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EPA's 33/50 Program Seventh Progress Report

33/50 Hits the Mark!

TRI REPORTING PROFILES FOR 33/50 PROGRAM CHEMICALS

INTRODUCTION

The 33/50 Program, an EPA voluntary pollution reduction initiative, derives its name from its overall goals—an interim goal of a 33% reduction in 1992 and an ultimate goal of a 50% reduction in 1995 in releases and transfers of 17 high-priority toxic chemicals, using 1988 TRI reporting as a baseline. During 1988, 1.49 billion pounds of the target chemicals were either released to the environment on-site or transferred off-site to waste management facilities. The aim of the 33/50 Program was to reduce this amount by at least 50%—747 million pounds—by 1995, with an interim reduction target of more than 493 million pounds by 1992.

The 33/50 Program, the grandparent of EPA's growing array of voluntary environmental programs, represented at its inception an innovative experiment aimed at demonstrating whether voluntary partnerships can augment the Agency's traditional command-and-control approach by achieving targeted reductions more quickly than would regulations alone. The positive results from this experiment in corporate environmental voluntarism are best reflected in the rapid expansion of EPA volun-

33/50 Hits the Mark!

The 33/50 Program achieved overall reductions of 50.7% in 1994, a full year ahead of the 1995 target date for a 50% reduction. All told, 757 million pounds of releases and transfers have been eliminated since the 1988 baseline year for the program.

Other notable 33/50 achievements include:

- The 1,300 companies participating in 33/50 are projecting continued reductions in 1995 and 1996.
- The 17 chemicals targeted by 33/50 have been reduced at nearly twice the rate of other TRI chemicals, since 1991 when the Program began.
- 33/50 participants have gone well beyond their commitments, achieving 50% more than the amount of reductions originally pledged to the program.
- 33/50 participants are achieving reductions at a much faster rate than other companies—50% vs. 30% from 1991 through 1994 and 60% vs. 35% since 1988.
- Overall generation of production-related waste for the 33/50 chemicals has declined slightly since 1991 and is projected to continue declining, even as waste for all other TRI chemicals increases.
- 33/50 chemicals are more frequently targeted for source reduction than other TRI chemicals.

Box 1. 33/50 Program Highlights

tary programs since 33/50 was announced in February 1991. The 33/50 Program is now one of 27 voluntary partnership programs and initiatives underway at EPA.

The 33/50 Program is also part of a broad group of EPA activities designed to encourage pollution prevention as the best means of achieving reductions in toxic chemical releases and transfers. The hallmark of 33/50's response to this challenge is its top-down approach. More than 20,000 TRI facilities have reported 33/50 Program chemicals to TRI since 1988. By contacting the chief executives of nearly 9,000 parent companies of these facilities, the Program seeks to instill a pollution prevention ethic throughout the highest echelons of American business.

At the time the 33/50 Program was formulated, 1988 was the most recent year for which national TRI data were available, and the Program's baseline and goals were set accordingly. Reductions that companies achieved between 1988 and 1990 therefore contribute to the 33/50 Program's national reduction goals. However, these prior reductions should not be viewed as resulting from the 33/50 Program, as companies were first informed about the Program in February 1991.

Many states, a number of industry associations, and numerous individual companies include 33/50 Program chemicals within the scope of their own environmental initiatives. Twenty-six states had established toxics use reduction and pollution prevention programs prior to establishment of the 33/50 Program, and these contributed to its design. Others have used the 33/50 Program as a model. EPA views the 33/50 Program as an umbrella under which the federal government, states, industry, and communities work in partnership to achieve common goals.

Any progress in reducing releases and transfers of 33/50 Program chemicals reflects the efforts of all these partners.

Analyses of 33/50 Program progress consider only those data elements that facilities were required to report in 1988: environmental releases and transfers off-site for treatment and disposal (including transfers to POTWs). Transfers off-site for energy recovery and for recycling are not included in 33/50 Program goals. These data, along with waste management data (also reported to TRI only since 1991) for the 17 target chemicals, are presented and analyzed in this chapter, but do not contribute to assessments of the 33/50 Program's progress in meeting its national pollution reduction goals.

SUMMARY OF FINDINGS

Findings revealed in the 1994 TRI reporting data are summarized below. The data themselves are presented in subsequent sections.

33/50 Program's National 50% Reduction Goal Achieved Ahead of Schedule

- Releases and transfers of 33/50 Program chemicals were reduced by an additional 62 million pounds (7.8%) in 1994, bringing total reductions since 1988 to 757 million pounds and exceeding the Program's ultimate 1995 50% national pollution reduction goal by more than 10 million pounds a full year ahead of schedule (see Figure 1).

- 33/50's interim 1992 33% reduction goal was also achieved a year early, and reductions through 1992 exceeded the interim goal by more than 100 million pounds.

- Facilities are projecting continued reductions in their releases and transfers of 33/50

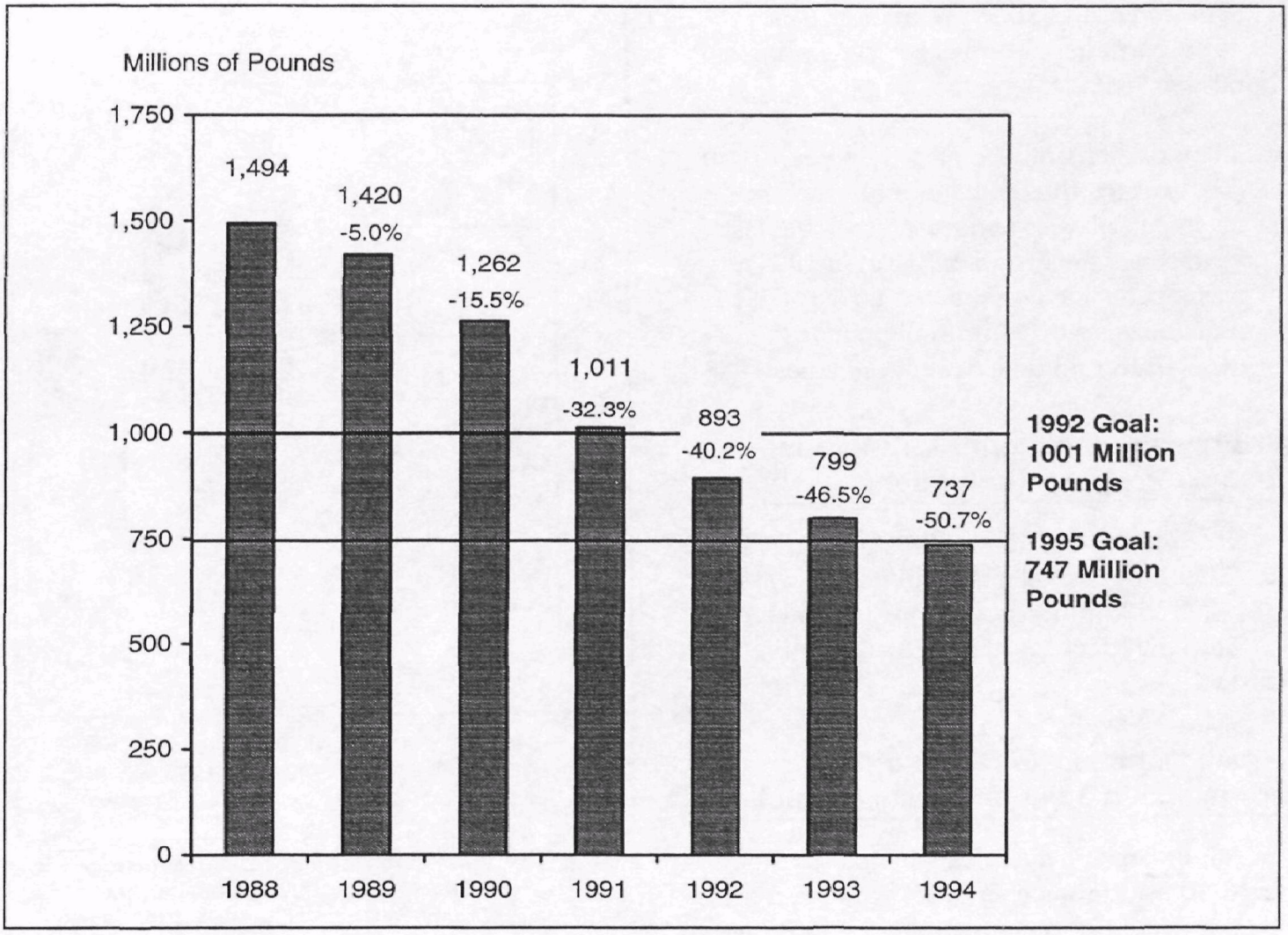

Figure 1. TRI Releases and Transfers of 33/50 Program Chemicals, 1988-1994.❶

Program chemicals in 1995 and 1996, demonstrating that American industry's commitment to voluntary environmental action is not ending with the achievement of the Program's namesake goals.

33/50 Program Chemicals Outpace Other TRI Reductions

- Releases and transfers for treatment and disposal of 33/50 Program chemicals were reduced at more than twice the rate observed for all other TRI chemicals from 1993 to 1994 (7.8% vs. 3.5%).
- Since the Program's announcement in 1991, 33/50 chemical reductions have outpaced reductions for all other TRI chemicals by nearly two to one (41.6% vs. 22.3%).

33/50 Program Participants Account for Most Reductions

- Since the Program began in 1991, facilities owned by companies enrolled as 33/50 participants reduced releases and transfers of the Program's 17 target chemicals by 49.5%, while non-participating companies' facilities

❶ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

achieved only a 30.3% reduction. Since 1988, participants outpaced non-participants 60% vs. 35%.

- 33/50 participants accounted for nearly half (46%) of the total reduction in Program chemical releases and transfers in the last year. Since the Program began in 1991, participants have accounted for 70% of the reductions, and 561 million pounds (74%) of the 757 million pounds reduced since 1988.

Air Emissions Account for Majority of 33/50 Program Reductions

- Nearly three-quarters of the reductions in 33/50 Program releases and transfers since 1988 (557 million pounds) were achieved through reduced air emissions (fugitive and stack).

Organic Chemicals Dominate Inorganics in 33/50 Program Reductions

- The 11 organic chemicals included among 33/50's 17 target chemicals accounted for 93% (706 million pounds) of 33/50 Program reductions between 1988 and 1994, while inorganics accounted for 7%.

- The percentage reduction in releases and transfers of organics was also much larger from 1988 to 1994 than for inorganics (53% vs. 31%).

33/50 Program Chemicals in Production-related Waste Projected to Decline

- Total production-related waste associated with 33/50 Program chemicals increased slightly (1.6%) from 1993 to 1994, but at a significantly lower rate than observed for other TRI chemicals in waste (5.8%) (see Figure 2).

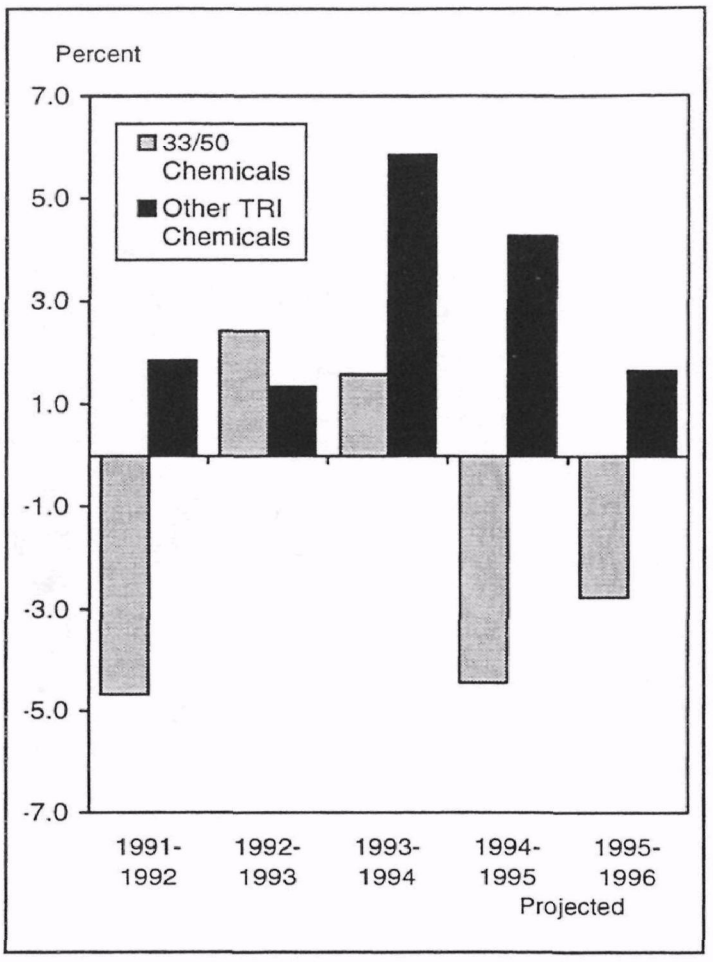

Figure 2. Percent Change in Total Production-related Waste, 33/50 Chemicals vs. Other TRI Chemicals, 1991-1996.❷

- Since 1991, 33/50 chemicals in waste have been reduced slightly (1%), compared with an increase of more than 9% for other TRI chemicals in waste.

- 33/50 chemicals in waste are projected to decline by 4.5% in 1995 and more than 7% by 1996, while facilities expect other TRI chemicals in waste to continue increasing (4.3% in 1995 and 6% by 1996).

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

Facilities owned by 33/50 Program participating companies reported a slight increase in production-related waste (0.2%) while facilities owned by non-participating parent companies reported a 3.4% increase.

Participating companies' facilities project a 13.4% decrease in production-related waste of 33/50 chemicals by 1996, compared to a 1.2% increase projected by non-participants.

33/50 Program Chemicals Targeted for Greater Source Reduction Activities

- Nearly a third of the Form Rs submitted for 33/50 Program chemicals reported the occurrence of a source reduction activity in 1994, compared to a fifth of the forms for other TRI chemicals.

- Nearly 7,000 source reduction activity reports were submitted for the seventeen 33/50 chemicals, representing more than 40% of all source reduction activities reported to TRI for 1994.

- Individual 33/50 Program chemicals had some of the highest levels of source reduction activity reporting in 1994. The top three TRI chemicals for number of forms reporting source reduction activities in 1994 were 33/50 Program targets, and several others are among the top 50.

COMPANY PARTICIPATION IN THE 33/50 PROGRAM

While the 33/50 Program did not have a fixed goal for the number of companies electing to participate, the Program nonetheless placed considerable emphasis on outreach to companies in an effort to promote a pollution prevention ethic as widely as possible.

Numbers of Companies Participating

Initial communications about the 33/50 Program were directed to the chief executive officers of the parent companies of the more than 20,000 industrial facilities that reported to TRI any of the Program's 17 target chemicals from 1988 to 1994. At the close of the Program's fifth and final year in February 1996, nearly 9,000 companies had been contacted by EPA with invitations to participate. Of these, nearly 1,300 companies (14.4%) elected to enroll (see Figure 3). Releases and transfers reported by facilities belonging to these companies represent 63% of the 1988 releases and transfers of 33/50 Program chemicals and 51% of the 1994 quantities.

The "Top 600" companies with the greatest amounts of releases and transfers were the first to be contacted and were the focus of greater outreach follow-up from the Program's headquarters and Regional Office staffs. This concentration on larger companies proved quite effective, with more than 60% of these companies electing to participate. However, less than 13% of the nearly 7,500 smaller companies chose to enroll.

Reductions Pledged by Participating Companies

While the Program's national goals were targeted for achievement by 1992 and 1995 (and achieved ahead of schedule), companies were encouraged to set their own reduction goals oriented to their own time frames. Nearly 1,100 (85%) of the 1,300 participating companies provided release/transfer reduction targets for 33/50 Program chemicals totalling 385 million pounds. Reduction commitments averaged slightly less than 50% per participating company.

