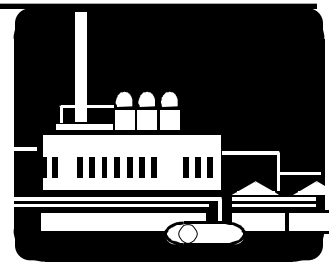

Chapter 4



Industry Reporting to the Toxics Release Inventory: Overview

This *1996 TRI Public Data Release* presents a more in-depth examination of industry reporting to TRI than the summary analyses offered in previous years. This overview chapter looks briefly at TRI data by industrial sector and at basic economic data for the sectors. The next five chapters take a closer look at five priority sectors: pulp and paper (SIC code 26), chemical manufacturing (SIC code 28), petroleum (SIC code 29), primary metals (SIC code 33), and electrical equipment (SIC code 36). A similar view of reporting by federal facilities follows in Chapter 10. (Box 4-1 lists the industry sectors by SIC code; Box 4-2 explains SIC codes and their use in TRI.)

As noted in Chapter 1, EPA plans to complete and release the remaining 15 industry chapters in the summer of 1998.

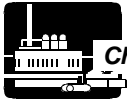
TRI Data by Industry, 1996

In 1996, across all industries, 21,626 facilities submitted 71,381 forms to TRI, as shown in Table 4-1. (Facilities submit one Form R or the Form A certification statement for each chemical). The

21,098 forms submitted by the chemical manufacturing sector amounted to 29.6% of all 1996 TRI forms. This is three times as many forms as submitted by the second largest industry sector, fabricated metals, which filed 7,416 forms, or 10.4% of the total. Primary metals submitted 6,603 forms (9.3%). The fourth largest number of forms came from the multiple-codes group, those with more than one two-digit SIC code (see Box 4-2). Federal facilities reported on a total of 378 forms.

On- and Off-site Releases

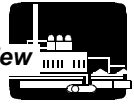
Reporting by the chemical industry (SIC code 28), which by definition primarily produces chemicals or manufactures products by processing chemicals, dominates most categories of TRI data. As shown in Table 4-2, 785.2 million pounds of on- and off-site releases were reported in chemical manufacturing for 1996. This represented 32.3% of all such releases. Primary metals (SIC code 33) reported the second largest amount, 564.5 million pounds, or 23.2% of the total, and producers of pulp, paper, and paper products (SIC code 26) were third, with 227.6 million pounds, or 9.4%. Ranking fourth was the multiple-codes category, with 120.8 million pounds, or 5.0%. Federal facilities reported a total



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

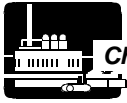
Standard Industrial Classification (SIC) Codes

- 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 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 broadwoven 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.
- 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, platemaking, 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**
Producing 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.


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

- 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.)
- 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, handtools, 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; 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 and 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 (SIC) 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 certification statements, Form As, 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.

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 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. This affects analyses at the four-digit level, as presented in Chapters 5 through 9, and it affects analyses when data are aggregated at the two-digit level, as in this chapter.

Four-digit Multiple SIC Codes: Forms that report multiple SIC codes within the same two-digit SIC code are categorized as “multiple codes” in the analyses of TRI data in Chapters 5 through 9. A facility that produces the pulp used in making paper and also produces paper itself, for example, will report both SIC code 2611, representing pulp mills, and SIC code 2621, representing paper mills, on the TRI form. In the analyses in Chapter 5 of TRI reporting in the pulp and paper sector (SIC code 26), data from these forms are included in the “multiple-codes” category. In some industrial sectors, such as chemical manufacturing (SIC code 28, analyzed in Chapter 6), the majority of TRI reporting occurs on forms with multiple SIC codes at the four-digit level.

Two-digit Multiple SIC Codes: In this chapter, 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 sectors on its TRI forms (such as SIC codes 2911, petroleum refining, and 2869, industrial organic chemicals). Data from these forms are classified in the “multiple codes” category in this chapter, where the tables analyze the TRI data at the two-digit level. In this chapter, TRI forms from the pulp and paper mill would be included in SIC code 26, because both of its four-digit SIC codes fall within SIC code 26.

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 2642 in Chapter 5 and in SIC code 26 in this chapter.

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, 1996

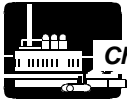
SIC Code	Industry	Total Facilities Number	Total Forms Number	Form Rs Number	Form As Number
20	Food	1,993	3,541	2,545	996
21	Tobacco	29	61	61	0
22	Textiles	307	657	622	35
23	Apparel	25	51	49	2
24	Lumber	765	1,926	1,446	480
25	Furniture	453	1,250	1,224	26
26	Paper	491	2,363	2,250	113
27	Printing	241	483	475	8
28	Chemicals	3,855	21,098	18,288	2,810
29	Petroleum	401	3,231	2,990	241
30	Plastics	1,824	3,747	3,404	343
31	Leather	89	223	209	14
32	Stone/Clay/Glass	640	1,716	1,517	199
33	Primary Metals	1,902	6,603	6,138	465
34	Fabricated Metals	2,883	7,416	6,895	521
35	Machinery	1,087	2,791	2,619	172
36	Electrical Equip.	1,233	3,121	3,031	90
37	Transportation Equip.	1,248	4,331	4,117	214
38	Measure./Photo.	291	707	661	46
39	Miscellaneous	362	766	710	56
	Multiple Codes 20-39	1,271	4,520	4,195	325
	No Codes 20-39	236	779	701	78
	Total	21,626	71,381	64,147	7,234
	Federal Facilities	133	378	350	28

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 of 20 to 39 are assigned to the "no codes 20-39" category.

