1	-3.6

Note: Data from Section 8 (Total of 8.1 through 8.7) of Form R for 1997. Current year is Column B, 1998 is Column C and 1999 is Column D. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

[a] One facility in SIC code 28, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997 and projected 213,213,000 pounds for both 1998 and 1999. The facility has since revised these quantities to 13,000,000 pounds each. In SIC code 28, Chemicals, total production-related waste changes to 11,186,790,017 pounds in 1997, to 10,917,821,397 projected for 1998, and to 10,928,246,345 projected for 1999. In SIC code 28, the percentage change in total production-related waste changes to -2.4% for 1997-1998 and to -2.3% for 1997-1999.

[b] One facility in SIC code 29, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 422,000,000 pounds in 1997 and projected 443,100,000 pounds for 1998 and 465,255,000 pounds for 1999. This facility also reported on-site energy recovery for propylene of 272,000,000 pounds in 1997 and projected 285,600,000 pounds for 1998 and 299,880,000 pounds for 1999. The facility has since revised these quantities to zero. In SIC code 29, Petroleum, total production-related waste changes to 937,464,252 pounds in 1997, to 919,450,884 pounds projected for 1998, and to 924,614,139 pounds projected for 1999. In SIC code 29, the percentage change in total production-related waste changes to -1.9% projected for 1997-1998 and to -1.4% projected for 1997-1999.

[c] Revisions by two facilities (in SIC codes 28 and 29, respectively) change total production-related waste managed to 23,850,566,745 pounds in 1997, to 23,403,721,510 projected pounds for 1998, and to 23,468,052,562 pounds projected for 1999. The percentage change in total production-related waste changes to -1.9% for 1997-1998 and to -1.6% for 1997-1999.

in 1999 (a 1.4% projected reduction). With these revisions, the petroleum industry would have the eighth-largest decrease rather than the second-largest increase.

The stone, clay, and glass industry and the primary metals industry projected the next largest absolute increases. In the stone, clay, and glass industry, facilities projected an increase in production-related waste managed from 750.3 million pounds in 1997 to 785.0 million pounds in 1999. In the primary metals industry, the projected increase was from 3.73 billion pounds in 1997 to 3.77 billion pounds in 1999. In percentage terms, these represented projected increases of 4.6% and 0.9%, respectively. Industries projecting large percentage reductions, as shown in Table 4-8, were among those with generally smaller quantities for total production-related waste. The apparel industry projected the largest relative decrease—25.2% (from 2.0 million pounds in 1995 to 1.5 million pounds in 1997), followed by the textiles industry with a projected decrease of 19.6% (from 69.6 million pounds to 55.9 million pounds).

Quantities of TRI Chemicals in Waste, 1995-1997

As shown in Table 4-9, facilities reported managing 27.49 billion pounds of production-related waste in 1995 and 24.73 billion pounds in 1997. However, facility errors and revisions would substantially change these totals. As noted above, two facilities revised their submissions after TRI data were "frozen" for preparation of this report. Another facility in the chemical manufacturing industry reported on-site recycling for vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. This facility has since revised these quantities to 200.0 million pounds and 244.0 million pounds, respectively (also revised after the TRI database was "frozen"). Furthermore, in 1995, seven food processing facilities (SIC code 20) reported on-site recycling of 500 million to 1 billion pounds each of n-hexane, a chemical added to TRI in the 1995 reporting year. Together, their 1995 on-site recycling of n-hexane totaled 4.00 billion pounds. In 1996 and 1997, these facilities reported no on-site recycling of n-hexane. TRI facilities report production-related waste quantities for both the prior year and current year (along with projections for the following two years). As noted in the *1996 TRI Data Release*[1] these facilities reported on their 1996 TRI Form Rs zero amounts of on-site recycling of n-hexane for the prior year (1995), but did not revise their 1995 submissions. Such changes generally indicate that facilities have revised their interpretation of on-site recycling. Currently, there are no TRI regulatory definitions of recycling, and facilities may use their own interpretations for purposes of reporting to TRI. Some facilities have chosen to restrict their interpretation of on-site recycling to cover a very limited set of activities. Therefore, quantities that may have been reported as amounts undergoing waste management activities in early years are not reported on the Form R in subsequent years and are, thus, not in the TRI database. These changes in interpretations do not represent a change in guidance by EPA on how to report recycling. Because the seven food processing facilities did not revise their 1995 submissions, the large amounts of on-site recycling they reported in 1995 remain in the TRI data.

If the 4.00 billion pounds of n-hexane on-site recycling by food industry facilities are excluded from the amounts for 1995 and the facility revisions are incorporated into the data for 1996 and 1997, the totals for production-related waste managed would change to 23.59 billion pounds in 1995, 22.34 billion pounds in 1996, and 23.85 billion pounds in 1997, a 1.1% increase between 1995 and 1997 instead of the 10.0% reduction shown in Table 4-9.

While the food industry recorded the largest absolute reduction from 1995 to 1997, if the 4.00 billion pounds of n-hexane are excluded from the 1995 amounts, then the primary metals industry had the largest absolute reduction from 1995 to 1997 in total production-related waste managed. The primary metals industry reported 4.35 billion pounds of total production-related waste managed in 1995 and 3.73 billion pounds in 1997. The multiple-codes group ranked second, reporting 1.90 billion pounds in 1995 and 1.38 billion pounds in 1997. In percentage terms, these represented a 14.3% decrease by the primary metals industry and a 27.1% decrease by the multiple-codes group.

The plastics industry ranked third for absolute reductions in total production-related waste managed, with 540.5 million pounds in 1995 and 290.7 million pounds in 1997 (a 46.2% reduction). The paper industry ranked fourth, reporting 1.76 billion pounds in 1995 and 1.51 billion pounds in 1997 (a 14.0% reduction).

[1] *1996 Toxics Release Inventory Public Data Release-Ten Years of Right-to-Know: Industry Sector Analyses*, US EPA, Office of Pollution Prevention and Toxics, EPA 745-R-98-018, December 1998.

Table 4-9. Total Production-related Waste Managed, by Industry, 1995-1997

SIC Code	Industry	Total Production-related Waste Managed					
					Change		
		1995 Pounds	1996 Pounds	1997 Pounds	1995-1996 Percent	1996-1997 Percent	1995-1997 Percent
20	Food[a]	4,096,727,212	373,432,121	531,233,413	-90.9	42.3	-87.0
21	Tobacco	2,871,737	6,007,909	6,169,265	109.2	2.7	114.8
22	Textiles	57,720,302	49,927,437	69,569,417	-13.5	39.3	20.5
23	Apparel	2,149,244	2,342,159	1,969,315	9.0	-15.9	-8.4
24	Lumber	122,273,245	113,375,035	975,873,385	-7.3	760.7	698.1
25	Furniture	60,529,386	53,148,903	40,929,660	-12.2	-23.0	-32.4
26	Paper	1,759,386,960	1,596,811,808	1,512,630,567	-9.2	-5.3	-14.0
27	Printing	294,319,163	265,264,493	287,960,401	-9.9	8.6	-2.2
28	Chemicals[b]	10,120,073,858	10,041,267,515	11,367,620,017	-0.8	13.2	12.3
29	Petroleum[c]	1,047,153,152	1,141,329,979	1,631,464,252	9.0	42.9	55.8
30	Plastics	540,484,205	371,880,845	290,744,736	-31.2	-21.8	-46.2
31	Leather	10,860,417	10,543,444	10,861,863	-2.9	3.0	0.0
32	Stone/Clay/Glass	860,633,492	672,729,829	750,315,473	-21.8	11.5	-12.8
33	Primary Metals	4,352,773,017	3,913,992,119	3,730,354,979	-10.1	-4.7	-14.3
34	Fabricated Metals	758,443,850	759,623,545	780,798,828	0.2	2.8	2.9
35	Machinery	171,365,119	159,147,884	155,686,737	-7.1	-2.2	-9.1
36	Electrical Equip.	690,449,975	678,680,714	628,817,070	-1.7	-7.3	-8.9
37	Transportation Equip.	408,933,268	364,187,802	326,945,439	-10.9	-10.2	-20.0
38	Measure./Photo.	80,970,622	77,469,774	77,475,653	-4.3	0.0	-4.3
39	Miscellaneous	51,700,894	49,019,375	50,245,500	-5.2	2.5	-2.8
	Multiple codes 20-39	1,899,432,059	1,347,935,813	1,384,400,285	-29.0	2.7	-27.1
	No codes 20-39	98,104,395	96,362,618	113,330,490	-1.8	17.6	15.5
	Total[d]	27,487,355,572	22,144,481,121	24,725,396,745	-19.4	11.7	-10.0
	Federal Facilities	44,587,407	41,474,566	45,476,258	-7.0	9.6	2.0

Note: Data from Section 8 (Total of 8.1 through 8.7) of Form R of year indicated. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

[a]Seven facilities in the food processing industry (SIC code 20) reported from 500 million pounds to 1 billion pounds each in on-site recycling of n-hexane in 1995, for a total 4,000,192,215 billion pounds. In 1996, these facilities reported no on-site recycling of n-hexane. On their 1996 Form Rs, these facilities also reported zero for on-site recycling of n-hexane for the prior year (1995). However, they have not revised their 1995 Form Rs. In SIC code 20, total production-related waste changes to 96,534,997 pounds in 1995. The percentage change in total production-related waste changes to 286.8% for 1995-1996, to 42.3% for 1996-1997, and to 450.3% for 1995-1997.

