



# EPA's 33/50 Program Fifth Progress Update

*1992 Interim Reduction Goal Exceeded*





# TRI REPORTING PROFILES FOR 33/50 PROGRAM CHEMICALS

## INTRODUCTION

The 33/50 Program, an EPA voluntary pollution prevention initiative, derives its name from its overall goals—an interim goal of a 33% reduction in 1992 and an ultimate goal of a 50% reduction by 1995 in releases and transfers of 17 high-priority toxic chemicals (see box below), using 1988 TRI reporting as a baseline. During 1988, 1.48 billion pounds of the target chemicals were either released to the environment on-site or transferred off-site to waste management facilities. The aim of the 33/50 Program is to reduce this amount by at least 50%—743 million pounds—by 1995, with an interim reduction target of more than 490 million pounds by 1992.

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

At the time the 33/50 Program was formulated, 1988 was the most recent year for which TRI data were available, and the Program's baseline and goals were set accordingly. Reductions that companies achieved between 1988 and 1990 therefore contribute to the 33/50 Program's national

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

Benzene  
Cadmium and compounds  
Carbon tetrachloride  
Chloroform  
Chromium and compounds  
Cyanide compounds  
Dichloromethane  
Lead and compounds  
Mercury and compounds

Methyl ethyl ketone  
Methyl isobutyl ketone  
Nickel and compounds  
Tetrachloroethylene  
Toluene  
1,1,1-Trichloroethane  
Trichloroethylene  
Xylenes



reduction goals. However, these prior reductions should not be viewed as resulting from the 33/50 Program, as companies were first informed about the Program in February of 1991.

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

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

## SUMMARY OF FINDINGS

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

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

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

- Aggregate reductions of the 17 target chemicals from 1988 through 1992 stand at 596 million pounds (40.1%), exceeding by more than 100 million pounds the 33/50 Program's 1992 interim 33% reduction goal of 490 million pounds (see Figure 1).
- Releases and transfers of the 17 target chemicals declined at four times the rate reported for all other TRI chemicals between 1991 and 1992 (10.4% vs. 2.6%), and accounted for more than half of the total reduction in releases and transfers of all TRI chemicals during that period.
- Facilities' projections for 33/50 Program chemicals suggest the Program's 1995 50% reduction goal of 743 million pounds may be achieved substantially ahead of schedule. Projections for 1993 suggest the potential for an additional 100 million pounds of reductions; facilities anticipate a total of nearly 200 million pounds of additional reductions by 1994.

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



### 33/50 Program: Fifth Progress Update

- Between 1991 and 1992, facilities owned by Program participants reduced releases and transfers of the 17 Program chemicals by 15%, nearly twice the rate of reduction achieved by facilities owned by non-participating companies.
- Participating companies accounted for 80% of the reduction in 33/50 Program chemical releases and transfers in the last year.
- Since 1988, participating companies have almost halved their releases and transfers of 33/50 Program chemicals (48%).

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

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

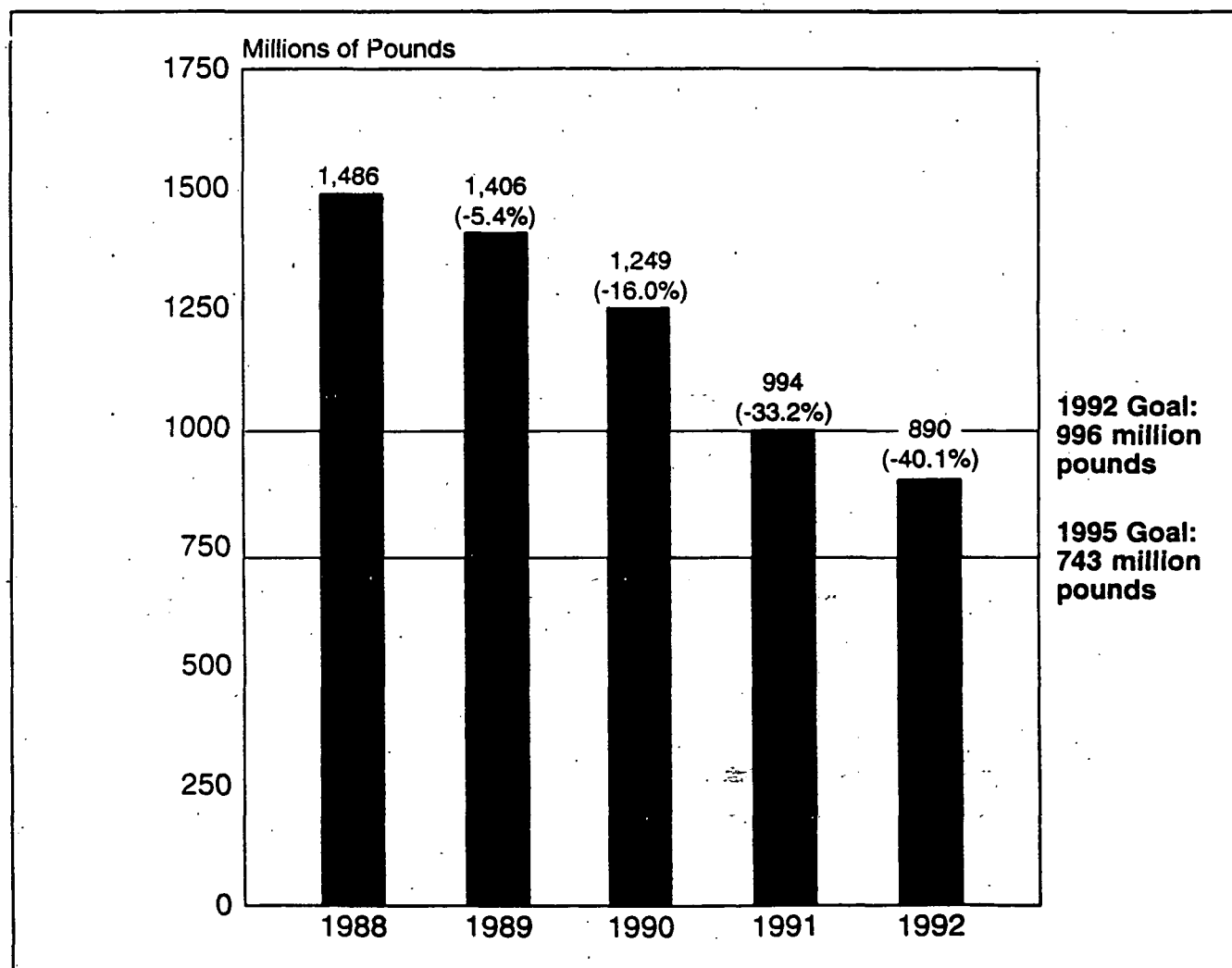


Figure 1. TRI Releases and Transfers of 33/50 Program Chemicals, 1988-1992.①

① The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.



