

LEGEND

M	Matched Chemicals/Industries
MY	Multi-year Matched Chemicals/Industries
A	All Chemicals/Industries

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■ Key Findings

- Top parent companies (companies that owned reporting facilities) accounted for a greater proportion of NPRI releases and transfers (30 percent) than the top parent companies in TRI (18 percent). Differences within individual release and transfer categories was even more extreme between the two groups: 28 percent of air emissions, 39 percent of surface water discharges, and 91 percent of underground injection within the totals reported to NPRI in 1995, as opposed to 14 percent, 6 percent, and 46 percent of the respective totals reported to TRI.
- Canadian facilities were required to report the reason for year-to-year changes in total releases and transfers only in fairly general terms. Forms citing production-level changes as the reason for changes—alone or in conjunction with other factors—accounted for 30 percent of NPRI's total releases and 54 percent of total transfers. No specific reporting on source reduction activities was required by NPRI in 1995.
- US facilities report the amount of year-to-year change and projections of future changes for separate categories of total production-related waste. Total production-related waste was projected to decrease overall, as was the amount of the waste released or disposed of.
- US facilities also report on source reduction activity. While 29 percent of TRI facilities reported some source reduction activity undertaken during 1995, only 21 percent of the forms indicated such activity.

6.1 Introduction

Some data common to both PRTRs can be refined for further comparisons. Parent company reporting and analyses of chemical groups of particular interest are two examples. In addition, differences in the specific data that must be reported in each country support analyses specific to one country or the other. This chapter presents these types of analyses. Some analyses below draw on data from the complete NPRI and TRI databases (see **Table 3–4** in **Chapter 3**). Others examine data from the matched data set, representing chemicals and industries covered in both PRTRs, as presented in **Chapters 3** and **4**.

Table 6-1		The 10 Parent Companies with Largest NPRI Releases						
M	1995							
Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	Major Chemicals Reported (Primary Media/Transfers)*
Sherritt Inc.	3	26	6,362,781	382,400	1,655,240	114,709	8,516,490	Ammonia, methanol (air)
Irving Forest Services Inc.	3	7	275,743	3,498,449	0	0	3,774,192	Methanol (water)
Methanex Corporation	2	13	3,639,483	9,000	0	1,320	3,649,803	Methanol (air)
Shell Canada	7	76	1,000,314	17,096	2,515,001	3,928	3,538,462	Ammonia (UIJ)
Celanese Canada Inc.	3	17	374,996	4,864	3,156,460	1,202	3,537,844	Methanol, methyl ethyl ketone (UIJ)
Domtar Inc.	6	20	1,202,918	2,005,797	0	40	3,208,755	Methanol (water, air)
Novacor Chemicals Ltd.	6	50	2,982,888	921	5,215	6,022	2,995,066	Cyclohexane, ethylene (air)
General Motors of Canada	11	73	2,901,179	1,772	0	0	2,904,068	Xylene, toluene, n-butyl alcohol (air)
CF Industries, Inc.	1	4	2,618,992	25,663	0	0	2,644,759	Ammonia (air)
Petro-Canada	4	59	695,502	51,368	1,698,800	2,100	2,448,264	Ammonia (water, air)
Subtotal	46	345	22,054,796	5,997,330	9,030,716	129,321	37,217,703	
% of Total	3.5	8.0	27.7	38.9	90.9	1.1	31.9	
Total	1,309	4,328	79,547,053	15,419,582	9,937,227	11,690,712	116,744,327	

* Chemicals accounting for more than 70% of the total releases from the facilities belonging to the parent company. UIJ= underground injection.

6.2 Parent Company Reporting

Both NPRI and TRI require a facility to report parent company information. NPRI collects the parent company name and address. More than one parent company can be listed, if needed, with the percentage of ownership given. TRI collects the parent company name and its Dun and Bradstreet number (an identification number supplied by this corporate information service). Compiling chemical reports by parent company requires the direct inspection of names, addresses, and identification numbers. Complicating this is the fact that company nomenclature is not standardized

in the databases. In TRI, for example, facilities belonging to the General Motors Corporation may identify their parent company by half a dozen or more variations, such as GMC or GM Corporation or Delco Div., GMC.

In 1995, the top 10 parent companies in NPRI accounted for nearly one-third of total releases reported in Canada in the matched data set of chemicals and industries common to both NPRI and TRI. In the US, the top 10 reported about one-fifth of TRI's total releases. **Tables 6-1** and **6-2** list the top 10 parent companies for total releases in each country. As mentioned previously, any evaluation of the relative

health and environmental impacts of these facilities must also take into account the toxicity of the chemicals released, local climatic conditions, and the proximity of people and/or ecologically sensitive areas to the released waste streams.