[b]One facility in SIC code 28, Shintech Inc. in Freeport, TX, reported on-site recycling for vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 pounds in 1996. Another facility, Shell Chemical Co. in Geismar, LA, reported 193,830,000 pounds of on-site energy recovery of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. In SIC code 28, total production-related waste changes to 10,319,873,858 pounds in 1995, to 10,285,023,515 pounds in 1996, and to 11,186,790,017 pounds in 1997. The percentage change in total production-related waste changes to -0.3% for 1995-1996, to 8.8% for 1996-1997, and to 8.4% for 1995-1997.

[c]One facility in SIC code 29, TPI Petroleum in Ardmore, OK reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. This facility also reported on-site energy recovery for propylene of 12,900,000 pounds in 1995, 16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. In SIC code 29, Petroleum, total production-related waste changes to 951,753,152 pounds in 1995, to 1,088,779,979 pounds in 1996, and to 937,464,252 pounds in 1997. The percentage change in total production-related waste changes to 14.4% for 1995-1996, to -13.9% for 1996-1997 and to -1.5% for 1991-1997.

[d]Apparent errors by seven facilities and revisions by three facilities change total production-related waste managed to 23,591,563,357 pounds in 1995, to 22,335,687,121 pounds in 1996, and to 23,850,566,745 pounds in 1997. The percentage change in total production-related waste changes to -5.3% for 1995-1996, to 6.8% for 1996-1997, and to 1.1% for 1995-1997.

The chemical manufacturing industry reported the largest absolute increase, from 10.12 billion pounds in 1995 to 11.37 billion pounds in 1997 (a 12.3% increase), as shown in Table 4-9. Facility revisions previously discussed would change the totals for the chemical manufacturing industry to 10.32 billion pounds in 1995 and 11.19 billion pounds in 1997 (an 8.4% increase), but would not alter the industry rankings.

The lumber industry reported the second-largest absolute increase in total production-related waste managed, with 122.3 million pounds in 1995 and 975.9 million pounds in 1997. This was also the largest percentage increase—698.1%. Four facilities in the lumber industry, owned by the same parent company, reported large increases in waste management, all involving creosote. Two of the facilities attributed their increases to increased production, one cited an increase in the quantity of wastewater at the facility but did not explain that change, and the fourth declined to explain its increased waste management quantities.

The largest of the facility reporting issues discussed above—on-site recycling of n-hexane reported in 1995 by seven food-processing facilities—would change the food industry's apparent ranking as the industry with the largest absolute and relative reduction from 1995 to 1997 in total production-related waste managed. The food industry's total production-related waste would change from 4.10 billion pounds, as shown in Table 4-9, to 96.5 million pounds in 1995, and the industry's total would increase by 450.3% to 531.2 million pounds in 1997. This would rank as the third-largest absolute increase and the second-largest percentage increase among all industries. This increase was largely attributable to a food-processing facility that came on-line during 1996. This facility did not report for n-hexane in 1995, but reported 77.5 million pounds of on-site recycling of n-hexane in 1996 and 220.6 million pounds in 1997. The facility contact stated that the facility began operation in August 1996 and was in full operation during 1997.

Quantities of TRI Chemicals in Waste, 1991 and 1995-1997

As shown in Table 4-10, total production-related waste managed rose from 18.44 billion pounds in 1991 to 20.85 billion pounds in 1997, a 13.1% increase. Late revisions by reporting facilities, discussed above, would change these amounts. Taking these revisions into account, production-related waste managed for the 1991-1997 "core" chemicals would total 19.98 billion pounds in 1997, and the percentage increase from 1991 to 1997 would change to 8.3%. (Apparent errors in reporting of n-hexane by facilities in the food industry do not affect data presented in Table 4-10 because n-hexane was added to TRI in 1995.)

The multiple-codes group reported the largest absolute reduction from 1991 to 1997 in total production-related waste managed. These forms totaled 1.95 billion pounds of production-related waste in 1995 and 1.17 billion pounds in 1997. In percentage terms, this represented a 39.7% decrease. Although the petroleum industry appeared to have a large increase (from 1.17 billion pounds in 1991 to 1.48 billion pounds in 1997), revisions by one facility in this industry for on-site energy recovery of ethylene and propylene, noted above, would change the petroleum industry's rank to second for absolute decreases. These revisions would change the petroleum industry's 1997 total to 789.8 million pounds, and the percentage change from 1991 to 1997 would change from a 26.7% increase to a 32.6% decrease.

The stone, clay, and glass industry ranked third (following the multiple-codes group and the petroleum industry) for absolute decreases with 953.1 million pounds in 1991 and 717.9 million pounds in 1997. The plastics industry ranked fourth, decreasing from 457.2 million pounds to 263.0 million pounds. These represented percentage reductions of 24.7% and 42.5%, respectively.

Table 4-10. Total Production-related Waste Managed, by Industry, 1991 and 1995-1997

SIC Code	Industry	Total Production-related Waste Managed				Change		
		1991 Pounds	1995 Pounds	1996 Pounds	1997 Pounds	1996-1997 Percent	1995-1997 Percent	1991-1997 Percent
20	Food	63,027,707	71,936,694	70,532,406	70,843,378	0.4	-1.5	12.4
21	Tobacco	51,405,093	150,596	108,156	210,791	94.9	40.0	-99.6
22	Textiles	51,580,594	46,536,034	42,786,507	54,476,883	27.3	17.1	5.6
23	Apparel	2,340,880	2,118,876	2,165,029	1,770,806	-18.2	-16.4	-24.4
24	Lumber	68,006,740	119,207,673	110,038,585	972,391,759	783.7	715.7	1,329.8
25	Furniture	60,883,209	59,813,552	52,392,104	40,256,052	-23.2	-32.7	-33.9
26	Paper	1,401,175,507	1,317,592,594	1,325,535,955	1,291,608,906	-2.6	-2.0	-7.8
27	Printing	259,904,658	291,280,441	264,220,588	287,090,072	8.7	-1.4	10.5
28	Chemicals[a]	7,354,796,781	7,882,552,320	7,950,666,706	9,135,159,658	14.9	15.9	24.2
29	Petroleum[b]	1,171,403,907	911,968,773	930,689,371	1,483,803,949	59.4	62.7	26.7
30	Plastics	457,235,414	497,107,205	338,090,548	262,952,768	-22.2	-47.1	-42.5
31	Leather	18,010,356	7,497,055	6,379,245	6,443,865	1.0	-14.0	-64.2
32	Stone/Clay/Glass	953,140,758	837,647,724	645,317,606	717,864,932	11.2	-14.3	-24.7
33	Primary Metals	2,318,851,086	3,420,511,273	3,462,785,991	3,365,553,638	-2.8	-1.6	45.1
34	Fabricated Metals	597,885,506	684,155,303	720,023,427	745,596,824	3.6	9.0	24.7
35	Machinery	261,821,641	158,602,984	148,765,091	145,106,755	-2.5	-8.5	-44.6
36	Electrical Equip.	663,946,454	593,622,657	609,759,426	560,885,921	-8.0	-5.5	-15.5
37	Transportation Equip.	384,413,509	385,439,477	345,353,778	309,978,967	-10.2	-19.6	-19.4
38	Measure./Photo.	118,291,507	71,832,907	68,078,152	67,966,322	-0.2	-5.4	-42.5
39	Miscellaneous	59,769,414	49,669,419	47,346,282	48,546,744	2.5	-2.3	-18.8
	Multiple codes 20-39	1,948,675,205	1,371,257,172	1,183,045,458	1,174,119,010	-0.8	-14.4	-39.7
	No codes 20-39	172,065,448	93,034,071	84,480,702	109,172,368	29.2	17.3	-36.6
	Total[c]	18,438,631,374	18,873,534,800	18,408,561,113	20,851,800,368	13.3	10.5	13.1
	Federal Facilities	NA	41,995,364	39,154,234	41,467,861	5.9	-1.3	NA

Note: Does not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. Data from Section 8 (Total of 8.1 through 8.7) of Form R in year indicated. Forms that reported more than one 2-digit SIC code within the range 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range 20 to 39 are assigned to the "no codes 20-39" category.

[a]One facility in SIC code 28, Shintech Inc. in Freeport, TX, reported on-site recycling for vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 in 1996. Another facility, Shell Chemical Co. in Geismar, LA, reported 193,830,000 pounds of on-site energy recovery of ethylene in 1997. The facility has since revised this quantity to 13,000,000 pounds. In SIC code 28, total production-related waste changes to 8,082,352,320 pounds in 1995, to 8,194,422,706 pounds in 1996, and to 8,954,329,658 pounds in 1997. The percentage change in total production-related waste changes to 9.3% for 1996-1997, to 10.8% for 1995-1997, and to 21.4% for 1991-1997.

[b]One facility in SIC code 29, TPI Petroleum in Ardmore, OK reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. This facility also reported on-site energy recovery for propylene of 12,900,000 pounds in 1995, 16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. In SIC code 29, Petroleum, total production-related waste changes to 816,568,773 pounds in 1995, to 878,139,371 pounds in 1996, and to 789,803,949 pounds in 1997. The percentage change in total production-related waste changes to -10.1% for 1996-1997, to -3.3 for 1995-1997, and to -32.6% for 1991-1997.