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

### **Source Reduction Activity Highlights**

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

## **COMPANY PARTICIPATION IN THE 33/50 PROGRAM**

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

### **Numbers of Companies Participating**

Initial communications about the 33/50 Program are directed to the chief executive officers of the parent companies of the more than 16,000 industrial facilities that have reported to TRI any of the Program's 17 target chemicals since 1988. At the close of the Program's third year in February of 1994, nearly 7,500 companies had been contacted by EPA with invitations to participate. Of these, 1,216 companies have elected to enroll, pledging to reduce voluntarily more than 355 million pounds of pollution (see Figure 2).

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

### **Reductions Pledged by Participating Companies**

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

Most of the remaining Program participants have also developed reduction targets, but have structured them in ways that are difficult to assess against the 1988 release/transfer baseline. For example, many companies have reduction goals that are indexed to changes in production. If production remains constant throughout the duration of the Program, these can be read as direct



### 33/50 Program: Fifth Progress Update

reductions targets. However, where production increases or decreases, the absolute impact of the company's reduction pledge can not be determined in advance. Accordingly, EPA has not factored these commitments into its assessment of total release/transfer reductions anticipated to be obtained through the 33/50 Program.

Other Program participants have developed reduction goals that go beyond the goals of the 33/50 Program. Some have pledged to reduce all TRI releases and transfers by specified amounts or percentages, but have not indicated specific targets for 33/50 Program chemicals. Others have gone beyond targeting end-of-pipe releases or transfers by attempting to reduce their actual use of toxic chemicals, but have not stipulated the impact such pollution prevention initiatives will have on environmental releases of 33/50 Program chemicals. As a result, the 355 million pounds of release/transfer reductions represents a lower bound on the reductions that companies are attempting under the 33/50 Program.

### Actual Reductions Out-Pacing Pledges

As evidenced in both the 1991 and 1992 TRI reporting data, actual reductions being achieved by companies for the Program's 17 target chemicals are exceeding significantly EPA's conservative interpretation of companies' reduction pledges. The 596 million pounds of 33/50 Program chemical releases and transfers reduced between 1988 and 1992 is more than two-thirds greater than the 355 million pounds pledged by participating companies to be reduced by 1995.

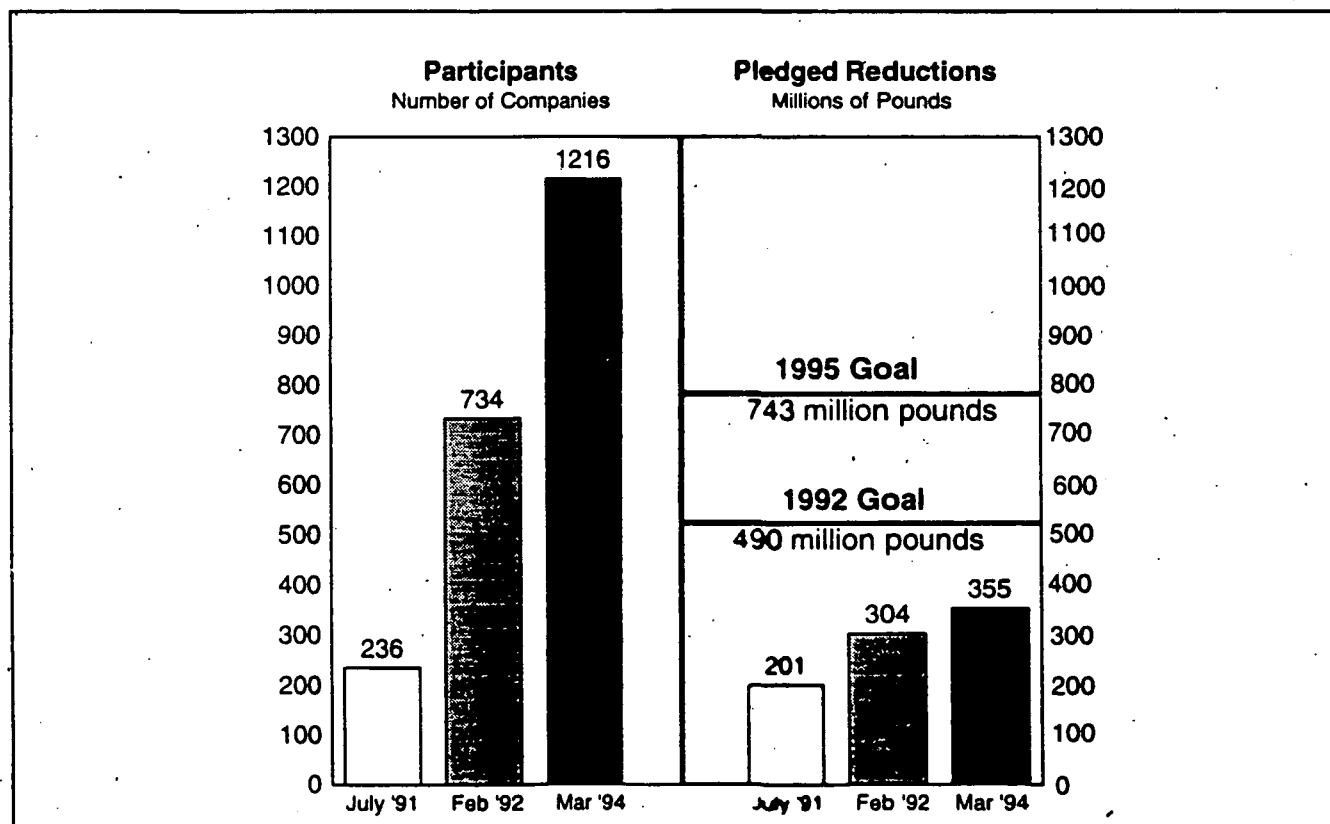


Figure 2. 33/50 Program Participant Status, March 1994.



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

## 33/50 PROGRAM RELEASES AND TRANSFERS

Table 1 presents facilities' reports of on-site releases and off-site transfers to treatment and disposal for 1988, the 33/50 Program's base year, and for the latest three years: 1990, 1991, and 1992. Therefore, with few exceptions, TRI data for 1989 will not be presented. In order to control for changes to the chemical list over time, year-to-year comparisons are based on a consistent list of chemicals that have been reportable for all years 1988-1992. In addition, 33/50 Program chemicals are broken out in aggregate for comparison to all other TRI chemicals. The trends in reductions for each grouping of chemicals are depicted in Figures 3 and 4. These data are presented by chemical in Table 2.