Table 4-2. TRI On-site and Off-site Releases, by Industry, 1996

SIC Code	Industry	On-site Releases							Total On-site Releases Pounds	Off-site Releases Transfers Off-site to Disposal Pounds	Total On-and Off-site Releases Pounds
		Air		Surface Water Discharges Pounds	Underground Injection Wells		On-site Releases to Land				
		Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds			Class I Wells Pounds	Class II-V Wells Pounds	RCRA Subtitle C Landfills Pounds	Other On-site Land Releases Pounds		
20	Food	21,810,437	47,255,169	8,983,229	1,010	29,548	28,506	4,438,103	82,546,002	757,393	83,303,395
21	Tobacco	61,394	3,453,344	179,701	0	0	0	0	3,694,439	458,133	4,152,572
22	Textiles	3,217,057	13,125,828	348,877	0	0	0	173,620	16,865,382	462,148	17,327,530
23	Apparel	130,287	1,663,532	7,320	0	0	0	534	1,801,673	63,177	1,864,850
24	Lumber	4,636,576	23,856,213	76,874	0	0	6,039	9,807	28,585,509	7,657,171	36,242,680
25	Furniture	4,813,779	30,910,342	43	0	0	0	26,641	35,750,805	125,858	35,876,663
26	Paper	18,227,534	185,722,017	16,008,715	0	0	602,265	4,160,489	224,721,020	2,842,352	227,563,372
27	Printing	13,782,537	14,579,092	1,670	0	0	0	13,650	28,376,949	89,070	28,466,019
28	Chemicals	93,363,107	299,070,993	90,420,803	200,317,453	197,441	2,689,697	68,276,606	754,336,100	30,842,063	785,178,163
29	Petroleum	27,968,469	24,132,610	10,567,225	2,310,233	8,664	5,685	1,236,941	66,229,827	2,657,431	68,887,258
30	Plastics	27,540,757	77,774,998	27,815	750	0	48,918	398,367	105,791,605	10,617,686	116,409,291
31	Leather	747,962	1,906,965	53,526	0	0	0	6,611	2,715,064	1,526,825	4,241,889
32	Stone/Clay/Glass	1,870,677	28,158,910	45,443	500	500	105,977	2,416,616	32,598,623	6,141,803	38,740,426
33	Primary Metals	38,722,723	105,958,141	31,988,843	930,779	0	22,192,029	193,591,686	393,384,201	171,150,982	564,535,183
34	Fabricated Metals	23,613,262	45,578,614	351,080	563	7	204,331	572,609	70,320,466	19,933,901	90,254,367
35	Machinery	6,665,652	12,373,145	34,089	0	0	7,144	121,101	19,201,131	2,859,589	22,060,720
36	Electrical Equip.	6,351,489	17,401,668	1,462,615	22	5	210,430	225,890	25,652,119	16,113,258	41,765,377
37	Transportation Equip.	28,283,393	74,410,242	224,148	0	0	86,685	618,616	103,623,084	7,729,685	111,352,769
38	Measure./Photo.	2,698,043	10,503,368	1,297,561	0	0	0	2,531	14,501,503	848,568	15,350,071
39	Miscellaneous	1,929,982	7,478,283	2,364	0	0	11,957	8,189	9,430,775	839,283	10,270,058
	Multiple Codes 20-39	26,982,381	66,599,536	10,964,363	11,400	10	180,840	5,680,956	110,419,486	10,359,532	120,779,018
	No Codes 20-39	1,854,254	4,905,200	241,905	0	520,224	74,466	628,674	8,224,723	660,188	8,884,911
	Total	355,271,752	1,096,818,210	173,288,209	203,572,710	756,399	26,454,969	282,608,237	2,138,770,486	294,736,096	2,433,506,582
	Federal Facilities	2,463,277	1,831,564	384,602	0	505,541	23,516	681,351	5,889,851	612,797	6,502,648

Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range of 20 to 39 are assigned to the "no codes 20-39" category.



of 6.5 million pounds of on- and off-site releases, representing 0.3% of the total.

In 1996, chemical manufacturing reported the largest totals in air emissions, surface water discharges, and on-site underground injection. Primary metals facilities reported the largest amounts of on-site land releases and off-site releases (transfers off-site to disposal). Figure 4-1 displays on- and off-site releases for the industries with the largest total releases.

Other On-site Waste Management

Of the 17.74 billion pounds reported in other on-site waste management in 1996, the chemical industry accounted for 8.33 billion pounds, or 47.0% of the total (see Table 4-3). This industry also led all three types of on-site waste management, reporting 45% or more of on-site recycling (3.73 billion pounds reported by chemical manufacturers), energy recovery (1.35 billion pounds), and treatment (3.25 billion pounds). Federal facilities reported 21.8 million pounds of on-site waste management, or 0.1% of the total.

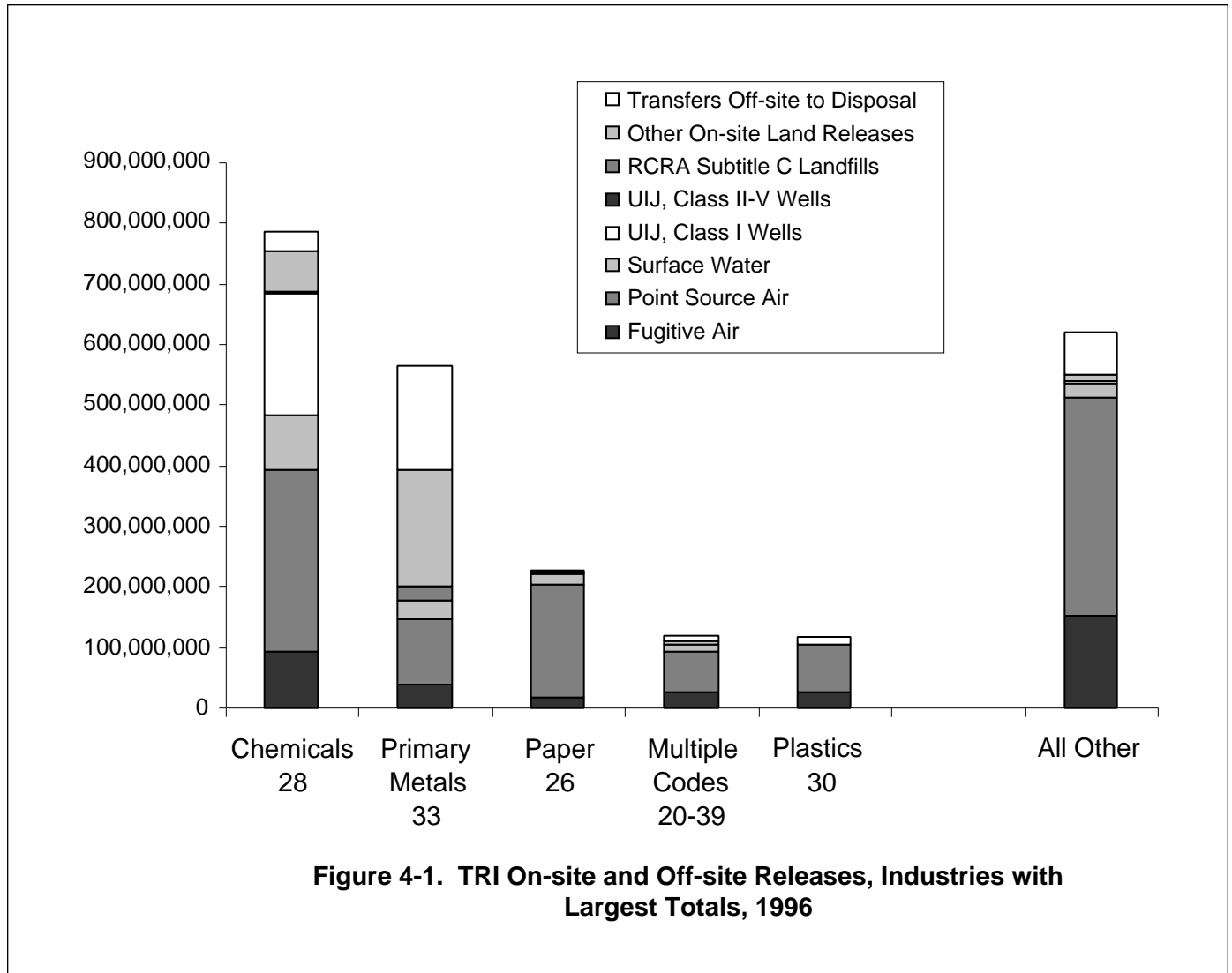


Figure 4-1. TRI On-site and Off-site Releases, Industries with Largest Totals, 1996

Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. UIJ = underground injection.