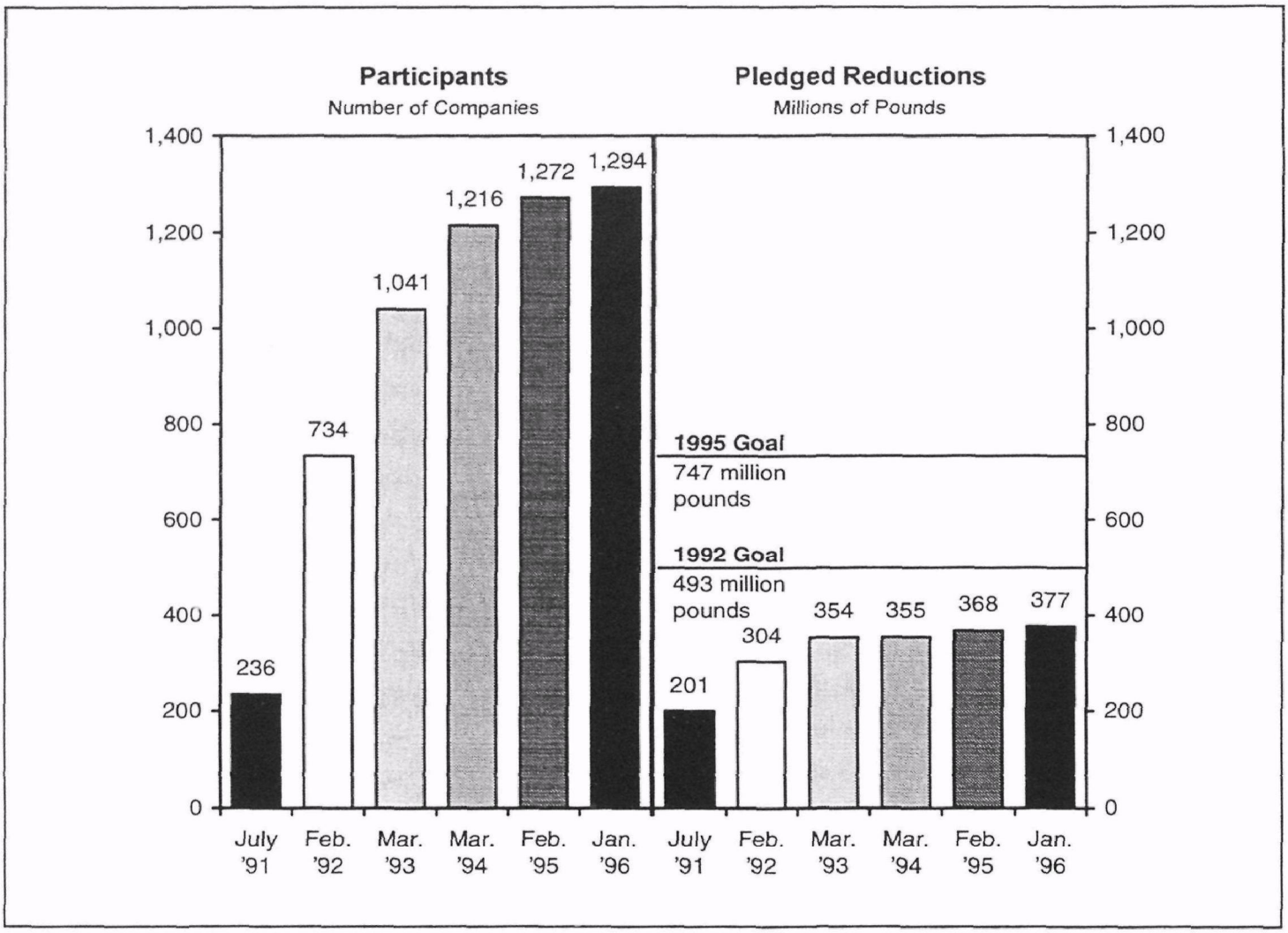

Figure 3. 33/50 Program Participant Status, January 1996.

Most of the remaining Program participants also developed reduction targets, but have structured them in ways that are difficult to assess against the 1988 release/transfer baseline. For example, some companies have reduction goals that are indexed to changes in production. If production remains constant throughout the duration of the Program, these can be read as direct reductions targets. However, where production increases or decreases, the absolute impact of the company's reduction pledge cannot be determined in advance. Accordingly, EPA has not factored these commitments into its assessment of total release/transfer reductions anticipated to be obtained through the 33/50 Program.

Other Program participants have developed reduction goals that go beyond the goals of the 33/50 Program. Some have pledged to reduce all TRI releases and transfers by specified amounts or percentages, but have not indicated specific targets for 33/50 Program chemicals. Others have gone beyond targeting end-of-pipe releases or transfers by attempting to reduce their actual use of toxic chemicals, but have not stipulated the impact such pollution prevention initiatives will have on environmental releases of 33/50 Program chemicals. As a result, the 385 million pounds of release/transfer reductions represent a lower bound on the reductions that companies attempted under the 33/50 Program.

Actual Reductions Outpacing Pledges

As evidenced in the TRI reporting data, actual reductions being achieved by companies for the Program's 17 target chemicals are exceeding significantly EPA's conservative interpretation of companies' reduction pledges. The 757 million pounds of 33/50 Program chemical releases and transfers reduced between 1988 and 1994 is more than twice the 385 million pounds pledged by participating companies to be reduced by 1995.

Some of these additional reductions result from decreases being achieved by companies that are not participating in the 33/50 Program [about 196 million pounds (26%) through 1994]. Some are due to the efforts of participating companies whose reduction pledges could not be factored into the national total. Significantly, however, companies that made reduction pledges achieved substantially greater results than they anticipated.

33/50 Program Participants Are Continuing Their Reductions

The 33/50 Program seeks to instill among its participants a commitment to continuous and comprehensive environmental improvement. Many participants targeted additional reductions for after 1995, for other chemicals besides the Program's 17 target chemicals, and for facilities outside of the United States. Altogether, more than 200 participants made extended pollution reduction pledges. As discussed below, participants are also projecting continued significant reductions in 33/50 chemical emissions (17.7% by 1996), further demonstrating a continuing commitment to voluntary pollution reductions.

33/50 PROGRAM RELEASES AND TRANSFERS

Releases and transfers of 33/50 Program chemicals were reduced by 62 million pounds (7.8%) in 1994, bringing total reductions since 1988 to 757 million pounds and exceeding the Program's ultimate 1995 50% national pollution reduction goal by more than 10 million pounds a full year ahead of schedule (see Figure 1 presented previously in this chapter).

Table 1 presents facilities' reports of on-site releases and off-site transfers to treatment and disposal of 33/50 Program chemicals versus reports for all other TRI chemicals for 1988 (the 33/50 Program's base year), 1990 (the year prior to EPA's initiation of the Program), 1993, and 1994. In order to control for changes in the TRI chemical list over time, year-to-year comparisons for non-33/50 Program chemicals (labelled "TRI Chemicals Less 33/50 Chemicals") are based on a consistent list of chemicals that have been reported under TRI for all years 1988-1994. The trends in reductions for each grouping of chemicals are depicted in Figure 4.

Figure 5 highlights the dramatic change in the reduction trends for 33/50 Program chemicals versus other TRI chemicals since the 33/50 Program was initiated. In the two years prior to the Program's announcement, reductions in releases and off-site transfers of other TRI chemicals significantly outpaced those for 33/50 Program chemicals: 20.2% vs. 15.5%. However, in the four years following announcement of the 33/50 Program's voluntary reduction goals, releases and transfers of its 17 target chemicals were reduced at nearly twice the rate observed for all other TRI chemicals: a 41.6% reduction between 1990 and 1994 for 33/50 Program chemicals versus a 22.3% reduction for the remaining TRI chemicals. In 1994, 33/50 chemicals outpaced the reduction rate for other

Table 1. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988, 1990, 1993, 1994.[3]

Year	All TRI Chemicals (Excluding Additions/ Deletions)	TRI Chemicals Less 33/50 Chemicals	33/50 Chemicals Only
	Pounds	Pounds	Pounds
1988	4,709,109,988	3,215,344,142	1,493,765,846
1990	3,828,286,482	2,566,155,970	1,262,130,512
1993	2,866,422,865	2,067,108,748	799,314,117
1994	2,731,490,375	1,994,449,624	737,040,751
	Percent Change	Percent Change	Percent Change
1988-1990	-18.70%	-20.19%	-15.51%
1990-1994	-28.65%	-22.28%	-41.60%
1993-1994	-4.71%	-3.52%	-7.79%
1988-1994	-42.00%	-37.97%	-50.66%

TRI chemical emissions by more than two to one (7.8% vs. 3.5%).

Facilities are projecting continued reductions in 33/50 Program emissions in 1995 and 1996. Using waste management data reported in Section 8 of Form R (see next section of this chapter), quantities reported as released (which include off-site disposal) added to quantities reported shipped off-site for treatment provides a reasonable proxy for anticipating future trends in the releases and transfers used to monitor the progress of the 33/50 Program. Facilities project 33/50 Program releases, disposal, and transfers to treatment to decline by 10.7% in 1995 and 16.5% by 1996. Similar projections for other TRI chemicals forecast a 5.4% increase by 1996.

The "leaders-in-reductions" role being played by 33/50 Program participants is also reflected in the reduction performance of the individual TRI facilities that use the target chemicals. Three of the top facilities showing the greatest reductions in direct environmental releases in 1994, and 12 of the top 20, report 33/50 chemicals and are owned by participating parent companies. Of the top 50 reducing facilities, 31 report Program chemicals and are owned by participating parents.

33/50 Program Chemical Releases and Transfers, by Medium/Transfer Type and by Chemical

Releases and off-site transfers of 33/50 Program chemicals are summarized by chemical and release medium/transfer type for 1988 (the 33/50 Program's base year), 1990 (the year prior to EPA's initiation of the Program), 1993, and 1994 in Table 2. (Box 2 explains the presentation of 33/50 chemicals in these tables.) The "Subtotal" column in the transfers portion of the table represents those transfer types (POTWs, treatment, disposal, and "other" transfers) that are included in the 33/50 Program goals. The

[3] Does not include amounts for recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

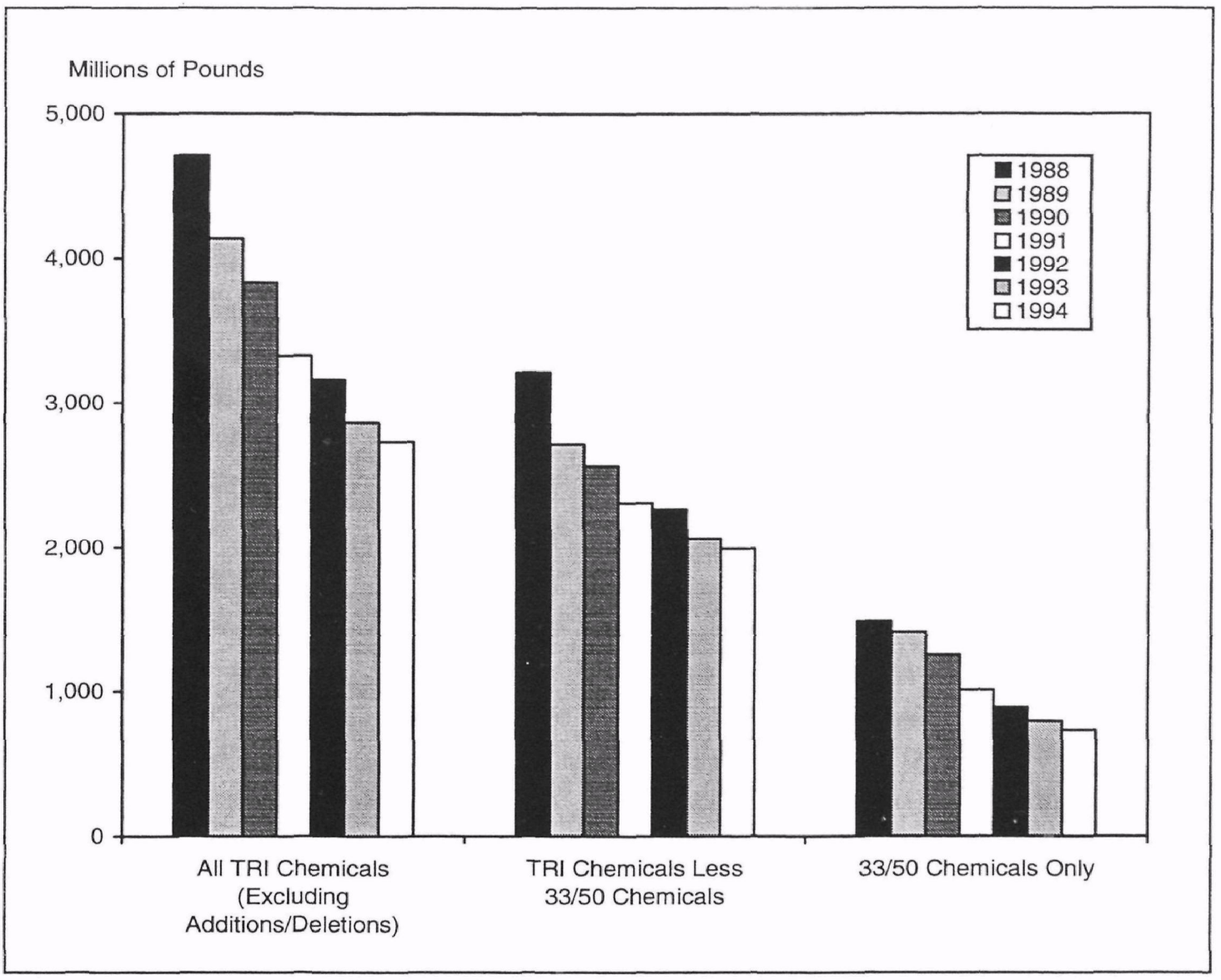

Figure 4. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988-1994.❹

"Total" column adds in transfers for recycling and energy recovery, which have been reportable to TRI since 1991 but are not included in the 33/50 Program. Figure 6 presents a graphical representation of the total releases and transfers (excluding transfers to recycling and energy recovery) for each chemical for these years.

Figure 7 shows the percentage reduction for the 11 organic chemicals and the six inorganic chemicals and their compounds, as well as for the total of all 33/50 chemicals. All percentages are calculated from a 1988 baseline. As the figure shows, releases and transfers of organic chemicals have steadily declined from 1988 to 1994 for a total reduction of nearly 53% over the time period. Releases and transfers of inorganic compounds, on the other hand,

❹ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

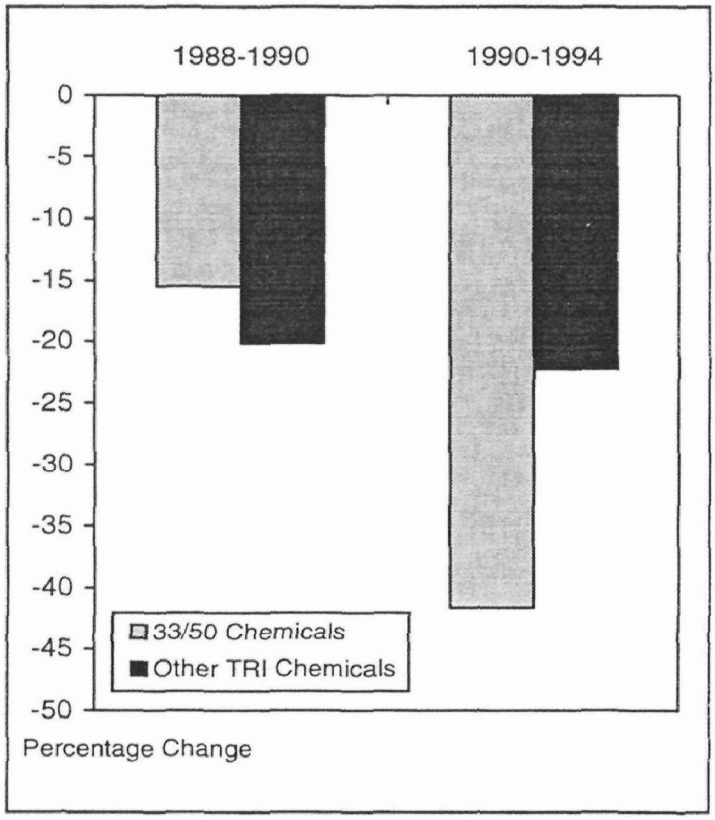

Figure 5. Comparison of Reductions in Releases and Transfers of 33/50 Program Chemicals vs. Other TRI Chemicals, 1988-1994.[5]

decreased from 1988 to 1989, increased in 1990, decreased significantly in 1991, decreased again in 1992, then increased in 1993 before decreasing again in 1994, resulting in total releases and transfers of inorganics decreasing less than 31% from 1988 to 1994. Because the inorganics account for a much smaller percentage of the total releases and transfers of 33/50 Program chemicals, however, their relatively small percentage decrease has had little impact on the total percentage reduction of 33/50 chemicals.