[c]Revisions in three facilities (two in SIC code 28 and one in SIC code 29) change total production-related waste managed to 18,977,934,800 pounds in 1995, to 18,599,767,113 pounds in 1996, and to 19,976,970,368 pounds in 1997. The percentage change in total production-related waste changes to 7.4% for 1996-1997, to 5.3% for 1995-1997, and to 8.3% for 1991-1997.

NA: Federal facilities not required to report before 1994.

The largest percentage reductions involved industries with small totals. The tobacco industry reported 51.4 million pounds of total production-related waste in 1991 and 211,000 pounds in 1997, a reduction of 99.6%. The leather industry reported 18.0 million pounds in 1991 and 6.4 million pounds in 1997, a reduction of 64.2%.

The largest absolute increase in production-related waste from 1991 to 1997 was reported by the chemical manufacturing industry, from 7.35 billion pounds to 9.14 billion pounds. As noted earlier, one facility in this industry revised its quantity of on-site energy recovery of ethylene after the data were "frozen" for preparation of this report. In addition, another facility in SIC code 28 similarly revised its reports for on-site recycling of vinyl chloride (from 200,000 pounds to 200.0 million pounds in 1995 and from 244,000 pounds to 244.0 million pounds in 1996).

With these revisions, the chemical manufacturing industry's production-related waste managed would increase from 7.35 billion pounds in 1991 to 8.95 billion pounds in 1997, still the largest absolute increase among all industries. The percentage increase for 1991 to 1997 would change from 24.2% to 21.7%.

The primary metals industry reported the second-largest absolute increase from 1991 to 1997 in total production-related waste managed, from 2.32 million pounds to 3.37 billion pounds. This was an increase of 45.1%. The lumber industry reported the third-largest increase, from 68.0 billion pounds in 1991 to 972.4 million pounds in 1997, or 904.4 million pounds. This amounted to a 1,329.8% increase by the lumber industry, by far the largest percentage increase among all industries. As noted earlier, four facilities in the lumber industry reported substantial increases in waste management of creosote.

Economic Overview, by Industry, Multi-Year Comparisons

U.S. economic expansion continued in 1997 with 3.9% real growth (adjusted for inflation) in gross domestic product, compared to growth of 2.8% in 1996 (*Economic Report of the President*, February 1998.) As shown in Table 4-11, manufacturing production also continued to increase.

Table 4-11 presents production indexes for each industrial sector from 1991 to 1997. During this period, production increased 32.0% for U.S. manufacturing overall. Table 4-12 compares the change in manufacturing production since 1991 with the change in TRI quantity released on- and off-site and in TRI total production-related waste managed. As shown in Table 4-12 the quantity released on- and off-site steadily decreased, even as manufacturing production expanded. Overall, while production rose 32.0%, TRI facilities reported a decrease of 25.5% in quantity released on- and off-site. Although the total quantity of production-related waste that facilities managed rose, the overall increase was still considerably smaller than the nation's increase in manufacturing production. As noted earlier, three facilities' revisions would change the total production-related waste managed for 1995, 1996, and 1997. The percentage changes also change, as follows: to 2.9% for 1991-1995, to 0.9% for 1991-1996 and to 8.3% for 1991-1997. Thus, taking into account these revisions, for 1991 to 1997, TRI production-related waste increased by 8.3%, roughly one-quarter the 32.0% increase in manufacturing production over the same period. While manufacturing production steadily increased from 1991 to 1997, TRI production-related waste decreased in most years. However, increases in 1994 and 1997 resulted in an overall increase for the period.

Table 4-11. Industrial Production Indexes by Industry, 1991-1997

SIC Code	Industry	1991	1992	1993	1994	1995	1996	1997
Total Index		100.0	103.1	106.8	112.6	118.0	122.2	128.4
Manufacturing		100.0	104.0	107.9	114.3	120.6	124.9	132.0
20	Food	100.0	101.6	103.7	105.4	108.5	109.0	111.4
21	Tobacco	100.0	101.1	85.1	105.7	113.0	114.7	114.5
22	Textiles	100.0	107.9	113.5	119.3	118.6	115.1	118.2
24	Lumber	100.0	105.8	106.7	112.1	114.1	118.3	121.7
25	Furniture	100.0	105.5	110.7	114.0	117.8	122.4	129.4
26	Paper	100.0	103.3	107.4	112.0	113.3	111.5	116.6
27	Printing	100.0	100.9	101.5	101.6	102.4	102.4	105.9
28	Chemicals	100.0	103.7	105.2	108.6	111.5	114.6	119.5
29	Petroleum	100.0	100.9	103.8	103.6	105.4	107.5	110.5
30	Plastics	100.0	110.3	117.9	128.4	131.8	135.1	139.5
31	Leather	100.0	101.6	102.5	95.1	85.3	79.6	74.9
32	Stone/Clay/Glass	100.0	102.9	105.0	111.0	114.3	117.9	124.0
33	Primary metals	100.0	103.4	109.3	117.3	121.2	123.0	128.7
34	Fabricated metals	100.0	104.0	108.5	116.6	121.2	124.3	127.8
35	Machinery	100.0	104.8	115.2	130.8	149.6	162.8	179.6
36	Electrical Equip.	100.0	111.6	123.5	148.7	190.7	222.4	258.4
37	Transportation Equip.	100.0	103.6	107.6	111.0	109.5	110.4	119.7
38	Measure/Photo.	100.0	100.2	101.0	99.9	100.8	105.3	108.2
39	Miscellaneous	100.0	101.6	107.4	111.8	115.5	120.7	127.9

Note: 1991=100. Data not provided for apparel industry (SIC code 23). From: *1998 Statistical Abstract of the United States, No. 1241. Industrial Production Indexes, by Industry* (Source: *Board of Governors of the Federal Reserve System, Federal Reserve Bulletin*, monthly, and *Industrial Production Capacity Utilization, Statistical Release G.17*, monthly.)

Table 4-12. Cumulative Change in Manufacturing Production and in TRI Quantities in Waste Managed, 1991-1997

	1991-1992 Percent	1991-1993 Percent	1991-1994 Percent	1991-1995 Percent	1991-1996 Percent	1991-1997 Percent
Manufacturing Production	4.0	7.9	14.3	20.6	24.9	32.0
TRI Quantity Released On- and Off-site	-6.0	-12.0	-19.4	-23.6	-25.7	-25.5
TRI Total Production-related Waste Managed*	-1.4	-1.9	3.7	2.4	-0.2	13.1

Note: Cumulative change in manufacturing production based on *1998 Statistical Abstract of the United States, No. 1241. Industrial Production Indexes, by Industry* (Source: *Board of Governors of the Federal Reserve System, Federal Reserve Bulletin*, monthly, and *Industrial Production Capacity Utilization, Statistical Release G.17*, monthly.) TRI quantities do not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. TRI data taken from Section 8 (Current Year) of Form R for year indicated.

*One facility, Shintech Inc. in Freeport, TX, reported on-site recycling of vinyl chloride of 200,000 pounds in 1995 and 244,000 pounds in 1996. The facility has since revised these quantities to 200,000,000 pounds in 1995 and 244,000,000 pounds in 1996. Another facility, TPI Petroleum in Ardmore, OK, reported on-site energy recovery for ethylene of 82,500,000 pounds in 1995, 36,250,000 pounds in 1996, and 422,000,000 pounds in 1997. The facility also reported on-site energy recovery for propylene of 12,900,000 pounds in 1995, 16,300,000 pounds in 1996, and 272,000,000 pounds in 1997. The facility has since revised these quantities to zero. Another facility, Shell Chemical Co. in Geismar, LA, reported on-site energy recovery for ethylene of 193,830,000 pounds in 1997. The facility has since revised this quantity to 13,000,000 pounds. Revisions by the three facilities change total production-related waste to 18,977,934,800 pounds in 1995, to 18,599,767,113 pounds in 1996, and to 19,976,970,368 pounds in 1997. The percentage change in total production-related waste changes to 2.9% for 1991-1995, to 0.9% for 1991-1996, and to 8.3% for 1991-1997.

Appendix A

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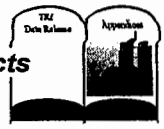

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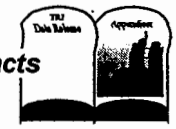

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Fax: (603) 225-7341
leek@nhoem.state.nh.us

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EPCRA Section 313
Bureau of Chemical Release Information &
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aopperma@dep.state.nj.us

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Emergency Management Bureau
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(505) 476-9620
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Mjohnson@DPS.state.nm.us

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New York Emergency Response Commission
State Department of Environmental Conservation
Pollution Prevention Unit
50 Wolf Road/Room 298
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North Carolina
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North Carolina Division of Emergency Management
116 West Jones Street
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North Dakota
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P.O. Box 5511
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Bob.ALBERS@state.or.us

Pennsylvania
Thomas J.Ward, Jr.
Pennsylvania Emergency Management Council
Bureau of Worker and Community Right-to-Know
Labor and Industry Building
7th and Forster Streets, Room 1503
Harrisburg, PA 17120
(717) 783-2071
Fax: (717) 783-5099

Puerto Rico
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Title III-SARA Section 313
Environmental Quality Board
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(787) 766-2823
Fax: (787) 766-0150

Rhode Island
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RI Department of Environmental Management
Division of Air Resources
291 Promenade Street
Providence, RI 02908-5767
Attn: Toxic Release Inventory
(401) 222-2808, ext. 7030
Fax: (401) 222-2017
kslatter@dem.state.ri.us