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

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

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

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

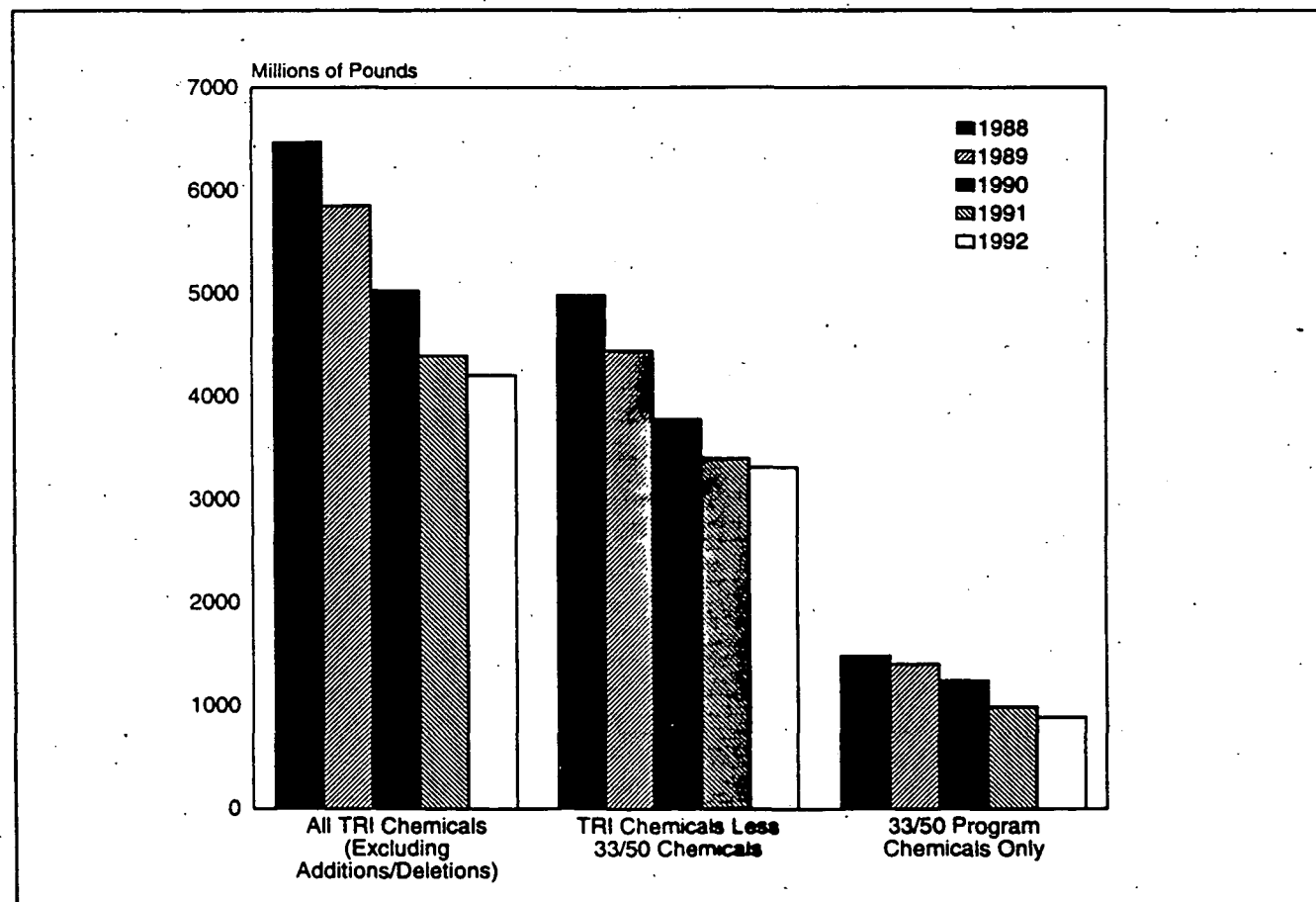
Reductions of the 17 33/50 Program chemicals are accounting for increasing proportions of the aggregate TRI release/transfer reductions. Prior to the Program's initiation in 1991, the 17 target chemicals accounted for 16.5% of the reductions in the releases and transfers of TRI chemicals



# 33/50 Program: Fifth Progress Update

**Table 1. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988, 1990-1992<sup>2</sup>.**

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



**Figure 3. Releases and Transfers of 33/50 Program Chemicals Compared to Other TRI Chemicals, 1988-1992.<sup>2</sup>**

<sup>2</sup> The amounts for recycling and energy recovery reported for 1991 and 1992 have not been included in these totals.





(238 million of the 1.4 billion pounds of TRI releases and transfers reduced between 1988 and 1990). In the Program's first year, the portion of total reductions attributable to 33/50 Program chemicals jumped to 40%; between 1991 and 1992, the share of reductions associated with Program chemicals increased again to more than half (54%) of the TRI total.

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

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

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

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

### **Transfers to Energy Recovery and Recycling**

The Pollution Prevention Act of 1990 (PPA) substantially expanded the scope of TRI to include reporting on additional toxic chemical management activities. Off-site transfers to energy recovery and recycling processes are now reported in Section 6.2 of Form R in addition to the previously reported transfers to POTW's and other treatment and disposal facilities. Off-site transfers to energy recovery and recycling facilities are also reported in Section 8 of Form R, which was made mandatory under the PPA commencing with the 1991 reporting period.