Table 4-3. TRI Other On-site Waste Management, by Industry, 1996

SIC Code	Industry	Recycled On-site Pounds	Energy Recovery On-site Pounds	Treated On-site Pounds	Total Other On-site Waste Management Pounds
20	Food	216,405,632	411,710	75,715,014	292,532,356
21	Tobacco	9,753	0	1,329,064	1,338,817
22	Textiles	13,085,659	5,326,659	23,627,782	42,040,100
23	Apparel	190,976	600	1,049,762	1,241,338
24	Lumber	50,544,925	1,538,386	23,482,107	75,565,418
25	Furniture	2,841,917	37,467	1,181,030	4,060,414
26	Paper	104,481,896	184,352,318	1,022,099,101	1,310,933,315
27	Printing	168,501,410	203,536	61,721,672	230,426,618
28	Chemicals	3,731,246,814	1,348,429,666	3,254,527,247	8,334,203,727
29	Petroleum	153,400,536	603,601,392	1,305,533,526	2,062,535,454
30	Plastics	162,062,640	19,598,143	39,036,343	220,697,126
31	Leather	604,322	0	3,620,694	4,225,016
32	Stone/Clay/Glass	149,823,758	445,258,980	22,702,838	617,785,576
33	Primary Metals	2,092,485,352	49,768,460	625,844,126	2,768,097,938
34	Fabricated Metals	148,030,876	20,976,980	113,727,254	282,735,110
35	Machinery	49,613,047	130,702	9,438,553	59,182,302
36	Electrical Equip.	148,298,966	11,424,647	78,313,464	238,037,077
37	Transportation Equip.	16,523,234	1,458,959	29,517,152	47,499,345
38	Measure./Photo.	3,960,735	938,685	37,645,252	42,544,672
39	Miscellaneous	16,533,257	3,362,337	4,770,453	24,666,047
	Multiple Codes 20-39	609,928,425	40,337,718	388,721,568	1,038,987,711
	No Codes 20-39	4,021,012	24,582,100	16,257,919	44,861,031
	Total	7,842,595,142	2,761,739,445	7,139,861,921	17,744,196,508
	Federal Facilities	12,169,917	7,700	9,650,204	21,827,821

Note: Other On-site Waste Management from Section 8 of Form R. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range of 20 to 39 are assigned to the "no codes 20-39" category.

For on-site recycling, primary metals reported the second largest amount, with 2.09 billion pounds, or 26.7% of the total. Petroleum production (SIC code 29) was second for on-site energy recovery, with 603.6 million pounds (21.9%), and for on-site treatment, with 1.31 billion pounds (18.3%).

Figure 4-2 shows on-site waste management for the industries with the largest such totals.

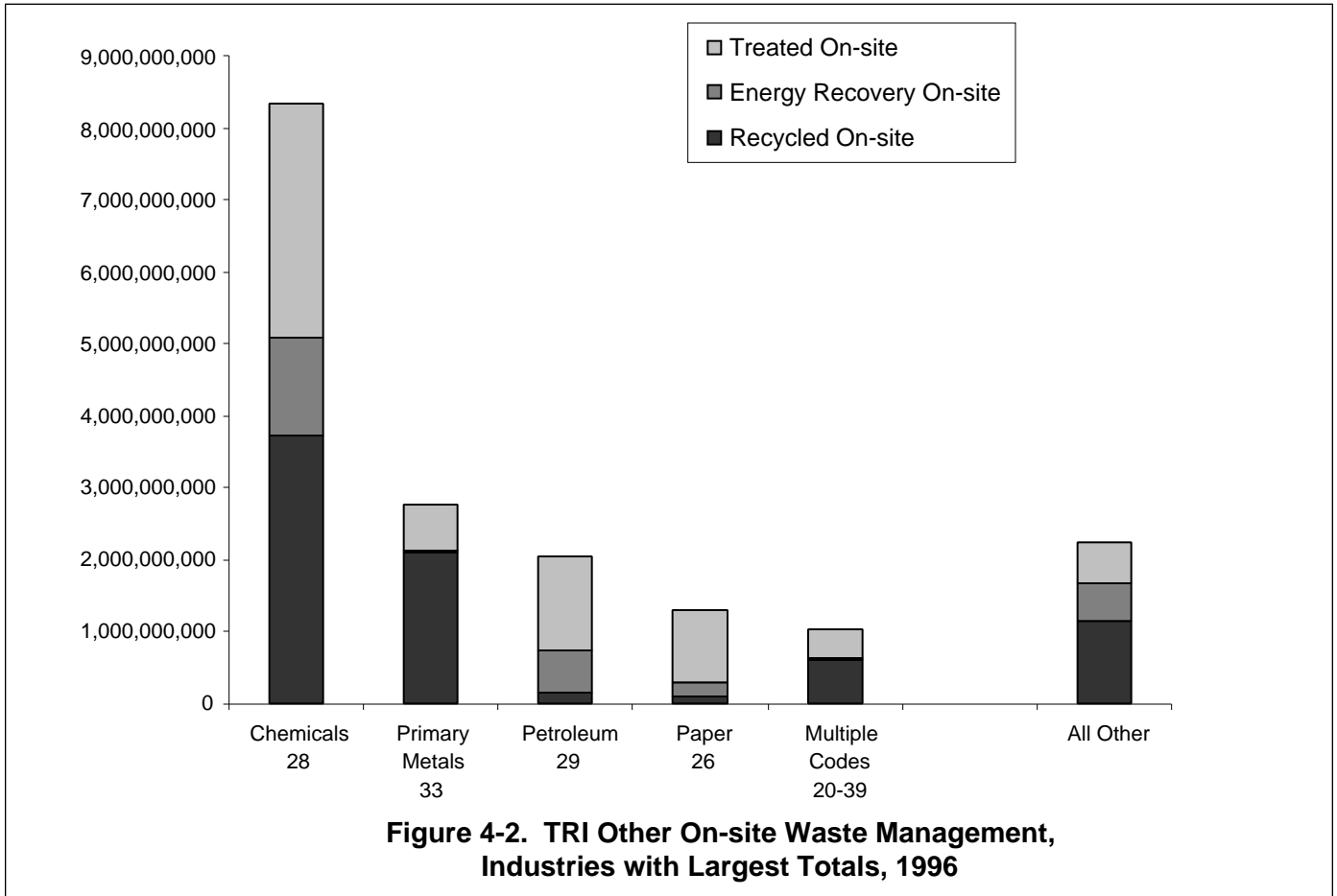
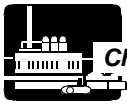
Transfers Off-site for Further Waste Management

As in other aspects of the data, chemical manufacturing accounted for the largest portion of transfers off-site for further waste management in 1996. As seen in Table 4-4, the chemicals industry reported 898.9 million pounds of such transfers, or

28.5% of the total. Primary metals was again second with 876.0 million pounds, or 27.7%. Ranking third was electrical equipment (SIC code 36) with 372.7 million pounds, 11.8%. Federal facilities, with 19.5 million pounds (almost all of which were transfers to recycling), reported 0.6% of the total.

