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Key Findings

- The 10 parent companies (companies that owned reporting facilities) with the largest total releases and transfers accounted for one-third of NPRI releases and transfers. In TRI, the 10 parent companies with the largest total releases and transfers accounted for one-fifth of the total.
- In the matched data set, NPRI facilities reported a 4 percent increase from 1995 to 1996 in total releases of substances targeted under Canada's Accelerated Reduction/Elimination of Toxics program that are on the NPRI list. TRI facilities reporting these substances increased 3 percent. (Of the 117 substances targeted by the program, 49 appear in the matched data set.)
- For US EPA's 33/50 Program, reductions in total releases and transfers of targeted chemicals have continued beyond the 1995 ending date of the program. From 1995 to 1996, TRI facilities reported a further decrease of 9 percent and NPRI facilities reported a decrease of 2 percent. (Sixteen of the 17 target substances of the program appear in the matched data set.)
- More facilities (129) in the matched data set reported in Ontario's Toronto Metropolitan Municipality (lying along the north shore of Lake Ontario) than in any other Canadian census division. The Montreal Urban Community, in the province of Quebec, ranked second with 91 facilities. However, the largest total releases and transfers were reported by facilities in Durham Regional Municipality, which is east of Toronto in Ontario (12 million kg), and the second largest by Alberta's Division No. 11 (the Edmonton area), with 10 million kg,
- A total of 481 facilities reported in Cook County, Illinois, which includes the city of Chicago and lies along the southwestern shore of Lake Michigan, making this the US county with the largest number of facilities. California's Los Angeles County ranked second with 403 facilities. Harris County in Texas (which includes Houston) had the largest total releases and transfers in the US with 40 million kg. Tooele County in Utah ranked second for total releases and transfers with 30 million kg.
- In the Great Lakes region, 272 manufacturing facilities reported surface water discharges to TRI. US permit data indicate that public sewage treatment plants, which do not report to TRI, outnumber TRI facilities in the region by three to two. Because NPRI also covers non-manufacturing industries, the complete NPRI database includes public sewage treatment plants that meet reporting thresholds. In Ontario, 28 such xfacilities reported to NPRI. Their releases included 90 times as much chlorine and four times as much nitric acid and nitrate compounds as were reported by the 48 manufacturing facilities in Ontario that submitted reports to NPRI.

7.1 Introduction

This chapter examines some of the data common to both Canadian and US PRTRs that can be refined for further comparisons: parent company reporting and chemical groups of particular interest. It also provides a brief look at the common PRTR data in comparison to basic geographic and demographic information.

This chapter also presents analyses supported by data specific to one country or the other, including information from sewage treatment plants that report only to NPRI and waste management information reported only to TRI.

Some analyses in this chapter draw on data from the complete NPRI and TRI databases (see **Chapter 3**, **Table 3–1**, p. 22). Others examine data from the matched data set, representing chemicals and industries covered in both PRTRs, as presented in **Chapters 4** through **6** (see **Chapter 3**, **Table 3–2**, p. 22).

7.2 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 necessary, together 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 facility reports by parent company requires the direct inspection of names, addresses and identification numbers. Complicating this is the fact that company names are 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.

Releases

In 1996, the 10 parent companies with the largest total releases in NPRI accounted for 34 facilities and one-third of all releases reported in Canada in the matched data set of chemicals and industries common to both PRTRs. In the United States, the 10 with the largest releases reported about one-quarter of TRI's total releases from 362 facilities. Any evaluation of the relative health and environmental impact of 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 (**Tables 7–1** and **7–2**).

One company, General Motors Corporation, appeared on both lists. It had 10 facilities reporting to NPRI and 90 reporting to TRI in 1996.

In NPRI, methanol accounted for a substantial portion of four companies' releases. For the facilities of four TRI parent companies, zinc and its compounds represented a substantial portion of their releases, and for three companies, methanol was commonly reported in large amounts.

Releases and Transfers

Facilities of the 10 NPRI parent companies with the largest total releases and transfers reported one-third of the NPRI total. However, half of these parent companies did not rank among the top 10 parent companies for releases only. In TRI, facilities of the 10 parent companies with the largest total releases and transfers reported one-fifth of the total. All but one of these companies also ranked among the 10 with the largest releases only. None of the 10 parent companies for the largest NPRI total releases and transfers appears on the TRI list of the 10 parent companies with the largest totals or vice versa (**Tables 7–3** and **7–4**, pp. 284–85).

Zinc and its compounds represented a substantial portion of releases and transfers by facilities of five NPRI and four TRI parent companies.

Because the matched data set includes only industries that are required to 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.

[Text continues on p. 286-.]

Table 7–1
M 1996

The 10 Parent Companies with the Largest NPRI Releases

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)*
Inco Limited	4	23	4,890,745	51,757	0	55,325	4,997,827	Sulfuric acid (air)
Celanese Canada Inc.	2	16	441,192	9,370	4,081,300	16,529	4,548,392	Methanol, Methyl ethyl ketone (UIJ)
Nova Corporation	6	43	3,088,776	857	11,707	358	3,101,698	Cyclohexane, Ethylene (air)
Agrium Inc.	3	28	2,323,250	105,210	650,480	540	3,079,580	Methanol (air)
ISPAT Mexicana	4	13	59,430	386	0	2,720,580	2,780,396	Zinc and compounds (land)
Irving Forest Services	1	4	249,591	1,933,834	0	0	2,183,425	Methanol (water)
General Motors of Canada	10	59	2,158,437	22	0	0	2,159,705	Xylenes, Toluene (air)
Grupo Gerdau	1	5	22,367	0	0	2,008,700	2,031,067	Zinc and compounds (land)
Bayer AG	1	16	1,697,761	28,065	0	0	1,725,826	Chloromethane, Cyclohexane, Hydrochloric acid (air)
Methanex Corporation	2	8	1,698,496	6,600	0	340	1,705,436	Methanol (air)
Subtotal	**34**	**215**	**16,630,045**	**2,136,101**	**4,743,487**	**4,802,372**	**28,313,352**	
% of Total	**2.5**	**5.0**	**26.2**	**41.7**	**98.6**	**53.7**	**34.3**	
Total	**1,344**	**4,298**	**63,590,706**	**5,128,134**	**4,812,379**	**8,936,491**	**82,596,460**	

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

Table 7–2
M 1996

The 10 Parent Companies with the Largest TRI Releases

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)*
Renco Group Inc.	9	32	29,856,553	270	0	3,467,234	33,324,057	Chlorine (air)
ASARCO Inc.	9	65	967,781	2,804	114,075	28,551,717	29,636,377	Zinc/Copper and compounds (land)
DuPont	56	522	6,919,992	1,232,564	13,601,047	11,226	21,764,829	Nitric acid and nitrate compounds, Methanol (UIJ), Hydrochloric acid (air)
Potash Corp. of Saskatchewan	15	72	531,810	9,736,111	0	7,394,216	17,662,137	Phosphoric acid (water, land)
International Paper Co.	57	274	15,363,489	364,308	0	34,165	15,761,962	Methanol (air)
General Motors Corp.	90	672	7,008,706	35,772	0	7,087,185	14,131,663	Zinc/Manganese and compounds (land), Xylene, n-Butyl alcohol (air)
Courtaulds United States Inc.	9	41	13,189,092	16,155	0	206,032	13,411,279	Carbon disulfide (air)
Monsanto Co.	27	173	471,477	191,390	11,874,739	32,003	12,569,609	Nitric acid and nitrate compounds, Formaldehyde (UIJ)
Cyprus Amax Minerals Co.	6	24	270,411	2,533	0	11,299,875	11,572,819	Copper/Zinc and compounds (land)
Georgia-Pacific Corp.	84	340	9,410,933	626,270	0	729,497	10,766,700	Methanol, Sulfuric acid (air), Zinc and compounds (land)
Subtotal	**362**	**2,215**	**83,990,244**	**12,208,177**	**25,589,861**	**58,813,150**	**180,601,432**	
% of Total	**1.9**	**3.8**	**16.8**	**16.6**	**36.3**	**43.0**	**23.1**	
Total	**19,190**	**57,927**	**499,678,471**	**73,614,363**	**70,427,564**	**136,901,554**	**780,621,952**	

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

Table 7–3
M 1996

The 10 Parent Companies with the Largest NPRI 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)
Stelco Inc.	12	72	439,610	84,190	0	1,060,662	1,587,006
Inco Limited	4	23	4,890,745	51,757	0	55,325	4,997,827
Co-Steel Inc.	1	6	12,695	298	0	1,241,900	1,254,893
Celanese Canada Inc.	2	16	441,192	9,370	4,081,300	16,529	4,548,392
Kikuchi Color & Chemicals Corp.	1	6	0	0	0	0	50
Nova Corporation	6	43	3,088,776	857	11,707	358	3,101,698
Agrium Inc.	3	28	2,323,250	105,210	650,480	540	3,079,580
Dofasco Inc.	2	19	578,783	7,559	0	99	586,441
Noranda Inc.	11	62	1,195,601	27,142	0	0	1,224,770
ISPAT Mexicana	4	13	59,430	386	0	2,720,580	2,780,396
Subtotal	**46**	**288**	**13,030,082**	**286,769**	**4,743,487**	**5,095,993**	**23,161,053**
% of Total	**3.4**	**6.7**	**20.5**	**5.6**	**98.6**	**57.0**	**28.0**
Total	**1,344**	**4,298**	**63,590,706**	**5,128,134**	**4,812,379**	**8,936,491**	**82,596,460**

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

Table 7–4
M 1996

The 10 Parent Companies with the 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)
ASARCO Inc.	9	65	967,781	2,804	114,075	28,551,717	29,636,377
Renco Group Inc.	9	32	29,856,553	270	0	3,467,234	33,324,057
DuPont	56	522	6,919,992	1,232,564	13,601,047	11,226	21,764,829
International Paper Co.	57	274	15,363,489	364,308	0	34,165	15,761,962
Potash Corp. of Saskatchewan	15	72	531,810	9,736,111	0	7,394,216	17,662,137
General Motors Corp.	90	672	7,008,706	35,772	0	7,087,185	14,131,663
Monsanto Co.	27	173	471,477	191,390	11,874,739	32,003	12,569,609
Nucor Co.	18	77	155,779	623	0	225,738	382,140
Courtaulds United States Inc.	9	41	13,189,092	16,155	0	206,032	13,411,279
Cyprus Amax Minerals Co.	6	24	270,411	2,533	0	11,299,875	11,572,819
Subtotal	**296**	**1,952**	**74,735,090**	**11,582,530**	**25,589,861**	**58,309,391**	**170,216,872**
% of Total	**1.5**	**3.4**	**15.0**	**15.7**	**36.3**	**42.6**	**21.8**
Total	**19,190**	**57,927**	**499,678,471**	**73,614,363**	**70,427,564**	**136,901,554**	**780,621,952**