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



# 33/50 Program: Fifth Progress Update

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

CAS Number	Chemical	Year	Fugitive or Nonpoint Air Emissions Pounds	Stack or Point Air Emissions Pounds	Surface Water Discharges Pounds	Underground Injection Pounds	Releases to Land Pounds	Total Releases Pounds
71-43-2	Benzene	92	7,640,101	4,744,478	24,918	355,683	340,636	13,105,816
		91	9,730,501	7,594,244	26,966	824,342	111,928	18,287,981
		90	14,509,387	10,759,685	25,286	689,066	717,007	26,700,431
		88	20,384,441	11,404,198	46,998	825,035	127,920	32,788,592
56-23-5	Carbon tetrachloride	92	416,994	973,268	2,441	45,984	333	1,439,020
		91	528,622	1,019,252	2,844	42,470	2,152	1,595,340
		90	419,001	1,320,225	4,718	31,557	1,005	1,776,506
		88	1,081,552	2,695,101	15,627	98,054	14,759	3,905,093
67-66-3	Chloroform	92	6,017,425	11,017,501	654,452	50,240	28,582	17,768,200
		91	7,720,653	11,529,517	764,484	65,089	22,150	20,101,893
		90	8,388,150	14,648,445	1,005,860	89,560	57,924	24,189,939
		88	7,595,976	18,265,090	1,132,684	36,002	68,544	27,098,296
75-09-2	Dichloromethane	92	27,495,557	46,467,648	221,192	1,183,867	79,313	75,447,577
		91	31,896,963	48,227,792	98,924	1,317,706	118,560	81,659,945
		90	38,001,615	62,614,734	194,670	850,018	21,024	101,682,061
		88	49,344,483	79,395,371	348,560	1,478,833	157,156	130,724,403
78-93-3	Methyl ethyl ketone	92	31,107,484	59,397,157	153,249	365,395	241,794	91,265,079
		91	34,945,620	70,452,517	139,752	355,736	166,746	106,060,371
		90	44,852,450	87,382,385	88,289	146,204	50,526	132,519,854
		88	39,149,720	98,154,472	87,847	255,962	166,537	137,814,538
108-10-1	Methyl isobutyl ketone	92	7,814,570	18,079,207	96,387	129,100	194,986	26,314,250
		91	8,388,210	18,960,112	167,452	161,600	130,415	27,807,789
		90	9,850,864	18,284,937	55,598	52,221	24,733	28,268,353
		88	13,056,204	18,956,818	762,108	116,650	31,770	32,923,550
127-18-4	Tetrachloroethylene	92	5,198,796	7,112,439	10,207	12,780	9,354	12,343,576
		91	6,617,995	10,151,368	7,448	14,000	23,304	16,814,115
		90	9,312,227	13,328,073	21,510	11,012	1,255	22,674,077
		88	16,328,800	19,668,646	33,314	72,250	82,144	36,185,154
108-88-3	Toluene	92	64,986,449	126,010,712	84,024	1,573,901	708,278	193,363,364
		91	75,638,113	130,598,817	105,120	1,373,957	179,941	207,895,948
		90	85,965,861	159,946,495	201,796	1,432,918	371,222	247,918,292
		88	103,150,123	190,959,865	197,233	1,473,666	731,199	296,512,086
71-55-6	1,1,1-Trichloroethane	92	56,479,078	58,465,308	13,132	561	76,381	115,034,460
		91	70,669,445	70,284,531	22,058	2,805	174,480	141,153,319
		90	84,171,441	82,033,915	16,727	1,581	62,176	166,285,840
		88	91,654,550	86,658,242	95,624	1,000	187,786	178,597,202
79-01-6	Trichloroethylene	92	15,269,203	14,305,372	8,153	466	20,726	29,603,920
		91	16,833,623	18,603,398	12,784	800	62,991	35,513,596
		90	18,794,419	20,633,998	14,285	805	12,554	39,456,061
		88	26,076,180	29,712,439	13,801	390	21,186	55,823,996
	Xylenes	92	29,431,717	87,640,149	46,627	219,285	1,450,687	118,788,465
		91	32,063,749	96,130,343	62,024	139,963	291,621	128,687,700
		90	36,335,446	110,736,528	49,538	105,394	423,198	147,650,104
		88	38,835,850	127,483,764	212,808	144,978	647,739	167,325,139
	Cadmium and cadmium compounds	92	13,642	55,498	1,418	1,211	72,443	144,212
		91	17,923	54,569	4,241	1,540	251,107	329,380
		90	31,039	72,345	3,339	1,575	397,523	505,821
		88	32,399	90,293	4,397	2,409	389,729	519,227



Table 2.

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



# 33/50 Program: Fifth Progress Update

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

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



Table 2, Cont.

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

<sup>4</sup> "Other" indicates: For 1991 and 1992, transfers reported with no waste management codes or invalid codes. For 1988 and 1990, transfers reported with no waste management codes, invalid codes, or codes not required to be reported in 1988 and 1990.

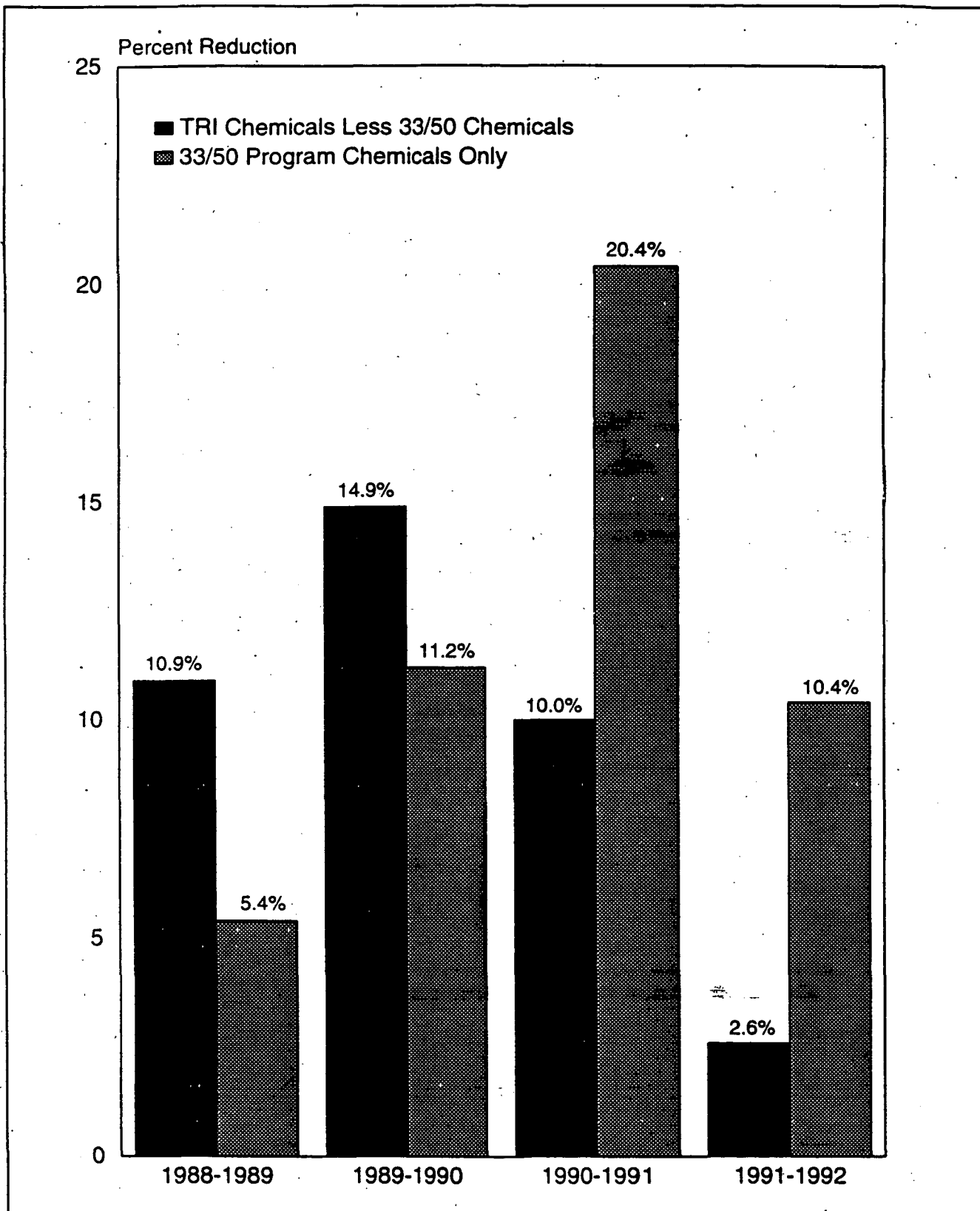


Figure 4. Year-to-Year Reduction Comparisons: Releases and Transfers of 33/50 Program Chemicals versus Other TRI Chemicals, 1988-1992.③