Primary metals reported the largest transfers off-site to recycling, with 796.1 million pounds. Chemical manufacturing led the other categories, with 378.4 million pounds transferred to energy recovery, 154.3 million pounds to treatment, and 109.5 million pounds to POTWs (sewage treatment).

Figure 4-3 presents off-site transfers for further waste management for the sectors with the largest totals.



Note: Other On-site Waste Management from Section 8 of Form R. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category.

Economic Overview, by Industry, 1996

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 lack of information on non-TRI sources of releases of TRI chemicals. Chapter 2 attempts to set TRI data for some types of chemicals (fertilizers, pesticides, and volatile organic chemicals) in the context of larger environmental releases, not reported to TRI.

This year's industry-by-industry view of TRI reporting addresses another limitation—that TRI data alone do not distinguish industry-specific

factors that influence the chemicals, amounts, and types of releases and waste management facilities report. Each industry chapter in this volume and in the volume scheduled for publication in summer 1998 offers some economic, technological, and regulatory information for that sector as a context for the data reported to TRI.

For each two-digit SIC code, Table 4-5 presents value of shipments and employment for 1996. These basic economic data 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 value of shipments data as one way to indicate the size of industrial sectors, because no direct comparison can be drawn among products of those sectors. The dollar value of shipments



Table 4-4. TRI Transfers Off-site for Further Waste Management, by Industry, 1996

SIC Code	Industry	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs Pounds	Other Off-site Transfers Pounds	Total Transfers Off-site for Further Waste Management Pounds
20	Food	1,816,235	267,672	1,286,750	20,311,887	750	23,683,294
21	Tobacco	165,113	0	56,491	267,349	0	488,953
22	Textiles	1,013,876	1,926,069	523,939	2,287,565	0	5,751,449
23	Apparel	1,440	139,653	535	255	0	141,883
24	Lumber	515,208	2,299,252	491,157	32,799	12,036	3,350,452
25	Furniture	6,453,880	5,612,741	601,162	383,502	6,295	13,057,580
26	Paper	2,180,119	7,495,656	9,983,082	40,311,407	0	59,970,264
27	Printing	3,642,455	3,670,369	382,262	242,411	0	7,937,497
28	Chemicals	256,639,247	378,369,918	154,280,145	109,463,055	104,516	898,856,881
29	Petroleum	18,553,327	657,071	2,150,251	4,788,134	1	26,148,784
30	Plastics	11,817,283	6,750,688	3,169,307	2,890,863	24,575	24,652,716
31	Leather	337,555	167,073	29,024	1,290,230	0	1,823,882
32	Stone/Clay/Glass	3,672,150	2,865,219	2,987,594	1,019,855	16,497	10,561,315
33	Primary Metals	796,078,608	5,643,584	66,153,726	7,859,057	263,705	875,998,680
34	Fabricated Metals	303,449,098	13,729,060	12,677,769	6,597,522	88,546	336,541,995
35	Machinery	64,012,061	2,530,890	1,316,961	4,168,245	2,025,681	74,053,838
36	Electrical Equip.	345,621,345	8,084,043	7,294,538	10,998,130	694,794	372,692,850
37	Transportation Equip.	164,986,403	13,944,925	8,676,026	5,577,802	8,146	193,193,302
38	Measure./Photo.	12,245,918	2,366,341	2,480,361	930,896	44,588	18,068,104
39	Miscellaneous	17,835,260	2,479,411	516,301	635,395	0	21,466,367
	Multiple Codes 20-39	135,247,125	15,615,643	14,128,226	15,248,528	15,500	180,255,022
	No Codes 20-39	4,310,288	2,441,292	911,221	508,621	750	8,172,172
	Total	2,150,593,994	477,056,570	290,096,828	235,813,508	3,306,380	3,156,867,280
	Federal Facilities	18,553,503	304,101	590,337	71,893	0	19,519,834

Note: Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range of 20 to 39 are assigned to the "no codes 20-39" category. Other Off-site Transfers are transfers reported without a valid waste management code.

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 reported to TRI for 1996, to allow approximate comparisons with the economic activity of the sectors. Percentages indicate the relative contribution of each sector to total employment and production (measured by the dollar-value of shipments) and to the total quantity of TRI chemicals in production-related waste reported to TRI. The ratio of total production-related waste to shipments, in the last column, compares the reported TRI quantities in each two-digit sector with that sector's production level for 1996. Many factors influence the differences in TRI reporting among industrial sectors. Relating TRI quantities to the dollar value of each sector's products takes into account one measure of the differences among sectors in their level of production in 1996.

In 1996, as shown in Table 4-5, chemical manufacturing accounted for 4.8% of U.S. manufacturing employment, 9.9% of the value of shipments in U.S. manufacturing, and 45.6% of the total production-related waste reported to TRI. Chemical manufacturing had the highest ratio of production-related waste to value of shipments, 27,303 pounds per million dollar-value. With 4.8% of the value of shipments and 19.0% of total production-related waste, primary metals production had the second-highest ratio, 23,467 pounds of production-related waste per million dollar-value of shipments. Petroleum production was third, with 12,367 pounds per million dollar-value.