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

Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
3,151,642	100,879	4,267,982	7,520,503	9,107,509	Zinc and compounds (transfers to treatment, disposal), Manganese and compounds (transfers to disposal)
0	0	0	0	4,997,827	Sulfuric acid (air)
0	10	3,578,500	3,578,510	4,833,403	Zinc and compounds (transfers to disposal)
0	0	48,955	48,955	4,597,347	Methanol, Methyl ethyl ketone (UIJ)
0	3,870,000	229,400	4,099,400	4,099,450	Nitric acid and nitrate compounds (transfers to sewage)
80,044	0	35,824	115,868	3,217,566	Cyclohexane, Ethylene (air)
40,314	0	37,010	77,324	3,156,904	Methanol (air), Nitric acid and nitrate compounds (UIJ)
6,000	1,692	2,539,200	2,546,892	3,133,333	Zinc/Manganese and compounds (transfers to disposal)
1,388,969	11,983	258,744	1,659,696	2,884,466	Methanol (transfers to treatment), Lead/Zinc and compounds (air)
0	0	0	0	2,780,396	Zinc and compounds (land)
4,666,969	**3,984,564**	**10,995,615**	**19,647,148**	**42,808,201**	
34.4	**80.6**	**47.8**	**47.3**	**34.5**	
13,571,799	**4,943,234**	**23,017,654**	**41,532,687**	**124,129,147**	

Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
3,121,426	415	1,633,272	4,755,113	34,391,490	Zinc/Lead and compounds (land)
3,189	679	113	3,981	33,328,038	Chlorine (air)
3,174,298	448,520	666,005	4,288,823	26,053,652	Nitric acid and nitrate compounds, Methanol (UIJ), Hydrochloric acid (air), Ethylene glycol, Acetonitrile (transfers to treatment)
563,158	1,740,630	14,718	2,318,506	18,080,468	Methanol (air)
9,070	9,740	526	19,336	17,681,473	Phosphoric acid (water, land)
254,534	357,731	899,069	1,511,334	15,642,997	Zinc/Manganese and compounds (land), Xylene, n-Butyl alcohol (air)
346,617	1,708,200	27,927	2,082,744	14,652,353	Nitric acid and nitrate compounds, Formaldehyde (UIJ)
4,306,298	2	9,306,427	13,612,727	13,994,867	Zinc and compounds (transfers to disposal, treatment)
29,296	12,080	425	41,801	13,453,080	Carbon disulfide (air)
0	113	35	148	11,572,967	Copper/Zinc and compounds (land)
11,807,886	**4,278,110**	**12,548,517**	**28,634,513**	**198,851,385**	
10.6	**5.0**	**10.1**	**8.9**	**18.0**	
110,901,271	**86,130,663**	**124,047,657**	**321,079,591**	**1,101,701,543**	

7.3 Voluntary Reduction Programs

Both the United States and Canada have programs designed to encourage industry to achieve voluntary reductions of selected chemicals. The US effort was called the 33/50 Program (from the goal of a 33 percent reduction to be achieved by 1991 and a 50 percent reduction by 1995, based on amounts of releases and transfers reported to TRI in 1988). The 33/50 Program encompassed 17 chemicals. The Canadian program is called ARET (Accelerated Reduction/Elimination of Toxics). This program set its reduction goals of 90 percent for persistent, bioaccumulative and toxic substances released on-site to air, water and soil, and 50 percent for other toxic substances by the year 2000, from the base year 1993. ARET goals are not specifically tied to NPRI reporting categories. Of the 117 ARET target substances, 49 are on the NPRI list. Each program invites companies to join, but this is not mandatory. To show the overall progress in reducing the releases and/or transfers of the substances covered by the programs, however, the following analysis looks at all reporting for substances in the matched data set on the ARET or 33/50 Program lists, regardless of whether or not an individual company joined the program.

The 49 chemicals co-listed by NPRI and ARET are also covered by TRI. Of the seventeen 33/50 chemicals, 16 are listed in both NPRI and TRI (1,1,1-trichloroethane is reportable in TRI but not in NPRI). All but three of the 33/50 chemicals—methyl ethyl ketone, toluene and xylene—are on the ARET chemical list (see accompanying box).

7.3.1 Accelerated Reduction/Elimination of Toxics (ARET)

Discussions leading to the ARET program began in late 1990 among corporate executives and leading environmentalists to improve environmental decision-making by organizations. The ARET Stakeholders Committee was formed by the Canadian federal environment minister to establish criteria for defining toxicity, to compile a list of target substances based on these criteria, and to establish a means for encouraging industry to reduce environmental releases of the target substances. It identified criteria for persistence, bioaccumulation and toxicity and prepared a list of 117 chemicals meeting one or more of the criteria. The "ARET challenge," issued in March 1994, calls for industry to make voluntary reductions of 90 percent by the year 2000 of the target substances that meet all three criteria and 50 percent during the same time period for the other target substances. Reductions are measured against the 1993 base year. The goal of the ARET program is the reduction of environmental releases to the air, water and soil (not including landfills).

From 1995 to 1996, NPRI facilities reported a 4 percent increase in total on-site releases of the ARET substances that are also on the NPRI list (there had been a 14 percent decrease from 1994 to 1995—see *Taking Stock 1995*). Not all NPRI facilities are members of the ARET program. In 1996, less than 300 facilities submitted an action plan to the ARET program. Although surface water discharges declined 13 percent, NPRI facilities reported increases in air emissions (3 percent) and on-site land releases (5 percent). Underground injection, not targeted under the program, increased 24 percent. Total TRI releases of these substances also increased—by 3 percent. This included a 16 percent increase in surface water discharges and a 15 percent increase in on-site land releases. TRI air emissions of ARET substances decreased 7 percent, and underground injection declined 12 percent (**Table 7–5**, p. 288).

Transfers of ARET substances in the matched data set decreased in NPRI (9 percent) and increased in TRI (13 percent), so that total releases and transfers also decreased in NPRI (3 percent) and increased in TRI (7 percent).

Two facilities—one each in NPRI and TRI—reported a reduction of more than 1 million kg in releases of ARET substances from 1995 to 1996. One NPRI facility reported an increase of more than 1 million kg, while five TRI facilities did so (**Tables 7–6** and **7–7**, p. 289).

For total releases and transfers of ARET substances in the matched data set, two NPRI facilities and three TRI facilities reported large decreases (more than 1 million kg each). Four of these five facilities made all or most of their reductions in transfers. Increases of more than 1 million kg each were reported by three NPRI facilities and 15 TRI facilities. For two of the NPRI facilities and 10 of the TRI facilities, most or all of the increase occurred in reporting of transfers (**Tables 7–8**, pp. 290–91 and **7–9**, pp. 292–93).

These facilities' large reductions or large increases consisted principally of metals and their compounds, released on-site to land or transferred off-site to treatment or disposal. The metals and compounds most often involved were copper and zinc. However, one NPRI facility that reported transfers of asbestos to disposal in 1995 but not in 1996. The facility reported that it was a one-time transfer, resulting from the remediation of an inactive asbestos pit.

7.3.2 The 33/50 Program

The 33/50 Program, established by the US EPA in 1991, is also a call for voluntary reductions by industry. The 17 substances subject to the program are TRI chemicals chosen for their high toxicity and the large volume of their reported releases and transfers. The goals of the program were a 33 percent reduction in total releases and transfers by 1991 and a 50 percent reduction by 1995, from a base level of 1988 TRI reporting. The 33/50 Program achieved its ultimate goal by 1994, one year early, and further reductions continued in 1995. Nearly 1,300 parent companies, controlling more than 6,800 TRI facilities, have committed themselves to the program. This represents one-third of all TRI facilities reporting 33/50 Program chemicals, but two-thirds of the total releases and transfers reported in the base year 1988.

From 1995 to 1996, TRI facilities reported a further decrease of 9 percent in total releases and transfers of the substances targeted by the 33/50 Program. This consisted of an 11 percent decrease in releases, along with a small decrease (less than 1 percent) in transfers. The largest component of the year's reduction was a 28-million-kg decrease in air emissions (13 percent). NPRI facilities reported a smaller overall reduction—2 percent—in total releases and transfers of the seventeen 33/50 Program chemicals. NPRI releases decreased 8 percent, while transfers rose 19 percent. As in TRI, the largest factor in NPRI's overall reduction was a decrease in air emissions, which declined 2 million kg (9 percent, see **Table 7–10**, p. 295).

From 1995 to 1996, one NPRI facility and nine TRI facilities reported reductions of more than 750,000 kg each in total releases and transfers, as targeted by the 33/50 Program. The NPRI facility's reduction consisted of releases for xylene reported in 1995 but not in 1996. Seven of the nine TRI facilities reported the bulk of their reductions in transfers (**Table 7–11**, pp. 296–97).

One NPRI facility and five TRI facilities reported increases of more than 750,000 kg each in the 33/50 Program chemicals. The NPRI facility's increase consisted of forms submitted in 1996 only, predominantly reporting transfers. For three of the five TRI facilities, the increase was also attributable to reporting of transfers (**Table 7–12**, pp. 296–97).

ARET and 33/50 Chemicals on both NPRI and TRI lists

ARET Chemicals on both NPRI and TRI lists*

75-07-0	Acetaldehyde
79-06-1	Acrylamide
107-13-1	Acrylonitrile
62-53-3	Aniline
120-12-7	Anthracene
1332-21-4	Asbestos (friable)
71-43-2	Benzene
100-44-7	Benzyl chloride
106-99-0	1,3-Butadiene
56-23-5	Carbon tetrachloride
10049-04-4	Chlorine dioxide
67-66-3	Chloroform
106-46-7	1,4-Dichlorobenzene
107-06-2	1,2-Dichloroethane
75-09-2	Dichloromethane
120-83-2	2,4-Dichlorophenol
117-81-7	Di(2-ethylhexyl) phthalate
534-52-1	4,6-Dinitro-o-cresol
121-14-2	2,4-Dinitrotoluene
606-20-2	2,6-Dinitrotoluene
123-91-1	1,4-Dioxane
106-89-8	Epichlorohydrin
75-21-8	Ethylene oxide
96-45-7	Ethylene thiourea
50-00-0	Formaldehyde
77-47-4	Hexachlorocyclopentadiene
302-01-2	Hydrazine
101-14-4	4,4'-Methylenebis(2-chloroaniline)
108-10-1	Methyl isobutyl ketone
79-46-9	2-Nitropropane
86-30-6	N-Nitrosodiphenylamine
108-95-2	Phenol
91-22-5	Quinoline
127-18-4	Tetrachloroethylene
62-56-6	Thiourea
26471-62-5	Toluenediisocyanate (mixed isomers)
79-01-6	Trichloroethylene
–	Arsenic (and its compounds)
–	Cadmium (and its compounds)
–	Chromium (and its compounds)
–	Cobalt (and its compounds)
–	Copper (and its compounds)
–	Cyanide compounds
–	Lead (and its compounds)
–	Mercury (and its compounds)
–	Nickel (and its compounds)
–	Silver (and its compounds)
–	Zinc (and its compounds)

33/50 Chemicals on both NPRI and TRI lists

71-43-2	Benzene
56-23-5	Carbon tetrachloride
67-66-3	Chloroform
75-09-2	Dichloromethane
78-93-3	Methyl ethyl ketone
108-10-1	Methyl isobutyl ketone
127-18-4	Tetrachloroethylene
108-88-3	Toluene
79-01-6	Trichloroethylene
–	Cadmium (and its compounds)
–	Chromium (and its compounds)
–	Cyanide compounds
–	Lead (and its compounds)
–	Mercury (and its compounds)
–	Nickel (and its compounds)
–	Xylenes

* Tetraethyl lead is listed as an ARET chemical separately from lead and lead compounds. It is included in lead and lead compounds in NPRI.