South Carolina
Michael Juras
Community Right-to-Know
Department of Health and Environmental Control
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Columbia, SC 29201
(803) 898-4385
Fax: (803) 898-4117
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Tennessee Emergency Response Council
Tennessee Emergency Management Agency
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Fax: (615) 242-9635

Texas
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Office of Pollution Prevention and Recycling
Texas Natural Resources Conservation Commission
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Environmental Assistance Division
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Division of Environmental Protection
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(340) 773-0565 (St. Croix)
Fax: (340) 773-9310 (St. Croix)
(340) 777-4577 (St. Thomas)
Fax: (340) 774-5416 (St. Thomas)

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Virginia Department of Environmental Quality
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Department of Ecology
Community Right-to-Know Unit
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(360) 407-6727 or (800) 633-7585
Fax: (360) 407-6715
ihan461@ecy.wa.gov

West Virginia
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West Virginia Emergency Response Commission
West Virginia Office of Emergency Services
Main Capital Building 1, Room EB-80
Charleston, WV 25305-0360
(304) 558-5380
Fax: (304) 344-4538

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Fax: (608) 267-5231
pippid@dnr.state.wi.us

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Hazardous Materials Planner
Wyoming ERC/EMA
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Fax: (307) 635-6017
hellerj@wy-iso.army.mil

Appendix B

Public Access to the Toxics Release Inventory and Related Information

According to many, the TRI program is one of the most effective environmental programs ever legislated by Congress and administered by EPA. Its success is due, in large part, to the right-to-know provisions contained in the legislation itself. By requiring that the resulting data be made publicly available by electronic and other means, Congress ensures that citizens, the media, environmental advocates, researchers, the business community, and others can influence and evaluate industry's efforts to reduce toxics emissions.

Every year, EPA enhances its databases to make the received data easier to search and expands its outreach activities to include new potential users of the data. To do this, EPA identifies and engages the assistance of organizations to help promote TRI awareness, provide access, and increase data usage. Journalists, national and local public interest and environmental groups, and state governments continue to be key outreach participants. Libraries in communities all across the U.S., in particular, members of the Federal Depository Library Program, are committed to providing public access to TRI data in a variety of formats. Because the value of TRI increases as more people use it, EPA encourages these organizations to acquaint new users with TRI, help people who already know about TRI to better use and understand the data, and, whenever possible, provide feedback on how to improve TRI products and services.

TRI products are available in a variety of common computer and hard copy formats to ensure that everyone can easily use the information. TRI is available on diskette, CD-ROM, and computer bulletin boards. It is also available through several on-line national computer databases, and more and more TRI information is being added to the Internet. TRI reports are available from state government offices as well as from EPA. Users can contact their state EPCRA Coordinator or their EPA Regional TRI Coordinator for assistance. (See listing of Regional coordinators and state EPCRA contacts in Appendix A.) Many other avenues for accessing TRI are described in the following pages.

TRI has proven to be a rich source of data for a broad public audience. For instance, educators are using the data to conduct studies and courses on the environment; labor unions are using TRI data to improve conditions for workers; and businesses are using the data in many ways—as a basis for reducing large stocks of toxic chemicals, to cut costs, to improve operations, to reduce the use of toxic chemicals, and for a host of other reasons. Happily, concerned citizens continue to be a growing user group. These individuals, on their own and through organized groups, are using TRI to raise and answer questions about chemical releases in their communities. States use the national data to compare releases within industries.

Avenues of public access to TRI continue to thrive, and TRI continues to be an important first step for discovering which chemicals are being manufactured, released, or transferred in communities across the country. The diversity of the groups across the country who use TRI also increases as well as the varied uses of the data. TRI is increasingly becoming

the data source used to positively influence the views of companies, legislators, and the public regarding the overall conditions of the nation's environment.

ACCESSING TOXICS RELEASE INVENTORY (TRI) PRODUCTS AND SERVICES

Accessing TRI data is easy. The data are available in a wide variety of computer and hard copy formats to meet most user's needs. Through outreach activities, EPA identifies organizations in the toxics community to help promote awareness of TRI and use of its data products. TRI data are available on-line, for purchase from the Government Printing Office (GPO) or the National Technical Information Service (NTIS), for use in Federal Depository Libraries across the U.S., or from the National Service Center for Environmental Publications (NSCEP). In addition, state officials also receive TRI reports from facilities in their jurisdiction, and many states publish reports highlighting state and local trends. To find out more about TRI access visit EPA's web site at **http://www.epa.gov/opptintr/tri/access.htm.**

Products

TRI CD-ROM

This two-disc set contains the complete national TRI, starting with the first inventory in 1987. It also contains Chemical Fact Sheets that provide reference material on the health and environmental effects of TRI chemicals. User-friendly software provides the capability to search TRI data by facility, location, chemical, SIC code, and other data fields. Other features allow flexibility in printing standard and custom reports, downloading data, and calculating releases for search sets (for example, to calculate average air releases for all pulp and paper manufacturers). Complete documentation outlining the history of TRI, how it is used, and how to operate the software is included. NSCEP offers the TRI CD-ROM free of charge to all government organizations, educators, students, non-profit organizations, and citizen groups. Businesses may purchase the discs from the GPO or NTIS for about $40. To order the TRI CD-ROM, visit EPA's web site at **http://www.epa.gov/opptintr/tri/cd-rom.htm.**

For more information, contact:

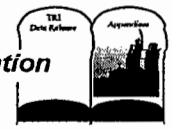
National Service Center for Environmental Publications (NSCEP)
P.O. Box 42419
Cincinnati, OH 45242-2419
Call: (800) 490-9198
(513) 489-8190
Fax: (513) 489-8695
Hours: 7:00 a.m. - 5:30 p.m. (Eastern Time)

U.S. Government Printing Office (GPO)
Superintendent of Documents
P.O. Box 371954
Pittsburgh, PA 15250-7954
Call: (202) 512-1800
Fax: (202) 512-2250
Hours: 7:30 a.m. - 5:00 p.m. (Eastern Time)

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
Call: (800) 553 6847
(703) 487-4650
Fax: (703) 605-6900
Email: info@ntis.fedworld.gov
Hours: 8:00 a.m. - 8:00 p.m. (Eastern Time)

TRI State, National, and Federal Facilities Data Files

Selected information from TRI reports submitted to EPA for the current reporting year is available on diskettes or the Internet in dBASE (dbf) format. For each state, one file or diskette contains user instructions and three file types: Releases and Transfers, Source Reduction and Recycling



Activities, and Source Reduction and Recycling Methods. The Release and Transfer file contains the most frequently used TRI data such as the names, locations, and contacts for reporting facilities; chemical names and CAS numbers; aggregate releases in pounds of chemicals released to air, land, water, and underground injection wells; and total chemical transfers to off-site locations and publicly owned treatment works. The remaining two files (Source Reduction and Recycling Activities, and Source Reduction and Recycling Methods) contain selected pollution prevention data. The same format is used for the federal facilities file and the national file. The cost of diskettes for a single state is about $15, and they are available from GPO. The same information may be downloaded off the Internet for free at **http://www.epa.gov/opptintr/tri/disks97.htm.**

To obtain diskettes, contact:

U.S. Government Printing Office (GPO)
Superintendent of Documents
P.O. Box 37082
Washington, DC 20013-7082
Call: (888) 293-6498 (toll-free)
(202) 512-1530
Fax: (202) 512-1262
Hours: 7:00 a.m. - 5:30 p.m. (Eastern Time)

TRI Information Kit

The TRI Information Kit is designed to acquaint a broad and disparate audience with the TRI. The information kit is appropriate for those familiar or unfamiliar with TRI. It contains a brochure, bookmark, poster, and other explanatory materials. It is designed to answer the "who, what, when, why, where, and how" questions of TRI in clear, non-jargon language. The kit provides a broad explanation of TRI, as well as examples of how various groups have used TRI, where it can be accessed or obtained, and organizations that are sources for further information about TRI and the chemicals reported. Copies are free.

To request copies, contact:

National Service Center for Environmental Publications (NSCEP)
P.O. Box 42419
Cincinnati, OH 45242-2419
Call: (800) 490-9198
(513) 489-8190
Fax: (513) 489-8695
Document Number: EPA-749-K-98-001

TRI User Support Service (TRI-US)
U.S. EPA
401 M Street, SW. (MC-7407)
Washington, DC 20460
Call: (202) 260-1531
Fax: (202) 401-2347
Email: tri.us@epamail.epa.gov
Hours: 8:00 a.m. - 4:30 p.m. (Eastern Time)

Chemicals in the Environment

Issue number 6 of *Chemicals in the Environment* (CIE), published in the Fall of 1997, is devoted entirely to TRI. This 22-page publication contains 19 articles ranging from the history of TRI to the future of new TRI products. Articles include perspectives from the community, state, federal, and international level. The publication also provides valuable information on training and contacts within the EPA. CIE is available free over the Internet at **http://www.epa.gov/opptintr/cie** or from NSCEP.

To request copies, contact:

National Service Center for Environmental Publications (NSCEP)
P.O. Box 42419
Cincinnati, OH 45242-2419
Call: (800) 490-9198
(513) 489-8190
Fax: (513) 489-8695
Document Number: EPA749-R-97-001b

Public Data Release Reports

EPA assembles several detailed annual reports providing summaries, analyses, and comparison of TRI data by year. The reports summarize data on total releases and other waste management of TRI chemicals; geographic distribution of TRI releases and other waste management; industrial patterns of releases and other waste management; the interstate and intrastate transport of wastes and other kinds of analyses. A limited number of copies are free while supplies last.