NPRI parent companies accounted for twice the proportion of air emissions (28 percent of all NPRI air emissions), compared to TRI parent companies (14 percent). Differences in other release media were much greater: facilities of the top NPRI parent companies were responsible for a much larger proportion of surface water discharges (39 percent) and underground injection

(91 percent) than their TRI counterparts, but very little of the on-site land releases (1 percent). On the other hand, facilities of the top TRI companies reported smaller proportions of releases to surface water (6 percent) and underground injection (46 percent) and a much larger proportion of on-site land releases (33 percent).

The tables also include, for each parent company, the chemicals and type of release that accounted for the majority of total releases. Thus, for Canada, the parent company with the largest releases, Sherritt Inc., owned three reporting facilities whose releases were primarily emissions to air of ammonia

Table 6-2		The 10 Parent Companies with Largest TRI Releases						
M	1995							
Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	Major Chemicals Reported (Primary Media/Transfers)*
Renco Group Inc.	12	43	26,635,191	3,971	0	3,858,683	30,497,845	Chlorine (air)
ASARCO Inc.	10	72	870,012	4,298	79,753	28,449,940	29,404,003	Zinc/copper and compounds (land)
DuPont	61	600	6,076,361	1,486,924	20,078,524	238,697	27,880,505	Nitric acid/nitrate cmpds., acetonitrile, ammonia (UIJ), methanol (air)
Courtaulds U. S. Inc.	9	45	15,738,031	23,524	0	240,091	16,001,646	Carbon disulfide (air)
General Motors Corp.	99	696	8,017,407	19,153	0	7,439,923	15,476,483	Zinc and compounds (land), xylene, n-butyl alcohol (air)
Monsanto Co.	26	205	910,411	302,262	11,631,220	27,404	12,871,297	Nitric acid and nitrate compounds, ammonia, formaldehyde (UIJ)
Cytec Industries Inc.	16	129	935,111	208,305	11,645,332	8,724	12,797,472	Acetonitrile, ammonia, methanol (UIJ)
International Paper Co.	54	258	12,282,595	481,287	0	24,014	12,787,895	Methanol (air)
Arcadian Fertilizer L.P.	8	59	5,075,167	7,128,612	2	200,586	12,404,367	Phosphoric acid (water), ammonia (air)
BP America Inc.	8	118	637,217	64,183	11,361,515	5,698	12,068,612	Acetonitrile, ammonia, acrylamide, acrylonitrile (UIJ)
Subtotal	303	2,225	77,177,502	9,722,519	54,796,346	40,493,758	182,190,125	
% of Total	1.8	4.1	13.9	6.2	45.8	32.8	19.2	
Total	19,786	59,764	560,407,943	60,570,521	92,783,273	123,219,666	836,981,403	

* Chemicals accounting for more than 70% of total releases from the facilities belonging to the parent company. UIJ= underground injection.

and methanol. For eight of the top 10 NPRI parent companies, ammonia and/or methanol represented a large portion of releases. For the United States, 12 facilities of the Renco Group Inc., the top parent company for releases, reported primarily chlorine emissions to air. Altogether, the chemicals reported in the greatest amounts by the top 10 TRI companies were more diverse than those in NPRI.

Tables 6-3 and 6-4 list the 10 parent companies in each country with the largest total releases and transfers from the common set of chemicals and industries. Facilities of the top 10 companies reported 30 percent of

NPRI's total releases and transfers (Table 6-3), while facilities of the top 10 in TRI accounted for 18 percent of that total (Table 6-4).

Three companies that did not appear among the top 10 NPRI parent companies for releases did rank among the top 10 for total releases and transfers because they owned facilities that reported sizable transfers (Tables 6-1 and 6-3). Likewise, two TRI companies in the top 10 for total releases and transfers were not among the top 10 for releases (Tables 6-2 and 6-4). Notably, parent companies accounted for about the same percentage of transfers to treatment/destruction in each country

(15 to 16 percent), but 76 percent of transfers to sewage/POTWs in NPRI and 6 percent in TRI.

Because the matched data set includes only those industries that report in both databases—that is, manufacturing industries—NPRI parent companies in other industries do not appear in this analysis, although their facilities may report significant amounts of releases and transfers. Companies whose facilities engage in mining are one example.

