

## **Executive Summary**



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## Introduction

North Americans are concerned about the effects of chemicals on their health and their environment. Pollutant release and transfer registers (PRTRs) are designed to track the quantities of chemicals released from industrial activities into the air, water or land and provide detailed information on the types, locations and amounts of chemicals that facilities have released or transferred. Results are fed into a national database, which allows information to be made available to the public by chemical, community, or facility and over time.

This report is intended to serve as an information source for governments, industry and communities in analyzing such data from a North American perspective and for identifying opportunities for pol-

*Taking Stock 2001* is the eighth in the CEC's *Taking Stock* series on sources and management of industrial pollutants in North America.

### Scope of this Year's Report

*Taking Stock 2001* includes:

- data on releases and transfers from industrial facilities for 2001 (**Chapters 4 and 5**);
- four-year trends in releases and transfers of chemicals (1998–2001) (**Chapter 6**);
- seven-year trends in releases and transfers of chemicals from manufacturing sectors (1995–2001) (**Chapter 7**);
- transfers for recycling, energy recovery, treatment and disposal within and between US and Canada. (**Chapter 8**);
- analyses of groups of chemicals (**Chapter 9**):

### *Taking Stock Online*

The *Taking Stock 2001* report, past volumes of *Taking Stock* (as PDF files), and searchable access to the data sets used in *Taking Stock 2001* are all available at *Taking Stock Online*. Try *Taking Stock Online* at <[www.cec.org/takingstock](http://www.cec.org/takingstock)>. The web site permits searches of the entire matched data set from 1995 to 2001 and allows users to customize reports. Queries can be made by chemical, facility, sector, or geographic region. The site also includes links to electronic versions of *Taking Stock* reports, the three North American PRTRs, and other PRTR-related information.

lution reduction. The analyses are based on 1995–2001 data from the US Toxics Release Inventory (TRI) and the Canadian National Pollutant Release Inventory (NPRI). Results from 2001, trends over the seven years from 1995 to 2001 and from 1998 to 2001 are presented here. As data become available from the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (voluntary for the 2001 reporting year), they will be included in future reports.

- carcinogens, and
- chemicals associated with cancer, reproductive and developmental effects (California Proposition 65 chemicals);
- a special look at air releases (**Chapter 9**);
- reporting on persistent bioaccumulative toxics (PBTs), including mercury, dioxins and furans, hexachlorobenzene and polycyclic aromatic compounds (**Chapter 10**);

- highlights of Mexico's significant progress towards a mandatory and publicly accessible PRTR system (**Chapter 3**); and
- an outline of ongoing work in an Action Plan to increase the comparability among the three national PRTR systems (**Chapter 2**).

While this report can provide answers to many questions, readers may need to go to other sources for more information. The report does not provide information on:

- all pollutants—only those chemicals common to TRI and NPRI,
- all sources of chemicals—only facilities in certain industry sectors common to TRI and NPRI,
- data from facilities in Mexico,
- environmental damage, or
- health risks.

## Using and Understanding this Report

This report uses data from Canada and the United States. The data are “matched” for a particular span of years, that is, they are based on chemicals and industrial sectors that are common to both TRI and NPRI for the years in question. Reporting to the Mexican PRTR system was voluntary for 2001 and prior years, and thus the data are not currently comparable. **Chapter 2** presents a full description of the terminology and scope of the data used in this report. Taking a few moments to familiarize yourself with the differences in these data sets and terms will help you to better use and understand the information presented in this report.

### CEC Action Plan to Enhance the Comparability of Pollutant Release and Transfer Registers in North America

The governments of Canada, Mexico and the United States have worked together through the CEC's PRTR program to develop an action plan to implement changes in their respective PRTRs that will enhance the comparability of the three systems. Much progress has already been made, including:

- expanding the number of industries covered under TRI,
- adding mandatory reporting of transfers to recycling and energy recovery to the NPRI,
- expanding both the chemical lists and the reporting on persistent bioaccumulative toxic chemicals (NPRI and TRI),
- requiring reporting on pollution prevention activities (NPRI), and
- the adoption of a mandatory requirement for RETC reporting in Mexico.

The Action Plan to Enhance the Comparability of PRTRs in North America, adopted by the CEC Council in June 2002, identifies specific issues for which action is still needed, such as:

- lists of chemicals,
- use of standardized North American industry-sector classification codes, and
- types of reporting thresholds and exemptions used.

The Action Plan includes a description of such issues and outlines steps to be taken by the national programs to increase the comparability among the three systems. The Action Plan can be found on the CEC web site at <[www.cec.org](http://www.cec.org)>.