- 1997 Toxics Release Inventory: Public Data Release (EPA 745-R-99-003)

- 1997 Toxics Release Inventory: Public Data Release State Fact Sheets (EPA 745-F-99-001)

To request copies, contact:

National Service Center for Environmental Publications (NSCEP)
P.O. Box 42419
Cincinnati, OH 45242-2419
Call: (800) 490-9198
(513) 489-8190
Fax: (513) 489-8695

EPCRA Hotline
Call: (800) 424-9346
(703) 412-9810 (Washington Metropolitan area)
TDD: (800) 553-7672
Fax: (703) 412-3333 (To request documents only)
Hours: 9:00 a.m. - 6:00 p.m. (Eastern Time)

TRI User Support Service (TRI-US)
U.S. EPA
401 M Street, SW. (MC-7407)
Washington, DC 20460
Call: (202) 260-1531
Fax: (202) 401-2347
Email: tri.us@epamail.epa.gov
Hours: 8:00 a.m. - 4:30 p.m. (Eastern Time)

Act Locally: Preventing Pollution at the Community Level with Resources that Control Pesticide and Toxic Chemical Use

This is a catalogue which describes tools, resources, and programs of the Office of Prevention, Pesticides and Toxic Substances (OPPTS). It lists information about OPPTS' extensive base of information on the characteristics and effects of pesticides and industrial chemicals. These "tools" include databases, computer programs for chemical screening, funding resources, access to information hotlines, and descriptions of programs and initiatives that may be useful in protecting local environments.

Act Locally describes activities developed by OPPTS that are compatible with the Agency's community-based environmental protection (CBEP) goals and initiatives. In addition, it describes some of the products that OPPTS developed that are useful tools for supporting CBEP activities in large and small

communities. These tools can help communities learn about potential chemical risks, and can be used to develop strategies to mitigate those risks and help improve the local environment.

The catalogue is available as a resource on the Internet at **http://www.epa.gov/opptintr/cbep/actlocal** and can be viewed, printed, or downloaded. The on-line site also has hyperlinks to other OPPTS and related resources.

Risk Screening Guide

The "Toxic Chemical Release Inventory Risk Screening Guide" describes a method for evaluating TRI data for environmental managers and provides a structured way for citizens to look at TRI data from a human health perspective (The Process, Vol. 1, and Appendices, Vol. 2, EPA Document Number: 560/2-89-002, July 1989.)

To order, contact:

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
Call: (800) 553-6847
(703) 487-4650
Fax: (703) 605-6900
Email: info@ntis.fedworld.gov
Hours: 8:00 a.m. - 8:00 p.m. (Eastern Time)
Publication Number: PB90-122-128
Cost: $61.50

Chemical Fact Sheets

OPPT is continuing to develop Chemical Fact Sheets as part of its effort to provide the public with information on chemicals. The goal is to provide information summaries that supplement environmental release information for TRI chemicals. Two types of summaries are available for each chemical. One is a two-page document providing a non-technical summary of chemical information. The other is a longer, referenced presentation of information that provides the basis for statements included in the shorter summary.

Both summaries provide the following information for each chemical:

- its identity and properties
- how it is used
- how exposure to it might occur
- what happens to it in the environment
- how it affects human health and the environment
- what EPA offices and other groups can be contacted for more information

Chemical Fact Sheets are now available for 40 high-production volume TRI chemicals. Another 60 are in various stages of OPPT review. Among the chemicals for which Fact Sheets are available are: methylene chloride (dichloromethane), toluene, acrylonitrile, perchloroethylene, methyl tert-butyl ether, and styrene. The Chemical Fact Sheets, their accompanying support documents, and a list of completed fact sheets can be found on the Internet at **http:// www.epa.gov/chemfact.**

For more information, contact:

TSCA Assistance Information Services Hotline
c/o: Garcia Consulting
401 M St. S.W. (MC-7408)
Washington, DC 20460
Call: (202) 554-1404
TDD: (202) 554-0551
Fax: (202) 554-5603

Assistance Services

TRI User Support Service (TRI-US)
U.S. EPA
401 M Street, SW. (MC-7407)
Washington, DC 20460
Call: (202) 260-1531
Fax: (202) 401-2347
Email: tri.us@epamail.epa.gov
http://www.epa.gov/opptintr/tri
Hours: 8:00 a.m.- 4:30 p.m. (Eastern Time)

The TRI-US Service provides general information about the TRI and support for access to any of the data formats. TRI specialists can help determine the data product best suited for an individual user's needs. The service provides a comprehensive search assistance for the TRI on-line and CD-ROM applications. TRI-US provides both National Library of Medicine/TOXNET and CD-ROM training through individual sessions and workshops. Documentation for all TRI products is available from TRI-US. Copies of TRI reports are distributed as well. This support service provides referrals to EPA Regional and state TRI contacts and to the libraries where TRI is available. Referrals to TRI resources in other localities are also available. For more information about accessing TRI or obtaining TRI data products, visit us at the TRI Web site at **http:// www.epa.gov/opptintr/tri/disks.htm**.

EPCRA Hotline
Call: (800) 424-9346
(703) 412-9810 (Washington Metropolitan area)
TDD: (800) 553-7672
Fax: (703) 412-3333 (To request documents only)
http://www.epa.gov/epaoswer/hotline
Hours: 9:00 a.m. - 6:00 p.m. (Eastern Time)

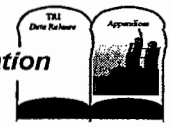
The Emergency Planning and Community Right-to-Know (EPCRA) Hotline provides regulatory, policy, and technical assistance to the regulated community, federal agencies, local and state governments, the public, and other interested parties in response to questions related to EPCRA. The Hotline provides information on the availability of documents related to EPCRA and copies of selected EPCRA documents on a limited basis. For more information about the EPCRA Hotline, visit their Internet Web site at: **http://www.epa.gov/epaoswer/hotline**.

Federal Depository Libraries

TRI products are distributed though the Federal Depository Library Program, a network of 1,400 public and academic libraries located in communities all across the U.S. While librarians in these organizations are not specialists in TRI information, they are often quite knowledgeable about obtaining and using information resources in general. Over 700 depository libraries receive the TRI on CD-ROM. Librarians in these institutions can assist you in searching the database and using other features, such as printing reports and downloading data from the CD-ROM. More and more depository libraries are allowing patrons to access the Internet using public workstations located in the library.

For more information or to identify the Federal Depository Library nearest you, contact your local library. TRI User Support Service can also refer you to the closest Federal Depository Library that can provide access to TRI.

TRI User Support Service (TRI-US)
U.S. EPA
401 M Street, SW. (MC-7407)
Washington, DC 20460
Call: (202) 260-1531
Fax: (202) 401-2347
Email: tri.us@epamail.epa.gov
http://www.epa.gov/opptintr/tri
Hours: 8:00 a.m.- 4:30 p.m. (Eastern Time)



On-line Services

EPA's Web Sites

For TRI, like many other EPA programs, the Internet is fast becoming one of the best resources for identifying information that is available to the public. EPA manages a full service Internet site, offering access via the World Wide Web. EPA's World Wide Web server (**http://www.epa.gov**) allows access not only to text but to images as well. Using a browser such as Netscape or Explorer, users can access the Web site at no cost.

To access information on TRI specifically visit the TRI access page at **http://www.epa.gov/opptintr/tri/access.htm** or visit the TRI home page at **http://www.epa.gov/opptintr/tri**. These sites offer information useful to both novice and experienced users of the toxics community. The TRI home page provides, in lay terms, a description of what TRI is, how it can be used, a discussion of TRI and health issues, and much more. You can find out about TRI products, view or download the 1997 TRI data release reports, and identify who to contact for more information in EPA regions and states programs across the country. From the TRI home page, you can "link" to other EPA and non-EPA sites that allow you to search the TRI data base on-line.

OPPTS's databases and software web page at **http://www.epa.gov/opptintr/opptdb.htm** contains a variety of TRI related software and databases. Another source for TRI information is the Envirofacts Warehouse (**http://www.epa.gov/enviro**) which provides free access to five of EPA's largest databases with Superfund data, Safe Drinking Water information, Hazardous Waste data, Water Discharge permits, Air Releases, and TRI data. The user can read about EPA's Toxics Release Inventory System, generate reports, and produce maps showing the location of TRI and other facilities at **http://www.epa.gov/enviro/html/tris/tris_overview.html**. Envirofacts allows the user to search the TRI database by facility name, geographic location, SIC Code, or chemical name and to produce reports on the facilities and map their locations. A variety of user specified parameters let users point and click to customize their searches. The maps include facility locations as well as user defined demographic information, schools, hospitals, roads, bodies of water, and more. Maps can be printed out or saved in various formats including GIF, JPG, TIF, PDF, EPS, ARC/INFO and more.

National Library of Medicine (NLM) TOXNET System

The National Library of Medicine (NLM) TOXNET System makes TRI accessible to concerned citizens and to businesses and organizations interested in environmental or public health issues. TOXNET offers state-of-the-art, user-friendly, on-line searching. The system features a variety of on-line user assistance features, a flexible command language, and "free text" search capability. Users can print specific portions of the records either on-line or off-line, and there are a wide variety of customized text options built into the system. The menu-driven search package allows individuals with limited computer skills to use the TRI on-line database efficiently and effectively. However, starting this spring, NLM plans to remove all the backfiles of TRI from TOXNET, and only keep TRI95, TRI96 and the new TRI97 up on the TOXNET system. The TRIFACTS file will not be available for searching on the TOXNET system starting this spring. On-line costs range from $18-$20 per hour. An NLM password is necessary to use the file. The three TRI files will also be available for searching on the Internet free of charge on TOXNET on the Web. The address for that is **http://toxnet.nlm.nih.gov**. You can obtain more information about accessing TRI on TOXNET on NLM's Specialized Information Services web site at **http://sis.nlm.nih.gov**.