Table 6-3		The 10 Parent Companies with Largest NPRI Releases and Transfers						
M	1995							
Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	
Sherritt Inc.	3	26	6,362,781	382,400	1,655,240	114,709	8,516,490	
Co-Steel Incorporated	1	6	13,986	221	0	2,397,300	2,411,507	
Stelco Inc.	12	69	462,160	302,938	0	1,048,301	1,816,607	
Irving Forest Services Inc.	3	7	275,743	3,498,449	0	0	3,774,192	
Methanex Corporation	2	13	3,639,483	9,000	0	1,320	3,649,803	
Shell Canada	7	76	1,000,314	17,096	2,515,001	3,928	3,538,462	
Celanese Canada Inc.	3	17	374,996	4,864	3,156,460	1,202	3,537,844	
Kikuchi Color & Chemicals Corp.	1	6	0	0	0	0	100	
Novacor Chemicals Ltd.	6	50	2,982,888	921	5,215	6,022	2,995,066	
Domtar Inc.	6	20	1,202,918	2,005,797	0	40	3,208,755	
Subtotal	44	290	16,315,269	6,221,686	7,331,916	3,572,822	33,448,826	
% of Total	3.4	6.7	20.5	40.3	73.8	30.6	28.7	
Total	1,309	4,328	79,547,053	15,419,582	9,937,227	11,690,712	116,744,327	
Parent Company	Treatment/Destruction (kg)	Sewage/POTWs (kg)	Disposal/Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*		
Sherritt Inc.	0	0	16,370	16,370	8,532,860	Ammonia, methanol (air)		
Co-Steel Incorporated	0	24	6,030,800	6,030,824	8,442,331	Zinc and compounds (transfers to disposal)		
Stelco Inc.	2,008,189	182,304	464,773	2,655,266	4,471,873	Zinc/manganese and compounds (transfers to treatment, land), ammonia (water, transfers to sewage)		
Irving Forest Services Inc.	81	0	0	81	3,774,273	Methanol (water)		
Methanex Corporation	0	74,900	30	74,930	3,724,733	Methanol (air)		
Shell Canada	731	0	51,382	52,113	3,590,575	Ammonia (UIJ)		
Celanese Canada Inc.	0	0	35,688	35,688	3,573,532	Methanol, methyl ethyl ketone (UIJ)		
Kikuchi Color & Chemicals Corp.	0	3,150,000	186,100	3,336,100	3,336,200	Nitric acid and nitrate compounds (transfers to sewage)		
Novacor Chemicals Ltd.	76,449	0	256,693	333,142	3,328,208	Cyclohexane, ethylene (air)		
Domtar Inc.	200	0	6,940	7,140	3,215,895	Methanol (water, air)		
Subtotal	2,085,650	3,407,228	7,048,776	12,541,654	45,990,480			
% of Total	15.9	76.4	34.1	32.8	29.7			
Total	13,148,001	4,457,382	20,654,350	38,259,733	155,004,060			

* Chemicals accounting for more than 70% of the total releases and transfers from the facilities belonging to the parent company. UIJ= underground injection.

Table 6-4

M 1995

The 10 Parent Companies with Largest TRI Releases and Transfers

Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
DuPont	61	600	6,076,361	1,486,924	20,078,524	238,697	27,880,505
ASARCO Inc.	10	72	870,012	4,298	79,753	28,449,940	29,404,003
Renco Group Inc.	12	43	26,635,191	3,971	0	3,858,683	30,497,845
General Motors Corp.	99	696	8,017,407	19,153	0	7,439,923	15,476,483
Horsehead Industries Inc.	7	42	281,497	6,247	712	3,187	291,644
Monsanto Co.	26	205	910,411	302,262	11,631,220	27,404	12,871,297
Courtaulds United States Inc.	9	45	15,738,031	23,524	0	240,091	16,001,646
International Paper Co.	54	258	12,282,595	481,287	0	24,014	12,787,895
Georgia-Pacific Corp.	80	338	9,348,795	975,805	0	537,254	10,861,854
Cytec Industries Inc.	16	129	935,111	208,305	11,645,332	8,724	12,797,472
Subtotal	374	2,428	81,095,410	3,511,776	43,435,541	40,827,915	168,870,643
% of Total	1.9	4.1	14.5	5.8	46.8	33.1	20.2
Total	19,786	59,764	560,407,943	60,570,521	92,783,273	123,219,666	836,981,403