## Mexico's RETC

Following the 1992 United Nations Conference on the Environment and Development (UNCED) and the adoption of Agenda 21, there was increasing international interest in the establishment of national pollutant release and transfer registers as a tool for improving environmental management at the national level. In 1994, the United Nations Institute for Training and Research (UNITAR), in cooperation with the OECD and other programs of the United Nations, initiated a program to evaluate the feasibility of implementing national PRTR systems in developing countries. Mexico was one of the countries selected.

Following the initial design phase, which involved a multi-stakeholder National Coordinating Group, a pilot study in the Mexican state of Queretaro during 1995 and 1996 tested the concept of an integrated environmental reporting system as the foundation for its PRTR, called *Registro de Emisiones y Transferencia de Contaminantes* (RETC). Based on this experience, an integrated reporting format called *Cédula de Operación Anual* (COA) was developed. The reporting form includes, as Section V, data on releases to air, water and soil and transfers of specific substances. A list of 104 substances (see Appendix A) on which the Section V data could be submitted was established in 2001. Reporting under Section V of the COA was voluntary for 1998 through 2002. Reporting on air emissions of four criteria air contaminants (sulfur dioxide, nitrogen oxide, particulates and volatile organic compounds) has been mandatory since 1998.

In 2001, the Mexican Congress approved legislative changes aimed at establishing reporting on a mandatory basis for the COA Section V data. In addition, legislation was enacted to allow public access to information which had previously been for official use only. The federal rule based on the legislation is expected to be published in 2004. The first mandatory data will be for the year 2003. (See **Chapter 3** for a more detailed description of these events.)

### Federal/State Cooperation

Because many environmental responsibilities are shared, the federal and state governments are cooperating in developing state-level RETC programs. The federal program covers 11 industrial sectors, such as chemical manufacturing, steel mills, automotive, petroleum and petrochemical, electricity generation and hazardous waste management. During 2000, the federal government of Mexico established a program to decentralize environmental responsibilities. The state PRTRs, under this program, cover other industry sectors, such as food products, textiles, printing products, metal products and service facilities. As of 2001, 14 states had committed to participating in this program and to establishing their own state RETC.

Seven states (Aguascalientes, Tamaulipas, State of Mexico, Nuevo León, Quintana Roo, Durango and Guanajuato) and the Federal District are expected to collect data for the RETC, for the 2002 reporting year. The state of Aguascalientes has already established the laws and reporting format for its RETC and collected data for 2000 and

2001. Its first two RETC reports, covering the 2000 and the 2001 data, can be viewed at <[www.aguascalientes.gob.mx/sedeso](http://www.aguascalientes.gob.mx/sedeso)>.

### Improving and Expanding Reporting

Since the first data collection cycle, many different kinds of activities have been undertaken in order to increase the quantity as well as the quality of the reports. **Chapter 3** outlines many of these activities and shows the diverse roles and actions undertaken for the implementation of the Mexican RETC. These activities include:

- improvement and accessibility of the guidelines for filling in the COA form,
- development of software used for filling in the COA,
- organization of information events to publicize the COA reporting requirements, and
- preparation and implementation of training courses for industry.

All stakeholders in the process have been active in this process:

- The government has developed and published reporting guidelines and software and conducted many training programs throughout the country.
- Industry councils have organized workshops to explain and encourage reporting.
- NGOs have conducted workshops and undertaken information campaigns aimed at increasing the awareness and understanding of PRTR reporting and its benefits.

The CEC has played an important supporting role by fostering the exchange of experiences among the three countries and capacity building through direct support for workshops and other initiatives organized by NGOs, industrial associations and the government.

**Table 1. Timeline of Key Stages in RETC Development from 1994 to the Present**

1992	Designation of pilot project for Mexico by UNITAR
1994	National Coordinating Group of RETC established
1996	Pilot study in state of Queretaro
1997	Integrated form and list of 185 substances established
1998	First data collection cycle, reporting on releases and transfers voluntary.
1999	First report published, contains monitoring data; release/transfer data not reported.
2000	Second report published, contains monitoring data; release/transfer data not reported.
2001	Laws to require mandatory reporting and establish public access to data passed.
2003	State of Aguascalientes published first RETC report with data on releases and transfers by industrial sector, municipality and substance.
2004	Expected publication of federal rule for RETC reporting and data accessibility.

**Table 2. Reporting to Mexican COA, 1997–2001**

Section of COA	Number of Facilities Reporting				
	1997 Number	1998 Number	1999 Number	2000 Number	2001 Number
Section I or II (Facility Identification and Criteria Air Contaminants, Mandatory)	about 1,100*	1,090	1,525	1,775	1,968
Section V (RETC, Voluntary)					
5.1 (Facility Identification)		93	274	406	486
5.2 or 5.3 (Amounts for Releases and Transfers of Listed Pollutants)	about 5%*	48	117	39	244

Note: From Semarnat, February 2004.