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

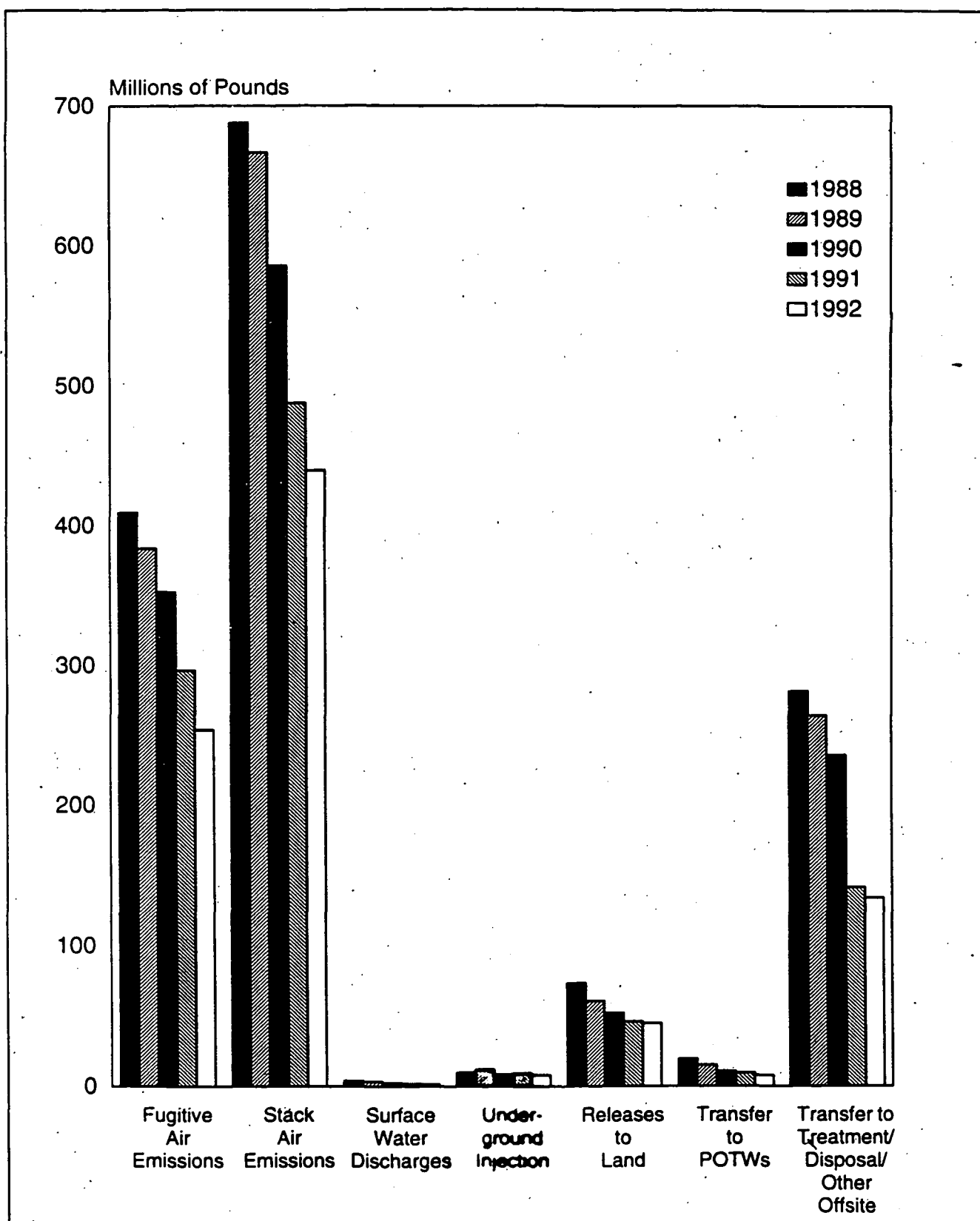


Figure 5. TRI Releases and Transfers of 33/50 Program Chemicals, by On-site Release Medium or Transfer Management Type, 1988-1992.<sup>⑤</sup>

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

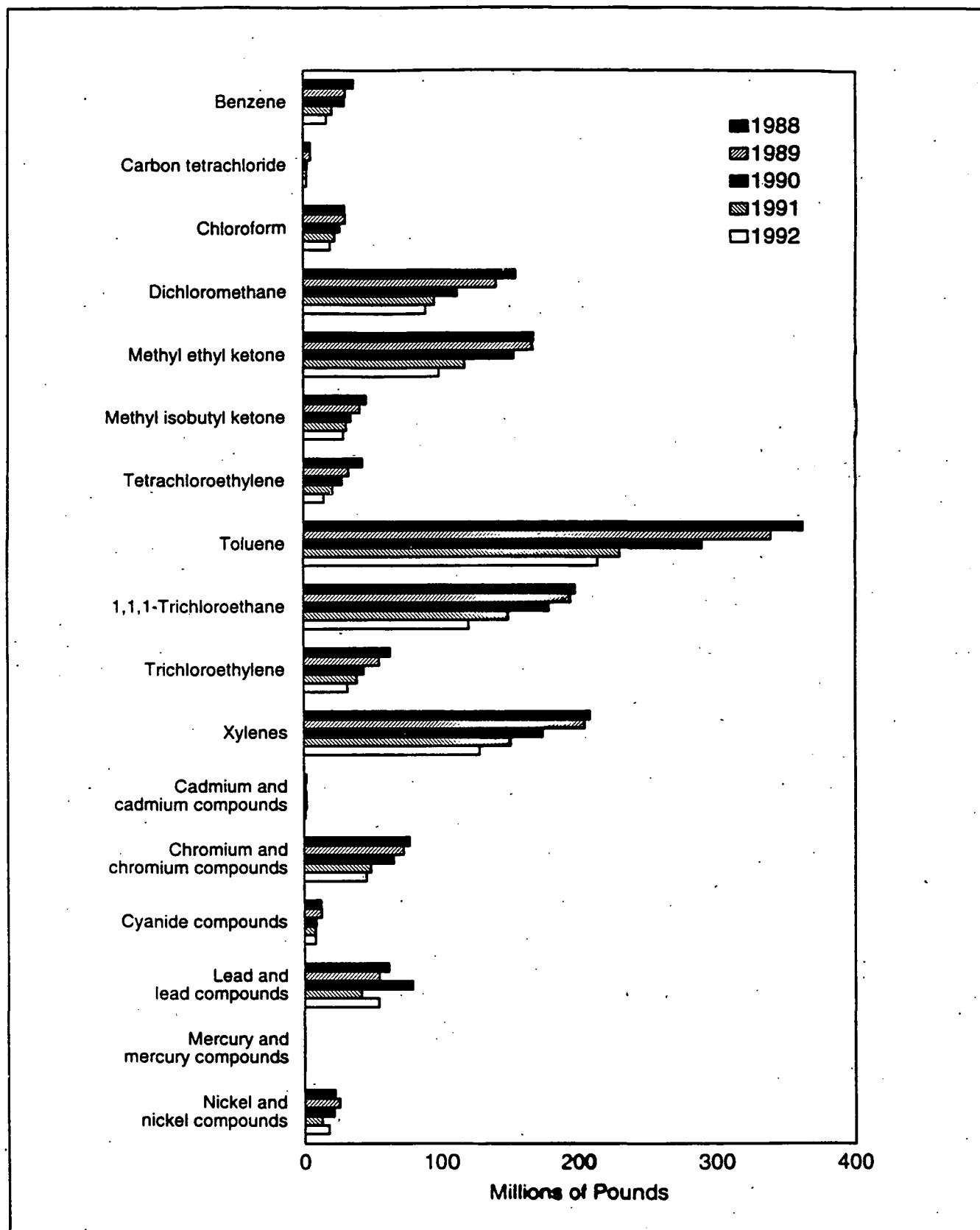


Figure 6. TRI Releases and Transfers of 33/50 Program Chemicals, by Chemical, 1988-1992.⑥