The 11 organic chemicals accounted for 93% of all reductions in 33/50 chemicals between 1988 and 1994, while inorganics accounted for 7% of total reductions. There are two reasons for this result. First, organics accounted for a much larger percent of total releases and transfers in 1988 than inorganics (89% vs. 11%). Second, the percentage reduction in releases and transfers of organics was much larger from 1988 to 1994 than for inorganics (53% vs. 31%).

Five chemicals accounted for 76% of total reductions in 33/50 Program releases and transfers between 1988 and 1994: toluene (23% of all reductions), 1,1,1-trichloroethane (21%), methyl ethyl ketone (11%), xylenes (11%), and dichloromethane (10%).

These results are not surprising given that these five organic chemicals were the largest source of releases and transfers of 33/50 chemicals in 1988 (74%). These chemicals still comprise nearly 71% of all releases and transfers of 33/50 chemicals. All organics represent 84% of total releases and transfers of 33/50 chemicals. Inorganics, however, are increasing in prominence, representing 16% of total releases and transfers of 33/50 Program chemicals in 1994, up from 11% in 1988. Lead and compounds and chromium and compounds are the most important inorganics, each accounting for 6% of total releases and transfers of 33/50 chemicals in 1994. Releases and transfers of cadmium and compounds increased between 1988 and 1994, primarily from an increase in 1993. Because release and transfer quantities of cadmium compounds are small, however, the impact on total 33/50 releases and transfers was negligible.

Figure 8 shows the percent change in releases and transfers of 33/50 Program chemicals from 1988 to 1994 for each chemical. With the exception of mercury and compounds, the inorganic chemicals (presented at the bottom of the figure) show smaller percentage decreases than observed for the 11 organic chemicals between 1988 and 1994, and releases and

[5] Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

transfers of one of the inorganics (cadmium and compounds) actually increased.

Figure 9 presents a graphical representation of the data in Table 2 by release medium and transfer type for the years 1988 to 1994. Figure 10 shows the percent change in releases and transfers from 1988 to 1994 by release medium and transfer type. Figure 11 shows the contribution of reductions in each release medium and transfer type to total reductions in releases and transfers of 33/50 chemicals from 1988 to 1994. As these diagrams show, the largest quantity reductions in releases and transfers have occurred in air emissions. Reductions in air emissions account for 74% of total reductions in releases and transfers of 33/50 chemicals.

Transfers to Energy Recovery and Recycling

As described in Chapter 2, the Pollution Prevention Act of 1990 (PPA) substantially expanded the scope of TRI to include reporting on additional toxic chemical management activities. Off-site transfers to energy recovery and recycling processes are now reported in Section 6 of Form R in addition to the previously reported transfers to POTWs and other treatment and disposal facilities.

Facilities' reports of transfers to energy recovery and recycling for 1991-1994 are presented after the "Subtotal" column in Table 2. The absence of reporting requirements for these activities in 1988 is reflected by "NA." Transfers to energy recovery (233.5 million pounds) and transfers to recycling (751.3 million pounds) in 1994 again substantially exceeded the total for all previously reported types of off-site transfers of 33/50 Program chemicals (134.3 million pounds). Increases

33/50 Program Chemical Identities

In the tables in this chapter, the 33/50 Program chemicals appear in alphabetical order by organic chemicals followed by inorganic chemicals. Xylenes and the inorganic chemicals have been grouped into categories, as shown below. The 10 individual organic chemicals and the seven groups constitute the 17 high-priority chemicals targeted by the 33/50 Program.

Organic chemicals

71-43-2	Benzene
56-23-5	Carbon tetrachloride
67-66-3	Chloroform
75-09-2	Dichloromethane
78-93-3	Methyl ethyl ketone
108-10-1	Methyl isobutyl ketone
127-18-4	Tetrachloroethylene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-01-6	Trichloroethylene

Xylenes

108-38-3	m-Xylene
95-47-6	o-Xylene
106-42-3	p-Xylene
1330-20-7	Xylene (mixed isomers)

Inorganic chemicals[6]

Cadmium and cadmium compounds	
7440-43-9	Cadmium
—	Cadmium compounds
Chromium and chromium compounds	
7440-47-3	Chromium
—	Chromium compounds
Cyanide compounds	
74-90-8	Hydrogen cyanide
—	Cyanide compounds
Lead and lead compounds	
7439-92-1	Lead
—	Lead compounds
Mercury and mercury compounds	
7439-97-6	Mercury
—	Mercury compounds
Nickel and nickel compounds	
7440-02-0	Nickel
—	Nickel compounds

Box 2. 33/50 Program Chemical Identities.

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

Table 2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1990, 1993, 1994.[7]

CAS Number	Chemical	Year	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
71-43-2	Benzene	94	491	5,266,338	4,226,037	22,256	223,103	25,371	9,763,105
		93	474	6,802,701	4,246,167	19,497	356,660	31,215	11,456,240
		90	503	14,673,280	10,901,492	25,303	689,066	717,007	27,006,148
		88	482	20,574,341	11,642,018	46,983	825,035	127,921	33,216,298
56-23-5	Carbon tetrachloride	94	69	226,057	392,870	1,223	12,654	0	632,804
		93	75	585,481	1,648,678	1,453	34,332	79	2,270,023
		90	100	419,002	1,320,385	4,718	31,557	1,005	1,776,667
		88	95	1,084,548	2,694,047	15,627	98,050	14,759	3,907,031
67-66-3	Chloroform	94	167	3,450,479	7,472,557	362,812	80,002	11,667	11,377,517
		93	175	4,562,449	9,289,998	451,262	38,039	32,926	14,374,674
		90	192	8,443,255	14,593,635	1,005,760	89,560	57,924	24,190,134
		88	169	7,695,273	18,275,242	1,131,484	36,000	68,544	27,206,543
75-09-2	Dichloromethane	94	1,030	25,022,843	37,687,647	52,289	960,942	50,845	63,774,566
		93	1,081	24,227,024	40,677,058	62,909	956,098	78,267	66,001,356
		90	1,451	38,208,293	62,749,754	194,764	850,018	21,024	102,023,853
		88	1,673	49,639,037	79,465,932	349,960	1,478,833	157,156	131,090,918
78-93-3	Methyl ethyl ketone	94	2,389	27,184,737	51,440,202	108,385	575,848	51,794	79,360,966
		93	2,473	29,378,455	56,738,332	184,339	360,927	134,162	86,796,215
		90	2,722	45,850,307	88,727,094	94,393	146,209	50,531	134,868,534
		88	2,527	41,669,961	99,080,759	91,426	255,955	166,537	141,264,638
108-10-1	Methyl isobutyl ketone	94	1,031	6,847,214	18,429,655	80,177	131,600	12,925	25,501,571
		93	1,021	7,810,250	17,477,368	90,214	131,600	76,771	25,586,203
		90	1,125	9,875,727	18,538,178	55,593	52,226	24,738	28,546,462
		88	1,011	13,049,874	18,985,959	762,108	116,650	31,770	32,946,361
127-18-4	Tetrachloro-ethylene	94	459	4,671,751	5,530,378	3,872	4,051	4,349	10,214,401
		93	490	4,538,411	6,634,275	10,152	15,041	618,026	11,815,905
		90	666	9,351,150	13,597,042	21,510	11,012	1,260	22,981,974
		88	746	16,336,282	19,786,265	33,314	72,250	82,144	36,310,255
108-88-3	Toluene	94	3,566	57,656,473	110,561,812	82,751	496,440	161,205	168,958,681
		93	3,643	62,341,544	117,599,735	119,858	967,496	239,798	181,268,431
		90	4,285	87,654,988	161,621,719	201,830	1,432,923	371,482	251,282,942
		88	3,999	105,716,267	192,930,207	197,208	1,473,666	731,449	301,048,797
71-55-6	1,1,1-Trichloro-ethane	94	1,207	20,070,741	17,981,336	1,980	102	2,732	38,056,891
		93	2,111	33,199,831	31,568,263	11,146	2,528	42,743	64,824,511
		90	4,210	85,672,408	83,099,485	16,984	1,586	62,446	168,852,909
		88	3,915	92,995,587	87,654,575	95,624	1,000	204,923	180,951,709
79-01-6	Trichloro-ethylene	94	783	14,788,788	15,083,085	1,671	288	4,417	29,878,249
		93	790	14,524,316	15,939,964	5,220	460	8,212	30,478,172
		90	3,985	37,236,658	111,804,060	49,549	105,399	423,453	149,619,119
		88	951	26,168,126	29,759,510	13,801	390	21,186	55,963,013
95-47-6	Xylenes	94	3,517	27,308,716	86,799,963	55,692	314,461	250,980	114,729,812
		93	3,611	30,079,209	90,702,452	57,773	213,172	252,969	121,305,575
		90	807	19,030,377	20,900,640	14,285	805	12,554	39,958,661
		88	3,646	39,645,690	129,685,753	213,032	144,978	647,989	170,337,442
	Cadmium and cadmium compounds	94	158	8,941	50,628	2,029	170	58,472	120,240
		93	178	9,140	52,135	1,069	977	123,376	186,697
		90	257	31,035	72,265	3,339	1,575	397,523	505,737
		88	205	32,399	90,293	4,147	2,409	389,479	518,727

Table 2.

CAS Number	Chemical	Year	Transfers to POTWs Pounds	Transfers Off-site for Treatment Disposal/Other[8] Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers[9]
71-43-2	Benzene	94	210,714	2,346,337	2,557,051	555,346	1,657,785	4,770,182
		93	308,621	1,880,043	2,188,664	1,101,028	1,094,388	4,384,080
		90	633,978	2,221,358	2,855,336	NA	NA	NA
		88	1,164,722	2,295,959	3,460,681	NA	NA	NA
56-23-5	Carbon tetrachloride	94	574	1,223,436	1,224,010	850,623	17,314	2,091,947
		93	1,675	1,042,171	1,043,846	111,626	4,109	1,159,581
		90	42,050	1,082,188	1,124,238	NA	NA	NA
		88	5,014	1,350,011	1,355,025	NA	NA	NA
67-66-3	Chloroform	94	437,920	2,037,728	2,475,648	351,182	101,775	2,928,605
		93	603,550	1,890,580	2,494,130	435,332	69,463	2,998,925
		90	802,260	1,321,726	2,123,986	NA	NA	NA
		88	1,226,573	1,369,922	2,596,495	NA	NA	NA
75-09-2	Dichloromethane	94	835,117	11,764,796	12,599,913	20,785,487	3,755,198	37,140,598
		93	825,299	9,929,184	10,754,483	21,058,873	3,272,177	35,085,533
		90	1,293,254	9,477,878	10,771,132	NA	NA	NA
		88	1,831,154	22,436,109	24,267,263	NA	NA	NA
78-93-3	Methyl ethyl ketone	94	410,746	6,565,715	6,976,461	21,395,064	46,300,997	74,672,522
		93	753,095	6,070,956	6,824,051	24,476,161	46,145,068	77,445,280
		90	891,591	20,998,202	21,889,793	NA	NA	NA
		88	964,168	29,252,652	30,216,820	NA	NA	NA
108-10-1	Methyl isobutyl ketone	94	488,749	1,699,146	2,187,895	17,951,007	18,854,225	38,993,127
		93	636,214	1,521,675	2,157,889	22,886,709	12,055,803	37,100,401
		90	1,259,294	4,599,709	5,859,003	NA	NA	NA
		88	1,509,030	10,509,270	12,018,300	NA	NA	NA
127-18-4	Tetrachloro-ethylene	94	62,053	2,139,983	2,202,036	7,415,291	855,782	10,473,109
		93	111,002	2,463,092	2,574,094	6,277,898	823,697	9,675,689
		90	450,922	4,548,481	4,999,403	NA	NA	NA
		88	558,691	5,582,693	6,141,384	NA	NA	NA
108-88-3	Toluene	94	940,281	22,721,417	23,661,698	23,471,806	80,113,663	127,247,167
		93	1,038,026	23,590,449	24,628,475	31,265,466	81,278,013	137,171,954
		90	1,771,459	40,546,165	42,317,624	NA	NA	NA
		88	3,594,036	62,082,350	65,676,386	NA	NA	NA
71-55-6	1,1,1-Trichloro-ethane	94	6,439	2,558,074	2,564,513	6,983,705	1,845,839	11,394,057
		93	60,463	3,895,932	3,956,395	14,617,408	2,329,613	20,903,416
		90	173,444	13,099,706	13,273,150	NA	NA	NA
		88	305,358	19,389,542	19,694,900	NA	NA	NA
79-01-6	Trichloroethylene	94	50,325	2,819,904	2,870,229	8,304,071	1,183,610	12,357,910
		93	42,987	1,924,254	1,967,241	7,012,395	1,206,942	10,186,578
		90	1,956,518	25,323,209	27,279,727	NA	NA	NA
		88	85,652	6,509,867	6,595,519	NA	NA	NA
95-47-6	Xylenes	94	712,545	10,219,158	10,931,703	39,732,244	78,581,009	129,244,956
		93	743,277	8,197,929	8,941,206	36,927,358	72,798,030	118,666,594
		90	11,949	3,879,599	3,891,548	NA	NA	NA
		88	4,225,457	37,922,313	42,147,770	NA	NA	NA
	Cadmium and cadmium compounds	94	3,013	2,093,444	2,096,457	3,078,180	2,717	5,177,354
		93	4,948	3,372,687	3,377,635	2,122,544	1,142	5,501,321
		90	13,762	1,320,148	1,333,910	NA	NA	NA
		88	21,613	1,286,818	1,308,431	NA	NA	NA

Table 2. TRI Releases and Transfers of 33/50 Program Chemicals, 1988, 1990, 1993, 1994,[7] Continued.

CAS Number	Chemical	Year	Forms Number	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
	Chromium and	94	3,182	647,070	495,886	179,281	38,109	21,784,598	23,144,944
	chromium	93	3,206	430,459	424,262	254,144	42,762	23,739,737	24,891,364
	compounds	90	3,094	573,628	576,925	451,154	83,237	26,044,284	27,729,228
		88	2,436	625,812	700,772	400,219	54,902	40,215,263	41,996,968
	Cyanide	94	292	199,002	3,109,468	103,345	4,099,986	13,961	7,525,762
	compounds	93	297	109,808	3,099,162	98,062	3,110,685	6,055	6,423,772
		90	369	240,698	1,720,830	129,669	4,981,412	19,720	7,092,329
		88	428	657,222	1,699,447	197,544	5,445,176	108,969	8,108,358
	Lead and	94	1,662	604,678	1,211,976	65,699	1,263	15,159,116	17,042,732
	lead compounds	93	1,687	474,864	1,260,905	75,058	1,768	16,636,721	18,449,316
		90	1,911	908,323	1,385,134	133,290	1,648	18,959,611	21,388,006
		88	1,592	838,990	1,821,919	242,154	2,760	26,684,055	29,589,878
	Mercury and	94	30	9,757	3,563	321	7	1,351	14,999
	mercury	93	35	11,621	3,442	446	15	1,812	17,336
	compounds	90	63	14,793	8,756	809	21	4,199	28,578
		88	52	16,797	8,484	1,406	27	13,279	39,993
	Nickel and	94	2,573	534,093	273,464	98,323	62,941	1,685,462	2,654,283
	nickel	93	2,537	250,328	289,426	96,505	130,038	3,316,740	4,083,037
	compounds	90	2,342	394,500	325,707	152,013	268,958	5,086,279	6,227,457
		88	1,729	425,080	297,707	222,369	239,263	3,609,583	4,794,002
	Total for	94	22,606	194,497,678	360,750,527	1,222,106	7,001,967	39,279,245	602,751,523
	33/50 Chemicals	93	23,884	219,335,891	397,651,622	1,539,107	6,362,598	45,339,609	670,228,827
		90	28,082	358,578,422	591,943,101	2,554,963	8,747,212	52,255,040	1,014,078,738
		88	25,656	417,171,286	694,578,889	4,018,406	10,247,344	73,275,006	1,199,290,931
	All Other	94	44,171	155,516,424	630,215,862	45,789,667	299,649,764	242,988,677	1,374,160,394
	TRI Chemicals	93	44,683	160,115,843	608,339,622	201,464,061	288,484,349	228,722,676	1,487,126,551
		90	46,700	213,872,551	742,702,592	113,754,037	358,513,009	360,740,975	1,789,583,164
		88	40,915	268,826,438	872,327,820	172,708,335	615,719,877	407,176,871	2,336,759,341
	Total for All	94	66,777	350,014,102	990,966,389	47,011,773	306,651,731	282,267,922	1,976,911,917
	TRI Chemicals	93	68,567	379,451,734	1,005,991,244	203,003,168	294,846,947	274,062,285	2,157,355,378
		90	74,782	572,450,973	1,334,645,693	116,309,000	367,260,221	412,996,015	2,803,661,902
		88	66,571	685,997,724	1,566,906,709	176,726,741	625,967,221	480,451,877	3,536,050,272

Table 2, Cont.