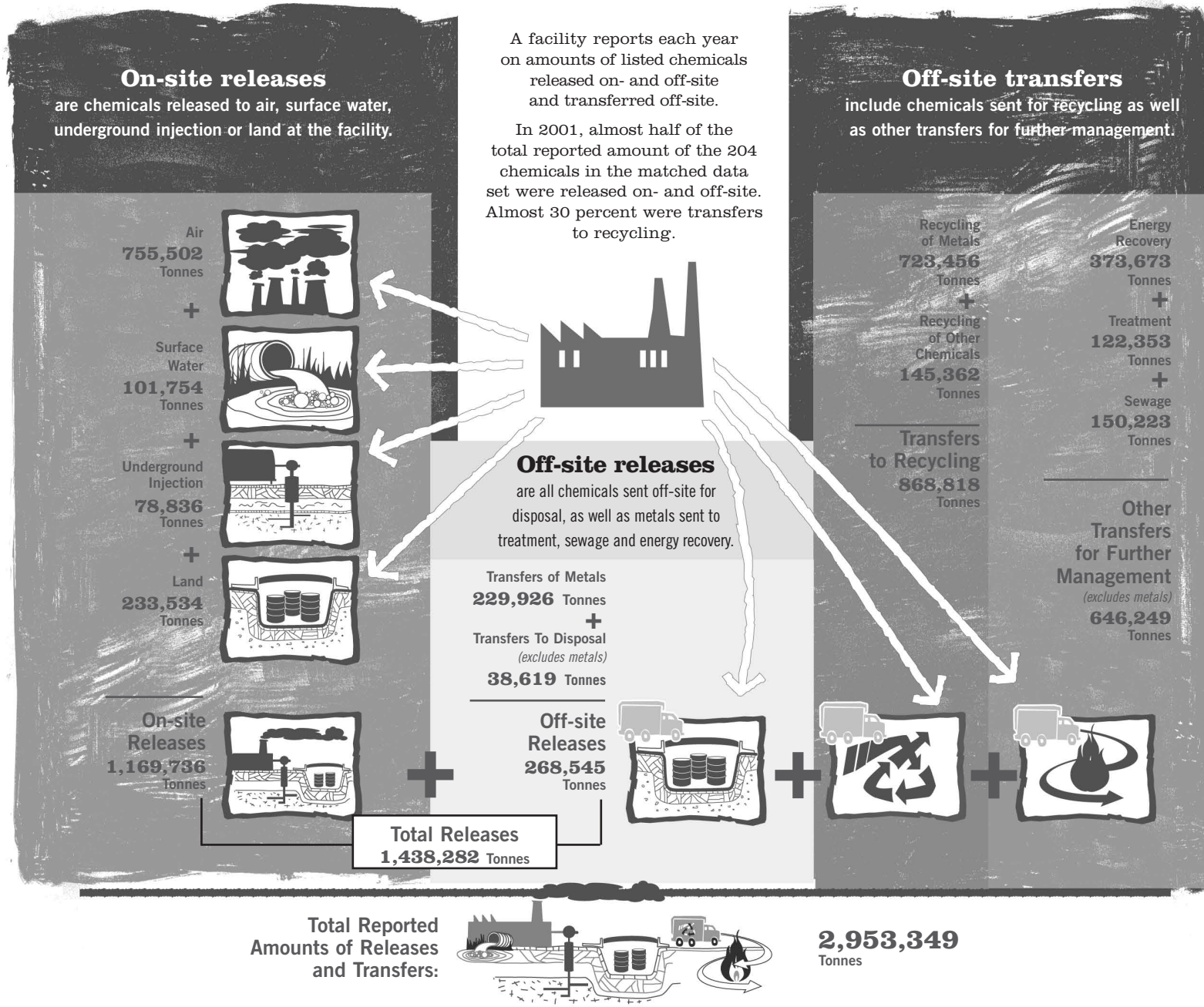
\* The first year of reporting found many submissions incomplete.

### RETC Data

The integrated COA form has been used for reporting since 1997, and the number of facilities using the COA form steadily increased from 1997 to 2001. For the reporting year 2001, over 1,900 facilities under federal jurisdiction submitted the form and were registered. This represented almost twice the number that submitted the form in the first year (1997).

Only Sections I and II (general facility information and air emissions of criteria air contaminants) of the COA form were mandatory for the years 1997 through 2001. For the voluntary Section V, which contains information on releases and transfers of substances, about 4 percent of the facilities reported some data for 1998, and almost 12 percent had for 2001.