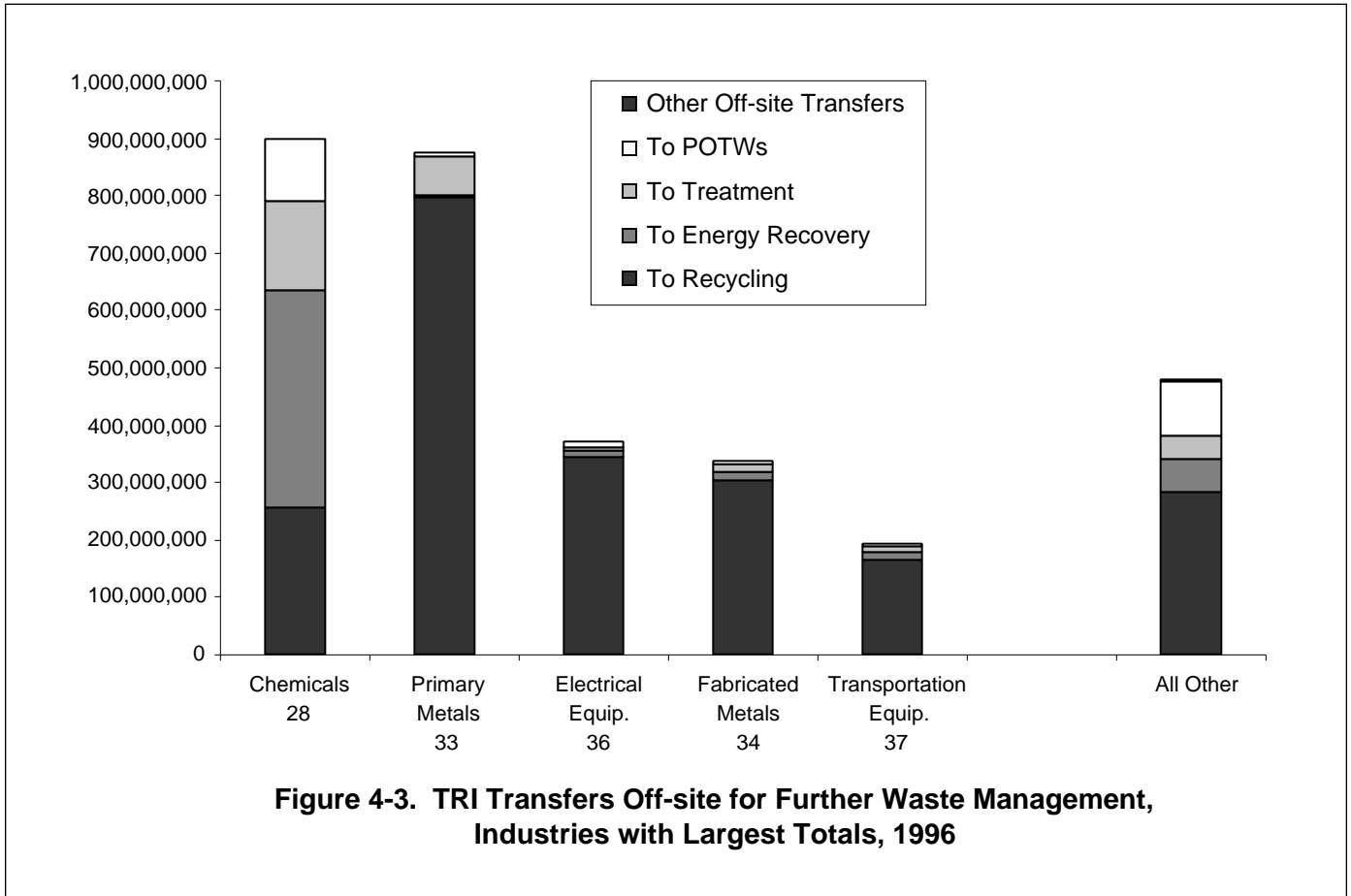
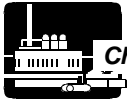


Figure 4-3. TRI Transfers Off-site for Further Waste Management, Industries with Largest Totals, 1996

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

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 and other industry chapters.

Progress is measured from TRI’s designated baseline year, 1988, for on-site releases and off-

site transfer types that have been collected since TRI began. On- and off-site waste management data, authorized under the federal Pollution Prevention Act of 1990, have been collected since 1991. This chapter presents industry data for the appropriate comparison years, as well as data for the most recent two years, 1995 and 1996.

On- and Off-site Releases, 1995-1996

Table 4-6 summarizes on- and off-site releases by industry for 1995 and 1996. The net change for the two-year period was a decrease of 97.3 million pounds, or 3.8%.

With the largest releases in 1996, chemical manufacturing also had the largest decrease in



Table 4-5. Employees, Value of Shipments, and Total Production-related Waste, by Industry, 1996

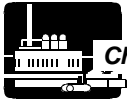
SIC Code	Industry	Employees		Value of Shipments		TRI Total Production-related Waste		Production-related Waste per Value of Shipments Pounds per Million Dollar-Value
		Number	Percent	(\$000)	Percent	Pounds	Percent	
20	Food	1,516,600	8.8	461,324,200	12.4	397,557,868	1.8	862
21	Tobacco	31,400	0.2	34,481,700	0.9	5,921,753	0.0	172
22	Textiles	576,400	3.3	80,242,000	2.2	64,609,067	0.3	805
23	Apparel	864,900	5.0	77,628,100	2.1	3,273,589	0.0	42
24	Lumber	738,700	4.3	106,518,100	2.9	110,972,285	0.5	1,042
25	Furniture	514,500	3.0	55,696,700	1.5	57,823,940	0.3	1,038
26	Paper	630,600	3.6	160,661,000	4.3	1,599,797,509	7.3	9,958
27	Printing	1,515,000	8.7	195,435,200	5.3	266,207,152	1.2	1,362
28	Chemicals	824,400	4.8	367,441,800	9.9	10,032,390,027	45.6	27,303
29	Petroleum	106,000	0.6	174,284,600	4.7	2,155,301,359	9.8	12,367
30	Plastics	1,017,900	5.9	150,467,500	4.0	369,790,262	1.7	2,458
31	Leather	77,200	0.4	9,308,500	0.3	10,168,880	0.0	1,092
32	Stone/Clay/Glass	520,400	3.0	82,441,300	2.2	668,768,984	3.0	8,112
33	Primary Metals	687,400	4.0	178,297,800	4.8	4,184,091,672	19.0	23,467
34	Fabricated Metals	1,483,000	8.6	214,006,300	5.8	716,239,652	3.3	3,347
35	Machinery	1,980,500	11.4	381,793,700	10.3	169,485,752	0.8	444
36	Electrical Equip.	1,556,500	9.0	320,614,700	8.6	679,402,239	3.1	2,119
37	Transportation Equip.	1,466,900	8.5	465,172,200	12.5	355,169,310	1.6	764
38	Measure./Photo.	820,700	4.7	151,015,900	4.1	76,477,512	0.3	506
39	Miscellaneous	397,300	2.3	48,596,800	1.3	57,640,501	0.3	1,186
	Total	17,326,300	100.0	3,715,428,100	100.0	21,981,089,313	100.0	5,916

Note: Employees and Value of Shipments from U.S. Census Bureau, 1996 Annual Survey of Manufactures. Total Production-related Waste from Section 8 (total of 8.1 through 8.7, Column B) of TRI Form R for 1995. Total Production-related Waste does not include forms reporting more than one 2-digit SIC code and forms reporting SIC codes outside the 20-to-39 range.