Parent Company	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
DuPont	8,982,849	550,279	159,826	9,692,954	37,573,459	Nitric acid and nitrate compounds, acetonitrile, ammonia (UIJ), methanol (air), ethylene glycol (transfers to treatment)
ASARCO Inc.	2,220,831	842	1,521,025	3,742,698	33,146,701	Zinc/lead and compounds (land)
Renco Group Inc.	3,968	13,465	113,717	131,150	30,628,995	Chlorine (air)
General Motors Corp.	397,610	263,924	1,255,508	1,917,043	17,393,527	Zinc/manganese and compounds (land), xylene, n-butyl alcohol (air)
Horsehead Industries Inc.	12,172	547	16,559,567	16,572,286	16,863,930	Zinc/lead and compounds (transfers to disposal)
Monsanto Co.	1,259,158	2,430,202	14,919	3,704,279	16,575,576	Nitric acid and nitrate compounds, formaldehyde, ammonia, methanol (UIJ)
Courtaulds United States Inc.	47,726	11,626	84,493	143,845	16,145,491	Carbon disulfide (air)
International Paper Co.	409,610	1,697,827	17,893	2,125,330	14,913,225	Methanol (air)
Georgia-Pacific Corp.	2,559,927	457,572	22,399	3,039,898	13,901,751	Methanol, formaldehyde (air), xylene (transfers to treatment)
Cytec Industries Inc.	70,180	282,788	139,233	492,201	13,289,673	Acetonitrile, acrylic acid, ammonia, methanol (UIJ)
Subtotal	15,964,033	5,709,072	19,888,581	41,561,686	210,432,328	
% of Total	15.4	6.0	16.9	13.1	18.2	
Total	103,959,767	95,796,854	117,927,818	317,684,439	1,154,665,842	

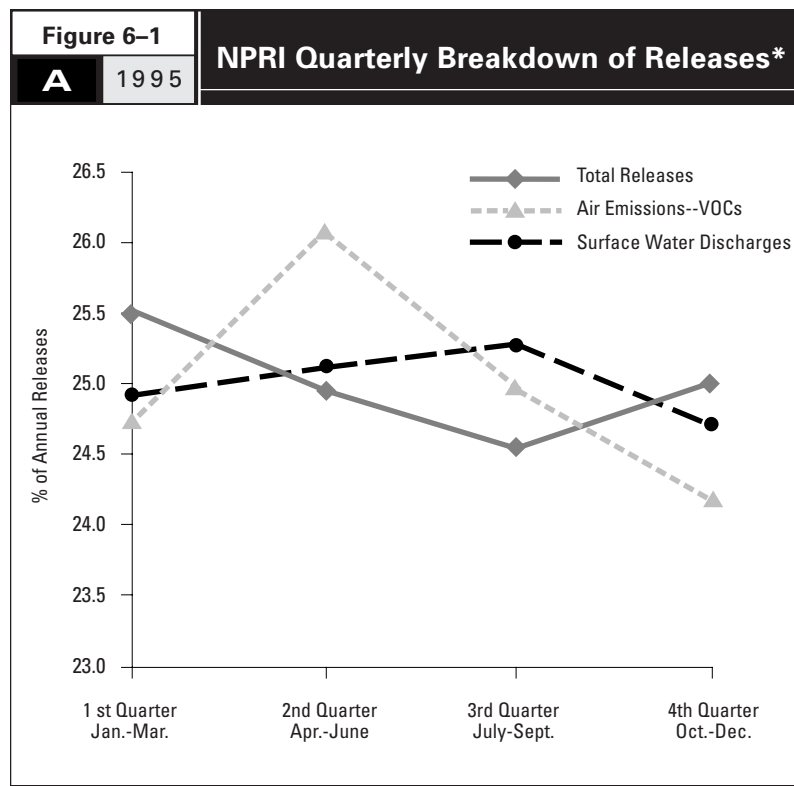
* Chemicals accounting for more than 70% of total releases and transfers from the facilities belonging to the parent company. UIJ= underground injection.

Table 6-5		NPRI Quarterly Breakdown of Releases*				
A		1995				
Type of Release	Quarterly Breakdown				Total (kg)	
	First Quarter (kg)	Second Quarter (kg)	Third Quarter (kg)	Fourth Quarter (kg)		
Total Releases	42,964,498	42,076,795	41,432,628	41,840,799	168,314,720	
% of Total	25.5	25.0	24.6	24.9	100.0	
Total Air Emissions of VOCs**	16,205,278	17,117,979	16,454,759	15,916,832	65,694,848	
% of Total	24.7	26.1	25.0	24.2	100.0	
Surface Water Discharges***	4,421,204	4,447,224	4,484,885	4,373,085	17,726,398	
% of Total	24.9	25.1	25.3	24.7	100.0	

* Does not include forms with no quarterly breakdown.

** Includes forms with releases to air for volatile organic chemicals only.

*** Includes forms with releases to surface water only.



* See notes, Table 6-5.

6.3 Data Specific to Each PRTR

The specific data that must be reported to each country differ in several respects. In its additional data collection, NPRI expands its concentration on releases and transfers by requiring an estimate of the percentage of annual releases by quarter, and breaking down the major release categories into routine releases, storage or handling releases, and spills, leaks, and other non-routine releases. It also asks in general terms the reasons for changes in releases and/or transfers from the previous year. NPRI is more thorough than TRI in characterizing the facility by asking for the number of employees and the address of the parent company.