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





## TRI POLLUTION PREVENTION ACT DATA FOR 33/50 PROGRAM CHEMICALS

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

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

Section 8 reporting items described above pertain only to chemical quantities contained in wastes that are the result of regular production-related activities. Toxic chemical quantities contained in wastes that are generated at the facility through non-routine activities, such as spill clean-ups and catastrophic events, are reported in a separate Section 8 reporting item. Each of the items reported for production-related wastes in Section 8 is reported in aggregate, by chemical, for the reporting year (1992), the prior year (1991), and forecasted by facilities for the two successive years (1993 and 1994).

Analysts will note significant discrepancies between reported off-site transfers to recycling in Sections 6 and 8 of Form R. Less significant discrepancies can also be observed in the reporting of off-site shipments to energy recovery and treatment. These discrepancies are a result of ambiguities in Form R reporting definitions and instructions. An EPA work group is currently developing revised Form R guidance to address this problem in future TRI reporting cycles.

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

### Management of 33/50 Program Chemicals in Wastes

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



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

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

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

Total for 33/50 Chemicals		3,601,081,731	3,619,255,120	3,458,091,783	3,311,890,789
Total for All Other TRI Chemicals		15,228,412,985	15,636,834,277	16,390,395,779	16,952,614,198
Total for All TRI Chemicals		18,829,494,716	19,256,089,397	19,848,487,562	20,264,504,987



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

CAS Number	Chemical	1991 On-site Pounds	1992 On-site Pounds	Projected Data	
				1993 On-site Pounds	1994 On-site Pounds
71-43-2	Benzene	33,015,755	36,703,579	22,297,708	23,051,244
56-23-5	Carbon tetrachloride	4,421,868	4,889,374	4,587,378	4,810,854
67-66-3	Chloroform	5,495,474	6,471,447	6,912,839	6,891,840
75-09-2	Dichloromethane	10,662,551	11,832,816	12,539,968	13,146,768
78-93-3	Methyl ethyl ketone	87,985,435	84,226,588	93,355,448	105,537,394
108-10-1	Methyl isobutyl ketone	39,271,740	51,018,601	46,475,389	53,896,285
127-18-4	Tetrachloroethylene	5,507,721	9,655,330	9,142,000	10,086,346
108-88-3	Toluene	254,531,730	255,986,447	285,761,516	335,528,420
71-55-6	1,1,1-Trichloroethane	5,422,186	6,457,400	6,575,250	7,690,000
79-01-6	Trichloroethylene	2,248,000	1,421,546	2,457,611	2,622,311
	Xylenes	218,121,061	222,759,973	253,852,372	304,877,880
	Cadmium and cadmium compounds	0	0	0	0
	Chromium and chromium compounds	8,331	9,410	10,000	10,000
	Cyanide compounds	22,457,509	23,649,069	22,798,386	22,981,579
	Lead and lead compounds	3,500	4,250	4,650	5,250
	Mercury and mercury compounds	0	0	0	0
	Nickel and nickel compounds	0	0	0	0
Subtotal On-site for 33/50 Chemicals		689,152,861	715,085,830	766,770,515	891,136,171
Subtotal On-site for All Other TRI Chemicals		2,153,305,078	2,226,136,283	2,142,536,121	2,200,548,200
Subtotal On-site for All TRI Chemicals		2,842,457,939	2,941,222,113	2,909,306,636	3,091,684,371
CAS Number	Chemical	1991 Off-site Pounds	1992 Off-site Pounds	Projected Data	
				1993 Off-site Pounds	1994 Off-site Pounds
71-43-2	Benzene	4,621,312	4,347,690	4,301,407	4,150,444
56-23-5	Carbon tetrachloride	9,955	6,451	4,048	3,048
67-66-3	Chloroform	713,071	565,883	510,411	445,146
75-09-2	Dichloromethane	3,619,866	3,247,710	2,781,527	2,909,892
78-93-3	Methyl ethyl ketone	32,888,025	39,688,668	38,293,592	36,374,762
108-10-1	Methyl isobutyl ketone	13,510,417	17,643,369	17,636,861	18,251,623
127-18-4	Tetrachloroethylene	565,416	560,816	577,256	559,848
108-88-3	Toluene	75,285,746	82,041,437	72,241,814	69,322,212
71-55-6	1,1,1-Trichloroethane	3,107,273	3,060,231	1,843,474	1,023,000
79-01-6	Trichloroethylene	929,245	884,498	921,898	928,313
	Xylenes	61,739,897	66,458,815	61,338,567	57,761,072
	Cadmium and cadmium compounds	6,525	3,193	2,154	1,104
	Chromium and chromium compounds	170,499	102,216	78,388	76,803
	Cyanide compounds	24	168,614	169,815	169,815
	Lead and lead compounds	2,535,181	3,050,765	49,456	49,390
	Mercury and mercury compounds	0	0	0	0
	Nickel and nickel compounds	19,084	20,226	22,411	24,774
Subtotal Off-site for 33/50 Chemicals		199,721,536	221,850,582	200,773,079	192,051,246
Subtotal Off-site for All Other TRI Chemicals		380,988,735	508,104,018	498,698,829	499,782,921
Subtotal Off-site for All TRI Chemicals		580,710,271	729,954,600	699,471,908	691,834,167
Total for 33/50 Chemicals		888,874,397	936,936,412	967,543,594	1,083,187,417
Total for All Other TRI Chemicals		2,534,293,813	2,734,240,301	2,641,234,950	2,700,331,121
Total for All TRI Chemicals		3,423,168,210	3,671,176,713	3,608,778,544	3,783,518,538



# 33/50 Program: Fifth Progress Update

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

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

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

Total for 33/50 Chemicals	500,313,948	546,189,659	557,482,650	554,470,487
Total for All Other TRI Chemicals	10,048,201,053	10,458,933,685	10,253,962,856	10,141,804,157
Total for All TRI Chemicals	10,548,515,001	11,005,123,344	10,811,445,506	10,696,274,644



Table 6. Quantity of 33/50 Chemicals Released, 1991-1994.⑦

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

⑦ "Quantity Released" in Section 8 of Form R includes amounts released to the environment on-site and amounts sent off-site for disposal.