Chromium and its compounds were the principal substances in five of the facilities' large changes and toluene in four. For chromium and its compounds, these facilities reported transfers to treatment and disposal, along with on-site land releases. For toluene, the facilities reported air emissions and transfers to treatment.

[Text continues on p. 298.]

Table 7–5

M 1996

NPRI and TRI Releases and Transfers of ARET Chemicals

	NPRI				TRI			
	1995 Number	1996 Number	Change 1995–1996 Number	Change 1995–1996 %	1995 Number	1996 Number	Change 1995–1996 Number	Change 1995–1996 %
Total Facilities	840	875	35	4.2	11,976	11,772	-204	-1.7
Total Forms	1,648	1,682	34	2.1	23,425	22,954	-471	-2.0
	kg	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**
Total Air Emissions	10,618,036	10,941,005	322,969	3.0	86,869,467	81,154,559	-5,714,908	-6.6
Surface Water Discharges	564,511	491,165	-73,346	-13.0	1,368,320	1,581,543	213,223	15.6
Underground Injection	202,322	250,985	48,663	24.1	14,218,051	12,544,791	-1,673,260	-11.8
On-site Land Releases	6,357,533	6,694,305	336,772	5.3	80,042,102	92,017,978	11,975,876	15.0
Matched Releases	**17,790,180**	**18,419,611**	**629,431**	**3.5**	**182,497,940**	**187,298,871**	**4,800,931**	**2.6**
Treatment/Destruction	5,103,891	4,779,964	-323,927	-6.3	30,931,155	45,563,798	14,632,643	47.3
Sewage/POTWs	116,135	195,497	79,362	68.3	5,416,250	4,723,485	-692,765	-12.8
Disposal/Containment	17,403,664	15,700,302	-1,703,362	-9.8	84,323,518	86,407,233	2,083,715	2.5
Matched Transfers	**22,623,684**	**20,675,755**	**-1,947,929**	**-8.6**	**120,670,923**	**136,694,516**	**16,023,593**	**13.3**
Matched Releases and Transfers	**40,413,864**	**39,095,366**	**-1,318,498**	**-3.3**	**303,168,863**	**323,993,387**	**20,824,524**	**6.9**

Table 7–6
M 1996

NPRI and TRI Facilities with Decreases greater than 1,000,000 kg in Total Releases of ARET Chemicals

Facility	City, State/Province	SIC Codes		Number of Forms		Total Releases		Change 1995–1996 in Total Releases (kg)	Major Chemicals Reported (Primary Media with Decreases)*
		Canada	US	1995	1996	1995 (kg)	1996 (kg)		
NPRI Facility									
Co-Steel Lasco	Whitby, ON	29	33	5	5	2,410,763	1,158,981	-1,251,782	Copper and compounds (land)
TRI Facility									
ASARCO Inc., Ray Complex/Hayden Smelter	Hayden, AZ		33	7	7	7,997,776	4,797,448	-3,200,328	Copper/Zinc and compounds (land)

* Chemicals accounting for more than 70% of the decrease in total releases from the facility.

Table 7–7
M 1996

NPRI and TRI Facilities with Increases greater than 1,000,000 kg in Total Releases of ARET Chemicals

Facility	City, State/Province	SIC Codes		Number of Forms		Total Releases		Change 1995–1996 in Total Releases (kg)	Major Chemicals Reported (Primary Media with Increases)*
		Canada	US	1995	1996	1995 (kg)	1996 (kg)		
NPRI Facility									
Gerdau MRM Steel Inc.	Selkirk, MB	29	33	2	3	634,000	1,736,707	1,102,707	Zinc and compounds (land)
TRI Facilities									
Cyprus Miami Mining, Cyprus Amax Minerals Co.	Claypool, AZ		33	4	10	4,873,577	11,063,340	6,189,763	Copper/Zinc and compounds (land)
BHP Copper Metals Co., BHP Copper Co.	San Manuel, AZ		33	8	6	204,603	2,562,031	2,357,428	Copper and compounds (air)
ASARCO Inc.	East Helena, MT		33	7	7	16,820,143	18,573,164	1,753,021	Zinc and compounds (land)
Kennecott Utah Copper, Kennecott Holdings Corp.	Magna, UT		33	8	8	2,620,316	4,155,435	1,535,119	Copper and compounds (land)
ASARCO Inc., Glover Plant	Annapolis, MO		33	6	6	2,959,545	4,030,233	1,070,688	Lead/Zinc and compounds (land)
TRI Total				**33**	**37**	**27,478,184**	**40,384,203**	**12,906,019**	

* Chemicals accounting for more than 70% of the increase in total releases from the facility.

Table 7–8
M 1996

NPRI and TRI Facilities with Decreases greater than 1,000,000 kg in Total Releases and Transfers of ARET Chemicals

Facility	City, State/Province	SIC Codes		Number of Forms		Total Releases and Transfers	
		Canada	US	1995	1996	1995 (kg)	1996 (kg)
NPRI Facilities							
Co-Steel Lasco	Whitby, ON	29	33	5	5	8,146,583	4,408,490
CXY Chemicals-Nanaimo Plant	Nanaimo, BC	37	28	1	*	1,988,000	*
NPRI Total				**6**	**5**	**10,134,583**	**4,408,490**
TRI Facilities							
Zinc Corp. of America, Horsehead Industries Inc.	Monaca, PA		33	8	7	14,515,703	9,637,453
ASARCO Inc., Ray Complex/Hayden Smelter	Hayden, AZ		33	7	7	9,941,058	7,721,573
Electralloy Corp., G.O. Carlson Inc.	Oil City, PA		33	3	3	1,321,890	115,301
TRI Total				**18**	**17**	**25,778,651**	**17,474,327**

* Indicates facility did not report any ARET chemicals that year.

** Chemicals accounting for more than 70% of the decrease in total releases and transfers from the facility.

Change 1995–1996			
Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers with Decreases)**
-1,251,782	-2,486,311	-3,738,093	Zinc and compounds (transfers to disposal), Copper and compounds (land)
0	-1,988,000	-1,988,000	Asbestos (transfers to disposal)
-1,251,782	**-4,474,311**	**-5,726,093**	
-45,132	-4,833,119	-4,878,250	Zinc/Lead and compounds (transfers to disposal)
-3,200,328	980,843	-2,219,485	Copper/Zinc and compounds (land)
-64,015	-1,142,574	-1,206,589	Chromium (transfers to disposal)
-3,309,475	**-4,994,850**	**-8,304,324**	

Table 7–9
M 1996

NPRI and TRI Facilities with Increases greater than 1,000,000 kg in Total Releases and Transfers of ARET Chemicals

Facility	City, State/Province	SIC Codes		Number of Forms		Total Releases and Transfers	
		Canada	US	1995	1996	1995 (kg)	1996 (kg)
NPRI Facilities							
Lake Erie Steel Company Ltd.	Nanticoke, ON	29	33	6	6	113,183	1,236,341
Gerdau MRM Steel Inc.	Selkirk, MB	29	33	2	3	634,000	1,736,707
Stelco McMaster Ltée	Contrecoeur, QC	29	33	4	4	1,707,300	2,711,930
NPRI Total				**12**	**13**	**2,454,483**	**5,684,978**
TRI Facilities							
Cyprus Miami Mining, Cyprus Amax Minerals Co.	Claypool, AZ		33	4	10	4,873,577	11,063,340
Ameristeel Corp., Jacksonville Mill Div.	Baldwin, FL		33	*	5	*	3,322,329
Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	5	5	4,879,654	7,328,427
BHP Copper Metals Co., BHP Copper Co.	San Manuel, AZ		33	8	6	213,584	2,562,848
USS Mon Valley Works Edgar Thomson Plant, USX Corp.	Braddock, PA		33	4	5	947,807	2,934,154
Steel Dynamics Inc.	Butler, IN		33	1	3	6,117	1,984,614
Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	6	5	66,732	2,037,094
ASARCO Inc.	East Helena, MT		33	7	7	16,820,323	18,573,178
Kennecott Utah Copper, Kennecott Holdings Corp.	Magna, UT		33	8	8	2,790,024	4,501,491
Nucor Steel, Nucor Corp.	Plymouth, UT		33	5	6	159,261	1,759,251
Nucor Steel, Nucor Corp.	Darlington, SC		33	6	6	51,155	1,581,570
Ameristeel Corp.	Jackson, TN		33	6	6	22,486	1,491,734
Ameristeel Corp.	Charlotte, NC		33	5	5	19,257	1,393,583
American Insulated Wire, Leviton Mfg. Co. Inc.	Attleboro, MA		33	4	4	9,849	1,083,329
ASARCO Inc., Glover Plant	Annapolis, MO		33	6	6	2,959,545	4,030,233
TRI Total				**75**	**87**	**33,819,371**	**65,647,175**

* Indicates facility did not report any ARET chemicals in the matched set that year.

** Chemicals accounting for more than 70% of the increase in total releases and transfers from the facility.

➤ Thomson Consumer Electronics, Dunmore, PA, reported 6.8 million kg of transfers to disposal of lead compounds for 1996 in error. This facility has been omitted from this table.