For more information, contact:

National Library of Medicine
Specialized Information Services
TRI Representative
8600 Rockville Pike
Bethesda, MD 20894
Call: (301) 496-6531
E-mail: toxmail@tox.nlm.nih.gov
Hours: 7 days/week; 24 hours/day

Right-to-Know Computer Network (RTK NET)
The Right-to-Know Network (RTK NET) offers free access to TRI data from 1987 through the current reporting year, along with health facts for each TRI chemical, searchable through the World Wide Web, Telnet, and dial-up modem. RTK NET, operated jointly by the Unison Institute and OMB Watch, is an on-line telecommunications link to environmental and other databases. This service promotes pollution prevention by putting TRI data together with other prevention strategies. It provides communication among individuals concerned about toxics use reduction and seeks to increase use and analysis of TRI and related data. RTK NET links TRI with other environmental data, civil cases brought by the U.S. EPA, a portion of the 1990 Census data, and a mapping program called Landview.

The TRI data can be accessed through the World Wide Web at **http://www.rtk.net**, Telnet (rtk.net), and by modem. (To access by modem, dial 202-234-8570, set computer parameters to 8,N,1, and type "public" (no quotes) in lower case and register for a free account.) Participants can communicate with one another through computer-generated mail, in addition to exchanging and reviewing documents electronically.

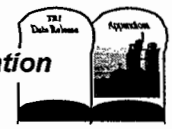
In addition to the TRI data, the following databases on RTK NET may be of interest to TRI users:

- **ARIP** - EPA Accidental Release Information Program.
- **BRS** - EPA RCRA Biennial Reporting System.
- **NPRI** - Canada's TRI-like system, called the National Pollutant Release Inventory.
- **Census Data by Zip Code** - Linking 1990 U.S. Summary with TRI, FINDS, and BRS.
- **CERCLIS** - CERCLA "Superfund" Information System.
- **CUS** - EPA TSCA Inventory of chemical production database.
- **DOCKET** - EPA civil litigation and administrative actions.
- **ERNS** - EPA Emergency Response Notification System.
- **FINDS** - Identifying information and location of all facilities regulated by EPA.
- **NPL** - EPA Superfund National Priorities List of Sites.
- **PCS** - EPA Water Permit Compliance System contains files on facilities, pipes, and pollutant limits.
- **ROADMAPS** - Regulatory levels and health effects of TRI chemicals.
- **RODs** - EPA Records of Decision
- **SETS** - EPA Superfund Site Enforcement Tracking System
- **USGS** - Water Use Database

Training is available from the computer service on using telecommunications, using RTK NET, and searching the database.

For more information, contact:

RTK NET
c/o The Unison Institute
1742 Connecticut Avenue, N.W.
Washington, DC 20009-1171
Call: (202) 797-7200
Fax: (202) 234-8584
Email: info@rtk.net



Integrated Risk Information System (IRIS)

The Integrated Risk Information System (IRIS) contains summaries of health risks and EPA regulatory information on over 500 specific chemicals. It is a key source for descriptive and quantitative hazard/risk information, such as oral reference dose and inhalation reference concentrations for chronic, noncarcinogenic health effects; oral slope factors and unit risk for chronic exposure to carcinogens; EPA drinking water health advisories; and summaries of EPA regulatory actions. The system is useful in the risk assessment process and can be found at **http://www.epa.gov/iris**.

For on-line access, contact:

National Library of Medicine
TRI Representative
8600 Rockville Pike
Bethesda, MD 20894
Call: (301) 496-6531
Hours: 7 days/week; 24 hours/day

For diskettes, contact:

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
Call: (800) 553-6847
(703) 487-4650
Fax: (703) 605-6900
Email: info@ntis.fedworld.gov
Hours: 8:00 a.m. - 8:00 p.m. (Eastern Time)

Appendix C

Additional Information for Assessing the Impacts of TRI Chemicals

SCREENING INFORMATION SYSTEM/LAN (SIS/L)

The SIS/L (Screening Information System/LAN) will enable the public to track chemicals across major OPPT, EPA and federal government databases, information systems and documents collections that contain information on production and use; release, exposure and monitoring; toxicity and hazard; and risk. Users will be able to search for chemicals by both CAS number and chemical name. Acting as a platform for multiple data sources, SIS/L will provide access to chemical information lists and databases regardless of their origin (see Table C-1). EPA is currently working to make SIS/L available on EPA's public access home page as a valuable information source for EPA, other federal agencies, state and local governments, public interest groups, research organizations, non-government organizations, industry, and the public. Table C-1 lists the top 24 TRI chemicals and the related information sources that are listed on SIS/L.

SIS/L Information Lists

Chemicals On Reporting Rules databases (CORR)

Chemicals On Reporting Rules database tracks all proposed and final chemical rules promulgated by US EPA/OPPT.

Toxic Substances Control Act Test Submissions (TSCATS)

8(d): Section 8(d) health and safety reporting requirements; chemicals not officially under Section 8(d) reporting requirements, but which had information concurrently submitted along with chemicals under Section 8(d) are also tracked as 8(d) chemicals.

SECT 4: Section 4 Chemical Testing Program (CTP); chemicals not officially under the CTP, but which had information concurrently submitted along with chemicals under the CTP, are also tracked as Section 4 chemicals.

8(e): Section 8(e) Notice of Substantial Risk requires manufacturers, processors or distributors of chemicals to submit to EPA any new data on one of their chemicals that reasonably supports a conclusion that the chemical presents a substantial risk of injury to health or the environment; besides data on health and environmental effects, submitters often make known uses of the chemical, workplace practices and other exposure and market information.

FYI: For Your Information (FYIs) are similar in content to the TSCA Section 8(e) Notices but do not meet the statutory requirements for submission under the Toxic Substances Control Act; besides data on health and environmental effects, submitters often make known uses of the chemical, workplace practices and other exposure and market information.

Chemical Hazard Information Profile (CHIPs)

Chemical Hazard Information Profiles summarize readily available information on health effects, environmental effects and exposure relating to a specific chemical. CHIPs were prepared by the US EPA, OPPT from about 1978 to 1990; they have since been superseded by other screening reviews in OPPT's current Existing Chemical Program.

Substitute Hazard Profiles (Sub)

Every chemical referenced in a Substitute Hazard Profile; these profiles are similar in content to CHIPs but generally summarize readily available information on only health and environmental effects; these reviews were prepared in the US EPA, OPPT from about 1985 to 1990; they have since been superseded by reviews in OPPT's current Existing Chemical Program.

***Health* Effects Assessment Summary Table (HEAST)**

Every chemical in the Health Effects Assessment Summary Table developed by US EPA, ORD, OHEA; these tables include draft (or unverified) RfD's, RfC's, and cancer potency estimates (both final and draft or unverified) and comments and references.

Chemical Unit Record Estimate (CURE)

Every chemical in the Chemical Unit Record Estimate; an index and summary of all health and environmental efforts and risk reviews published by US EPA, ORD.

Integrated Risk Information System (IRIS)

Every chemical referenced in the US EPA, ORD Integrated Risk Information System, which summarizes official EPA-wide chemical hazard and risk evaluations.

Production/Exposure Profile (PEPs)

Every chemical referenced in a Production/Exposure Profile; PEPs were prepared in the US EPA, OPPT from about 1978 to 1986.

Risk Management Tracking System (RMx)

Every chemical tracked in the Risk Management tracking system for the previous version of the US EPA, OPPT Existing Chemical Program.

TSCA Section 4 Testing Program (MEGA)

Every chemical within the TSCA Section 4 Testing Program including those chemicals with tests in proposal or negotiation stage, those awaiting submission of test results and those awaiting verification of compliance with the test rule or consent order, as well as historical information on chemicals that have completed Section 4 testing.

Screening Information Data Set Program (SIDS)

Every chemical being evaluated under the Screening Information Data Set program; SIDS is an international voluntary information sharing and testing program developed under the aegis of the Organization of Economic Cooperation and Development (OECD); the program is intended to fill basic data gaps on high volume chemicals with little safety information.

Register of Lists (RoL)

Every chemical referenced in the proprietary database Register of Lists (RoL; RoL listed the statutory authority for all chemicals regulated by the US EPA; RoL is no longer supported by the US EPA.