CAS Number	Chemical	Year	Transfers to POTWs Pounds	Transfers Off-site for Treatment Disposal/Other[8] Pounds	Subtotal Pounds	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Total Transfers[9]
	Chromium and chromium compounds	94	427,776	21,241,608	21,669,384	146,732,055	94,815	168,496,254
		93	454,713	20,848,059	21,302,772	132,058,478	31,056	153,392,306
		90	1,144,161	34,110,840	35,255,001	NA	NA	NA
		88	2,081,604	26,866,221	28,947,825	NA	NA	NA
	Cyanide compounds	94	171,214	571,579	742,793	27,418	8,344	778,555
		93	100,272	478,028	578,300	24,600	2,261	605,161
		90	141,644	1,301,442	1,443,086	NA	NA	NA
		88	1,162,724	2,719,177	3,881,901	NA	NA	NA
	Lead and lead compounds	94	89,717	28,464,311	28,554,028	349,333,583	84,961	377,972,572
		93	139,015	25,710,962	25,849,977	291,073,512	83,176	317,006,665
		90	192,818	56,906,502	57,099,320	NA	NA	NA
		88	213,425	31,060,205	31,273,630	NA	NA	NA
	Mercury and mercury compounds	94	15	42,573	42,588	24,908	0	67,496
		93	21	74,630	74,651	23,639	0	98,290
		90	311	213,305	213,616	NA	NA	NA
		88	1,892	274,767	276,659	NA	NA	NA
	Nickel and nickel compounds	94	216,870	10,715,951	10,932,821	104,330,489	4,086	115,267,396
		93	227,995	10,143,486	10,371,481	95,230,276	8,117	105,609,874
		90	317,644	16,004,257	16,321,901	NA	NA	NA
		88	904,544	13,711,382	14,615,926	NA	NA	NA
	Total for 33/50 Chemicals	94	5,064,068	129,225,160	134,289,228	751,322,459	233,462,120	1,119,073,807
		93	6,051,173	123,034,117	129,085,290	686,703,303	221,203,055	1,036,991,648
		90	11,097,059	236,954,715	248,051,774	NA	NA	NA
		88	19,855,657	274,619,258	294,474,915	NA	NA	NA
	All Other TRI Chemicals	94	175,376,656	444,912,574	620,289,230	1,482,281,399	229,247,105	2,331,817,734
		93	180,295,772	399,686,425	579,982,197	1,370,372,399	225,559,982	2,175,914,578
		90	270,610,724	505,962,082	776,572,806	NA	NA	NA
		88	277,491,836	601,092,965	878,584,801	NA	NA	NA
	Total for All TRI Chemicals	94	180,440,724	574,137,734	754,578,458	2,233,603,858	462,709,225	3,450,891,541
		93	186,346,945	522,720,542	709,067,487	2,057,075,702	446,763,037	3,212,906,226
		90	281,707,783	742,916,797	1,024,624,580	NA	NA	NA
		88	297,347,493	875,712,223	1,173,059,716	NA	NA	NA

[7] Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994. Also excludes delisted chemicals, chemicals added in 1990, 1991, and 1994, and aluminum oxide, ammonia, ammonium sulfate (solution), and sulfuric acid.

[8] "Other" indicates: For 1993 and 1994, transfers reported with no waste management codes or invalid codes. For 1988 and 1990, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988 and 1990.

[9] Because transfers for recycling and energy recovery were not required to be reported until 1991, total transfers in 1988 and 1990 are not comparable to total transfers reported for 1993 or 1994.

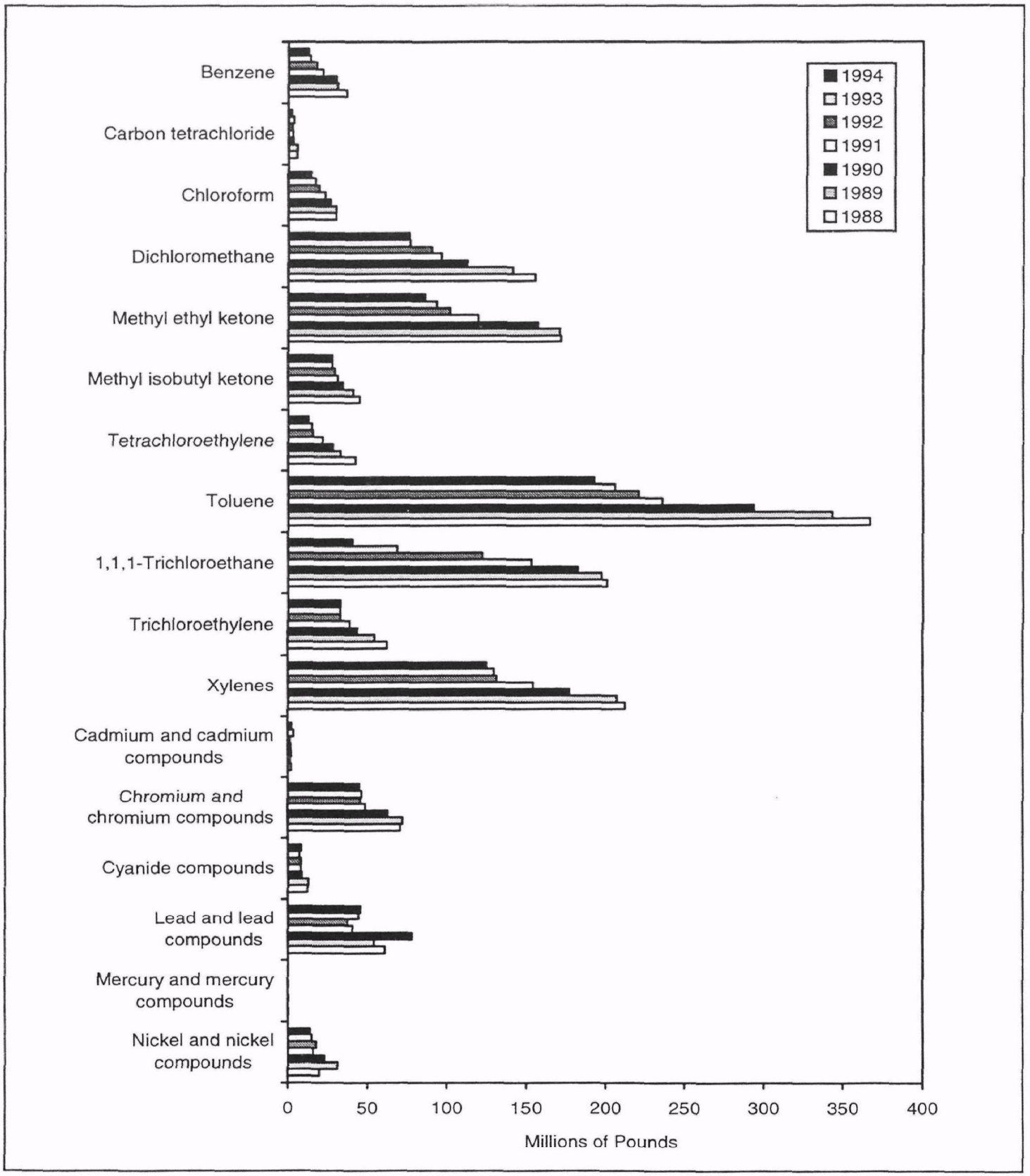

Figure 6. TRI Releases and Transfers of 33/50 Program Chemicals, by Chemical, 1988-1994.⑩

⑩ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

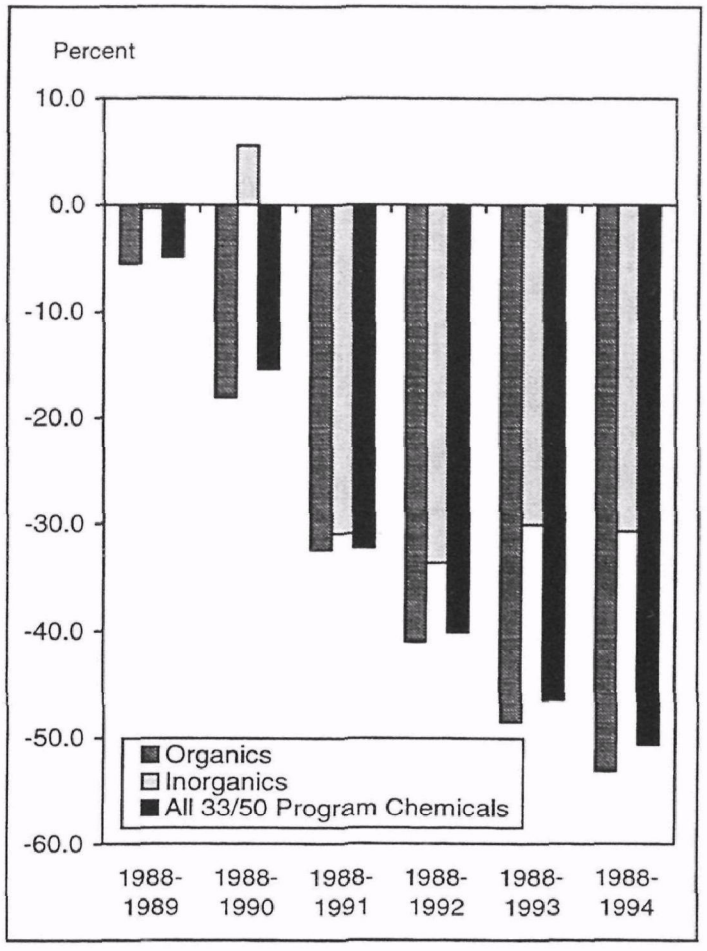

Figure 7. Percentage Change in Releases and Transfers of 33/50 Program Chemicals: Organics vs. Inorganics, 1988-1994.⓫

were reported in both of these categories in 1994: 5.6% for energy recovery, 9.4% for recycling.

33/50 PROGRAM CHEMICALS IN WASTE

In Section 8 of Form R, which was made mandatory under the PPA starting with the 1991 reporting year, facilities report the amounts of toxic chemicals:

- recycled or reused in on-site processes and/or sent off-site for recycling;
- combusted in on-site energy recovery systems and/or sent to off-site systems;
- destroyed in on-site treatment systems and/or sent to off-site treatment facilities;
- released to the environment as a result of on-site operations plus the amounts shipped off-site for disposal.

Section 8 reporting items described above pertain only to chemical quantities contained in waste that are the result of regular production-related activities. Toxic chemical quantities contained in waste that is generated at the facility through non-routine activities, such as spill clean-ups and catastrophic events, are reported in a separate Section 8 reporting item. Each of the items reported for production-related waste in Section 8 is reported in aggregate, by chemical, for the reporting year (1994) and the prior year (1993) and is forecast by facilities for the two successive years (1995 and 1996).

Throughout this chapter, 1991 data are drawn from facilities' 1991 Form R submissions. 1993 and 1994 data are actual quantities reported on 1994 Form Rs, and 1995 and 1996 data represent facilities' future years' projections reported on 1994 Form Rs.

Table 3 presents facilities' reports of total production-related waste for 33/50 Program chemicals versus reports for all other TRI chemicals for 1991-1996. The trends in reductions for each grouping of chemicals are depicted in Figure 2, presented at the beginning of this chapter.

⓫ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

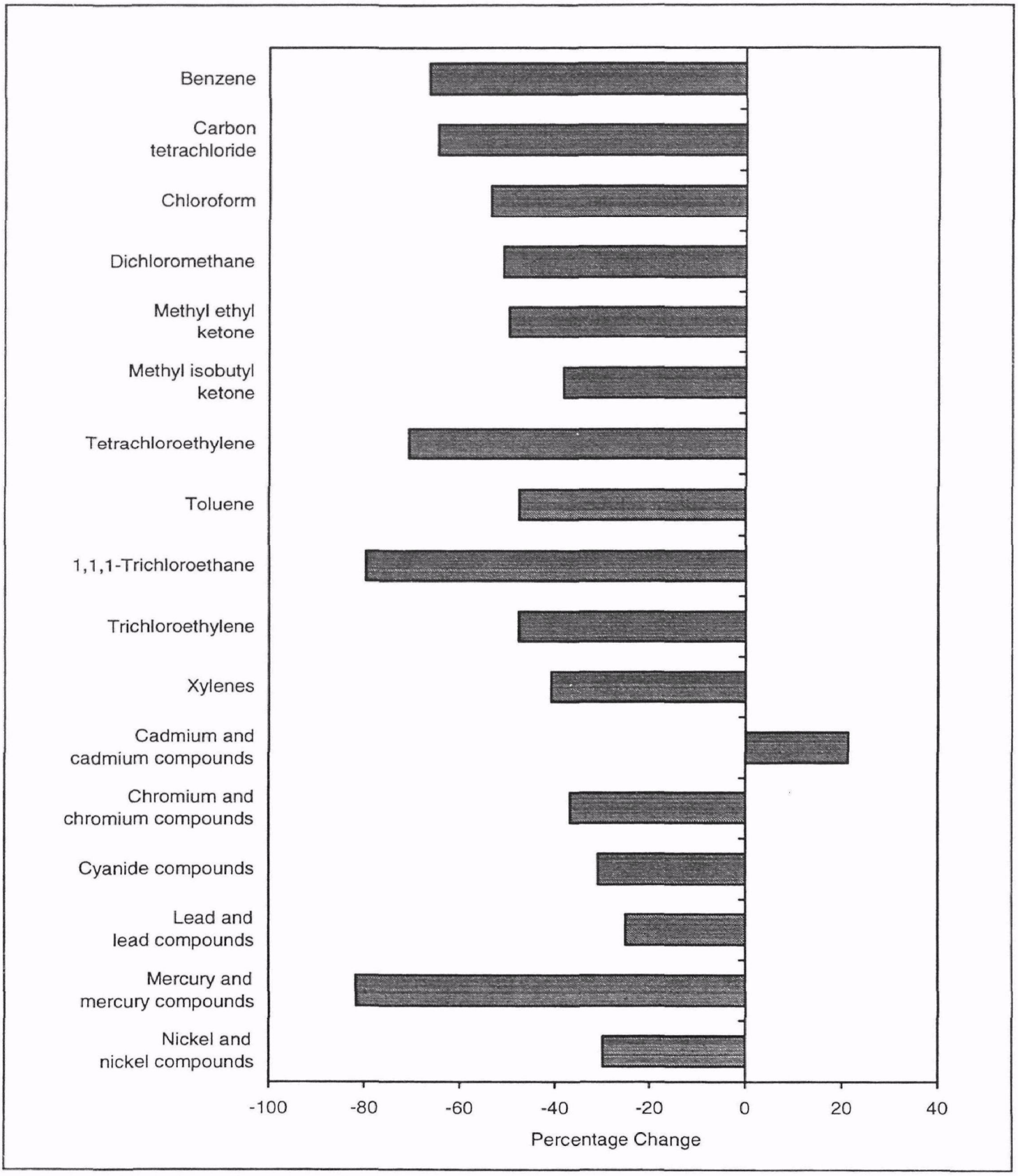

Figure 8. Percentage Change in Releases and Transfers of 33/50 Program Chemicals, 1988-1994.⑫