Change 1995–1996			
Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers with Increases)**
-43,242	1,166,400	1,123,158	Zinc and compounds (transfers to disposal)
1,102,707	0	1,102,707	Zinc and compounds (land)
7,330	997,300	1,004,630	Zinc and compounds (transfers to treatment)
1,066,795	**2,163,700**	**3,230,495**	
6,189,763	0	6,189,763	Copper/Zinc and compounds (land)
8,194	3,314,135	3,322,329	Zinc and compounds (transfers to disposal, treatment)
-8,763	2,457,537	2,448,773	Zinc and compounds (transfers to disposal)
2,357,428	-8,165	2,349,264	Copper and compounds (air)
-24,705	2,011,052	1,986,347	Zinc and compounds (transfers to disposal)
1,371	1,977,126	1,978,497	Zinc and compounds (transfers to disposal)
-18,846	1,989,209	1,970,362	Zinc and compounds (transfers to treatment)
1,753,021	-165	1,752,855	Zinc and compounds (land)
1,535,119	176,352	1,711,467	Copper and compounds (land)
-5,659	1,605,650	1,599,990	Zinc and compounds (transfers to treatment)
13,446	1,516,969	1,530,415	Zinc and compounds (transfers to disposal)
-10,733	1,479,981	1,469,248	Zinc and compounds (transfers to treatment)
-407	1,374,733	1,374,326	Zinc and compounds (transfers to treatment)
757	1,072,723	1,073,480	Copper and compounds (transfers to disposal)
1,070,688	0	1,070,688	Lead/Zinc and compounds (land)
12,860,674	**18,967,137**	**31,827,804**	

Table 7–10
M 1996

NPRI and TRI Releases and Transfers of 33/50 Chemicals

	NPRI				TRI			
	1995 Number	1996 Number	Change 1995–1996 Number	Change 1995–1996 %	1995 Number	1996 Number	Change 1995–1996 Number	Change 1995–1996 %
Total Facilities	685	701	16	2.3	11,047	10,619	-428	-3.9
Total Forms	1,303	1,330	27	2.1	20,930	19,885	-1,045	-5.0
	kg	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**
Total Air Emissions	25,465,438	23,074,590	-2,390,848	-9.4	207,131,867	179,393,979	-27,737,888	-13.4
Surface Water Discharges	117,675	100,077	-17,598	-15.0	441,596	707,857	266,261	60.3
Underground Injection	983,756	1,174,990	191,234	19.4	3,598,787	2,905,671	-693,116	-19.3
On-site Land Releases	1,320,638	1,441,700	121,062	9.2	18,455,388	21,605,101	3,149,713	17.1
Matched Releases	**27,937,854**	**25,836,445**	**-2,101,409**	**-7.5**	**229,628,036**	**204,612,608**	**-25,015,428**	**-10.9**
Treatment/Destruction	4,516,132	5,871,699	1,355,567	30.0	35,027,952	35,321,835	293,883	0.8
Sewage/POTWs	16,539	28,537	11,998	72.5	2,260,850	2,013,759	-247,091	-10.9
Disposal/Containment	3,892,145	4,087,630	195,485	5.0	24,759,833	24,433,752	-326,081	-1.3
Matched Transfers	**8,424,812**	**9,987,861**	**1,563,049**	**18.6**	**62,049,387**	**61,769,346**	**-280,041**	**-0.5**
Matched Releases and Transfers	**36,362,666**	**35,824,306**	**-538,360**	**-1.5**	**291,677,423**	**266,381,954**	**-25,295,469**	**-8.7**

Table 7–11
M 1996

NPRI and TRI Facilities with Decreases greater than 750,000 kg in Total Releases and Transfers of 33/50 Chemicals

Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms 1995	Number of Forms 1996	Total Releases and Transfers 1995 (kg)	Total Releases and Transfers 1996 (kg)
NPRI Facility							
Les Papiers Perkins Ltée	Candiac, QC	27	26	1	*	793,700	*
TRI Facilities							
Georgia-Pacific Resins Inc., Georgia-Pacific Corp.	Elk Grove, CA		28	3	4	2,558,539	38
Zinc Corp. of America, Horsehead Industries Inc.	Monaca, PA		33	5	5	2,610,601	1,276,498
Electralloy Corp., G.O. Carlson Inc.	Oil City, PA		33	2	2	1,315,953	107,049
Reynolds Metals Co.	Sheffield, AL		34	5	5	1,116,759	212,186
DuPont	Louisville, KY		28	5	4	901,878	7,233
Avesta Sheffield Plate Inc., Avesta Sheffield N.A.	New Castle, IN		33	2	2	801,049	226
American Steel Foundries, Amsted Ind. Inc.	Alliance, OH		33	2	4	1,158,086	384,648
Allegheny Ludlum Corp.	Brackenridge, PA		33	3	3	1,030,839	265,396
Goodyear Tire & Rubber Co.	Lincoln, NE		30	2	2	1,024,898	263,157
TRI Total				**29**	**31**	**12,518,602**	**2,516,431**

* Indicates facility did not report any 33/50 chemicals that year.
** Chemicals accounting for more than 70% of the decrease in total releases and transfers from the facility.

Table 7–12
M 1996

NPRI and TRI Facilities with Increases greater than 750,000 kg in Total Releases and Transfers of 33/50 Chemicals

Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms 1995	Number of Forms 1996	Total Releases and Transfers 1995 (kg)	Total Releases and Transfers 1996 (kg)
NPRI Facility							
Aimco Soltec Ltd.	Milton, ON	37	28	*	4	*	1,932,275
TRI Facilities							
Xerox Corp.	Webster, NY		38	4	4	43,906	907,356
American Chrome & Chemicals, Harrisons & Crossfield	Corpus Christi, TX		28	1	1	4,306,440	5,154,065
ASARCO Inc., Ray Complex/Hayden Smelter	Hayden, AZ		33	3	3	1,979,573	2,799,645
Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC		28	1	1	3,315,098	4,089,291
DuPont Dow Elastomers LLC	Louisville, KY		28	*	3	*	765,830
TRI Total				**9**	**12**	**9,645,017**	**13,716,187**

* Indicates facility did not report any 33/50 chemicals that year.
** Chemicals accounting for more than 70% of the increase in total releases and transfers from the facility.
➤ Thomson Consumer Electronics, Dunmore, PA, reported 6.8 million kg of transfers to disposal of lead compounds for 1996 in error. This facility has been omitted from this table.

Change 1995–1996			
Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers with Decreases)**
-793,700	0	-793,700	Xylene (air)
-44	-2,558,457	-2,558,501	Xylene (transfers to treatment)
180	-1,334,284	-1,334,103	Lead and compounds (transfers to disposal)
-63,765	-1,145,139	-1,208,904	Chromium and compounds (transfers to disposal)
-901,950	-2,623	-904,573	Methyl ethyl ketone, Toluene (air)
-28,926	-865,719	-894,645	Toluene (transfers to treatment)
0	-800,823	-800,823	Chromium and compounds (transfers to treatment)
-34,793	-738,645	-773,438	Chromium and compounds (transfers to disposal)
-16,623	-748,820	-765,443	Nickel/Lead and compounds (transfers to disposal)
-761,752	10	-761,741	Toluene (air)
-1,807,673	**-8,194,500**	**-10,002,171**	

Change 1995–1996			
Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers with Increases)**
31,988	1,900,287	1,932,275	Xylene, Toluene (transfers to treatment)
-19,331	882,783	863,450	Dichloromethane (transfers to disposal)
861,322	-13,697	847,625	Chromium and compounds (land)
-267,821	1,087,893	820,072	Lead and compounds (transfers to treatment)
771,381	2,812	774,193	Chromium and compounds (land)
30,256	735,574	765,830	Toluene (transfers to treatment)
1,375,807	**2,695,365**	**4,071,170**	

7.4 Geographic and Demographic Data

Information about releases and transfers reported to PRTRs can be linked with other kinds of data to support more wide-ranging analyses. Land area and population, for example, can be used to complement PRTR data. Detailed data are available in both fields—geography and demography—to enable more refined analyses, such as tracking ecological trends, estimating potential human and environmental risks, or prioritizing prevention and treatment plans.

Although Canada and the United States cover roughly equivalent land areas, the United States had nearly 10 times the population of Canada in 1996. The almost 19,200 facilities reporting to TRI in the matched data set represented half again as many facilities per person in the United States (72 facilities per 1 million population) as the more than 1,300 facilities in NPRI (45 facilities per 1 million population). However, releases and transfers reported in the two countries in 1996 represented comparable ratios to their populations: 4.14 kg per person in Canada and 4.15 kg per person in the United States (**Table 7–13**, p. 301).

Total releases and transfers in Canada averaged 12 kg per square kilometer, countrywide, in 1996. In the United States, total releases and transfers averaged 10 times that amount, 118 kg per square kilometer. Much more of the Canadian surface area of 10 million square kilometers remains sparsely populated than is the case across the United States' 9 million square kilometers. In the matched data set, no facilities reported in Canada's Yukon or Northwest Territories. As will be evident in the analyses presented in **Chapter 8**, most NPRI facilities are clustered in the more industrialized border regions, especially around the Great Lakes.

National data do little to suggest the density of human populations or the proximity of ecological systems near industrial facilities. Canadian census divisions and US counties offer the opportunity to examine PRTR data on a more localized basis than that afforded by the continent-wide, national, and state or provincial views presented elsewhere in *Taking Stock 1996*. Canada's 288 census divisions represent counties, regional districts, regional municipalities and united counties, and are designated by provincial law or, in the absence of provincial action, by Statistics Canada. Quebec has the most census divisions (99), while Prince Edward Island has only three and the Yukon, just one. The United States, on the other hand, is composed of 3,141 counties or county equivalents, including the District of Columbia. Texas has the most, with 254 (100 more than any other US state), while Delaware has the least, with three. The matched data set includes data from facilities in 197 Canadian census divisions and 2,195 US counties.

Canadian Census Divisions

More facilities in the matched data set reported in Ontario's Toronto Metropolitan Municipality (129 facilities) than in any other Canadian census division. The Montreal Urban Community in the province of Quebec ranked second with 91 facilities. Peel Regional Municipality in Ontario had the third-largest number of reporting facilities (85 facilities, see **Table 7–14**, p. 301 and **Map 7–1**).

Facilities in the Durham Regional Municipality, which lies east of Toronto in the province of Ontario, reported total releases and transfers of 12 million kg, the largest amount among census divisions. Off-site transfers represented about two-thirds of the Durham total. In Alberta's Division No. 11 (the Edmonton area), ranking second with 10 million kg, and Ontario's Lambton County (the Windsor area), ranking third with 8 million kg, most of the total consisted of releases (**Table 7–15**, p. 302 and **Map 7–2**).

United States Counties

A total of 481 facilities reported in Cook County, Illinois, which includes the city of Chicago, making this the US county with the largest number of facilities. California's Los Angeles County ranked second with 403 (**Table 7–16**, p. 303 and **Map 7–1**).

Harris County in Texas (which includes the city of Houston) had the third-largest number of facilities (254) and was the county with the United States' largest total releases and transfers. The 40 million kg reported in Harris County consisted equally of releases and transfers. Other counties with large releases and transfers included Tooele County in Utah, which ranked second with 30 million kg (entirely in releases), and Lewis and Clark County in Montana, which ranked third with 20 million kg (almost entirely in releases, see **Table 7–17**, p. 304 and **Map 7–2**).

[Text continues on p. 304.]