Table 4-6. Change in Total TRI On-site and Off-site Releases, by Industry, 1995-1996

SIC Code	Industry	Total On- and Off-site Releases			
		1995 Pounds	1996 Pounds	Change 1995-1996	
				Pounds	Percent
20	Food	86,466,520	83,303,395	-3,163,125	-3.7
21	Tobacco	2,034,129	4,152,572	2,118,443	104.1
22	Textiles	18,501,494	17,327,530	-1,173,964	-6.3
23	Apparel	1,287,024	1,864,850	577,826	44.9
24	Lumber	34,834,946	36,242,680	1,407,734	4.0
25	Furniture	41,779,889	35,876,663	-5,903,226	-14.1
26	Paper	238,316,638	227,563,372	-10,753,266	-4.5
27	Printing	31,156,331	28,466,019	-2,690,312	-8.6
28	Chemicals	844,232,213	785,178,163	-59,054,050	-7.0
29	Petroleum	64,140,915	68,887,258	4,746,343	7.4
30	Plastics	127,167,993	116,409,291	-10,758,702	-8.5
31	Leather	4,475,689	4,241,889	-233,800	-5.2
32	Stone/Clay/Glass	32,323,553	38,740,426	6,416,873	19.9
33	Primary Metals	524,040,619	564,535,183	40,494,564	7.7
34	Fabricated Metals	97,038,621	90,254,367	-6,784,254	-7.0
35	Machinery	26,202,906	22,060,720	-4,142,186	-15.8
36	Electrical Equip.	40,455,697	41,765,377	1,309,680	3.2
37	Transportation Equip.	121,154,521	111,352,769	-9,801,752	-8.1
38	Measure./Photo.	17,858,774	15,350,071	-2,508,703	-14.0
39	Miscellaneous	13,868,918	10,270,058	-3,598,860	-25.9
	Multiple Codes 20-39	152,530,504	120,779,018	-31,751,486	-20.8
	No Codes 20-39	10,918,043	8,884,911	-2,033,132	-18.6
	Total	2,530,785,937	2,433,506,582	-97,279,355	-3.8
	Federal Facilities	7,801,971	6,502,648	-1,299,323	-16.7

Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range of 20 to 39 are assigned to the "no codes 20-39" category.



releases from 1995 to 1996. This reduction was 59.1 million pounds, or 7.0%. The second-largest reduction was reported in the multiple-codes category, a 31.8-million-pound decrease, or 20.8%. Two industries also reporting decreases of more than 10 million pounds were plastics (SIC code 30; 10.8 million pounds, or 8.5%) and paper (also with 10.8 million pounds, or 4.5%).

With the second-largest total releases in 1996, primary metals had the largest increase from 1995 to 1996. Reporting 40.5 million pounds more in on- and off-site releases in 1996 than in 1995, this sector had an increase of 7.7%. Ranking second for 1995-1996 increases was the manufacture of stone/clay/glass products (SIC code 32), an increase of 6.4 million pounds, or 19.9%.

From 1995 to 1996, thirteen industry sectors reported decreases, as did the multiple-codes category and a category which includes all the forms that failed to report an SIC code. Federal facilities reported a decrease of 1.3 million pounds, or 16.7%. In comparison, seven sectors reported increases.

On- and Off-site Releases, 1988 and 1994-1996

From 1988 to 1996, on- and off-site releases decreased from 3.35 billion pounds to 1.82 billion pounds, as shown in Table 4-7 which summarizes release data for all sectors. This amounted to a reduction of 1.53 billion pounds, or 45.6%.

Chemical manufacturing contributed more than one third (35.0%) of this reduction. On- and off-site releases for the chemical manufacturing sector were 1.05 billion pounds in 1988, but decreased by more than half (51.0%) to 513.0 million pounds in 1996. This reduction of 534.7 million pounds was by far the largest decrease among the sectors. The second-largest reported

decrease occurred in the multiple-codes category, from 308.4 million pounds in 1988 to 91.2 billion pounds in 1996 (217.2 million pounds, or 70.4%). In two other sectors, the net reduction totaled more than 100 million pounds each: Primary metals reported 629.4 million pounds in 1988 and 496.7 million pounds in 1996, a difference of 132.7 million pounds or a 21.1% reduction. Makers of transportation equipment (SIC code 37) reported 208.4 million pounds in 1988 and 105.2 million pounds in 1996, a decrease of 103.2 million pounds, or 49.5%.

From 1988 to 1996, on- and off-site releases decreased for all but one of the sectors. The exception was apparel (SIC code 23), for which releases increased from 1.0 million pounds in 1988 to 1.7 million pounds in 1996, a 69.8% increase. Federal facilities were not required to report before the 1994 reporting year. They reported a 48.3% decrease (3.8 million pounds) from 1994 to 1996.

Actual and Projected Quantities of TRI Chemicals in Waste, 1995-1998

Table 4-8 presents the change in total production-related waste projected by industries through 1998. 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.

In 1996, projections for production-related waste amounted to an increase of 3.2% by 1998. Apparel, plastics, and industrial machinery were the sectors projecting the largest percentage decreases by 1998; these were 28.5% reduction for apparel, 24.3% for plastics, and 17.9% for machinery. Food and beverage processors projected the greatest percentage increase, 83.1%. No other industry projected a net change—either increase or decrease—of more than 10%. Federal facilities projected an increase of 108.2 million pounds, or 227%. Much of this increase is due to one facility—the U.S. Army facility in Radford,



Table 4-7. Change in Total On-site and Off-site Releases, by Industry, 1988 and 1994-1996

SIC Code	Industry Pounds	Total On- and Off-site Releases				Change 1988-1996	
		1988 Pounds	1994 Pounds	1995 Pounds	1996 Pounds	Pounds	Percent
20	Food	8,377,717	6,013,560	5,120,357	5,120,503	-3,257,214	-38.9
21	Tobacco	341,927	134,771	95,226	73,415	-268,512	-78.5
22	Textiles	35,798,377	16,346,332	15,655,607	15,280,411	-20,517,966	-57.3
23	Apparel	1,025,697	1,380,947	1,259,986	1,741,831	716,134	69.8
24	Lumber	32,981,807	32,986,266	30,434,637	27,116,641	-5,865,166	-17.8
25	Furniture	62,363,120	52,134,945	41,530,300	35,651,541	-26,711,579	-42.8
26	Paper	207,603,004	185,334,196	178,774,984	172,799,131	-34,803,873	-16.8
27	Printing	61,187,518	34,386,679	30,895,852	28,269,786	-32,917,732	-53.8
28	Chemicals	1,047,782,223	537,482,685	539,600,255	513,043,111	-534,739,112	-51.0
29	Petroleum	72,780,821	46,877,100	42,593,318	43,076,652	-29,704,169	-40.8
30	Plastics	158,313,799	125,462,108	114,765,358	105,358,191	-52,955,608	-33.4
31	Leather	13,023,617	5,104,391	4,026,421	3,813,502	-9,210,115	-70.7
32	Stone/Clay/Glass	40,539,364	17,359,182	19,053,390	23,263,716	-17,275,648	-42.6
33	Primary Metals	629,353,951	433,885,649	455,029,353	496,662,641	-132,691,310	-21.1
34	Fabricated Metals	160,369,759	99,572,056	90,440,941	77,610,533	-82,759,226	-51.6
35	Machinery	69,747,296	27,120,215	22,851,633	19,162,054	-50,585,242	-72.5
36	Electrical Equip.	132,719,036	36,671,754	31,457,129	33,753,037	-98,965,999	-74.6
37	Transportation Equip.	208,391,846	128,139,353	114,746,256	105,231,558	-103,160,288	-49.5
38	Measure./Photo.	58,084,824	14,328,227	12,955,213	10,358,619	-47,726,205	-82.2
39	Miscellaneous	32,592,710	15,350,168	13,285,855	9,843,403	-22,749,307	-69.8
	Multiple Codes 20-39	308,351,079	149,011,079	122,436,826	91,157,789	-217,193,290	-70.4
	No Codes 20-39	11,229,042	17,704,243	8,281,275	5,376,979	-5,852,063	-52.1
	Total	3,352,958,534	1,982,785,906	1,895,290,172	1,823,765,044	-1,529,193,490	-45.6
	Federal Facilities	NA	7,920,210	5,907,355	4,091,563	NA	NA