Table 7. Total Quantity of 33/50 Chemicals in Wastes, 1991-1994.<sup>8</sup>

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

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

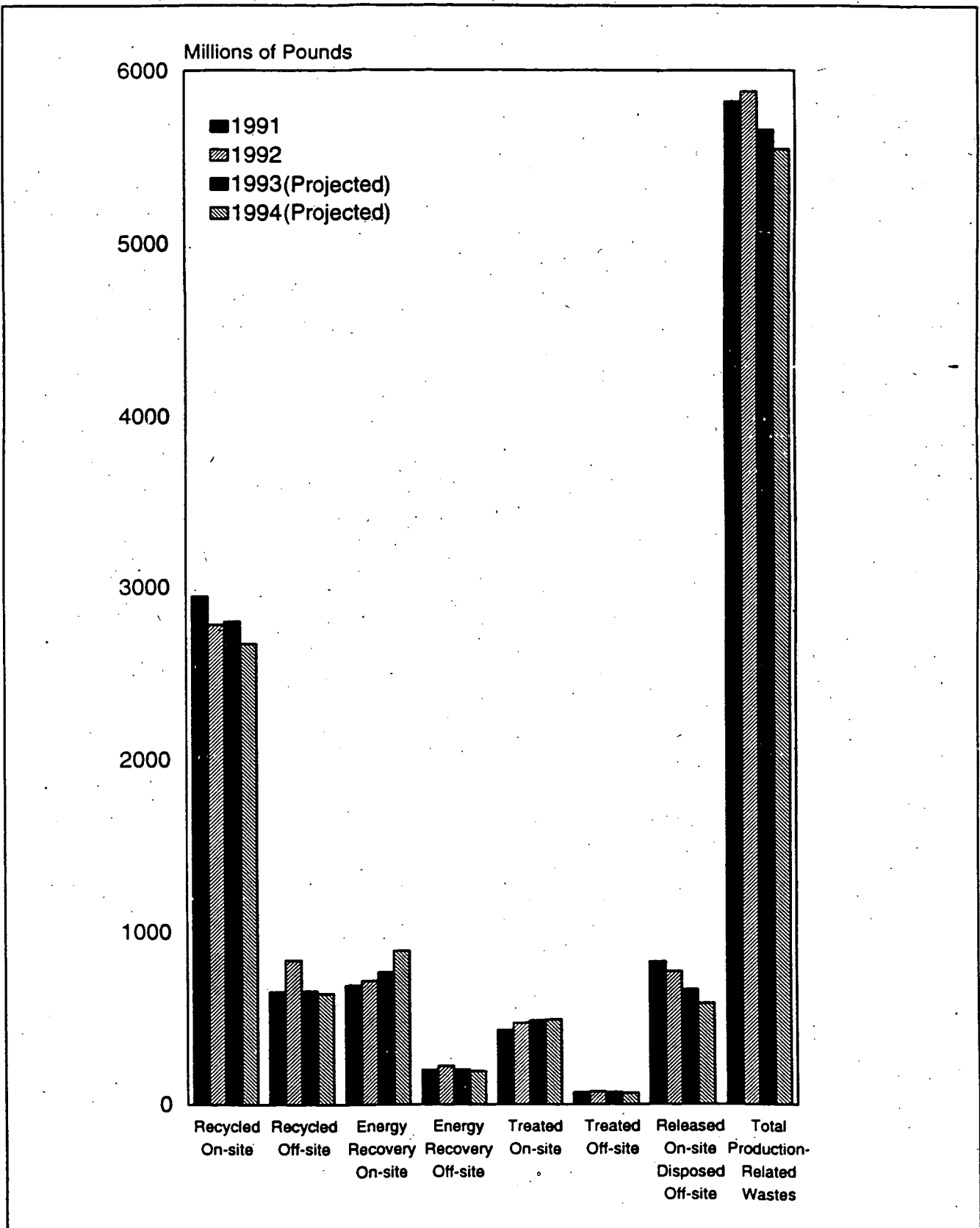


Figure 7. TRI Data Collected under the Pollution Prevention Act for 33/50 Program Chemicals, by Management Type, 1991-1994.

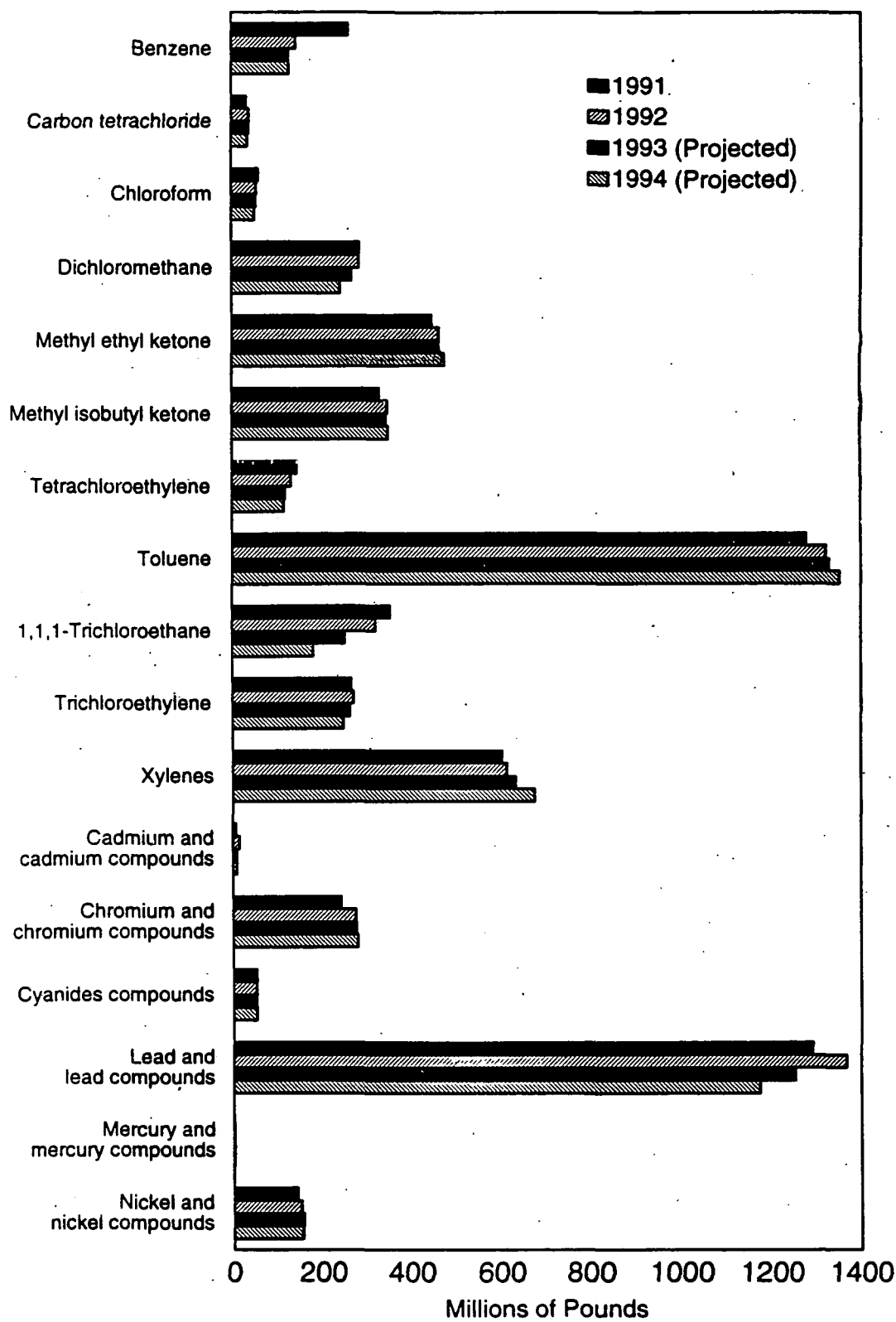


Figure 8. Total Production-Related Wastes for 33/50 Program Chemicals, by Chemical, 1991-1994.