For its part, TRI expanded reporting in 1991 to include on-site waste management and the types of source reduction activity undertaken at the facility (but not the amounts of any reductions produced—see the section below on Source Reduction Activities). Neither sort of information is specifically collected by NPRI. TRI also requires that facilities report transfer amounts for each off-site destination. In contrast, NPRI asks only for a total amount for each off-site transfer type, but does not inquire where the specific amounts are sent. (NPRI will begin collecting this information in the 1998 reporting year.) The ramifications of this difference will become evident in **Chapter 7: Border and Transborder Analyses**.

6.3.1 Additional Data in NPRI

Seasonal Reporting

Quarterly data collected by NPRI indicated only small seasonal fluctuations in releases (see **Table 6-5** and **Figure 6-1**). Data for volatile organic compounds (VOCs), which could

contribute to air pollution inversions in the summer months, show slightly more air emissions in spring and summer. On the other hand, discharges of pollutants to surface waters may do more damage in periods of low flow during the winter than at other times. Such releases, as reported to NPRI, also tended to occur in the second and third quarters (spring and summer). For total releases, however, the peak occurred in the first quarter (winter).

Reasons for Change from Previous Year's Releases and Transfers

The NPRI form requires facilities to indicate generally why the amount of releases and transfers changed from the previous year. Facilities indicate whether changes in total releases and, separately, changes in total transfers, arose from production-level changes, the use of different estimation methods, or other changes (including accidents, spills or breakdowns).

As **Table 6-6** shows, half of the forms indicated no significant change in releases. (The table shows only the magnitude of the changes, irrespective of whether they were increases or decreases.) But these forms represented relatively small amounts, 21 percent of total releases. The 18 percent of the forms that cited only “other” reasons for changes in release volumes represented 35 percent of total releases.

For transfers, this distribution was even more pronounced (see **Table 6-7**). No significant change was reported on two-thirds of the forms, representing just 11 percent of total transfers, while the 14 percent of the forms that cited only “other” reasons supplied 27 percent of the transfers. For transfers, however, changes in production level alone were cited by 11 percent of forms and accounted for 31 percent of the transfers. The forms that attribute

Table 6-6		Distribution of Reasons for Change in NPRI Releases						
A	1995							
Reason for Change in Releases		Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)		
Forms						kg	%	
Number	%							
Reason for Change in Releases								
Production Level	1,018	16.2	21,771,713	4,094,967	4,497,197	4,487,598	34,898,545	20.6
Production, Estimate	159	2.5	3,610,732	79,680	208,774	424,198	4,332,161	2.6
Production, Estimate, Other	12	0.2	5,009,883	0	4,550	800	5,015,233	3.0
Production, Other	98	1.6	5,598,685	319,032	83,326	251,394	6,253,375	3.7
Estimate	390	6.2	5,745,214	2,618,978	2,328,250	1,754,185	12,460,179	7.4
Estimate, Other	46	0.7	2,692,947	17,771	1,495,849	1,443	4,208,112	2.5
Other	1,108	17.6	37,923,899	13,237,319	2,752,910	5,408,248	59,337,135	35.1
No Significant Change	3,172	50.4	16,951,237	12,703,009	4,714,626	1,482,618	35,972,051	21.3
Not Applicable (NA)	291	4.6	3,233,191	1,338,706	0	2,011,651	6,593,152	3.9
Total	6,294	100.0	102,537,501	34,409,462	16,085,482	15,822,135	169,069,943	100.0
Reasons for Change Reported at Least Once*								
Production Level Change	1,287	20.4	35,991,013	4,493,679	4,793,847	5,163,990	50,499,314	29.9
Estimation Method Change	607	9.6	17,058,776	2,716,429	4,037,423	2,180,626	26,015,685	15.4
Other Change	1,264	20.1	51,225,414	13,574,122	4,336,635	5,661,885	74,813,855	44.3
Total for Forms Counted*	2,831	45.0	82,353,073	20,367,747	11,370,856	12,327,866	126,504,740	74.8
No Change Reported								
No Significant Change	3,172	50.4	16,951,237	12,703,009	4,714,626	1,482,618	35,972,051	21.3
Not Applicable (NA)	291	4.6	3,233,191	1,338,706	0	2,011,651	6,593,152	3.9
Total for Forms Counted	3,463	55.0	20,184,428	14,041,715	4,714,626	3,494,269	42,565,203	25.2

* Data for forms that report more than one reason for change are included in all applicable categories, but only once in the Total for Forms Counted.