⑫ Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

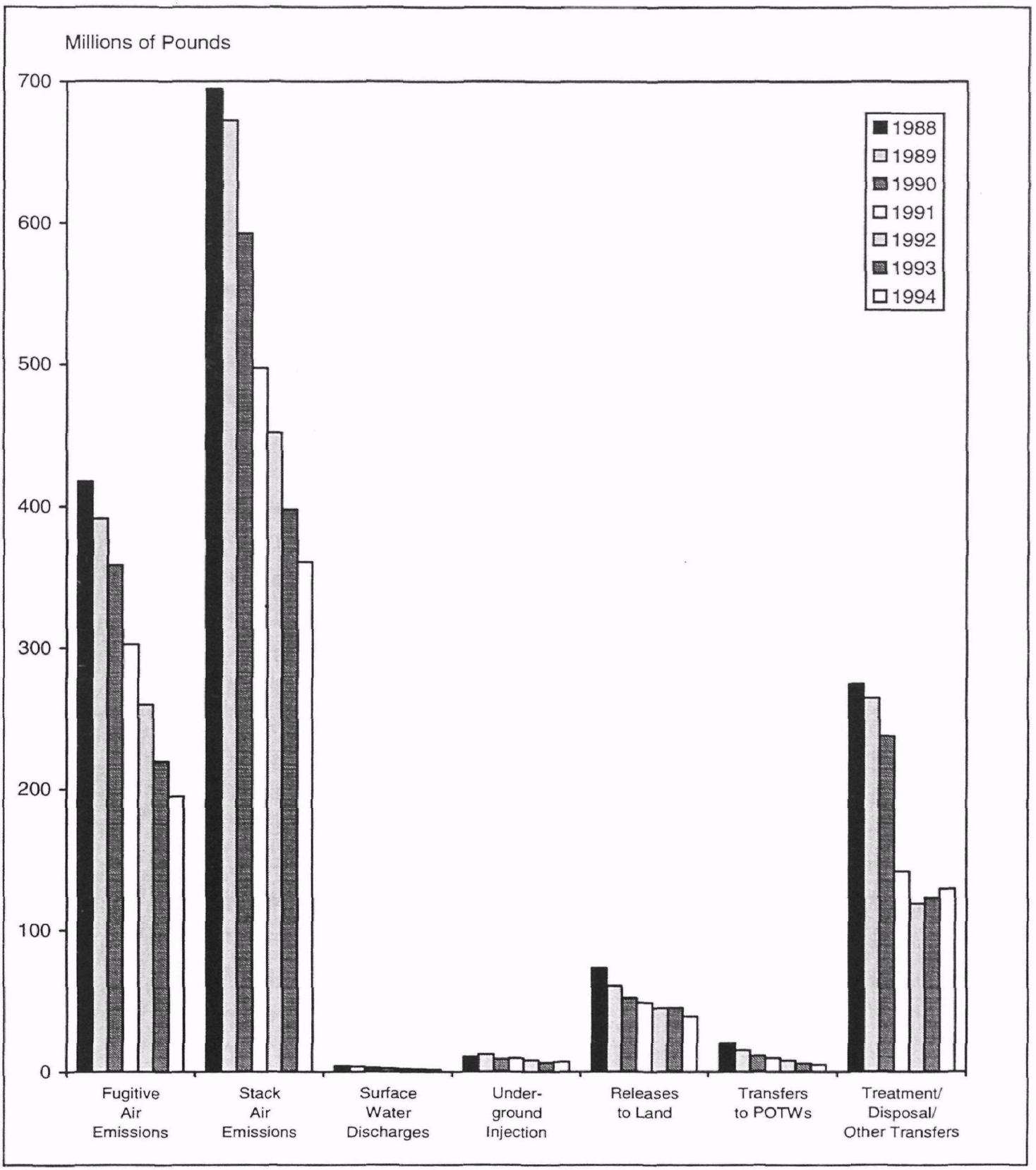

Figure 9. TRI Releases and Transfers of 33/50 Program Chemicals, by Release Medium and Transfer Type, 1988-1994.[13]

[13] Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

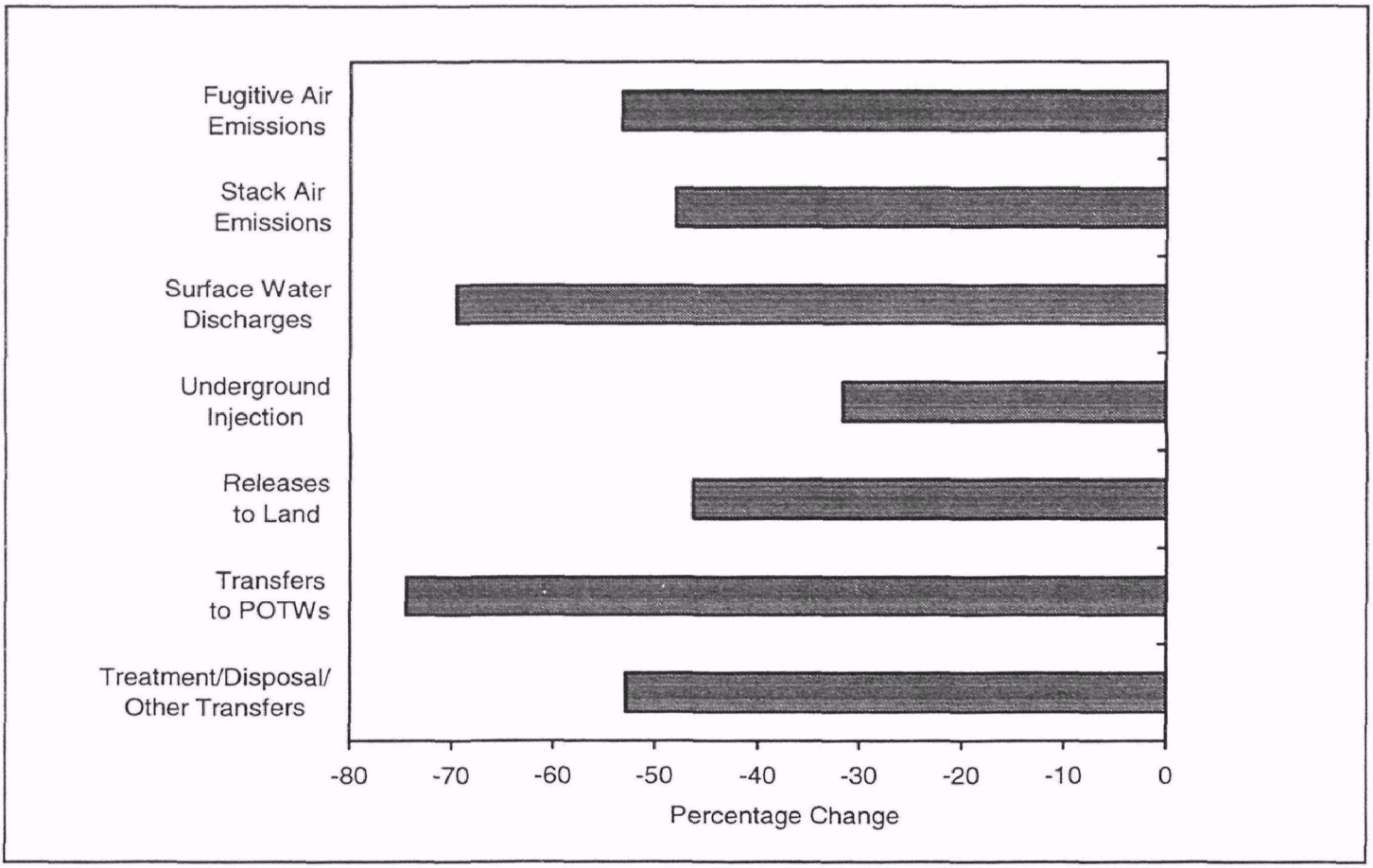

Figure 10. Percentage Change in Releases and Transfers of 33/50 Program Chemicals by Release Medium or Transfer Type, 1988-1994.[14]

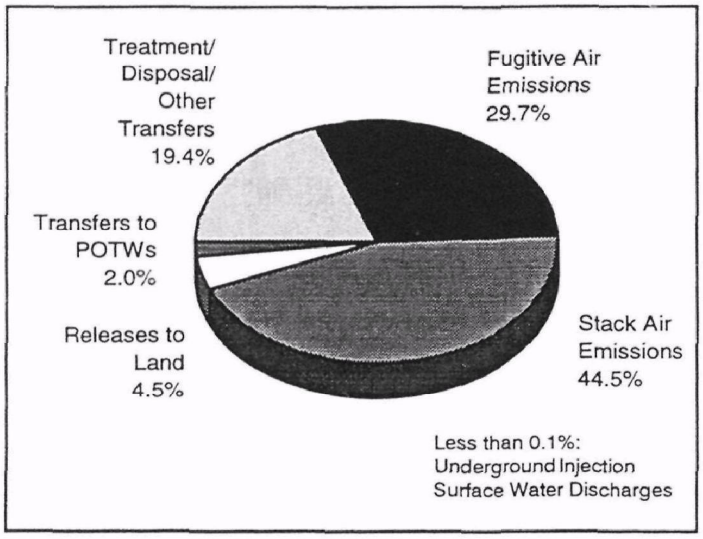

Figure 11. Contribution to Reductions in Releases and Transfers of 33/50 Program Chemicals by Release Medium or Transfer Type, 1988-1994.[14]

Total production-related waste associated with 33/50 Program chemicals increased slightly (1.6%) in 1994. Production-related waste for non-Program chemicals also increased in 1994, but by a significantly larger percentage (5.8%). Since 1991, 33/50 chemicals in production waste have decreased slightly (0.9%), while other TRI chemicals in waste have increased significantly (9.2%).

Facilities are projecting a significant reduction in production-related waste of 33/50 Program chemicals in 1995, a 4.5% decline. At the same time, production-related waste for other TRI chemicals is expected to increase again (4.3%). Projections for 1996 suggest an aggregate 7.1% decline from 1994 in 33/50 Program chemical

[14] Does not include amounts for transfers to recycling and energy recovery reported for 1991-1994.

Table 3. Total Production-related Waste for 33/50 Program Chemicals Compared to Other TRI Chemicals, 1991, 1993-1996.[15]

Year	All TRI Chemicals	TRI Chemicals Less 33/50 Chemicals	33/50 Chemicals Only
	Pounds	Pounds	Pounds
1991	20,793,202,032	15,219,391,575	5,573,810,457
1993	21,146,579,814	15,706,293,557	5,440,286,257
1994	22,149,380,646	16,624,256,302	5,525,124,344
1995[16]	22,612,393,439	17,333,515,380	5,278,878,059
1996[16]	22,749,708,079	17,617,205,331	5,132,502,748
	Percent Change	Percent Change	Percent Change
1991-1994	6.5%	9.2%	-0.9%
1993-1994	4.7%	5.8%	1.6%
1994-1996[16]	2.7%	6.0%	-7.1%
1991-1996[16]	9.4%	15.8%	-7.9%

waste, while non-Program chemical waste is forecast to increase by 6.0%.

Analyses of facility projections, particularly as national aggregates, should be viewed with caution. Forecasting waste generation is an imprecise art, and facilities are not bound by their estimates for future years. A review of our analysis of facilities' 1993 TRI reports reinforces this point. On page 281 of the 1993 Public Data Release report, we observed that facilities were projecting a decline of nearly 5.8% in their production-related waste for 33/50 Program chemicals in 1994. Actual data subsequently reported for 1994 showed an increase of nearly 1.6%.

Facilities owned by companies not participating in the 33/50 Program accounted for most (92%) of this increase, reporting a 3.4% increase (78 million pounds) in 1994, and are projected an additional 1.2% increase in production-related waste by 1996. Facilities owned by 33/50 participants, on the other hand, reported only a slight increase in production-related waste in 1994 (0.2%) and are projecting substantial reductions (13.4%) through 1996.

33/50 Program Chemicals in Waste, by Medium/Management Method and by Chemical

Production-related waste for 33/50 Program chemicals is summarized by chemical and waste management method for the period 1991 to 1996 in Tables 4-4 through 4-8. Figure 12 presents a graphical representation of the total production-related waste for each chemical for these years.

[15] Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

[16] Projected amounts.

Figure 13 shows these data in terms of the percent change in total production-related waste for the periods 1991-1994 (actual change) and 1994-1996 (projected change).

From 1991 to 1994, total production-related waste decreased significantly (over 50 million pounds) for each of five chemicals: 1,1,1-trichloroethane (198 million pounds), methyl ethyl ketone (114 million pounds), methyl isobutyl ketone (65 million pounds), tetrachloreoethylene (61 million pounds), and dichloromethane (54 million pounds). Total production-related waste of three other chemicals—carbon tetrachloride, mercury and compounds, and chloroform—decreased significantly on a percentage basis (over 15%). Production/import of 1,1,1-trichloroethane and carbon tetrachloride is banned in the United States after January 1, 1996.

From 1991 to 1994, total production-related waste increased over 30 million pounds for each of four chemicals: toluene (404 million pounds), chromium and compounds (98 million pounds), cyanide compounds (34 million pounds), and nickel and compounds (40 million pounds). On a percentage basis, total production-related waste increased by over 25% for an additional chemical, cadmium and compounds.

Facilities are projecting that total production-related waste will decrease significantly from 1994 to 1996 for four chemicals: lead and compounds (189 million pounds), trichloroethylene (129 million pounds), 1,1,1-trichloroethane (68 million pounds), and toluene (43 million pounds). Total production-related waste of tetrachloroethylene is also projected to decrease significantly on a percentage basis during this time period. Total production-related waste is also projected to decrease by smaller quantities/percentages for six other chemicals.

Total production-related waste is projected to increase for six chemicals, most notably chromium and compounds and nickel and compounds, which are expected to increase by 26 million pounds and 30 million pounds respectively. Total production-related waste of mercury and mercury compounds is also projected to increase by 12%.

Figure 14 shows the total production-related waste for 1991 to 1996 by management method. Figure 15 shows these data, in terms of the percent change for the periods 1991-1994 (observed changes) and 1994-1996 (projected changes).

From 1991 to 1994, use of four waste management methods for 33/50 chemicals decreased by a total of 270 million pounds, most notably, on-site releases and off-site disposal, which decreased by 234 million pounds (27%). These decreases were offset by increases in off-site recycling and on-site treatment which increased by 118 million pounds (19%) and 94 million pounds (20%), respectively.

Facilities are projecting that, from 1994 to 1996, on-site releases and off-site disposal of 33/50 Program chemicals will decrease by 108 million pounds (17%) and on-site recycling will decrease by 289 million pounds (11%). Only on-site energy recovery is projected to increase (56 million pounds, 8%).