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

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

## SOURCE REDUCTION REPORTING FOR 33/50 PROGRAM CHEMICALS

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

### Source Reduction Activities

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

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

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



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

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

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

CAS Number	Chemical	Number of Forms Reporting Source Reduction Activities	Pollution Prevention Opportunity Audit		Materials Balance Audit	Participative Team Management	Employee Recommendation	
			Internal	External			Informal	Formal Program
71-43-2	Benzene	154	72	11	13	52	16	22
56-23-5	Carbon tetrachloride	27	15	0	5	10	5	4
67-66-3	Chloroform	62	22	0	7	30	7	5
75-09-2	Dichloromethane	419	145	16	66	181	84	39
78-93-3	Methyl ethyl ketone	907	341	38	144	422	183	106
108-10-1	Methyl isobutyl ketone	360	150	14	53	178	72	46
127-18-4	Tetrachloroethylene	189	89	6	28	87	32	17
108-88-3	Toluene	1,430	527	64	187	633	250	152
71-55-6	1,1,1-Trichloroethane	1,477	606	79	173	681	223	200
79-01-6	Trichloroethylene	248	114	12	37	108	51	26
	Xylenes	1,305	492	51	159	556	258	134
	Cadmium and cadmium compounds	64	25	5	8	29	12	8
	Chromium and chromium compounds	560	220	24	81	268	117	58
	Cyanide compounds	86	43	2	10	34	15	9
	Lead and lead compounds	443	173	27	50	217	96	41
	Mercury and mercury compounds	8	3	2	0	4	1	4
	Nickel and nickel compounds	348	132	12	54	191	75	36
	Total for 33/50 Chemicals	8,087	3,169	461	1,075	3,681	1,497	907
	Total for All Other TRI Chemicals	12,421	4,891	465	1,554	5,761	2,336	1,310
	Total for All TRI Chemicals	20,508	8,060	828	2,629	9,442	3,833	2,217



Table 8.

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

Table 9.

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



Facilities described the type of source reduction activity which they implemented for each chemical (see Table 8). 33/50 Program chemicals as a group did not differ significantly from other TRI chemicals in the types of activities employed. Improvement in facility operating practices is the most common approach.

### **Methods Used to Identify Source Reduction Opportunities**

Table 9 summarizes facilities' reporting of source reduction activity identification methods for each of the 17 33/50 Program chemicals. Here again, facilities did not seem to treat Program chemicals differently than other TRI chemicals in their search for source reduction opportunities, although the data do show a somewhat greater reliance on assistance from federal programs, industry associations, and vendors in the case of 33/50 Program chemicals compared to other TRI chemicals.

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

### **LOOKING TO THE FUTURE: AN AGENDA FOR ACTION**

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

- Efforts to expand company participation will continue with initial invitations to be offered to more than 1,000 new companies.
- Industry trade associations are being asked to assist EPA in convincing smaller companies to participate.
- Case studies of companies' pollution reduction initiatives under the 33/50 Program are being prepared and will be made available to the public.
- The 33/50 Program will co-sponsor a national conference showcasing the accomplishments of voluntary pollution prevention programs and their company and community partners. The conference, Promoting Pollution Prevention by Voluntary Initiatives, will be held June 1-3, 1994, in Colonial Williamsburg, Virginia.
- A formal 33/50 Program evaluation has been initiated to assess the Program's success. The evaluation is being conducted under a cooperative agreement with INFORM, a citizen environmental advocacy organization. Preliminary results will be made public at the conference described above. Follow-up reports will be issued at least annually.



## FOR MORE INFORMATION

Anyone interested in obtaining additional information from the 33/50 Program can do so by calling EPA's TSCA Assistance Hotline at (202) 554-1404 Monday through Friday between 8:30 a.m. and 5:00 p.m. EST. Or contact us directly at EPA headquarters at (202) 260-6907 or by directing letters to Mail Code 7408, Office of Pollution Prevention and Toxics, U.S. EPA, 401 M Street, SW, Washington, DC 20460. Written communications from companies are maintained in a publicly available 33/50 Program Administrative Record. Copies of company communications and computer-generated lists of participating companies are available upon request.

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

### US EPA - Region I

(MS: ATR)

1 Congress Street  
Boston, MA 02203  
PHONE: (617) 565-3230  
FAX: (617) 565-4939

### US EPA - Region II

(MS: 105)

2890 Woodbridge Avenue, Bldg. 10  
Edison, NJ 08837  
PHONE: (908) 906-6815  
FAX: (908) 321-6788

### US EPA - Region III

(MS: 3AT01)

841 Chestnut Bldg.  
Philadelphia, PA 19107  
PHONE: (215) 597-9302  
FAX: (215) 580-2011

### US EPA - Region IV

345 Courtland Street, NE  
Atlanta, GA 30365  
PHONE: (404) 347-1033  
FAX: (404) 347-1681

### US EPA - Region V

(MS: SP-14J)

77 W. Jackson Blvd.  
Chicago, IL 60604  
PHONE: (312) 886-1331  
FAX: (312) 353-4342

### US EPA - Region VI

(MS: 6T-PT)

1445 Ross Avenue  
Dallas, TX 75202  
PHONE: (214) 655-7582  
FAX: (214) 655-2164

### US EPA - Region VII

(MS: ARTX)

726 Minnesota Avenue  
Kansas City, KS 66101  
PHONE: (913) 551-7600  
FAX: (913) 551-7065

### US EPA - Region VIII

(MS: 8ART-AP)

999 - 18th Street, Suite 600  
Denver, CO 80202-2405  
PHONE: (303) 294-7684  
FAX: (303) 293-1229

### US EPA - Region IX

(MS: A-4-3)

75 Hawthorne Street  
San Francisco, CA 94105  
PHONE: (415) 744-1069  
FAX: (415) 744-1073

### US EPA - Region X

(MS: AT-083)

1200 - 6th Avenue  
Seattle, WA 98101  
PHONE: (206) 553-4762  
FAX: (206) 553-8338