Map 7–1
M 1996

Canadian Census Divisions and US Counties with Largest Number of Facilities

Map 7–2
M 1996

Canadian Census Divisions and US Counties with Largest Total Releases and Transfers

Table 7–13
M 1996

Population and Land Area of Canada and United States

	1996 Population Number	Land Area (sq km)	Number of PRTR Facilities	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Facilities per Person	Total Releases per Person (kg)	Total Transfers per Person (kg)	Total Releases and Transfers per Person (kg)	Total Releases and Transfers per Sq Km (kg)
Canada	29,959,000	9,976,000	1,344	82,596,460	41,532,687	124,129,147	0.000045	2.76	1.39	4.14	12
United States	265,179,000	9,373,000	19,190	780,621,952	321,079,591	1,101,701,543	0.000072	2.94	1.21	4.15	118

➤ Land Area from "1997 Canada at a Glance," Statistics Canada
Other Canada data from data provided by Statistics Canada, September 1998.
Other United States data from US Census Bureau, extracted from <www.census.gov>, 22 June 1998.

Table 7–14
M 1996

The Canadian Census Divisions with the Largest Number of Facilities

Census Division	Province	Population Number	Land Area (sq km)	Number of Facilities	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)
Toronto Metropolitan Municipality	Ontario	2,385,421	630	129	317	2,945,753	921,849	3,867,602
Communauté-Urbaine-de-Montréal	Quebec	1,775,846	494	91	262	2,540,377	1,496,527	4,036,904
Peel Regional Municipality	Ontario	852,526	1,225	85	272	2,684,710	1,229,510	3,914,220
York Regional Municipality	Ontario	592,445	1,756	56	162	1,388,395	125,766	1,514,161
Division No. 11 (Edmonton)	Alberta	898,888	15,890	46	238	9,875,823	428,387	10,304,210
Halton Regional Municipality	Ontario	339,875	959	42	150	1,221,058	2,428,752	3,649,810
Waterloo Regional Municipality	Ontario	405,435	1,360	38	113	1,370,572	941,028	2,311,600
Greater Vancouver Regional District	British Columbia	1,831,665	2,821	36	120	326,255	494,004	820,259
Niagara Regional Municipality	Ontario	403,504	1,851	34	94	374,224	848,551	1,222,775
Hamilton-Wentworth Regional Municipality	Ontario	467,799	1,113	33	127	1,070,754	5,317,529	6,388,283
Essex County	Ontario	350,329	1,861	29	101	764,143	1,760,791	2,524,934
Durham Regional Municipality	Ontario	458,616	2,490	27	114	3,988,189	8,186,771	12,174,960
Division No. 11 (Winnipeg)	Manitoba	620,064	572	23	49	410,215	157,650	567,865
Wellington County	Ontario	171,395	2,659	21	69	225,593	521,217	746,810
Simcoe County	Ontario	329,865	4,842	20	91	698,042	286,066	984,108
Division No. 6 (Calgary)	Alberta	880,859	12,423	19	45	211,897	45,982	257,879
Lambton County	Ontario	128,975	2,998	17	167	6,785,462	882,622	7,668,084
Lajemmerais	Quebec	95,618	414	17	65	3,429,502	3,967,656	7,397,158
Middlesex County	Ontario	389,616	3,357	16	52	354,169	91,152	445,321
Brant County	Ontario	114,564	1,091	16	55	379,653	59,395	439,048
Subtotal		**13,493,305**	**60,806**	**795**	**2,663**	**41,044,786**	**30,191,205**	**71,235,991**
% of Total		**45.0**	**0.6**	**59.2**	**62.0**	**49.7**	**72.7**	**57.4**
Total		**29,959,000**	**9,976,000**	**1,344**	**4,298**	**82,596,460**	**41,532,687**	**124,129,147**

Table 7–15

M 1996

The Canadian Census Divisions with the Largest Total Releases and Transfers

Census Division	Province	Population Number	Land Area (sq km)	Number of Facilities	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)
Durham Regional Municipality	Ontario	458,616	2,490	27	114	3,988,189	8,186,771	12,174,960
Division No. 11 (Edmonton)	Alberta	898,888	15,890	46	238	9,875,823	428,387	10,304,210
Lambton County	Ontario	128,975	2,998	17	167	6,785,462	882,622	7,668,084
Lajemmerais	Quebec	95,618	414	17	65	3,429,502	3,967,656	7,397,158
Hamilton-Wentworth Regional Municipality	Ontario	467,799	1,113	33	127	1,070,754	5,317,529	6,388,283
Sudbury Regional Municipality	Ontario	164,049	2,607	3	18	4,882,252	0	4,882,252
Haldimand-Norfolk Regional Municipality	Ontario	102,575	2,911	10	54	811,136	3,819,014	4,630,150
Communauté-Urbaine-de-Montréal	Quebec	1,775,846	494	91	262	2,540,377	1,496,527	4,036,904
Peel Regional Municipality	Ontario	852,526	1,225	85	272	2,684,710	1,229,510	3,914,220
Toronto Metropolitan Municipality	Ontario	2,385,421	630	129	317	2,945,753	921,849	3,867,602
Halton Regional Municipality	Ontario	339,875	959	42	150	1,221,058	2,428,752	3,649,810
Essex County	Ontario	350,329	1,861	29	101	764,143	1,760,791	2,524,934
Waterloo Regional Municipality	Ontario	405,435	1,360	38	113	1,370,572	941,028	2,311,600
Saint John County	New Brunswick	79,302	1,559	5	21	2,216,434	1,120	2,217,554
Division No. 13 (Selkirk)	Manitoba	39,422	1,644	1	5	2,031,067	0	2,031,067
Stormont	Ontario	111,301	3,302	14	42	1,881,820	111,875	1,993,695
Division No. 1 (Medicine Hat)	Alberta	62,330	20,532	5	12	1,848,914	6,032	1,854,946
Madawaska County	New Brunswick	36,814	3,422	1	9	174,150	1,549,150	1,723,300
Thunder Bay District	Ontario	157,619	109,564	10	32	1,627,235	1,556	1,628,791
Prescott and Russell United Counties	Ontario	74,013	2,003	1	7	11,020	1,559,360	1,570,380
Subtotal		**8,986,753**	**176,978**	**604**	**2,126**	**52,160,371**	**34,609,529**	**86,769,900**
% of Total		**30.0**	**1.8**	**44.9**	**49.5**	**63.2**	**83.3**	**69.9**
Total		**29,959,000**	**9,976,000**	**1,344**	**4,298**	**82,596,460**	**41,532,687**	**124,129,147**

Table 7–16
M 1996

The US Counties with the Largest Number of Facilities

County	State	Population Number	Land Area (sq km)	Number of Facilities	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)
Cook	Illinois	5,085,770	2,449	481	1,382	5,347,033	4,596,772	9,943,805
Los Angeles	California	9,083,596	10,515	403	1,138	3,005,013	4,128,620	7,133,633
Harris	Texas	3,114,799	4,478	254	1,444	19,855,220	19,986,360	39,841,580
Cuyahoga	Ohio	1,397,311	1,187	201	565	1,948,232	2,548,266	4,496,498
Orange	California	2,619,358	2,045	140	308	886,578	453,427	1,340,005
Wayne	Michigan	2,137,302	1,591	138	582	3,263,171	13,798,098	17,061,269
Milwaukee	Wisconsin	918,238	626	138	399	618,201	2,288,921	2,907,122
Dallas	Texas	1,994,222	2,279	116	285	731,181	366,497	1,097,678
Maricopa	Arizona	2,613,409	23,839	113	243	463,781	1,038,057	1,501,838
Hennepin	Minnesota	1,053,490	1,442	97	204	770,668	137,723	908,391
Elkhart	Indiana	168,811	1,201	96	200	2,439,317	158,232	2,597,549
Hamilton	Ohio	855,800	1,055	95	290	875,999	3,587,690	4,463,689
Middlesex	New Jersey	701,587	805	92	352	1,054,296	3,790,684	4,844,980
Santa Clara	California	1,588,282	3,344	91	183	468,514	704,049	1,172,563
Providence	Rhode Island	576,558	1,070	91	203	511,584	260,698	772,282
Middlesex	Massachusetts	1,410,044	2,133	89	222	505,116	810,278	1,315,394
Tarrant	Texas	1,300,157	2,237	86	216	673,253	231,959	905,212
Worcester	Massachusetts	718,847	3,919	85	209	250,319	1,123,658	1,373,977
Marion	Indiana	814,854	1,027	84	253	374,997	2,952,028	3,327,025
New Haven	Connecticut	792,420	1,569	84	245	887,311	535,428	1,422,739
Subtotal		**38,944,855**	**68,811**	**2,974**	**8,923**	**44,929,784**	**63,497,445**	**108,427,229**
% of Total		**14.7**	**0.7**	**15.5**	**15.4**	**5.8**	**19.8**	**9.8**
Total		**265,179,000**	**9,373,000**	**19,190**	**57,927**	**780,621,952**	**321,079,591**	**1,101,701,543**

Table 7–17
M 1996

The US Counties with the Largest Total Releases and Transfers

County	State	Population Number	Land Area (sq km)	Number of Facilities	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)
Harris	Texas	3,114,799	4,478	254	1,444	19,855,220	19,986,360	39,841,580
Tooele	Utah	30,144	17,990	2	8	29,619,647	0	29,619,647
Lewis and Clark	Montana	53,262	8,964	3	16	20,172,918	241	20,173,159
Gila	Arizona	47,357	12,349	3	25	16,532,980	3,033,535	19,566,515
Wayne	Michigan	2,137,302	1,591	138	582	3,263,171	13,798,098	17,061,269
Ascension	Louisiana	67,778	755	18	182	16,337,883	482,509	16,820,392
Mobile	Alabama	396,573	3,194	37	192	15,202,602	548,858	15,751,460
Jefferson	Texas	242,664	2,340	41	355	13,558,210	779,287	14,337,497
Beaver	Pennsylvania	186,690	1,127	28	130	778,095	11,899,263	12,677,358
Brazoria	Texas	220,410	3,592	22	200	11,616,555	438,507	12,055,062
Jefferson	Louisiana	453,517	792	22	93	11,394,182	21,770	11,415,952
Cook	Illinois	5,085,770	2,449	481	1,382	5,347,033	4,596,772	9,943,805
Hamblen	Tennessee	53,280	417	19	47	9,303,124	100,010	9,403,134
Victoria	Texas	81,624	2,286	4	35	8,816,001	479,943	9,295,944
Escambia	Florida	277,615	1,719	11	62	8,383,937	903,164	9,287,101
Galveston	Texas	240,213	1,033	12	206	6,567,984	2,491,968	9,059,952
Washington	Ohio	63,808	1,645	13	62	6,377,464	1,614,717	7,992,181
Montgomery	Indiana	36,213	1,307	7	28	171,335	7,696,703	7,868,038
Butler	Pennsylvania	167,442	2,042	28	92	7,241,573	172,092	7,413,665
Hopewell City	Virginia	22,234	27	7	41	1,540,526	5,745,229	7,285,755
Subtotal		**12,978,695**	**70,097**	**1,150**	**5,182**	**212,080,440**	**74,789,026**	**286,869,466**
% of Total		**4.9**	**0.7**	**6.0**	**8.9**	**27.2**	**23.3**	**26.0**
Total		**265,179,000**	**9,373,000**	**19,190**	**57,927**	**780,621,952**	**321,079,591**	**1,101,701,543**

7.5 Data Specific to NPRI or to TRI

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. NPRI also breaks 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. (Many facilities also offer explanations of changes in NPRI's voluntary comment option, cited throughout **Chapter 6** of this report.) 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 "Source Reduction Activity," in **Section 7.5.2**, below). Neither sort of information is specifically collected by NPRI.