Table 6-7		Distribution of Reasons for Change in NPRI Transfers						
A	1995							
Reason for Change in Transfers	Forms		Treatment/ Destruction	Sewage/ POTWs	Disposal/ Containment	Total Transfers		
	Number	%	(kg)	(kg)	(kg)	kg	%	
Reason for Change in Transfers								
Production Level	674	10.7	5,811,832	672,161	12,400,771	18,884,764	31.3	
Production, Estimate	82	1.3	777,340	60,080	4,680,974	5,518,394	9.1	
Production, Estimate, Other	9	0.1	15,980	230	216,635	232,845	0.4	
Production, Other	60	1.0	1,733,176	5,884	6,379,237	8,118,297	13.4	
Estimate	202	3.2	573,501	93,603	1,183,971	1,851,075	3.1	
Estimate, Other	12	0.2	11,710	63	222,844	234,617	0.4	
Other	893	14.2	3,905,014	4,650,752	7,720,880	16,276,646	26.9	
No Significant Change	4,061	64.5	3,515,351	614,516	2,752,876	6,882,743	11.4	
Not Applicable	301	4.8	204,283	27,822	2,190,178	2,422,283	4.0	
Total	6,294	100.0	16,548,187	6,125,111	37,748,366	60,421,664	100.0	
Reasons for Change Reported at Least Once*								
Production Level Change	825	13.1	8,338,328	738,355	23,677,617	32,754,300	54.2	
Estimation Method Change	305	4.8	1,378,531	153,976	6,304,424	7,836,931	13.0	
Other Change	974	15.5	5,665,880	4,656,929	14,539,596	24,862,405	41.1	
Total for Forms Counted*	1,932	30.7	12,828,553	5,482,773	32,805,312	51,116,638	84.6	
No Change Reported								
No Significant Change	4,061	64.5	3,515,351	614,516	2,752,876	6,882,743	11.4	
Not Applicable	301	4.8	204,283	27,822	2,190,178	2,422,283	4.0	
Total for Forms Counted	4,362	69.3	3,719,634	642,338	4,943,054	9,305,026	15.4	

* Data for forms that report more than one reason for change are included in all applicable categories, but only once in the "Total for Forms Counted" category.

changes in releases and transfers to production-level changes, alone or with other causes, accounted for 30 percent of total releases and 54 percent of total transfers.

6.3.2 Additional Data in TRI

Waste Management Categories

Beginning in 1991, TRI facilities have also reported the amounts of listed substances in waste, on- and off-site, by waste management category: recycling, energy recovery, treatment, and release/disposal. (This last category includes all on-site releases plus transfers off-site to disposal.) Only production-related waste is reported in these categories; any waste of chemicals resulting from accidents or a facility's remedial actions is reported separately. NPRI invites, but does not require, facilities to report transfers off-site for energy recovery and recycling.

The quantity of waste that was released/disposed of, plus the quantity treated off-site, corresponds to the amount of total releases and transfers, as discussed in earlier chapters of this report, except that releases or transfers from accidents or remedial actions are not included. **Table 6-8** shows that releases and transfers—as covered in other parts of the TRI form and reported in similar categories to NPRI—represented only 9 percent of all production-related waste reported to TRI in 1995. The largest portions of production-related waste are the amount of TRI chemicals in waste recycled and treated on-site, neither of which are reported to NPRI. On-site recycling accounted for 54 percent of the total waste reported to TRI in 1995, and on-site treatment for another 21 percent. Off-site recycling and energy recovery—optionally reported to NPRI—together amounted to just 8 percent of TRI production-related waste.

Management Activity	Actual		Projected			
	1995 (kg)	% of Total	1996 (kg)	% of Total	1997 (kg)	% of Total
Recycled On-Site	8,638,803,505	54.4	8,584,747,202	54.3	8,567,712,159	54.3
Recycled Off-Site	1,035,856,688	6.5	1,043,936,790	6.6	1,053,466,918	6.7
Energy Recovery On-Site	1,316,540,049	8.3	1,335,686,627	8.4	1,317,043,733	8.4
Energy Recovery Off-Site	227,066,956	1.4	219,963,895	1.4	217,915,246	1.4
Treated On-Site	3,306,291,859	20.8	3,308,897,348	20.9	3,319,760,709	21.1
Total Releases and Transfers	1,360,728,115	8.6	1,328,939,581	8.4	1,290,200,488	8.2
Treated Off-Site	252,642,651	1.6	233,170,302	1.5	231,909,440	1.5
Quantity Released/Disposed of	1,108,085,464	7.0	1,095,769,279	6.9	1,058,291,048	6.7
Total Production-Related Waste	15,885,287,174	100.0	15,822,171,443	100.0	15,766,099,254	100.0

Year-to-Year Change

TRI also takes a different approach from NPRI with regard to year-to-year changes. TRI facilities must report waste management data for the previous year as well as the current one, plus projections for the following two, while NPRI requires projections of releases and transfers (separately) for the next three years (with fourth and fifth years optional).