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 and **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range of 20 to 39 are assigned to the "no codes 20-39" category. NA: Federal facilities not required to report before 1994.

Table 4-8. Actual and Projected Total Production-related Waste, by Industry, 1996-1998

SIC Code	Industry Pounds	Total Production-related Waste				
		Current Year 1996 Pounds	Projected Pounds		Change	
			1997 Pounds	1998 Pounds	1996-1997 Percent	1996-1998 Percent
20	Food	397,557,868	653,060,717	727,957,465	64.3	83.1
21	Tobacco	5,921,753	6,058,749	6,208,774	2.3	4.8
22	Textiles	64,609,067	63,000,446	59,903,878	-2.5	-7.3
23	Apparel	3,273,589	2,670,153	2,341,081	-18.4	-28.5
24	Lumber	110,972,285	112,364,213	105,247,446	1.3	-5.2
25	Furniture	57,823,940	55,286,126	55,415,684	-4.4	-4.2
26	Paper	1,599,797,509	1,607,516,198	1,592,387,416	0.5	-0.5
27	Printing	266,207,152	271,986,787	273,386,005	2.2	2.7
28	Chemicals	10,032,390,027	10,353,025,860	10,711,018,548	3.2	6.8
29	Petroleum	2,155,301,359	2,149,256,710	2,154,256,626	-0.3	-0.0
30	Plastics	369,790,262	317,102,112	279,769,639	-14.2	-24.3
31	Leather	10,168,880	9,620,096	9,379,954	-5.4	-7.8
32	Stone/Clay/Glass	668,768,984	655,757,904	661,882,280	-1.9	-1.0
33	Primary Metals	4,184,091,672	4,157,446,855	4,098,770,311	-0.6	-2.0
34	Fabricated Metals	716,239,652	686,697,161	685,478,273	-4.1	-4.3
35	Machinery	169,485,752	154,171,333	139,198,996	-9.0	-17.9
36	Electrical Equip.	679,402,239	688,507,504	709,503,469	1.3	4.4
37	Transportation Equip.	355,169,310	349,768,654	352,591,138	-1.5	-0.7
38	Measure./Photo.	76,477,512	75,297,949	75,531,810	-1.5	-1.2
39	Miscellaneous	57,640,501	57,076,721	57,369,703	-1.0	-0.5
	Multiple codes 20-39	1,344,788,998	2,035,461,325	1,328,724,148	51.4	-1.2
	No codes 20-39	90,462,402	83,350,294	86,893,334	-7.9	-3.9
	Total	23,416,340,713	24,544,483,867	24,173,215,978	4.8	3.2
	Federal Facilities	47,591,818	43,616,949	155,744,502	-8.4	227.3

Note: Data from Section 8 (Total of 8.1 through 8.7) of Form R for 1996. Prior year is Column A, current year is Column B, 1997 is Column C and 1998 is Column D. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range of 20 to 39 are assigned to the "no codes 20-39" category. NA: Federal facilities not required to report before 1994.

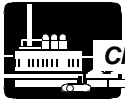


Table 4-9. Total Production-related Waste, by Industry, 1991 and 1994-1996

SIC Code	Industry Pounds	Total Production-related Waste					
		1991	1994	1995	1996	Change	
		Pounds	Pounds	Pounds	Pounds	1995-1996 Percent	1991-1996 Percent
20	Food	63,066,268	72,118,666	71,156,494	70,151,157	-1.4	11.2
21	Tobacco	51,405,093	238,686	150,596	107,615	-28.5	-99.8
22	Textiles	51,580,594	49,696,040	46,439,252	46,960,548	1.1	-9.0
23	Apparel	2,340,880	2,450,405	2,081,936	2,983,859	43.3	27.5
24	Lumber	68,482,868	62,445,982	117,713,741	108,000,702	-8.3	57.7
25	Furniture	62,158,973	69,100,903	64,657,002	57,110,926	-11.7	-8.1
26	Paper	1,401,164,200	1,390,873,031	1,317,034,610	1,305,706,645	-0.9	-6.8
27	Printing	259,904,658	238,262,543	291,227,127	265,137,838	-9.0	2.0
28	Chemicals	7,588,654,698	7,960,775,406	7,945,305,210	7,944,446,007	-0.0	4.7
29	Petroleum	1,171,406,294	1,272,138,197	1,006,857,742	1,812,421,303	80.0	54.7
30	Plastics	457,662,674	511,959,880	498,365,536	338,869,255	-32.0	-26.0
31	Leather	18,010,356	8,750,968	7,542,055	6,287,054	-16.6	-65.1
32	Stone/Clay/Glass	945,494,178	1,003,550,335	835,143,656	642,733,737	-23.0	-32.0
33	Primary Metals	2,306,289,254	3,125,155,465	3,201,648,708	3,247,781,282	1.4	40.8
34	Fabricated Metals	639,270,669	802,980,329	676,733,941	676,808,105	0.0	5.9
35	Machinery	220,732,830	168,142,108	154,403,423	159,614,838	3.4	-27.7
36	Electrical Equip.	663,918,802	547,072,102	592,043,373	612,154,741	3.4	-7.8
37	Transportation Equip.	382,686,549	413,901,849	377,430,033	334,876,290	-11.3	-12.5
38	Measure./Photo.	114,962,999	73,269,084	73,757,533	67,302,183	-8.8	-41.5
39	Miscellaneous	59,754,379	62,368,995	55,563,414	55,967,458	0.7	-6.3
	Multiple Codes 20-39	1,948,479,575	1,243,934,543	1,344,098,604	1,175,283,275	-12.6	-39.7
	No Codes 20-39	167,790,586	216,475,822	89,307,448	78,091,387	-12.6	-53.5
	Total	18,645,217,377	19,295,661,339	18,768,661,434	19,008,796,205	1.3	1.9
	Federal Facilities	NA	36,195,048	77,626,788	46,040,436	-40.7	NA

Note: Does not include delisted chemicals, chemicals added in 1994 and 1995, and ammonia, hydrochloric acid, and sulfuric acid. Data from Section 8 (Total of 8.1 through 8.7, Column B) of Form R of year indicated. Forms that reported more than one 2-digit SIC code within the range of 20 to 39 are assigned to the "multiple" category. Forms with no 2-digit SIC code within the range of 20 to 39 are assigned to the "no codes 20-39" category.