With the 1996 reporting year, NPRI began requiring facilities to specify the amount transferred to each off-site location, rather than a total amount covering one or more such destinations. This resolves a previous difference between the two databases and, as will be seen in **Chapter 8**, enhances the analysis of cross-border transfers.

7.5.1 Additional Data in NPRI

Other Industrial Sectors Required to Report to NPRI: Sewage Treatment Plants

With a few exceptions, NPRI requires all facilities that use its listed substances to report, while only manufacturing and federal facilities report to TRI. Thus, non-manufacturing facilities in NPRI are not included in the matched data set. Such facilities can be a significant source of releases and transfers. A case in point is provided by a consideration of releases to surface waters by public sewage treatment facilities in the Great Lakes region.

Releases to any environmental medium may adversely affect the quality of surface waters in a region. In many cases, for example, water quality problems can be traced back to the deposition of chemicals originally released to the air, sometimes following atmospheric transport of those chemicals over hundreds, if not thousands, of miles, as discussed in the Commission for Environmental Cooperation's *Continental Pollutant Pathways: An Agenda for Cooperation to Address Long-Range Transport of Air Pollution in North America*. Nevertheless, one index of stress on a watershed is the number and magnitude of direct discharges to surface waters within that watershed.

A review of facilities that discharge directly to surface waters in the vicinity of the Great Lakes illustrates some of the additional data collected by NPRI that can be used to assess potential water quality impacts. The 1996 matched data set for NPRI and TRI contains 320 manufacturing facilities, located within 100 kilometers of the Great Lakes, that report discharges to surface waters. Of these, 272 were in the eight US states that border the Great Lakes, and 48 were in the province of Ontario.

NPRI data, unlike TRI, include releases from publicly owned sewage treatment works (POTWs). Only those sewage treatment plants meeting reporting and employee thresholds report to NPRI. There were 28 such facilities reporting for 1996 in Ontario within 100 kilometers of the border, increasing the number of NPRI facilities to 76 (a 58 percent increase).

Sewage treatment plants do not report their releases to TRI. The locations of such facilities, however, are available from the US Permit Compliance System (PCS), used to track potential violations of conditions on permitted discharges to surface waters. A review of this system indicates that more than 2,000 facilities with permits for surface water discharges lie within 100 kilometers of the Great Lakes. Some may be included among the 272 TRI facilities noted above but, at a minimum, nearly 1,800 facilities with surface water discharges are not reporting data to TRI. (Precise matching of facilities across US databases requires considerable effort and leaves considerable uncertainty. In addition to non-manufacturing facilities, PCS includes facilities discharging substances not on the TRI list and facilities that do not reach the TRI reporting thresholds.)

In five Great Lakes states, the PCS facilities included 353 specifically designated as wastewater or sewage treatment plants: 63 facilities in Illinois, 31 in Indiana, 129 in Michigan, 127 in New York and 3 in Pennsylvania. In these five states alone, the number of POTWs within 100 kilometers of the Great Lakes exceeded the population of TRI facilities by 30 percent.

In the three remaining Great Lakes states, PCS facilities included 77 municipal facilities. Most are likely to be POTWs, although they may also represent drinking water supply utilities (in many US localities, a single authority undertakes both water supply and sewage treatment): six facilities in Minnesota, 14 in Ohio and 57 in Wisconsin.

Thus, the estimated total of 430 sewage treatment plants in US states bordering the Great Lakes outnumbers TRI facilities by three to two (**Maps 7–3** and **7–4**).

Although the United States' PCS does not provide amounts of discharges, Canada's NPRI does. The 28 Ontario sewage treatment plants discharged 90,600 kg of chlorine and 363,360 kg of nitric acid and nitrate compounds to surface waters within 100 kilometers of the Great Lakes. The NPRI manufacturing facilities in the matched data set in the Great Lakes region released 1,023 kg of chlorine and 84,000 kg of nitric acid and nitrate compounds to surface waters. Thus, sewage treatment plants were releasing 90 times the amount of chlorine and four times the amount of nitric acid and nitrate compounds of the NPRI manufacturing facilities (**Table 7–18**).

[Text continues on p. 308.]

Table 7–18
M 1996

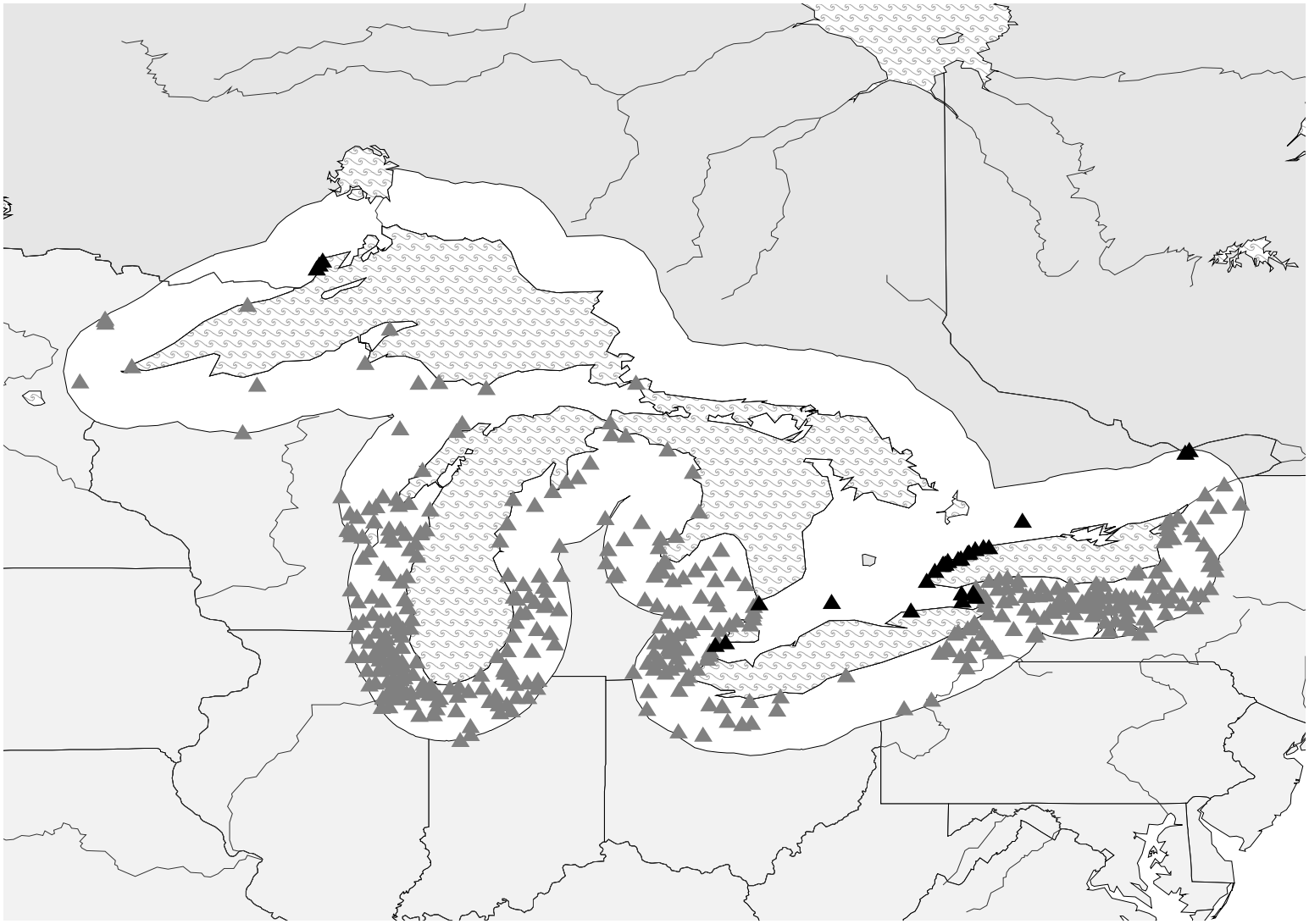
Manufacturing Facilities in the Great Lakes Region Reporting Surface Water Discharges and Sewage Treatment Plants

		Surface Water Discharges	
	Number of Facilities	Chlorine (kg)	Nitric Acid and Nitrate Compounds (kg)
NPRI Manufacturing Facilities	48	1,023	84,000
NPRI Sewage Treatment Plants	28	90,600	363,360
Total for NPRI	**76**	**91,623**	**447,360**
TRI Manufacturing Facilities	272	22,324	2,095,379
US Sewage Treatment Plants*	430	Unknown	Unknown
Total for United States	**702**	**Unknown**	**Unknown**

* Facilities found in US Permit Compliance System database.