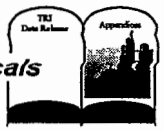


Table C-1. Screening Information System/LAN

CAS Number	Chemical Name	CORR	8(d)	SECT4	8(e)	FYI	CHIP	Sub	HEAST	CURE	IRIS	PEPS
67-56-1	*METHANOL	X	X	X	X	X	X	X	X	X	X	X
75-09-2	*METHANE, DICHLORO-	X	X	X	X	X	X	X	X	X	X	
75-15-0	*CARBON DISULFIDE	X	X	X	X	X	X		X	X	X	
78-93-3	*2-BUTANONE	X	X	X	X	X	X		X	X	X	X
100-42-5	*BENZENE, ETHENYL	X	X	X	X	X	X		X	X	X	
108-88-3	*BENZENE, METHYL	X	X	X	X	X	X		X	X	X	
110-49-6	*ETHANOL, 2 METHOXY-, ACETATE		X	X	X	X	X		X	X		X
110-54-3	*HEXANE	X	X	X	X	X			X	X	X	
110-80-5	*ETHANOL, 2 ETHOXY-	X	X	X	X	X	X		X	X	X	X
111-15-9	*ETHANOL, 2 ETHOXY-, ACETATE		X		X	X			X	X	X	X
1314-13-2	*ZINC OXIDE, (ZNO)		X	X	X					X		
1330-20-7	*BENZENE, DIMETHYL	X	X	X	X	X	X		X	X	X	
7439-92-1	*LEAD	X	X	X	X	X	X	X	X	X	X	
7439-96-5	*MANGANESE	X	X		X	X	X		X	X	X	
7440-47-3	*CHROMIUM	X	X	X	X	X	X			X		
7440-50-8	*COOPER	X	X	X	X	X	X	X	X	X	X	
7440-66-6	* ZINC	X	X	X	X	X	X	X	X	X	X	
7647-01-0	*HYDROCHLORIC ACID	X	X	X	X	X	X			X	X	
7664-38-2	*PHOSPHORIC ACID	X	X	X	X		X				X	
7664-41-7	*AMMONIA	X	X	X	X	X	X	X	X	X	X	
7782-50-5	*CHLORINE	X	X	X	X	X	X			X	X	
14797-55-8	*NITRATE	X	X	X						X	X	
16065-83-1	*CHROMIUM III		X						X	X	X	
18540-29-9	*CHROMIUM (HEXAVALENT)		X		X				X	X	X	

Table C-1. Screening Information System/LAN, continued

CAS Number	Chemical Name	RM(x)	MEGA	SIDS	RoL	WQCD	DWHA	FIFRA	INERT	OSHA	NIOSH	ACGIH
67-56-1	*METHANOL	X			X			X	X	X	X	X
75-09-2	*METHANE, DICHLORO-	X			X	X	X		X	X	X	X
75-15-0	*CARBON DISULFIDE	X	X		X					X	X	X
78-93-3	*2-BUTANONE	X	X	X	X		X		X	X	X	X
100-42-5	*BENZENE, ETHENYL	X		X	X	X	X			X	X	X
108-88-3	*BENZENE, METHYL	X			X	X	X		X	X	X	X
110-49-6	*ETHANOL, 2 METHOXY-, ACETATE	X		X	X					X	X	X
110-54-3	*HEXANE	X			X		X		X	X	X	X
110-80-5	*ETHANOL, 2 ETHOXY-	X	X		X				X	X	X	X
111-15-9	*ETHANOL, 2 ETHOXY-, ACETATE	X			X				X	X	X	X
1314-13-2	*ZINC OXIDE, (ZNO)	X			X			X	X	X	X	X
1330-20-7	*BENZENE, DIMETHYL	X			X		X	X	X	X	X	X
7439-92-1	*LEAD	X			X	X	X			X	X	X
7439-96-5	*MANGANESE	X			X	X				X	X	X
7440-47-3	*CHROMIUM	X			X		X			X	X	X
7440-50-8	*COOPER	X			X	X		X		X	X	X
7440-66-6	* ZINC	X			X	X		X	X		X	
7647-01-0	*HYDROCHLORIC ACID	X	X		X			X	X	X	X	X
7664-38-2	*PHOSPHORIC ACID	X			X			X	X	X	X	X
7664-41-7	*AMMONIA	X			X	X				X	X	X
7782-50-5	*CHLORINE		X		X	X		X		X	X	X
14797-55-8	*NITRATE				X	X						
16065-83-1	*CHROMIUM III										X	X
18540-29-9	*CHROMIUM (HEXAVALENT)				X						X	X

Water Quality Criteria Document (WQCD)

Every chemical which has a Water Quality Criteria Document form within the US EPA, Office of Water.

Drinking Water Health Advisory (DWHA)

Every chemical which has a Drinking Water Health Advisory as developed the US EPA, Office of Water.

Federal Insectide & Rodenticide Act (FIFRA)

Every chemical subject to regulation by the US EPA, Office of Pesticide Programs under the Federal Insecticide and Rodenticide Act as a registered Active Ingredient.

Inerts

Every chemical the US EPA, Office of Pesticide Programs has determined to be potentially toxic but are not claimed by pesticide manufacturers to have any pesticidal activity in their registered products.

Occupational Safety and Health Administration (OSHA)

Every chemical for which a PEL (Permissible Exposure Limits) and other workplace standards have been promulgated by the Occupational Safety and Health Administration US DOL.

National Institute for Occupational Safety and Health (NIOSH)

Every chemical in the NIOSH (National Institute for Occupational Safety and Health/NIH/US DHHS) Occupational Exposure Survey (NOES) of around 1980; NOES lists number of workers and number of facilities by SIC codes (Standard Industrial Classification).

American Conference of Governmental Industrial Hygienists (ACGIH)

Every chemical for which workplace standards have been recommended by the American Conference of Governmental Industrial Hygienists.

Appendix D

TRI Data Quality Program

The goals of EPA's data quality program for TRI are to: (1) identify and assist facilities that must report so that data submitted will be of the highest quality, (2) ensure high quality data entry, (3) correct and normalize as much of the submitted data as possible in order to maximize the utility of the data, (4) accurately assess the relative validity of release estimates and other data, and (5) ensure completeness of the database with compliance and enforcement measures.

IDENTIFICATION AND ASSISTANCE TO FACILITIES

Through work with a wide variety of trade associations, local and national seminars, training courses, and enforcement activities, EPA has endeavored to locate all facilities required to report under section 313 of EPCRA and inform them of their obligations. In addition, EPA has prepared various materials to assist facilities in complying with EPCRA section 313. These include detailed reporting instructions, a question-and-answer document, magnetic media reporting instructions, general technical guidance, and 27 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. For the 1997 reporting year, EPA's internal review of approximately 4% of the records showed a data entry accuracy rate of over 99.9%. This is up from a 1987 reporting year rate of 97.5%. EPA continued the computerized edit checks at the point of data entry, including a high percent of verification and formalization of data reconciliation activities. EPA mailed copies of the release and transfer estimates to all reporting facilities to allow them to verify the entered data. EPA also received 68% of the 1997 submissions from facilities reporting on magnetic media, which ensures that fewer EPA data entry errors occur. This compares to 13% magnetic media submissions for reporting year 1990 – the second year that magnetic media reporting was available. EPA is continuing to encourage the use of magnetic media by all submitters.

CORRECTIONS AND NORMALIZATIONS OF DATA

Because Congress has required that EPA make the TRI data available to the public through computer telecommunications, EPA has found it necessary to undertake a variety of activities to make the data more usable. This is due to the fact that computers only retrieve data in exactly the format requested (e.g., if asked for "Los Angeles," the computer will not identify facilities listed under "LA"), and facilities report their data in a wide variety of ways. As a result, EPA has taken steps to use a consistent name for all counties, has used a variety of nomenclature standards for names within the database, 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 reporting

facilities. Facilities are required to use this number on all future TRI reports submitted to the Agency. Use of this number facilitates data quality and cross-year analysis.

In 1998, EPA provided all states with a listing of facilities that reported for 1997 to verify that both the state and federal government received the same data. States that responded found cases where facilities had not reported to one or the other government. States provided copies of forms to the EPA where EPA had not received copies, and vice-versa. This activity has provided a critical step to assist EPA in coordinating the data collection with the states.

Every year EPA issues Notices of Noncompliance (NONs) to facilities who use invalid forms or provide incomplete forms, incomplete facility identification, or incorrect/missing chemical identification. These facilities are also notified by telephone to make sure their follow-up revisions correct these errors. A facility that does not comply with a NON may be subject to civil penalties.

For reporting year 1997, EPA has again issued Notices of Technical Error (NOTEs) for missing required data or for incorrect information, such as facility identification numbers or invalid codes. The response rate to the NONs and NOTEs has been very good and has prevented errors from recurring in following years. In addition, to help facilities avoid these types of errors, EPA provides a document entitled *Data Quality Checks to Prevent Common Reporting Errors on Form R/Form A.*

ACCURACY EVALUATION

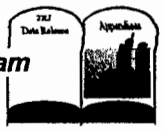
TRI data are widely used by the public, the media, state, local and tribal governments, environmental and industry advocacy groups, researchers, and the business community. The number of TRI data user groups grow every year. Therefore, TRI data quality is an important issue for any meaningful data analysis. The Agency is currently using data validation techniques, protocol to approve or deny any request to withdraw TRI data from the public database, TRI voluntary site surveys to improve TRI data quality, and TRI inspections. In order to ensure high quality, the Agency is in the process of setting up a procedure, similar to all withdrawal requests, to revise the data submitted to TRI.

The accuracy of the release data can vary. Some releases can be estimated fairly easily, just by knowing how much of a chemical was used or by weighing drums of solid/liquid waste, for example. Where monitoring of release streams or wastes has been done, release estimates may be within 20% of the actual amount released, although infrequent, non-representative sampling may lead to much less accuracy. Estimates of fugitive air emissions and complex wastewaters for which monitoring data are not available may be off by one or even two orders of magnitude, particularly when the release is a small percentage of the amount of the chemical actually processed.