Virginia, which projected an increase in nitric acid of 115.0 million pounds in on-site recycling and treatment. Without this form, the projection by federal facilities would be a decrease of 24.3%.

Waste Management Data, 1991 and 1995-1996

As discussed in Chapter 3, total production-related waste has fluctuated since 1991, when TRI began collecting waste management data. From 1995 to 1996, production-related waste increased 1.3%. Overall, from 1991 to 1996, production-related waste has increased 1.9%. Table 4-9 reviews these changes by industry.

Forms with multiple SIC codes reported the largest decrease in production-related waste: a decrease of 773.2 million pounds from 1.95 billion pounds in 1991 to 1.18 billion pounds in 1996. This

represented a 39.7% decrease. Other industries with large overall decreases were stone/clay/glass products, with a decrease of 302.8 million pounds (32.0%) from 945.5 million pounds to 642.7 million pounds, and plastics, with a decrease of 118.8 million pounds (26.0%) from 457.7 million pounds to 338.9 million pounds.

Primary metals reported the largest increase in production-related waste from 1991 to 1996, 941.5 million pounds. With 2.31 billion pounds reported in 1991 and 3.25 billion pounds in 1996, this constituted a 40.8% increase. Second was petroleum, with an increase of 641.0 million pounds, or 54.7% (from 1.17 billion pounds in 1991 to 1.81 billion pounds in 1996). Third for increases was chemicals, with an increase of 355.8 million pounds, or 4.7% (from 7.59 billion pounds to 7.94 billion pounds).



These six industries, with the largest increases and decreases, were the only industries with changes of more than 100 million pounds across the five years. Federal facilities were not required to report in 1991.

Economic Overview, by Industry, Multi-Year Comparisons

1996 was the sixth year in a relatively long period of moderate expansion in the United States economy. The economy as a whole grew at a rate of 2.8% for the year, as measured by real gross domestic product (*Economic Report of the President*, February 1998). Manufacturing output grew at a rate of 1.0% for the year, somewhat slower than in the previous several years.

Table 4-10 presents production indexes for each industrial sector from 1989 to 1996. These indexes measure real output (unlike the value of shipments data). As shown in the table, production increased 17.6% from 1989 to 1996 for U.S. manufacturing overall. Table 4-11 compares the change in manufacturing production since 1989 with the change in TRI on- and off-site releases and transfers off-site for treatment. As shown in Table 4-11, reported amounts of these TRI releases and transfers have steadily decreased since 1989, even as manufacturing production recovered from small decreases in the early years of the period and expanded through 1996. Overall, while manufacturing production increased 17.6% from 1989 to 1996, TRI on- and off-site releases and transfers off-site for treatment decreased 39.0%.

Table 4-10. Industrial Production Indexes by Industry, 1989-1996

SIC Code	Industry	1989	1990	1991	1992	1993	1994	1995	1996
	Total Index	100.0	99.9	97.9	101.0	104.4	109.7	113.2	116.4
	Manufacturing	100.0	99.5	97.2	101.0	104.7	110.5	114.3	117.6
20	Food	100.0	101.1	102.6	104.3	106.5	108.1	110.2	110.9
21	Tobacco	100.0	100.0	93.8	94.9	79.7	98.4	100.8	100.2
22	Textiles	100.0	96.6	96.1	103.6	109.3	114.8	113.9	110.6
24	Lumber	100.0	97.4	90.6	95.9	96.7	101.5	101.8	105.3
25	Furniture	100.0	98.5	92.6	97.7	102.2	105.4	106.1	106.3
26	Paper	100.0	100.6	101.5	104.8	109.0	113.6	115.2	113.2
27	Printing	100.0	99.6	95.7	96.6	97.4	97.1	96.4	95.2
28	Chemicals	100.0	102.3	101.4	105.2	106.2	109.5	112.0	114.4
29	Petroleum	100.0	101.0	99.8	100.7	103.6	103.7	105.2	107.3
30	Plastics	100.0	101.1	99.5	109.6	117.1	127.3	130.4	132.2
31	Leather	100.0	96.3	87.9	89.4	90.3	83.6	76.6	71.5
32	Stone/Clay/Glass	100.0	97.8	90.5	93.1	95.1	100.5	101.6	103.4
33	Primary Metals	100.0	99.1	92.2	95.3	100.6	107.7	110.3	111.6
34	Fabricated Metals	100.0	96.6	91.8	95.4	99.6	106.9	110.4	113.2
35	Machinery	100.0	97.2	92.6	97.1	106.7	121.7	137.3	151.8
36	Electrical Equip.	100.0	102.2	104.4	116.6	128.2	147.2	172.7	190.3
37	Transportation Equip.	100.0	97.3	91.8	95.1	98.7	102.2	99.9	101.0
38	Measure./Photo.	100.0	100.2	101.6	101.8	102.4	101.7	102.2	104.7

Note: 1989=100. Beginning 1990, data for production indexes based on 1987 Standard Industrial Classification (SIC), earlier years based on 1977 SIC. Data not provided for apparel industry (SIC code 23).

From: 1997 *Statistical Abstract of the United States*. No. 1227. *Industrial Production Indexes, by Industry: 1980 to 1996* (Source: Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, monthly, and *Industrial Production and Capacity Utilization*, Statistical Release G. 17, monthly).

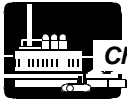


Table 4-11. Cumulative Change in Manufacturing Production and in TRI Releases and Transfers Off-site to Treatment and Disposal, 1989-1996

	1989-1990	1989-1991	1989-1992	1989-1993	1989-1994	1989-1995	1989-1996
Manufacturing Production	-0.5	-2.8	1.0	4.7	10.5	14.3	17.6
TRI Releases and Transfers Off-site to Treatment and Disposal	-5.7	-19.7	-23.9	-30.1	-34.8	-37.0	-39.0

Note: Does not include delisted chemicals, chemicals added in 1990, 1991, 1994, and 1995, aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid. Cumulative change in manufacturing production based on 1997 *Statistical Abstract of the United States, No. 1227. Industrial Production Indexes, by Industry: 1980 to 1996* (Source: Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin Monthly*, and *Industrial Production and Capacity Utilization, Statistical Release G. 17, monthly*). **TRI Releases** from Section 5 and **Transfers Off-site to Treatment and Disposal** from Section 6 of TRI Form R (excludes transfers to recycling and energy recovery reported 1991 through 1996).