Map 7–3
M 1996

Canadian and US Wastewater Treatment Plants within 100 kilometers of the Great Lakes

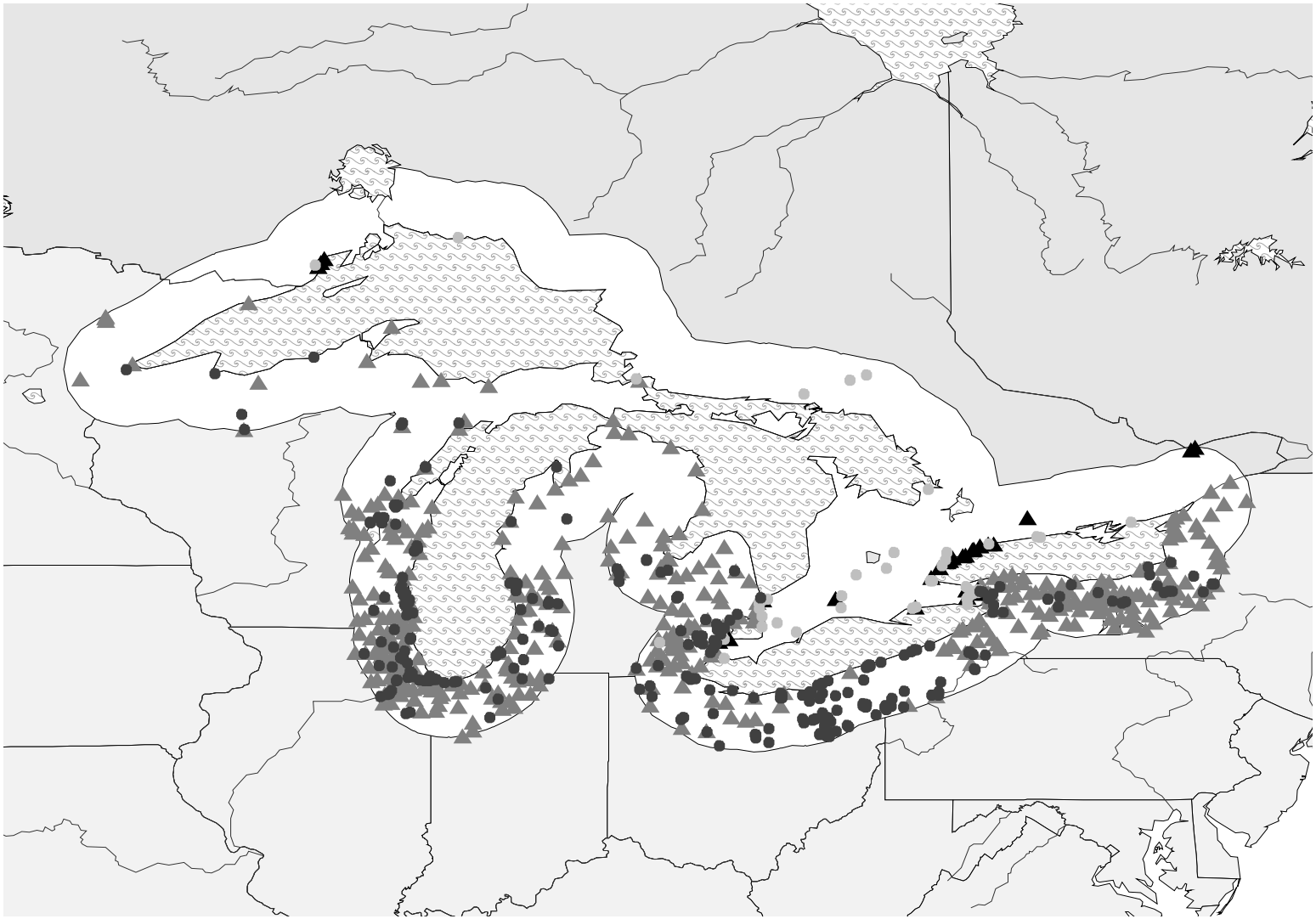


▲ Canadian wastewater treatment plants (in NPRI)

▲ US wastewater treatment plants (in PCS)

Map 7–4
M 1996

Canadian and US Manufacturing Facilities and Wastewater Treatment Plants within 100 kilometers of the Great Lakes



- Canadian wastewater treatment plants (in NPRI)
- Canadian manufacturing facilities (in NPRI)
- US wastewater treatment plants (in PCS)
- US manufacturing facilities (in PCS)

TRI Industry Expansion

In reporting year 1998, seven non-manufacturing industries will begin reporting to TRI for the first time: metal mining facilities, coal mining, oil- and coal-fired power plants, hazardous waste treatment facilities, chemical distributors, petroleum bulk storage facilities and solvent recovery services. These industries already report to NPRI, and the expansion of TRI's coverage will increase the comparability of the two PRTRs.

NPRI data for these industries offer some perspective on the value of the information to be gained from this expansion. The proportion of total releases and transfers that these industries will represent in TRI will undoubtedly differ from their proportion in NPRI, as is true of the manufacturing industries that now report in both PRTRs. However, NPRI data from facilities in these industries can suggest the extent to which the expansion will add to TRI's information base.

In 1996, a total of 109 facilities in these industries reported on matched chemicals to NPRI. Their releases and transfers totaled 7 million kg. Currently excluded from the matched data set, these facilities would represent, in NPRI, an 8 percent expansion of matched facilities and a 6 percent expansion of matched releases and transfers if the subject industries had been covered in both PRTRs in 1996 (**Table 7–19**, pp. 310–11).

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).

More than half of the 1996 forms (3,144 forms) indicated no significant change in releases since 1995, although they represented relatively small amounts. A total of 834 forms cited only "other" changes to explain the changes in their releases from 1995 to 1996. Their releases decreased by a greater percentage—32 percent—than any other group (**Table 7–20**, p. 312).

For transfers, no significant change was reported on two-thirds of the forms (3,880 forms). The 747 forms that attributed changes in transfers only to "other" reasons represented the bulk of the transfers reported. Their transfers increased by 17 percent from 1995 to 1996. The 710 forms that cited only production-level changes had a net increase of 29 percent (**Table 7–21**, p. 313).

An NPRI form may indicate one or more reasons for change. Generally, forms that cited production-level changes (whether alone or with other reasons) to explain their increases or decreases from 1995 reported somewhat higher releases (nearly 4 percent) and much higher transfers (25 percent). The group identifying the use of different estimation methods to explain changes in releases netted essentially no change (a 0.2 percent reduction). Those that identified changes in estimation methods to explain changes in transfers reported a larger percentage reduction (17 percent). Where "other" changes were cited—alone or with other reasons—releases decreased 28 percent. Similar forms for transfers, citing "other reasons" alone or in combination, showed a 14 percent increase (**Tables 7–20**, p. 312 and **7–21**, p. 313).

7.5.2 Additional Data in TRI

Waste Management Categories

Since 1991, TRI facilities have 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 the amount of the substance in production-related waste is included in these categories; any waste 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. In 1996, these releases and transfers—as covered in other parts of the TRI form and reported in similar categories to NPRI—represented 13 percent of all production-related waste reported to TRI. The largest portions of production-related waste were the amount of TRI chemicals in waste recycled and treated on-site, neither of which is reported to NPRI. On-site recycling accounted for 34 percent of the total waste reported to TRI in 1996, and on-site treatment for another 31 percent. Off-site recycling and energy recovery—optionally reported to NPRI—together amounted to 12 percent of TRI production-related waste (**Table 7–22**, p. 314).

Year-to-Year Change

TRI also takes a different approach from NPRI's 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 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, then energy recovery, then treatment, and finally releases and disposal as least desirable.

Changes that TRI facilities projected from 1996 to 1998 show that the quantity released or disposed of was expected to decrease as a percentage of total production-related waste (from 10 percent to 9 percent), while recycling on- and off-site increased (from 43 percent to 44 percent, see **Table 7–22**, p. 314). Although the projected increments are small, they represent progress consistent with the hierarchy of waste management options.

Source Reduction Activity

Although TRI captures actual and projected changes, facilities do not report reasons for these changes. 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 from a list of 43 in eight categories.

While 27 percent of TRI facilities reported some source reduction activity during 1996, only 20 percent of the forms reflected this, as facilities did not necessarily engage in such activities for all chemicals they reported. The most commonly reported activities were improvements in operating practices and process modifications (**Table 7–23**, p. 314).

Facilities also 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 were the methods most often used to identify source reduction opportunities (**Table 7–24**, p. 315).

TRI facilities do not report the results of their source reduction activities—that is, the amounts of waste reduced. However, facilities' projections for total production-related waste can be evaluated for the forms that indicated source reduction activity, compared to those that did not. Projected changes in the various waste management options can also be evaluated between the two groups.

Overall, the projections of production-related waste through 1998 showed little difference between forms indicating source reduction activity in 1996 (a projected increase of 3.1 percent) and forms that did not indicate source reduction activity (a projected increase of 3.5 for change percent, see **Table 7–25**, p. 316).

Year-by-year projections, however, showed considerable differences: Forms that indicated source reduction activity projected no change from 1996 to 1997, compared to a 7 percent increase for forms indicating no source reduction activity. For the following year (1997 to 1998), forms indicating source reduction activity projected an increase of 3.5 percent, while forms indicating no such activity projected a decrease of 3.5 percent (**Figure 7–1**, p. 315).

Among types of waste management, the forms indicating source reduction activity projected releases decreasing, through 1998, at twice the rate of those with no source reduction activity—11 percent versus 5 percent (**Table 7–25**, p. 316).

Table 7–19

M 1996

NPRI Releases and Transfers from Industries Added to TRI Reporting

US SIC Code		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)
10	Metal Mining	61	226	978,377	522,426	2,900,000	26,126	4,432,676
1021	Copper Ores	13	64	279,724	30,689	0	0	311,502
1031	Lead and Zinc Ores	7	37	413,878	252,956	0	6,527	673,361
1041	Gold Ores	28	84	99,701	222,400	2,900,000	5,000	3,229,323
1061	Ferroalloy Ores, except Vanadium	5	25	182,736	16,279	0	2,552	203,837
1081	Metal Mining Services	1	1	810	0	0	0	810
1094	Uranium-Radium-Vanadium Ores	6	14	1,528	102	0	12,047	13,843
1099	Metal Ores, not elsewhere classified	1	1	0	0	0	0	0
12	Coal Mining	1	1	0	0	0	0	0
1221	Bituminous Coal/Lignite Surface Mining	1	1	0	0	0	0	0
4911	Electric Generation, Transmission	29	67	751,019	30,618	0	104,233	885,870
4953	Refuse/Waste Disposal Systems	1	1	0	0	0	0	0
5169	Wholesale Trade of Chemicals	15	171	150,667	0	0	0	161,364
7389	Business Services (Solvent Recovery)	2	37	1,680	0	0	165,297	166,977
	Total in NPRI for TRI Expansion Industries	**109**	**503**	**1,881,743**	**553,044**	**2,900,000**	**295,656**	**5,646,887**
	Total in NPRI for Current TRI Industries/Matched Chemicals	**1,344**	**4,298**	**63,590,706**	**5,128,134**	**4,812,379**	**8,936,491**	**82,596,460**
	TRI Expansion Industries as % of Current TRI Industries, in NPRI	**8.1**	**11.7**	**3.0**	**10.8**	**60.3**	**3.3**	**6.8**

➤ Others on TRI expansion list but with no NPRI reports:
- 4939 Combination Utilities (Electric, Gas, Other)
- 4931 Electric and Other Services Combined
- 5171 Petroleum Bulk Stations and Treminals

Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)
1,000	0	0	1,000	4,433,676
0	0	0	0	311,502
0	0	0	0	673,361
1,000	0	0	1,000	3,230,323
0	0	0	0	203,837
0	0	0	0	810
0	0	0	0	13,843
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
40	0	565,065	565,105	1,450,975
0	0	234,180	234,180	234,180
132,391	0	721	133,112	294,476
0	0	339,000	339,000	505,977
133,431	**0**	**1,138,966**	**1,272,397**	**6,919,284**
13,571,799	**4,943,234**	**23,017,654**	**41,532,687**	**124,129,147**
1.0	**0.0**	**4.9**	**3.1**	**5.6**