The goal of the Pollution Prevention Act of 1990 that added these reporting elements to TRI was to stress the importance of pollution prevention by making source reduction the first priority and by focusing waste management, where source reduction was not feasible, on doing the least harm to the environment. After source reduction, the waste management categories are prioritized, with recycling as the most desirable option, to energy recovery,

then treatment, and finally releases and disposal as least desirable.

Indeed, the projected change from 1995 to 1997 shows that the quantity released or disposed of was expected to show a greater percentage decrease than that projected for total production-related waste. Releases/disposal were projected to decline from 8.6 percent to 8.2 percent of the total. The data do not indicate, however, that facilities expected to reduce releases and transfers by increasing recycling, the top of the hierarchy. On- and off-site recycling were projected to increase only from 60.9 percent to 61.0 percent of the total production-related waste over the two years (see **Table 6-8**).

Source Reduction Activity

Although TRI captures actual and projected changes, the reasons for these changes are not reported. One aspect,

however, that is reflected in TRI data is source reduction activity. Each facility, for each TRI-listed chemical, reports what type of source reduction activity was undertaken during the year, if any. Facilities select specific activities in eight major categories from a list of 43. While 29 percent of TRI facilities reported some source reduction activity undertaken during 1995, only 21 percent of the forms reflected this, since facilities did not necessarily engage in such activities for all chemicals they released. The most commonly reported activities were improvements in operating practices and process modifications (see **Table 6-9**).

In addition, facilities indicate the methods they used to identify each source reduction activity, choosing from a list of 11. Participative team management and internal pollution prevention audits are the methods most often used

to identify source reduction opportunities (see **Table 6-10**).

It is important to realize that TRI facilities do not report the results of their source reduction activities, that is, the amounts of waste reduced. However, projection data for total production-related waste can be evaluated for forms that indicate source reduction activity and compared with those for which no source reduction activity was reported. Not only can changes in total production-related waste be examined, but differences in the various waste management options can also be evaluated between the two groups.

Forms indicating source reduction activity in 1995 projected decreases in the quantities of TRI chemicals in waste over the next two years, as shown in **Figure 6-2**, which illustrates data from **Table 6-11**. For the year 1997, these forms projected 7 percent less production-related waste. In contrast, forms indicating no source reduction activity during 1995 projected increases in the following two years.

Changes projected for the different waste management options indicate overall movement away from releases and disposal, but they also indicate that forms reporting source reduction activity will accomplish this to a greater degree. **Table 6-11** shows that forms indicating source reduction activity projected reductions of 13 percent from 1995 to 1997 in the quantities released/disposed of. For forms indicating no source reduction activity, however, quantities released or disposed of were projected to decrease by only 1 percent. Instead, these forms show a greater percentage reduction expected in off-site treatment over the two years.

Table 6-9		TRI Facilities and Forms Reporting Source Reduction Activity, by Category			
A	1995	Facilities Reporting Source Reduction Activity		Forms Reporting Source Reduction Activity*	
Source Reduction Activity Categories	Number	As % of All TRI Facilities	Number	As % of All TRI Forms	
Good Operating Practices	2,829	12.9	6,662	9.1	
Inventory Control	700	3.2	1,599	2.2	
Spill and Leak Prevention	1,361	6.2	3,441	4.7	
Raw Material Modifications	1,601	7.3	2,667	3.6	
Process Modifications	2,261	10.3	4,869	6.6	
Cleaning and Degreasing	855	3.9	1,236	1.7	
Surface Preparation/Finishing	767	3.5	1,579	2.2	
Product Modification	666	3.0	1,265	1.7	
Any Source Reduction Activity**	6,309	28.7	15,082	20.6	

* All source reduction activities on a form are counted in the corresponding category.

** The numerical totals do not equal the sum of the above categories because facilities and forms may report more than one type of source reduction activity.