Table 4. Quantity of 33/50 Program Chemicals Recycled On- and Off-site, by Chemical, 1991, 1993-1996.⓱

CAS Number	Chemical	1991 Pounds	1993 Pounds	1994 Pounds	Projected Data 1995 Pounds	Projected Data 1996 Pounds
	Recycled On-site					
71-43-2	Benzene	40,200,807	39,898,335	48,236,739	44,755,812	45,672,260
56-23-5	Carbon tetrachloride	10,538,966	2,511,552	9,615,424	9,291,507	9,141,431
67-66-3	Chloroform	5,707,901	4,964,587	5,502,781	5,281,643	4,890,771
75-09-2	Dichloromethane	79,733,871	58,245,644	60,442,075	68,144,825	67,300,407
78-93-3	Methyl ethyl ketone	155,170,704	74,863,973	66,098,820	70,012,216	70,611,058
108-10-1	Methyl isobutyl ketone	116,883,266	50,415,557	54,877,123	56,167,162	59,902,049
127-18-4	Tetrachloroethylene	121,477,233	68,957,450	56,920,709	49,729,850	48,468,392
108-88-3	Toluene	581,362,098	1,031,238,427	1,022,017,402	1,047,700,045	997,798,959
71-55-6	1,1,1-Trichloroethane	128,309,015	67,219,214	71,974,733	60,662,578	41,156,070
79-01-6	Trichloroethylene	255,206,613	264,418,486	248,092,051	153,474,042	132,094,626
	Xylenes	173,757,537	120,252,943	126,209,629	130,700,430	138,185,872
	Cadmium and cadmium compounds	3,870,686	4,094,064	4,824,783	4,471,867	4,646,364
	Chromium and chromium compounds	74,306,523	71,140,390	73,209,806	86,794,335	92,484,711
	Cyanide compounds	3,815,454	818,711	798,887	832,678	803,568
	Lead and lead compounds	743,819,451	553,402,767	643,169,803	551,661,608	467,200,004
	Mercury and mercury compounds	1,283,330	1,106,229	928,742	997,130	1,054,822
	Nickel and nickel compounds	50,285,107	49,105,873	62,507,384	74,890,668	84,354,323
	Subtotal for 33/50 Chemicals	2,545,728,562	2,462,654,202	2,555,426,891	2,415,568,396	2,265,765,687
	Subtotal for All Other TRI Chemicals	3,635,506,013	4,032,287,959	4,344,908,124	4,680,757,523	4,869,509,815
	Subtotal for All TRI Chemicals	6,181,234,575	6,494,942,161	6,900,335,015	7,096,325,919	7,135,275,502
	Recycled Off-site					
71-43-2	Benzene	1,414,752	1,076,794	560,803	694,052	698,852
56-23-5	Carbon tetrachloride	390,538	101,842	850,623	1,002,700	1,002,700
67-66-3	Chloroform	2,078,744	432,320	350,379	426,362	426,362
75-09-2	Dichloromethane	26,612,121	20,875,089	20,783,673	15,346,271	14,314,794
78-93-3	Methyl ethyl ketone	26,246,204	20,661,858	21,196,120	21,251,476	20,637,229
108-10-1	Methyl isobutyl ketone	17,975,084	22,783,003	16,974,510	15,904,939	15,984,619
127-18-4	Tetrachloroethylene	9,359,426	7,265,438	7,634,068	7,434,205	7,148,237
108-88-3	Toluene	25,206,069	35,878,273	23,356,695	22,257,881	22,507,560
71-55-6	1,1,1-Trichloroethane	29,941,078	8,168,092	6,890,719	3,546,373	1,179,626
79-01-6	Trichloroethylene	7,403,581	6,776,285	8,462,852	7,124,491	5,911,732
	Xylenes	33,608,756	35,700,750	39,600,446	38,047,084	37,606,122
	Cadmium and cadmium compounds	2,047,067	2,120,099	3,093,622	3,028,066	3,123,903
	Chromium and chromium compounds	93,950,740	136,075,547	151,770,873	154,017,112	157,325,292
	Cyanide compounds	38,243	10,181	24,500	26,115	23,213
	Lead and lead compounds	278,459,950	346,547,886	342,379,729	329,625,551	333,974,962
	Mercury and mercury compounds	491,812	21,721	24,937	24,610	25,010
	Nickel and nickel compounds	81,169,458	97,325,047	110,494,613	113,414,259	116,541,137
	Subtotal for 33/50 Chemicals	636,393,623	741,820,225	754,449,162	733,171,547	738,431,350
	Subtotal for All Other TRI Chemicals	1,170,890,338	1,342,214,281	1,504,285,693	1,519,710,657	1,546,280,471
	Subtotal for All TRI Chemicals	1,807,283,961	2,084,034,506	2,258,734,855	2,252,882,204	2,284,711,821
	Total for 33/50 Chemicals	3,182,122,185	3,204,474,427	3,309,876,053	3,148,739,943	3,004,197,037
	Total for All Other TRI Chemicals	4,806,396,351	5,374,502,240	5,849,193,817	6,200,468,180	6,415,790,286
	Total for All TRI Chemicals	7,988,518,536	8,578,976,667	9,159,069,870	9,349,208,123	9,419,987,323

⓱ Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 5. Quantity of 33/50 Program Chemicals Used for Energy Recovery On- and Off-site, by Chemical, 1991, 1993-1996.⓲

CAS Number	Chemical	1991 Pounds	1993 Pounds	1994 Pounds	Projected Data 1995 Pounds	Projected Data 1996 Pounds
	Energy Recovery On-site					
71-43-2	Benzene	33,630,440	25,604,578	22,558,478	22,163,863	22,719,300
56-23-5	Carbon tetrachloride	5,964,156	5,070,219	118,200	118,200	119,200
67-66-3	Chloroform	5,499,527	15,990,537	10,972,419	11,176,797	11,486,546
75-09-2	Dichloromethane	14,270,049	10,099,938	12,010,971	13,283,403	14,466,754
78-93-3	Methyl ethyl ketone	98,970,095	97,413,892	94,269,472	102,267,914	107,048,012
108-10-1	Methyl isobutyl ketone	37,048,558	37,188,410	35,412,662	37,274,718	39,617,700
127-18-4	Tetrachloroethylene	4,023,584	11,085,256	10,715,929	11,132,621	11,626,931
108-88-3	Toluene	255,726,051	244,394,756	240,295,525	250,745,793	264,624,695
71-55-6	1,1,1-Trichloroethane	14,001,816	1,495,418	2,893,185	3,413,401	3,966,892
79-01-6	Trichloroethylene	6,188,130	1,012,244	2,379,037	2,609,214	3,044,175
	Xylenes	216,300,956	224,432,760	213,475,938	223,233,646	224,896,953
	Cadmium and cadmium compounds	0	0	0	0	0
	Chromium and chromium compounds	0	69,034	105,472	65,180	65,581
	Cyanide compounds	22,338,436	12,229,599	43,195,554	42,614,408	40,831,945
	Lead and lead compounds	102,675	34,925	46,177	46,177	53,103
	Mercury and mercury compounds	0	0	0	0	0
	Nickel and nickel compounds	0	0	0	0	0
	Subtotal for 33/50 Chemicals	714,064,473	686,121,566	688,449,019	720,145,335	744,567,787
	Subtotal for All Other TRI Chemicals	2,247,444,419	2,182,659,609	2,673,659,466	2,747,882,419	2,671,194,457
	Subtotal for All TRI Chemicals	2,961,508,892	2,868,781,175	3,362,108,485	3,468,027,754	3,415,762,244
	Energy Recovery Off-site					
71-43-2	Benzene	4,931,770	1,660,877	1,657,355	1,376,735	1,311,781
56-23-5	Carbon tetrachloride	10,849	4,731	17,311	22,445	21,445
67-66-3	Chloroform	719,071	51,416	59,270	72,171	78,620
75-09-2	Dichloromethane	6,171,317	3,097,813	3,807,830	2,843,525	2,379,948
78-93-3	Methyl ethyl ketone	38,787,317	46,218,598	47,569,206	45,486,627	45,105,775
108-10-1	Methyl isobutyl ketone	19,383,412	11,904,468	18,886,033	20,391,861	21,950,160
127-18-4	Tetrachloroethylene	1,519,555	710,938	893,544	621,328	663,188
108-88-3	Toluene	87,422,786	83,358,283	81,028,606	78,009,934	77,210,547
71-55-6	1,1,1-Trichloroethane	3,995,774	1,656,206	1,898,289	1,194,847	896,737
79-01-6	Trichloroethylene	963,407	960,864	1,192,486	1,087,512	997,005
	Xylenes	78,466,569	71,668,774	79,163,797	76,763,043	74,587,102
	Cadmium and cadmium compounds	8,337	3,054	2,334	1,511	1,004
	Chromium and chromium compounds	130,304	103,979	148,656	132,620	111,228
	Cyanide compounds	24	1,812	8,145	7,051	7,101
	Lead and lead compounds	62,921	80,735	82,141	74,987	76,449
	Mercury and mercury compounds	3,241	0	0	0	0
	Nickel and nickel compounds	4,449	11,481	10,231	3,188	3,406
	Subtotal for 33/50 Chemicals	242,581,103	221,494,029	236,425,234	228,089,385	225,401,496
	Subtotal for All Other TRI Chemicals	201,330,145	235,132,093	230,721,953	211,886,529	205,371,046
	Subtotal for All TRI Chemicals	443,911,248	456,626,122	467,147,187	439,975,914	430,772,542
	Total for 33/50 Chemicals	956,645,576	907,615,595	924,874,253	948,234,720	969,969,283
	Total for All Other TRI Chemicals	2,448,774,564	2,417,791,702	2,904,381,419	2,959,768,948	2,876,565,503
	Total for All TRI Chemicals	3,405,420,140	3,325,407,297	3,829,255,672	3,908,003,668	3,846,534,786

⓲ Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 6. Quantity of 33/50 Program Chemicals Treated On- and Off-site, by Chemical, 1991, 1993-1996.[19]

CAS Number	Chemical	1991 Pounds	1993 Pounds	1994 Pounds	Projected Data 1995 Pounds	Projected Data 1996 Pounds
	Treated On-site					
71-43-2	Benzene	32,067,226	40,960,815	32,088,508	33,237,900	33,642,345
56-23-5	Carbon tetrachloride	15,122,884	15,024,261	14,419,837	14,052,167	14,016,793
67-66-3	Chloroform	24,835,406	13,279,372	19,744,218	20,096,998	19,832,960
75-09-2	Dichloromethane	33,975,295	25,060,609	18,927,711	20,799,503	22,067,342
78-93-3	Methyl ethyl ketone	58,025,657	57,262,327	62,307,378	63,308,526	68,730,049
108-10-1	Methyl isobutyl ketone	12,147,639	12,045,137	16,549,233	16,434,674	16,912,537
127-18-4	Tetrachloroethylene	14,684,082	16,466,593	21,514,333	21,641,380	21,612,049
108-88-3	Toluene	128,478,222	112,964,616	155,607,346	133,993,092	137,483,692
71-55-6	1,1,1-Trichloroethane	3,031,986	1,750,504	1,146,568	969,285	837,248
79-01-6	Trichloroethylene	4,886,629	8,031,842	6,004,328	6,189,853	6,328,998
	Xylenes	50,439,940	134,037,114	72,570,751	71,852,159	73,511,239
	Cadmium and cadmium compounds	712,333	533,942	103,760	106,787	102,748
	Chromium and chromium compounds	35,341,390	90,599,323	79,649,625	79,942,563	79,821,608
	Cyanide compounds	16,756,351	30,236,841	32,530,091	28,467,317	28,889,558
	Lead and lead compounds	42,264,696	34,337,601	33,182,059	24,560,560	30,631,408
	Mercury and mercury compounds	35,853	40,900	11,065	8,550	8,550
	Nickel and nickel compounds	2,574,340	3,100,672	2,687,558	1,945,200	1,911,691
	Subtotal for 33/50 Chemicals	475,379,929	595,732,469	569,044,369	537,606,514	556,340,815
	Subtotal for All Other TRI Chemicals	5,613,242,026	5,861,678,865	5,920,503,209	6,268,044,291	6,268,549,140
	Subtotal for All TRI Chemicals	6,088,621,955	6,457,411,334	6,489,547,578	6,805,650,805	6,824,889,955
	Treated Off-site					
71-43-2	Benzene	2,167,000	2,291,840	2,226,836	2,096,811	2,111,608
56-23-5	Carbon tetrachloride	840,947	906,644	929,597	724,586	711,116
67-66-3	Chloroform	2,086,756	2,277,950	2,319,118	1,797,818	1,713,924
75-09-2	Dichloromethane	11,123,271	10,129,769	12,334,437	10,784,901	10,453,219
78-93-3	Methyl ethyl ketone	8,546,040	6,390,031	6,546,417	5,577,728	5,312,026
108-10-1	Methyl isobutyl ketone	2,621,785	2,126,747	2,062,305	1,544,674	1,258,372
127-18-4	Tetrachloroethylene	3,323,435	2,307,221	2,144,993	1,769,735	1,631,045
108-88-3	Toluene	15,572,603	16,503,972	17,645,405	17,691,209	17,477,897
71-55-6	1,1,1-Trichloroethane	5,427,953	2,766,119	2,420,884	1,815,808	1,155,197
79-01-6	Trichloroethylene	2,602,508	3,034,056	2,798,413	2,210,721	1,962,179
	Xylenes	11,900,818	8,007,062	9,541,783	8,998,333	8,373,670
	Cadmium and cadmium compounds	337,522	199,349	228,228	169,015	135,576
	Chromium and chromium compounds	5,047,723	5,974,885	5,156,876	3,917,803	3,792,765
	Cyanide compounds	485,275	397,495	538,971	421,764	385,744
	Lead and lead compounds	5,434,843	2,960,761	5,747,663	5,645,551	5,296,782
	Mercury and mercury compounds	65,832	526	2,475	2,547	2,552
	Nickel and nickel compounds	2,455,527	2,472,629	2,661,748	2,269,086	2,209,487
	Subtotal for 33/50 Chemicals	80,039,838	68,747,056	75,306,149	67,438,090	63,983,159
	Subtotal for All Other TRI Chemicals	421,053,343	365,871,929	372,677,666	379,046,717	353,450,678
	Subtotal for All TRI Chemicals	501,093,181	434,618,985	447,983,815	446,484,807	417,433,837
	Total for 33/50 Chemicals	555,419,767	664,479,525	644,350,518	605,044,604	620,323,974
	Total for All Other TRI Chemicals	6,034,295,369	6,227,550,794	6,293,180,875	6,647,091,008	6,621,999,818
	Total for All TRI Chemicals	6,589,715,136	6,892,030,319	6,937,531,393	7,252,135,612	7,242,323,792

[19] Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

Table 7. Quantity of 33/50 Program Chemicals Released/Disposed of, by Chemical, 1991, 1993-1996.[20]

CAS Number	Chemical	1991 Quantity Released/ Disposed of Pounds	1993 Quantity Released/ Disposed of Pounds	1994 Quantity Released/ Disposed of Pounds	Projected Data 1995 Quantity Released/ Disposed of Pounds	Projected Data 1996 Quantity Released/ Disposed of Pounds
71-43-2	Benzene	18,897,429	11,540,804	9,966,186	9,512,073	9,178,926
56-23-5	Carbon tetrachloride	1,650,166	1,168,152	847,419	563,029	498,542
67-66-3	Chloroform	19,939,888	13,436,746	11,466,125	10,605,487	10,383,493
75-09-2	Dichloromethane	79,828,895	65,082,386	69,053,033	57,080,360	52,457,403
78-93-3	Methyl ethyl ketone	106,412,846	83,721,857	80,107,774	71,814,786	67,636,617
108-10-1	Methyl isobutyl ketone	28,841,695	24,449,586	25,615,023	23,514,536	21,854,867
127-18-4	Tetrachloroethylene	16,735,732	10,900,830	10,785,921	8,778,725	7,718,748
108-88-3	Toluene	206,808,830	168,664,091	164,627,303	150,258,538	144,523,787
71-55-6	1,1,1-Trichloroethane	138,803,672	46,025,083	37,826,474	22,225,516	7,985,960
79-01-6	Trichloroethylene	35,034,674	30,264,373	29,980,770	24,006,845	19,376,046
	Xylenes	129,177,777	115,115,205	115,426,930	106,383,399	102,400,877
	Cadmium and cadmium compounds	1,234,575	3,360,643	2,047,197	2,073,501	2,036,794
	Chromium and chromium compounds	41,203,321	38,636,846	37,719,855	40,552,181	40,491,316
	Cyanide compounds	7,146,331	6,427,622	7,579,180	7,365,366	7,137,485
	Lead and lead compounds	36,367,408	34,377,029	33,542,596	30,907,872	31,715,081
	Mercury and mercury compounds	103,043	51,820	53,258	49,455	49,255
	Nickel and nickel compounds	11,436,647	10,493,637	9,378,476	11,167,123	12,567,257
	Total for 33/50 Chemicals	879,622,929	663,716,710	646,023,520	576,858,792	538,012,454
	Total for All Other TRI Chemicals	1,929,925,291	1,686,448,821	1,577,500,191	1,526,187,244	1,702,849,724
	Total for All TRI Chemicals	2,809,548,220	2,350,165,531	2,223,523,711	2,103,046,036	2,240,862,178

Table 8. Quantity of 33/50 Program Chemicals in Production-related Waste, by Chemical, 1991, 1993-1996.[20]

CAS Number	Chemical	1991 Total Production-related Waste Pounds	1993 Total Production-related Waste Pounds	1994 Total Production-related Waste Pounds	Projected Data 1995 Total Production-related Waste Pounds	Projected Data 1996 Total Production-related Waste Pounds
71-43-2	Benzene	133,309,424	123,034,043	117,294,905	113,837,246	115,335,072
56-23-5	Carbon tetrachloride	34,518,506	24,787,401	26,798,411	25,774,634	25,511,227
67-66-3	Chloroform	60,867,293	50,432,928	50,414,310	49,457,276	48,812,676
75-09-2	Dichloromethane	251,714,819	192,591,248	197,359,730	188,282,788	183,439,867
78-93-3	Methyl ethyl ketone	492,158,863	386,532,536	378,095,187	379,719,273	385,080,766
108-10-1	Methyl isobutyl ketone	234,901,439	160,912,908	170,376,889	171,232,564	177,480,304
127-18-4	Tetrachloroethylene	171,123,047	117,693,726	110,609,497	101,107,844	98,868,590
108-88-3	Toluene	1,300,576,659	1,693,002,418	1,704,578,282	1,700,656,492	1,661,627,137
71-55-6	1,1,1-Trichloroethane	323,511,294	129,080,636	125,050,852	93,827,808	57,177,730
79-01-6	Trichloroethylene	312,285,542	314,498,150	298,909,937	196,702,678	169,714,761
	Xylenes	693,652,353	709,214,608	655,989,274	655,978,094	659,561,835
	Cadmium and cadmium compounds	8,210,520	10,311,151	10,299,924	9,850,747	10,046,389
	Chromium and chromium compounds	249,980,001	342,600,004	347,761,163	365,421,794	374,092,501
	Cyanide compounds	50,580,114	50,122,261	84,675,328	79,734,699	78,078,614
	Lead and lead compounds	1,106,511,944	971,741,704	1,058,150,168	942,522,306	868,947,789
	Mercury and mercury compounds	1,983,111	1,221,196	1,020,477	1,082,292	1,140,189
	Nickel and nickel compounds	147,925,528	162,509,339	187,740,010	203,689,524	217,587,301
	Total for 33/50 Chemicals	5,573,810,457	5,440,286,257	5,525,124,344	5,278,878,059	5,132,502,748
	Total for All Other TRI Chemicals	15,219,391,575	15,706,293,557	16,624,256,302	17,333,515,380	17,617,205,331
	Total for All TRI Chemicals	20,793,202,032	21,146,579,814	22,149,380,646	22,612,393,439	22,749,708,079

[20] Data for 1991 reported on 1991 Form R; data for all other years reported on 1994 Form R. Does not include delisted chemicals, chemicals added in 1994, and ammonia, ammonium sulfate (solution), and sulfuric acid.