Table 7–20
A 1996

Distribution of Reasons for Change in NPRI Releases, for Chemicals Reported in both 1995 and 1996

	Forms		Total Releases		
	Number	%	1995 (kg)	1996 (kg)	Change 1995–1996 (%)
Reason for Change in Releases as Indicated on 1996 Form					
Production Level	1,071	18.4	31,568,766	32,999,595	4.5
Production, Estimate	151	2.6	5,871,211	6,753,139	15.0
Production, Estimate, Other	50	0.9	315,812	221,228	-29.9
Production, Other	83	1.4	7,184,963	6,527,425	-9.2
Estimate	380	6.5	15,125,818	14,097,823	-6.8
Estimate, Other	58	1.0	1,215,271	1,400,426	15.2
Other	834	14.3	53,613,957	36,615,589	-31.7
No Significant Change	3,144	53.9	33,860,834	34,181,827	0.9
Not Applicable (NA)	60	1.0	775,289	707,846	-8.7
Total	**5,831**	**100.0**	**149,531,921**	**133,504,898**	**-10.7**
Reasons for Change Reported at Least Once on 1996 Form*					
Production Level Change	1,355	23.3	44,940,752	46,501,387	3.5
Estimation Method Change	639	11.0	22,528,112	22,472,616	-0.2
Other Change	1,025	17.6	62,330,003	44,764,668	-28.2
Total for Forms Counted*	**2,627**	**45.1**	**114,895,798**	**98,615,225**	**-14.2**
No Change Reported					
No Significant Change	3,144	53.9	33,860,834	34,181,827	0.9
Not Applicable (NA)	60	1.0	775,289	707,846	-8.7
Total for Forms Counted	**3,204**	**54.9**	**34,636,123**	**34,889,673**	**0.7**

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

Table 7–21 A 1996

Distribution of Reasons for Change in NPRI Transfers, for Chemicals Reported in both 1995 and 1996

	Forms		Total Transfers		
	Number	%	1995 (kg)	1996 (kg)	Change 1995–1996 (%)
Reason for Change in Transfers as Indicated on 1996 Form					
Production Level	710	12.2	10,730,480	13,802,962	28.6
Production, Estimate	71	1.2	974,716	842,350	-13.6
Production, Estimate, Other	5	0.1	11,619	11,663	0.4
Production, Other	58	1.0	580,864	724,375	24.7
Estimate	186	3.2	1,378,498	1,414,081	2.6
Estimate, Other	29	0.5	1,630,420	1,049,626	-35.6
Other	747	12.8	24,253,227	28,471,612	17.4
No Significant Change	3,880	66.5	9,526,720	9,652,718	1.3
Not Applicable (NA)	145	2.5	75,346	3,946	-94.8
Total	**5,831**	**100.0**	**49,161,890**	**55,973,333**	**13.9**
Reasons for Change Reported at Least Once on 1996 Form*					
Production Level Change	844	14.5	12,297,679	15,381,350	25.1
Estimation Method Change	291	5.0	3,995,253	3,317,720	-17.0
Other Change	839	14.4	26,476,130	30,257,276	14.3
Total for Forms Counted*	**1,806**	**31.0**	**39,559,824**	**46,316,669**	**17.1**
No Change Reported					
No Significant Change	3,880	66.5	9,526,720	9,652,718	1.3
Not Applicable (NA)	145	2.5	75,346	3,946	-94.8
Total for Forms Counted	**4,025**	**69.0**	**9,602,066**	**9,656,664**	**0.6**

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

Table 7–22
A 1996

Actual and Projected Quantities of TRI Chemicals in Waste, 1996–1998

Waste Management Activity	Actual 1996 (kg)	% of Total	Projected 1997 (kg)	% of Total	1998 (kg)	% of Total
Recycled On-site	3,556,732,491	33.5	4,107,959,291	36.9	3,863,508,833	35.2
Recycled Off-site	1,011,472,794	9.5	970,242,370	8.7	984,748,172	9.0
Energy Recovery On-site	1,252,489,544	11.8	1,285,684,292	11.6	1,282,384,060	11.7
Energy Recovery Off-site	231,414,028	2.2	212,973,980	1.9	211,636,800	1.9
Treated On-site	3,238,032,617	30.5	3,254,582,878	29.2	3,370,141,763	30.7
Total Releases and Transfers	**1,329,514,178**	**12.5**	**1,299,842,390**	**11.7**	**1,250,490,113**	**11.4**
Treated Off-site	234,313,840	2.2	233,158,581	2.1	230,470,242	2.1
Quantity Released/Disposed of	1,095,200,338	10.3	1,066,683,809	9.6	1,020,019,871	9.3
Total Production-related Waste	**10,619,655,652**	**100.0**	**11,131,285,200**	**100.0**	**10,962,909,741**	**100.0**

➤ All amounts are all taken from TRI Form R for 1996.

Table 7–23
A 1996

TRI Facilities and Forms Reporting Source Reduction Activity, by Category

Source Reduction Activity Categories	Facilities Reporting Source Reduction Activity: Number	Facilities Reporting Source Reduction Activity: As % of All Facilities	Forms Reporting Source Reduction Activity*: Number	Forms Reporting Source Reduction Activity*: As % of All TRI Forms
Good Operating Practices	2,652	12.3	6,145	8.6
Inventory Control	582	2.7	1,303	1.8
Spill and Leak Prevention	1,152	5.3	2,944	4.1
Raw Material Modifications	1,453	6.7	2,459	3.4
Process Modifications	2,001	9.3	4,254	6.0
Cleaning and Degreasing	638	3.0	958	1.3
Surface Preparation/Finishing	646	3.0	1,233	1.7
Product Modification	551	2.5	1,025	1.4
Any Source Reduction Activity**	5,899	27.3	13,988	19.6

* 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 source reduction activity.

Table 7–24
A 1996

TRI Source Reduction Activity Reporting

Source Reduction Activity Categories	Number of Occurrences* Number	As % of All Occurrences
Good Operating Practices	11,603	30.7
Inventory Control	2,622	6.9
Spill and Leak Prevention	5,862	15.5
Raw Material Modifications	4,117	10.9
Process Modifications	7,566	20.0
Cleaning and Degreasing	1,845	4.9
Surface Preparation/Finishing	2,506	6.6
Product Modifications	1,722	4.6
Total	**37,843**	**100.0**

Methods Used to Identify Source Reduction Activity	Number of Occurrences* Number	As % of All Occurrences
Pollution Prevention Opportunity Audit		
Internal	8,147	21.5
External	862	2.3
Materials Balance Audits	3,051	8.1
Participative Team Management	10,917	28.8
Employee Recommendation		
Informal	3,586	9.5
Formal	1,861	4.9
State Program	242	0.6
Federal Program	40	0.1
Trade/Industry Program	979	2.6
Vendor Assistance	4,358	11.5
Other	3,800	10.0
Total	**37,843**	**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.

Figure 7–1
A 1996

TRI Source Reduction Activity Reporting and Projected Change in Chemicals in Waste

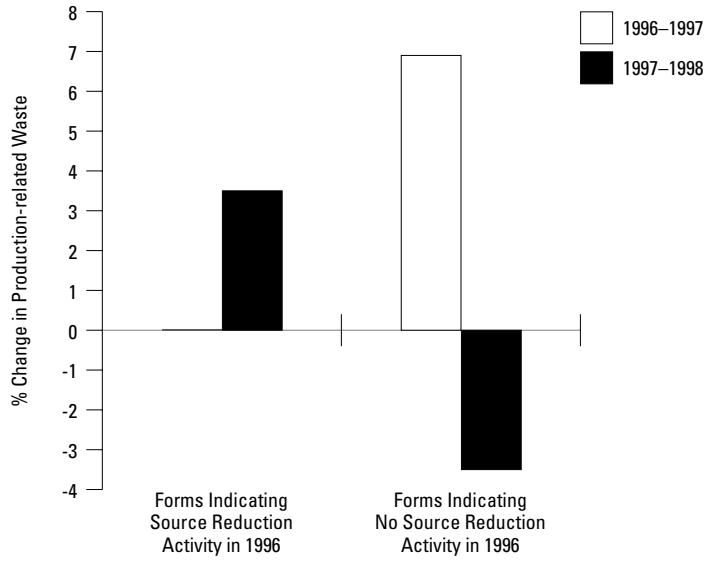


Table 7–25
A 1996

Actual and Projected Quantities of TRI Chemicals in Waste for Forms with and without Source Reduction Activity Reported, 1996–1998

Type of Waste Management	Actual 1996 (kg)	Projected 1997 (kg)	Projected 1998 (kg)	Projected Change 1996–1997 (%)	Projected Change 1997–1998 (%)	Projected Change 1996–1998 (%)
Forms Indicating Source Reduction Activity in 1996						
Recycled On-site	1,240,537,739	1,286,685,326	1,323,711,823	3.7	2.9	6.7
Recycled Off-site	243,514,670	228,707,231	230,479,163	-6.1	0.8	-5.4
Energy Recovery On-site	213,071,335	211,236,994	212,877,050	-0.9	0.8	-0.1
Energy Recovery Off-site	68,689,409	65,624,907	60,154,716	-4.5	-8.3	-12.4
Treated On-site	1,060,894,675	1,047,332,860	1,149,074,304	-1.3	9.7	8.3
Treated Off-site	62,300,379	59,010,319	57,652,698	-5.3	-2.3	-7.5
Quantity Released/Disposed of	303,092,264	294,082,797	269,571,824	-3.0	-8.3	-11.1
Total Production-related Waste	**3,192,100,471**	**3,192,680,434**	**3,303,521,577**	**0.0**	**3.5**	**3.5**
Forms Indicating No Source Reduction Activity in 1996						
Recycled On-site	2,316,194,752	2,821,273,965	2,539,797,010	21.8	-10.0	9.7
Recycled Off-site	767,958,124	741,535,139	754,269,009	-3.4	1.7	-1.8
Energy Recovery On-site	1,039,418,209	1,074,447,298	1,069,507,010	3.4	-0.5	2.9
Energy Recovery Off-site	162,724,619	147,349,073	151,482,084	-9.4	2.8	-6.9
Treated On-site	2,177,137,942	2,207,250,018	2,221,067,459	1.4	0.6	2.0
Treated Off-site	172,013,461	174,148,262	172,817,544	1.2	-0.8	0.5
Quantity Released/Disposed of	792,108,074	772,601,012	750,448,047	-2.5	-2.9	-5.3
Total Production-related Waste	**7,427,555,181**	**7,938,604,766**	**7,659,388,163**	**6.9**	**-3.5**	**3.1**