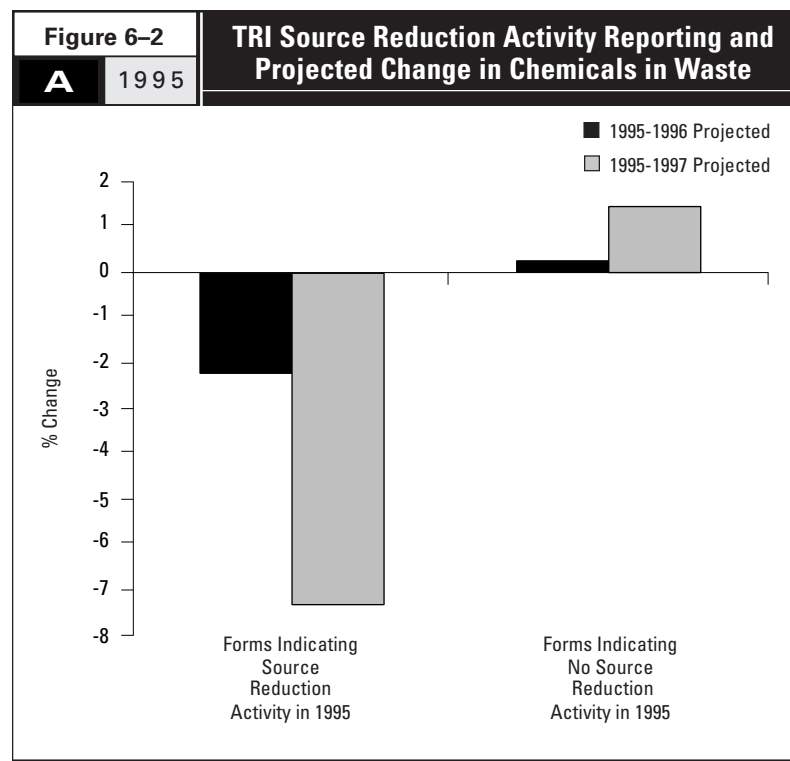


Table 6-10		TRI Source Reduction Activity Reporting			
A	1995	Number of Occurrences*		Number of Occurrences*	
Source Reduction Activity Categories	Number	As % of All Occurrences	Methods Used to Identify Source Reduction Activity	Number	As % of All Occurrences
Good Operating Practices	12,829	28.4	Pollution Prevention Opportunity Audit		
Inventory Control	3,467	7.7	Internal	9,883	21.9
Spill and Leak Prevention	7,039	15.6	External	989	2.2
Raw Material Modifications	4,526	10.0	Materials Balance Audit	3,413	7.6
Process Modifications	9,032	20.0	Participative Team Management	12,560	27.8
Cleaning and Degreasing	1,720	3.8	Employee Recommendation		
Surface Preparation/Finishing	4,398	9.7	Informal	4,378	9.7
Product Modification	2,184	4.8	Formal Program	2,457	5.4
			State Program	333	0.7
			Federal Program	83	0.2
			Trade/Industry Program	1,536	3.4
			Vendor Assistance	5,226	11.6
			Other	4,337	9.6
Total Occurrences	45,195	100.0	Total Occurrences	45,195	100.0

* Each TRI form can report any number of the 43 activity categories or 11 methods. Occurrences count each time an activity or method was reported.

Table 6-11		Actual and Projected Quantities of TRI Chemicals in Waste for Forms with and without Source Reduction Activity Reported				
A	1995					
	<u>Actual</u>	<u>Projected</u>		<u>Projected Change</u>		
	1995	1996	1997	1995-1996	1995-1997	
	(kg)	(kg)	(kg)	(%)	(%)	
Forms Indicating Source Reduction Activity in 1995						
Recycled On-Site	2,154,411,172	2,107,238,787	1,919,484,727	-2.2	-10.9	
Recycled Off-Site	225,374,503	235,086,859	231,069,106	4.3	2.5	
Energy Recovery On-Site	184,676,542	185,361,049	190,942,077	0.4	3.4	
Energy Recovery Off-Site	85,807,002	84,310,545	82,945,203	-1.7	-3.3	
Treated On-Site	836,029,417	816,141,610	823,993,785	-2.4	-1.4	
Treated Off-Site	77,093,717	71,987,781	72,513,610	-6.6	-5.9	
Quantity Released/Disposed of	320,533,280	294,405,164	278,935,925	-8.2	-13.0	
Total Production-Related Waste	3,883,925,635	3,794,531,795	3,599,884,433	-2.3	-7.3	
Forms Indicating No Source Reduction Activity in 1995						
Recycled On-Site	6,484,392,333	6,477,508,415	6,648,227,433	-0.1	2.5	
Recycled Off-Site	810,482,185	808,849,931	822,397,812	-0.2	1.5	
Energy Recovery On-Site	1,131,863,507	1,150,325,578	1,126,101,656	1.6	-0.5	
Energy Recovery Off-Site	141,259,954	135,653,350	134,970,043	-4.0	-4.5	
Treated On-Site	2,470,262,442	2,492,755,738	2,495,766,924	0.9	1.0	
Treated Off-Site	175,548,934	161,182,521	159,395,831	-8.2	-9.2	
Quantity Released/Disposed of	787,552,184	801,364,116	779,355,123	1.8	-1.0	
Total Production-Related Waste	12,001,361,539	12,027,639,648	12,166,214,821	0.2	1.4	