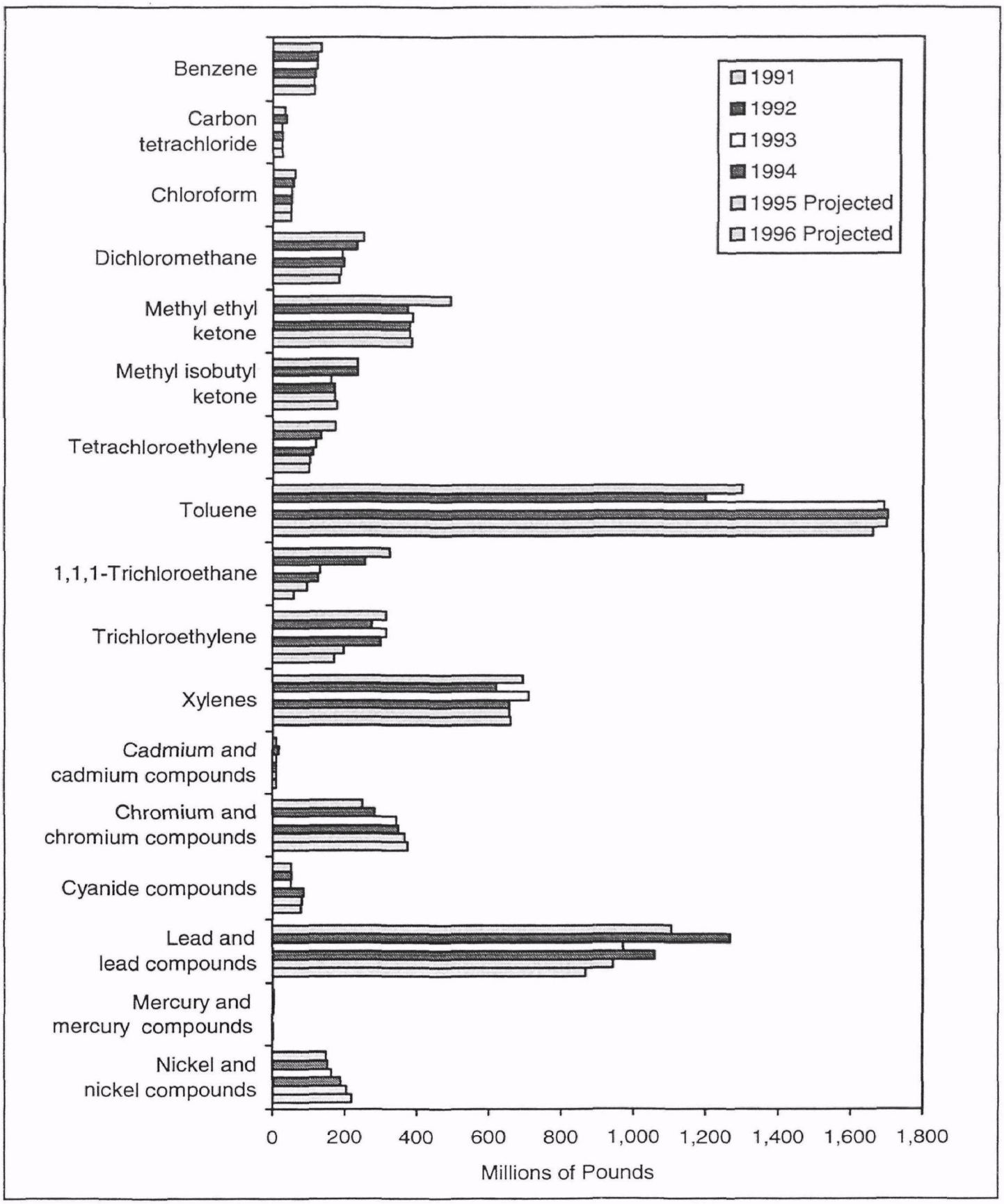

Figure 12. Total Production-related Waste, 33/50 Program Chemicals, Actual and Projected, 1991-1996.[21]

[21] Data for 1991 as reported on 1991 forms; data for 1992 as reported on 1992 forms; all other years from 1994 forms.

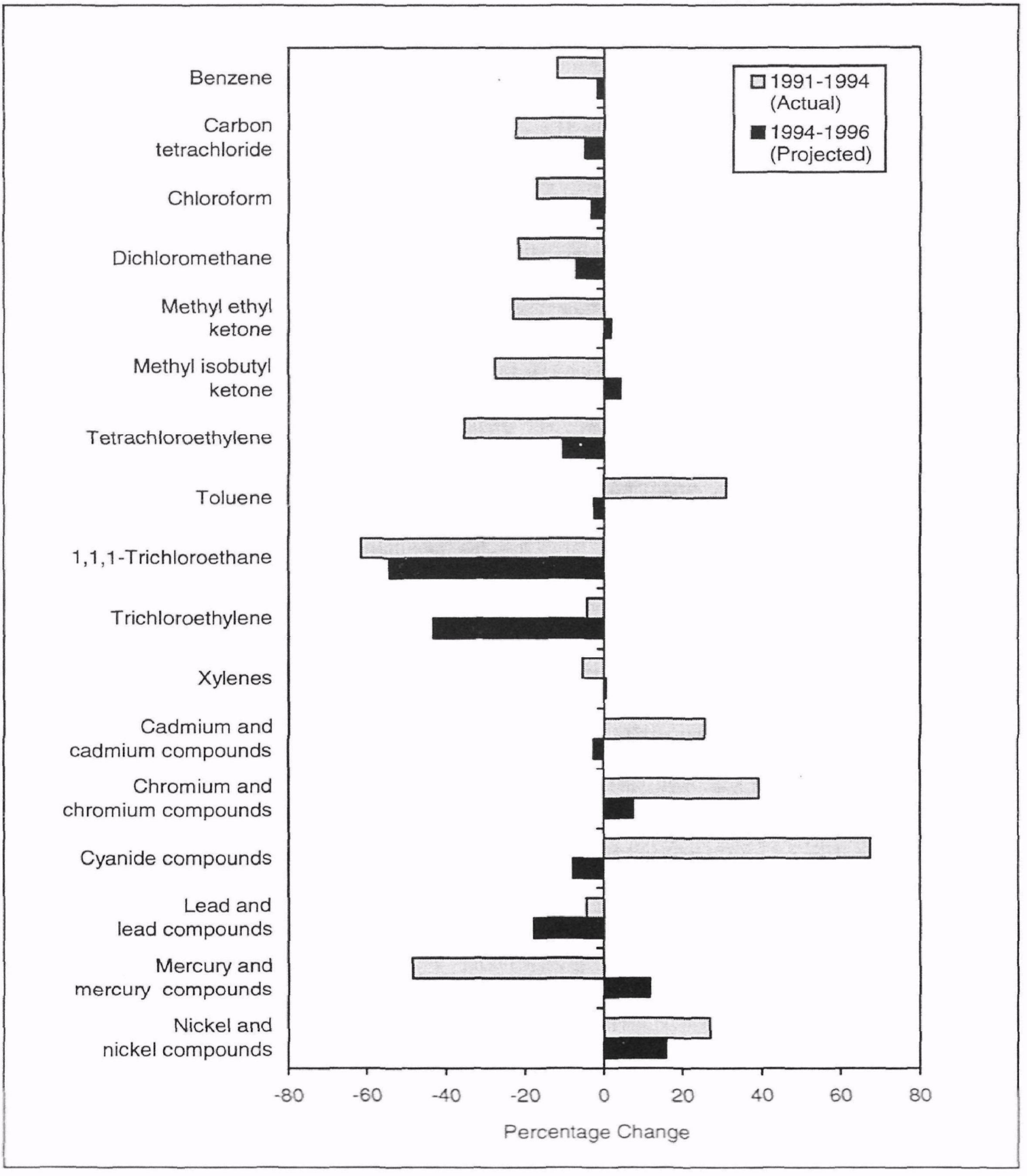

Figure 13. Percentage Change in Total Production-related Waste, 33/50 Program Chemicals, Actual and Projected, 1991-1996.[2]

[2] Data for 1991 as reported on 1991 forms; data for 1994 and 1996 from 1994 forms.

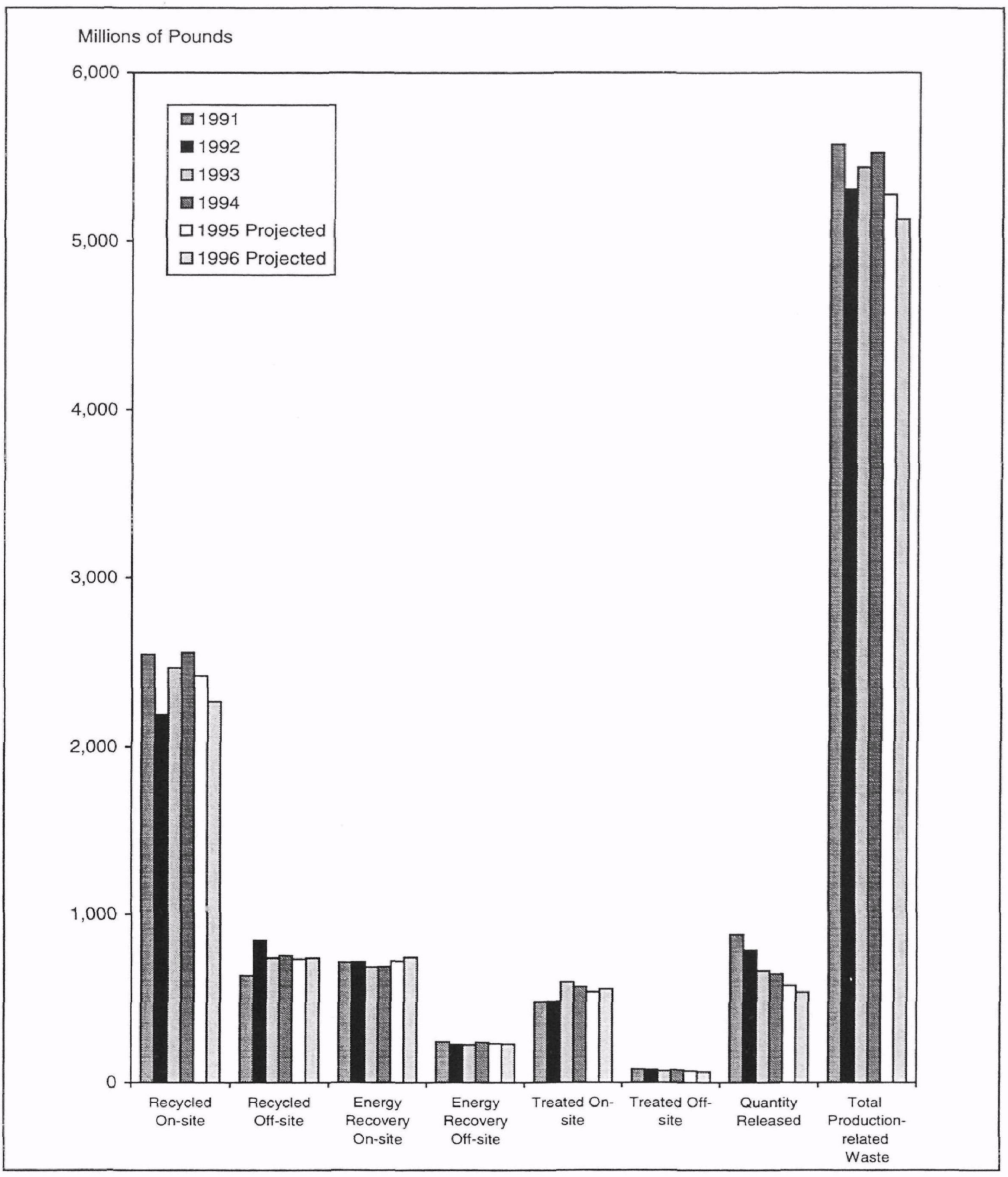

Figure 14. Quantities of 33/50 Program Chemicals Managed in Waste, by Management Type, Actual and Projected, 1991-1996.㉓

㉓ Data for 1991 as reported on 1991 forms; data for 1992 as reported on 1992 forms; all other years from 1994 forms.

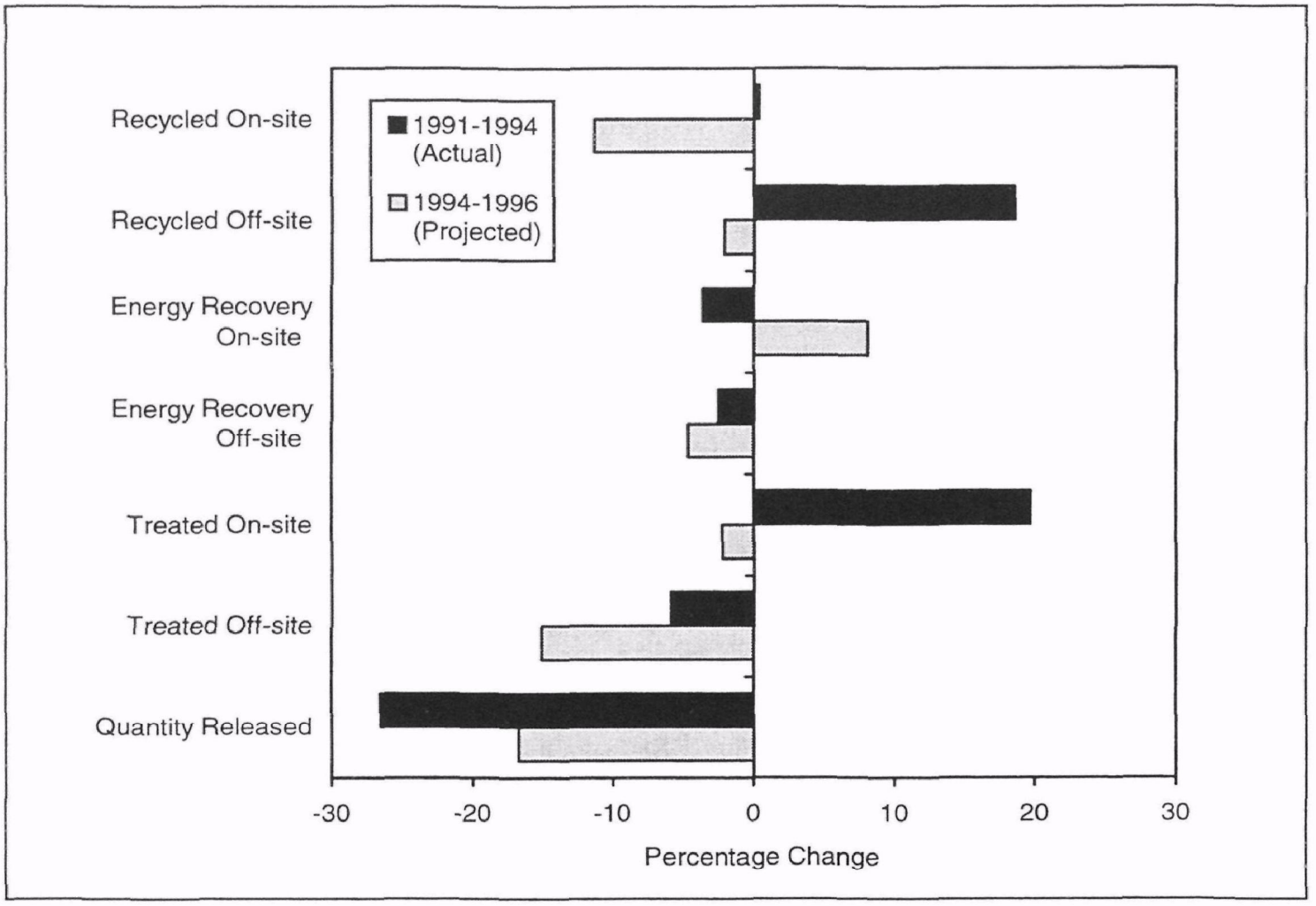

Figure 15. Percentage Change in Waste Management Practices, 33/50 Program Chemicals, 1991-1996.[24]

SOURCE REDUCTION REPORTING FOR 33/50 PROGRAM CHEMICALS

Facilities are also required to report in Section 8 of Form R any source reduction efforts that were directed toward TRI chemicals during the reporting year and the methods they employed in identifying source reduction opportunities.