The purpose of a data quality site survey is to assess the quality of the data collected under section 313 and to identify areas where improved guidance would be useful for improving the accuracy of future reported data. Site surveys are also designed to identify the frequency and the magnitude of errors in the Form R data and the reasons these errors occurred. EPA also conducts train-the-trainer courses for industry to assist them in reporting to TRI.

For the 1987 and 1988 reporting years, EPA conducted data quality site surveys at facilities to determine how well facilities complied with the law and estimated release quantities. These surveys did not "confirm" estimates through monitoring, but determined how well facilities used available data and estimation techniques to calculate releases.

Overall, based on the survey 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 year, 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 completed a 1994 and 1995 data quality site survey for facilities in SIC codes 25 (furniture manufacturing), 26 (pulp and paper manufacturing), 28 (chemical manufacturing), and 30 (rubber and plastics manufacturing). Overall, the survey found a high degree of agreement between facility and surveyor estimates. General trends noted in the RY 1994 data were that the total releases claimed by the facility for all SIC codes surveyed were less than the total releases claimed by the site surveyors. RY 1995 data showed that the total releases and other waste management quantities claimed by the facility approximately equaled those quantities claimed by the site surveyors. Total aggregate releases and other waste management quantities calculated by facilities and site surveyors for all SIC codes surveyed in RY 1994 and RY 1995 differed by 4%.

EPA recently completed a 1996 data quality site survey for facilities in SIC codes 33 (primary metals industry), 36 (electronic and other electrical equipment industry), and 37 (transportation equipment industry). Facilities determined thresholds correctly 95% of the time for all TRI chemicals used on-site. Overall, facilities correctly identified release and other waste management activity quantities. The survey identified facilities in the primary metals industry and electrical equipment industry (SIC codes 33 and 36) that misreported release and other waste management quantities of TRI chemicals, primarily due to the confusion over definitions of recycling.

Appendix E

TRI Form R and Form A for 1997

Facilities reporting to the Toxics Release Inventory submit their information on TRI's Form R. If a facility's total annual reportable amount of a chemical does not exceed 500 pounds, and the facility does not manufacture, process, or otherwise use more than 1 million pounds of the chemical, it may submit a Form A certification statement. (Form A certification statement reporting is further explained in Chapter 1.) This appendix supplies copies of the Form R and Form A certification statement for the 1997 reporting year.

FORM R

The 1997 Form R 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, amounts of on- and off-site releases and transfers off-site for further waste management, on-site waste treatment methods and efficiencies, on- and off-site waste management quantities, and information on source reduction and recycling activities.

FORM A CERTIFICATION STATEMENT

The 1997 Form A certification statement consists of facility identification information and chemical identification, as in Form R. Facilities do not report on the Form A certification statement amounts or other information about their use, releases, or waste management of the chemical.

Readers who are interested in a more in-depth understanding of who is required to report to TRI and how to fill out the forms, should refer to the EPCRA Information Hotline at 1-800-424-9346. Reporting software, forms, and instructions for the current reporting year are available form EPA's Web site at **http://www.epa.gov/opptintr/tri/report.htm**.

EPA FORM R

United States Environmental Protection Agency

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 _____

SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 2 trade secret?
☐ Yes (Answer question 2.2; Attach substantiation forms) ☐ No (Do not answer 2.2; Go to Section 3)

2.2 Is this copy ☐ Sanitized ☐ Unsanitized
(Answer only if "YES" in 2.1)

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 TRI Facility ID Number

Facility or Establishment Name	Facility or Establishment Name or Mailing Address(if different from street address)
Street	Mailing Address
City/County/State/Zip Code	City/County/State/Zip Code

4.2 This report contains information for: (Important : check a or b; check c if applicable) a. ☐ An entire facility b. ☐ Part of a facility c. ☐ A Federal facility

4.3	Technical Contact Name	Telephone Number (include area code)
4.4	Public Contact Name	Telephone Number (include area code)

4.5 SIC Code (s) (4 digits)	a.	b.	c.	d.	e.	f.

4.6	Latitude	Degrees	Minutes	Seconds	Longitude	Degrees	Minutes	Seconds

4.7 Dun & Bradstreet Number(s) (9 digits)	**4.8** EPA Identification Number (RCRA I.D. No.) (12 characters)	**4.9** Facility NPDES Permit Number(s) (9 characters)	**4.10** Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)
a.	a.	a.	a.
b.	b.	b.	b.

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of Parent Company	NA ☐	
5.2	Parent Company's Dun & Bradstreet Number	NA ☐	

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 completed 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 1, 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 completed 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:	3.2 Process the toxic chemical:	3.3 Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import		
If produce or import:		
c. ☐ For on-site use/processing	a. ☐ As a reactant	a. ☐ As a chemical processing aid
d. ☐ For sale/distribution	b. ☐ As a formulation component	b. ☐ As a manufacturing aid
e. ☐ As a byproduct	c. ☐ As an article component	c. ☐ Ancillary or other use
f. ☐ As an impurity	d. ☐ Repackaging	

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ONSITE AT ANY TIME DURING THE CALENDAR YEAR

4.1 ☐ (Enter two-digit code from instruction package.)

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE

			A. Total Release (pounds/year) (Enter range code 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)				
	Stream or Water Body Name				
5.3.1					
5.3.2					
5.3.3					
5.4.1	Underground Injection onsite to Class I Wells	NA ☐			
5.4.2	Underground Injection onsite to Class II-V Wells	NA ☐			

If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box ☐
and indicate the Part II, Section 5.3 page number in this box. ☐ (example: 1,2,3, etc)

* Range Codes: A= 1 - 10 pounds; B= 11- 499 pounds; C= 500 - 999 pounds.

EPA FORM R

PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number
Toxic Chemical, Category, or Generic Name

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE (Continued)

		NA	A. Total Release (pounds/year) (enter range code* or estimate)	B. Basis of Estimate (enter code)
5.5	Disposal to land onsite			
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3	Surface Impoundment	☐		
5.5.4	Other disposal	☐		

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)

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						
POTW Address							
City		State		County		Zip	
6.1.B. __	POTW Name						
POTW Address							
City		State		County		Zip	

If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box ☐ and indicate the Part II, Section 6.1 page number in this box ☐ (example: 1,2,3, etc.)

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2. __	Off-Site EPA Identification Number (RCRA ID No.)						
Off-Site Location Name							
Off-Site Address							
City		State		County		Zip	

Is location under control of reporting facility or parent company? ☐ Yes ☐ No

* Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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 (Continued)

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

6.2. __ Off-Site EPA Identification Number (RCRA ID No.)

Off-Site location Name

Off-Site Address

City | State | County | Zip

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 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 pages of Part II, Section 6.2/7A are attached, indicate the total number of pages in this box ☐

and indicate the Part II, Section 6.2/7A page number in this box : ☐ (example: 1,2,3, etc)

* Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

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. ☐

SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

		Column A Prior Year (pounds/year)	Column B Current Reporting Year (pounds/year)	Column C Following Year (pounds/year)	Column D Second Following Year (pounds/year)
8.1	Quantity released **				
8.2	Quantity used for energy recovery onsite				
8.3	Quantity used for energy recovery offsite				
8.4	Quantity recycled onsite				
8.5	Quantity recycled offsite				
8.6	Quantity treated onsite				
8.7	Quantity treated offsite				
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 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 onsite or offsite.

United States Environmental Protection Agency

TOXIC CHEMICAL RELEASE INVENTORY

FORM A

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 _____

SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 2 trade secret? [ ] Yes (Answer question 2.2; Attach substantiation forms) [ ] No (Do not answer 2.2; Go to Section 3)

2.2 Is this copy [ ] Sanitized [ ] Unsanitized (Answer only if "YES" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that to the best of my knowledge and belief, for each toxic chemical listed in the statement, the annual reportable amount as defined in 40 CFR 372.27 (a), did not exceed 500 pounds for this reporting year and that the chemical was manufactured, processed, or otherwise used in an amount not exceeding 1 million pounds during this reporting year.

Name and official title of owner/operator or senior management official:	Signature:	Date Signed:

SECTION 4. FACILITY IDENTIFICATION

4.1 TRI Facility ID Number

Facility or Establishment Name	Facility or Establishment Name or Mailing Address(if different from street address)
Street	Mailing Address
City/County/State/Zip Code	City/County/State/Zip Code

4.2 This report contains information for: (Important : check c if applicable) c. [ ] A Federal facility

4.3 Technical Contact Name | Telephone Number (include area code)

4.4 Intentionally left blank

4.5 SIC Code (s) (4 digits)	a.	b.	c.	d.	e.	f.

4.6 Latitude	Degrees	Minutes	Seconds	Longitude	Degrees	Minutes	Seconds

4.7 Dun & Bradstreet Number(s) (9 digits)	4.8 EPA Identification Number (RCRA I.D. No.) (12 characters)	4.9 Facility NPDES Permit Number(s) (9 characters)	4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)
a.	a.	a.	a.
b.	b.	b.	b.

SECTION 5. PARENT COMPANY INFORMATION

5.1 Name of Parent Company NA [ ]

5.2 Parent Company's Dun & Bradstreet Number NA [ ]

EPA FORM A
PART II. CHEMICAL IDENTIFICATION TRIFID:

SECTION 1. TOXIC CHEMICAL IDENTITY Report ___ of ___

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 completed Section 1 above.)

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

SECTION 1. TOXIC CHEMICAL IDENTITY Report ___ of ___

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.)
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SECTION 1. TOXIC CHEMICAL IDENTITY Report ___ of ___

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1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
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