Source Reduction Activities

Table 9 summarizes facilities' reporting of source reduction activities for each of the seventeen 33/50 Program chemicals for 1991-1994. As a group and individually, 33/50 Program chemicals in 1994 again evidenced higher rates and levels of source reduction activity reporting than that reported for other TRI chemicals. Of the more than 16,000 Form Rs reporting implementation of a source reduction activity during 1994, 42.9% (6,947) were for the seventeen 33/50 Program chemicals. The 33/50 chemicals accounted for only 34% of total TRI Form Rs, but 43% of the source reduction reports. Thirty percent of 33/50 chemical Form Rs reported the occurrence of source reduction, compared to 20% of the forms submitted for other TRI chemicals.

[24] Data for 1991 as reported on 1991 forms; data for 1994 and 1996 from 1994 forms.

Individual 33/50 Program chemicals had some of the highest levels of reporting on source reduction. Three of the five TRI chemicals with the greatest number of Form Rs reporting source reduction activities in 1994 are 33/50 chemicals [toluene, xylene (mixed isomers), and methyl ethyl ketone]. The high ranking for 33/50 Program chemicals is partly due to the fact that they rank among the highest TRI chemicals in total number of Form Rs submitted. But chemicals targeted for reduction under the 33/50 Program also evidenced some of the highest percentages of Form R submissions indicating source reduction. Among 33/50 Program chemicals, the highest was 1,1,1-trichloroethane, with 49% of its TRI forms indicating source reduction activity. The high degree of attention to applying source reduction techniques to this chemical reflects concerns over the 1996 ban on its production.

Thirteen 33/50 Program chemicals are among the top 50 TRI chemicals for numbers of forms reporting source reduction in 1994. Of these, organic chemicals generally evidenced higher percentages of Form Rs reporting source reduction than did the inorganics. Only one of the 11 organics fell below the 30% rate (carbon tetrachloride). None of the inorganics exceeded the 30% source reduction activity rate, with chromium and nickel (and their compounds) falling below the 20% mark (17% and 15% respectively).

For the period 1991-1994, source reduction activity reporting has declined both in absolute terms, due mostly to reductions in total Form Rs submitted to TRI, and in percentage terms, though only marginally (2.4% for 1991-1994). Similar patterns are observed for both 33/50 and non-33/50 Program chemicals. Facilities are only supposed to report an activity the first year they implement it, which may contribute to the decline in reporting.

Facilities described the type of source reduction activity that they implemented for each chemical (see Table 10). The 33/50 Program chemicals as a group did not differ significantly from other TRI chemicals in the types of activities employed. Improvement in facility operating practices is the most common approach, followed by process modifications.

Methods Used to Identify Source Reduction Opportunities

Table 11 summarizes facilities' reporting of source reduction activity identification methods for each of the seventeen 33/50 Program chemicals in 1994. Here again, facilities did not seem to treat Program chemicals differently than other TRI chemicals in their search for source reduction opportunities, although the data do show a somewhat greater reliance on assistance from state programs.

LOOKING TO THE FUTURE: WRAPPING UP 33/50 AND LOOKING TO A NEXT GENERATION

1995 has come and gone and even though 1995 TRI data won't be available for another year, the 33/50 Program's ultimate 50% pollution reduction goal has been achieved—a year ahead of schedule. So what's left to be done in wrapping up the 33/50 Program, and what's in store for the future?

Industries' efforts to meet 33/50's challenges have concluded in many cases, though many companies set environmental goals that extend years into the future and others are drawing on momentum established through their Program participation to continue their voluntary reduction efforts on their own. At EPA, the 33/50

Table 9. Number of Forms Reporting Source Reduction Activity, by 33/50 Program Chemical, 1991-1994.[25]

CAS Number	Chemical	Number of TRI Forms				Forms Reporting Source Reduction Activities: Number				Forms Reporting Source Reduction Activities: Percent of All Forms			
		1991	1992	1993	1994	1991	1992	1993	1994	1991	1992	1993	1994
71-43-2	Benzene	486	476	474	491	155	154	143	139	31.9	32.4	30.2	28.3
56-23-5	Carbon tetrachloride	102	90	75	69	29	27	18	14	28.4	30.0	24.0	20.3
67-66-3	Chloroform	185	181	175	167	68	62	54	42	36.8	34.3	30.9	25.1
75-09-2	Dichloromethane	1,300	1,140	1,081	1,030	525	421	382	344	40.4	36.9	35.3	33.4
78-93-3	Methyl ethyl ketone	2,594	2,512	2,473	2,389	974	918	921	911	37.5	36.5	37.2	38.1
108-10-1	Methyl isobutyl ketone	1,047	1,038	1,021	1,031	387	361	341	358	37.0	34.8	33.4	34.7
127-18-4	Tetrachloroethylene	578	519	490	459	216	193	178	169	37.4	37.2	36.3	36.8
108-88-3	Toluene	3,968	3,822	3,643	3,566	1,504	1,453	1,387	1,343	37.9	38.0	38.1	37.7
71-55-6	1,1,1-Trichloroethane	3,734	3,210	2,111	1,207	1,620	1,504	1,172	592	43.4	46.9	55.5	49.0
79-01-6	Trichloroethylene	725	681	790	783	291	248	288	273	40.1	36.4	36.5	34.9
	Xylenes	3,832	3,698	3,611	3,517	1,372	1,325	1,291	1,257	35.8	35.8	35.8	35.7
	Cadmium and cadmium compounds	217	187	178	158	61	64	64	60	28.1	34.2	36.0	38.0
	Chromium and chromium compounds	3,115	3,134	3,206	3,182	604	570	574	547	19.4	18.2	17.9	17.2
	Cyanide compounds	318	297	297	292	94	85	80	75	29.6	28.6	26.9	25.7
	Lead and lead compounds	1,819	1,712	1,687	1,662	488	444	431	419	26.8	25.9	25.5	25.2
	Mercury and mercury compounds	56	39	35	30	12	8	10	8	21.4	20.5	28.6	26.7
	Nickel and nickel compounds	2,418	2,448	2,537	2,573	381	356	392	396	15.8	14.5	15.5	15.4
Total for 33/50 Chemicals		26,494	25,184	23,884	22,606	8,781	8,193	7,726	6,947	33.1	32.5	32.3	30.7
Total for All Other TRI Chemicals		46,761	46,105	45,601	44,823	10,336	9,959	9,698	9,237	22.1	21.6	21.3	20.6
Total for All TRI Chemicals		73,255	71,289	69,485	67,429	19,117	18,152	17,424	16,184	26.1	25.5	25.1	24.0

Program staff are putting the finishing touches on the Agency's flagship partnership experiment. Major activities include:

National Conference

The 33/50 Program is co-sponsoring a National Conference, in conjunction with the Hampshire Research Institute, entitled "Putting Pollution Prevention into Action." This conference will be held in September 1996 in Washington, DC. The purpose of this gathering is twofold: 1) provide insight into current pollution prevention activities and challenges for developing new initiatives and partnerships for the future and 2) celebrate the successful partnership of the 33/50 Program.

The conference will follow three tracks that will cover:

- Partnerships and Initiatives for Pollution Prevention—pushing forward with P2;
- Integrating Pollution Prevention into the Mainstream—the challenges for P2 in global environmental concerns and business; and,
- Initiatives for the 21st Century—ideas for advancing environmental management and building a sustainable world.

In conjunction with this conference, the 33/50 Program will be thanking all 1,300 participants for their contributions to the early achievements of reduction goals.

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

Table 10. Number of TRI Forms Reporting Source Reduction Activity, by Category, by 33/50 Program Chemical, 1994.[26]

CAS Number	Chemical	Category of Source Reduction Activity							
		Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Material Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
71-43-2	Benzene	49	10	103	8	73	3	3	1
56-23-5	Carbon tetrachloride	6	0	3	1	10	0	0	0
67-66-3	Chloroform	15	0	7	15	23	0	0	1
75-09-2	Dichloromethane	159	34	82	95	110	89	19	36
78-93-3	Methyl ethyl ketone	459	175	159	233	235	107	287	98
108-10-1	Methyl isobutyl ketone	204	69	71	69	124	29	116	47
127-18-4	Tetrachloroethylene	95	14	37	13	40	72	4	9
108-88-3	Toluene	636	204	295	342	387	112	404	162
71-55-6	1,1,1-Trichloroethane	212	49	77	171	94	272	49	71
79-01-6	Trichloroethylene	136	13	35	20	54	152	8	17
	Xylenes	586	174	256	280	378	88	440	137
	Cadmium and cadmium compounds	24	8	14	19	20	4	1	15
	Chromium and chromium compounds	311	75	130	107	227	31	21	57
	Cyanide compounds	33	8	18	10	43	13	1	1
	Lead and lead compounds	238	60	85	137	159	7	9	66
	Mercury and mercury compounds	2	0	0	2	5	0	0	1
	Nickel and nickel compounds	240	62	89	48	155	39	12	38
	Total for 33/50 Chemicals	3,405	955	1,461	1,570	2,137	1,018	1,374	757
	Total for All Other TRI Chemicals	5,695	1,377	3,460	1,603	4,030	658	761	786
	Total for All TRI Chemicals	9,100	2,332	4,921	3,173	6,167	1,676	2,135	1,543

33/50 Program Company Profiles

Over the past two years, the 33/50 Program has released 23 Company Profiles detailing the specific projects companies have undertaken to reduce their emissions of the 17 target chemicals. Nine new studies incorporating 1994 TRI data will be released this summer. The release of each new group of Profiles is accompanied by a new volume of a Reduction Highlights summary report, which contains short extracts of the new studies and a table listing all studies completed at that time.

33/50 Program Success Stories

At the recommendation of an outside 33/50 Program advisory group, EPA issued invitations to all 1,300 33/50 participating parent companies to "Tell the World" about their 33/50 pollution reduction activities by submitting their own Success Stories. A sample story was modelled on one of EPA's more recent Company Profiles. More than 200 companies expressed interest in writing these case studies, which will be shorter than the Profiles since they will feature only one reduction project per story.

A compendium of Success Stories will be released initially at the September conference. Success Stories will be distributed in hard copy and electronic format via the Internet as an entire compendium and in custom groups based on readers' interests in chemicals, processes, sectors, and pollution reduction techniques.

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

Table 11. Methods Used to Identify Source Reduction Activity, by 33/50 Program Chemical, 1994.[27]

CAS Number	Chemical	Number of Forms Reporting Source Reduction Activities	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
			Internal	External			Informal	Formal Program
71-43-2	Benzene	139	77	4	12	45	19	14
56-23-5	Carbon tetrachloride	14	5	0	2	5	2	2
67-66-3	Chloroform	42	17	4	4	22	5	4
75-09-2	Dichloromethane	344	132	10	42	156	67	30
78-93-3	Methyl ethyl ketone	911	360	52	162	451	164	96
108-10-1	Methyl isobutyl ketone	358	150	20	55	188	65	41
127-18-4	Tetrachloroethylene	169	83	6	23	80	27	12
108-88-3	Toluene	1,343	520	68	171	620	222	137
71-55-6	1,1,1-Trichloroethane	592	230	27	80	263	72	59
79-01-6	Trichloroethylene	273	117	11	27	129	43	23
	Xylenes	1,257	492	56	161	570	230	120
	Cadmium and cadmium compounds	60	28	1	10	30	9	11
	Chromium and chromium compounds	547	211	27	85	278	104	57
	Cyanide compounds	75	33	4	7	33	14	5
	Lead and lead compounds	419	165	27	67	214	76	49
	Mercury and mercury compounds	8	4	1	0	5	2	3
	Nickel and nickel compounds	396	136	22	75	228	87	43
Total for 33/50 Chemicals		6,947	2,760	340	983	3,317	1,208	706
Total for All Other TRI Chemicals		10,610	4,198	433	1,408	5,099	2,048	1,160
Total for All TRI Chemicals		17,557	6,958	773	2,391	8,416	3,256	1,866

Table 11.

Chemical	State Program	Federal Program	Trade/ Industry Program	Vendor Assistance	Other
Benzene	1	3	9	11	57
Carbon tetrachloride	0	0	0	0	5
Chloroform	0	0	3	1	15
Dichloromethane	3	1	24	81	76
Methyl ethyl ketone	9	3	56	281	174
Methyl isobutyl ketone	8	2	26	109	60
Tetrachloroethylene	6	0	7	35	21
Toluene	28	8	89	437	281
1,1,1-Trichloroethane	13	10	41	195	118
Trichloroethylene	10	1	19	70	48
Xylenes	21	8	90	430	254
Cadmium and cadmium compounds	0	1	3	14	15
Chromium and chromium compounds	2	1	35	144	95
Cyanide compounds	1	0	6	19	13
Lead and lead compounds	3	5	25	93	92
Mercury and mercury compounds	0	0	0	0	0
Nickel and nickel compounds	1	0	20	79	60
Total for 33/50 Chemicals	106	43	453	1,999	1,384
Total for All Other TRI Chemicals	103	51	602	2,113	2,134
Total for All TRI Chemicals	209	94	1,055	4,112	3,518

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

FOR MORE INFORMATION . . . .

Companies' written communications with the 33/50 Program are available to the public along with a variety of Program information materials, including computer-generated lists of participating companies. Anyone interested in obtaining additional information about the 33/50 Program can do so by calling EPA's TSCA Assistance Hotline at (202) 554-1404 Monday through Friday between 8:30 a.m. and 5:00 p.m. EST.

Or contact the 33/50 Program staff directly at EPA headquarters at (202) 260-6907 or by directing letters to Mail Code 7408, Office of Pollution Prevention and Toxics, U.S. EPA, 401 M Street, SW., Washington, DC 20460. Program staff can also be reached via fax at (202) 401-8142, or via the Internet at BURNS.MIKE@EPAMAIL.EPA.GOV. Information about the 33/50 Program can also be obtained from 33/50 Program Coordinators in EPA's 10 Regional Offices:

US EPA - Region I
(MS: ATR)
1 Congress Street
Boston, MA 02203
PH#: (617) 565-3240
FAX: (617) 565-1141

US EPA - Region II
(MS: 105)
2890 Woodbridge Ave, Bldg. 10
Edison, NJ 08837
PH#: (908) 906-6815
FAX: (908) 321-6788

US EPA - Region III
(MS: 3AT01)
841 Chestnut Bldg
Philadelphia, PA 19107
PH#: (215) 566-9302
FAX: (215) 566-3156

US EPA - Region IV
345 Courtland Street, NE
Atlanta, GA 30365
PH#: (404) 347-3555 x 6977
FAX: (404) 347-1681

US EPA - Region V
(MS: SP-14J)
77 W. Jackson Blvd.
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FAX: (312) 353-4342

US EPA - Region VI
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1445 Ross Avenue
Dallas, TX 75202
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US EPA - Region VII
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726 Minnesota Avenue
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US EPA - Region VIII
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Denver, CO 80202-2405
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