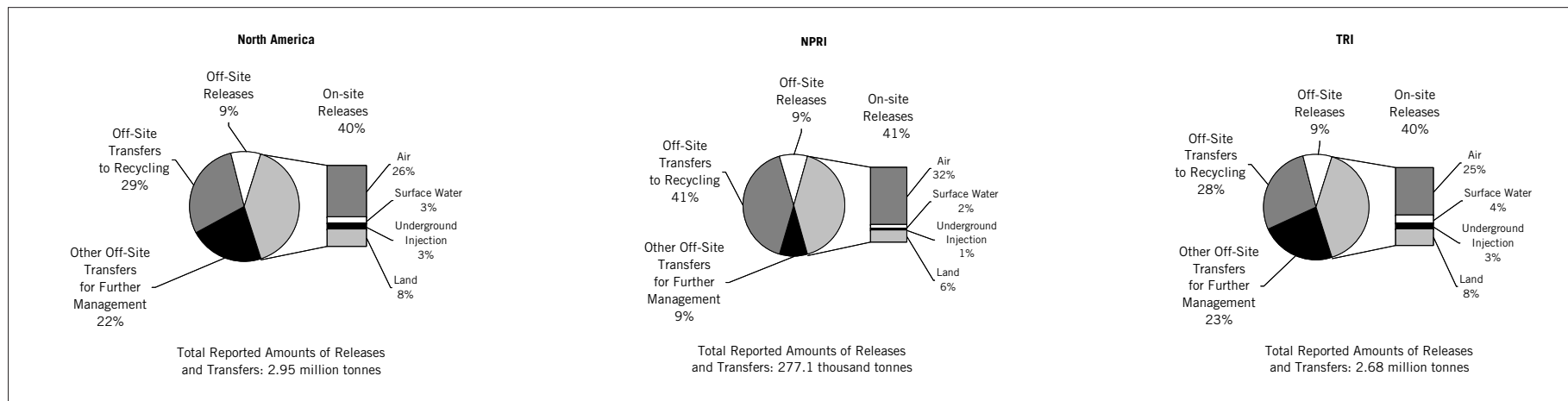
Figure 1. Pollutant Releases and Transfers in North America, 2001



Note: Canada and US data only. Mexico data not available for 2001. Analyses are based on the matched set of chemicals and industry sectors for which comparable data are available for 2001. Total on-site releases are greater than the sum of the individual media because an NPRI facility can report only the total if it is less than one tonne.



Figure 2. Total Reported Amounts of Releases and Transfers in North America by Category, 2001



Note: Canada and US data only. Mexico data not available for 2001.

## 2001 Results

The data for 2001 include reporting by 21,254 industrial facilities in North America on:

- the set of 204 chemicals common to both NPRI and TRI;
- manufacturing facilities, as well as electric utilities, hazardous waste management/solvent recovery facilities, wholesale chemical distributors and coal mining; and
- all categories of releases and transfers, including transfers to recycling and energy recovery.

Analyses of 2001 data are presented in **Chapter 4** (total releases and transfers) and **Chapter 5** (total releases on- and off-site).

### Releases and Transfers in North America in 2001

In 2001, over 2.95 million tonnes of matched chemicals were released and transferred in North America (Figure 1 and **Chapter 4**,

Table 4-1). Almost half of the total reported amounts of releases and transfers (1.44 million tonnes) were released on- and off-site. Over one-quarter, 755,500 tonnes, were released into the air at facility sites. This large amount of chemicals emitted to the air was more than all the chemicals released to land, water and underground injection combined.

About 30 percent of the total reported amounts, almost 869,000 tonnes, were substances sent off-site for recycling. About 20 percent, or 646,000 tonnes, were other transfers for further management, including to energy recovery, treatment, and sewage (Figure 2).

NPRI facilities reported 9 percent of the total North American amounts, while TRI facilities had 91 percent of the North American total reported amounts (See **Chapter 4**, Table 4-1). On-site releases were about 40 percent of total releases and transfers in both NPRI and TRI. However, NPRI on-site air releases comprised 32 percent of total re-

leases and transfers compared to 25 percent in TRI. On the other hand, surface water discharges and on-site land releases were proportionally higher in TRI than in NPRI. Also, NPRI transfers to recycling accounted for 41 percent of total releases and transfers while TRI recycling was 28 percent, and TRI other transfers for further management were 23 percent of total releases and transfers while NPRI's accounted for 9 percent.

### Releases of Carcinogens and Chemicals Causing Reproductive and Developmental Harm

Over 11 percent of all releases of chemicals in North America in 2001 were known or suspected carcinogens. For NPRI facilities, most carcinogens (58 percent) were released to the air. For TRI facilities, 39 percent of carcinogens were released to the air and 28 percent were on-site land releases, mainly disposal in landfills. (See **Chapter 9**, Figure 9-1.)

Over 13 percent of all releases were chemicals known to cause cancer, reproductive or developmental harm (California Proposition 65 chemicals). For NPRI facilities, 66 percent of these chemicals were released to the air. For TRI facilities, 47 percent were released to the air and 24 percent were on-site land releases, mainly disposal in landfills. (See **Chapter 9**, Figure 9-4.)

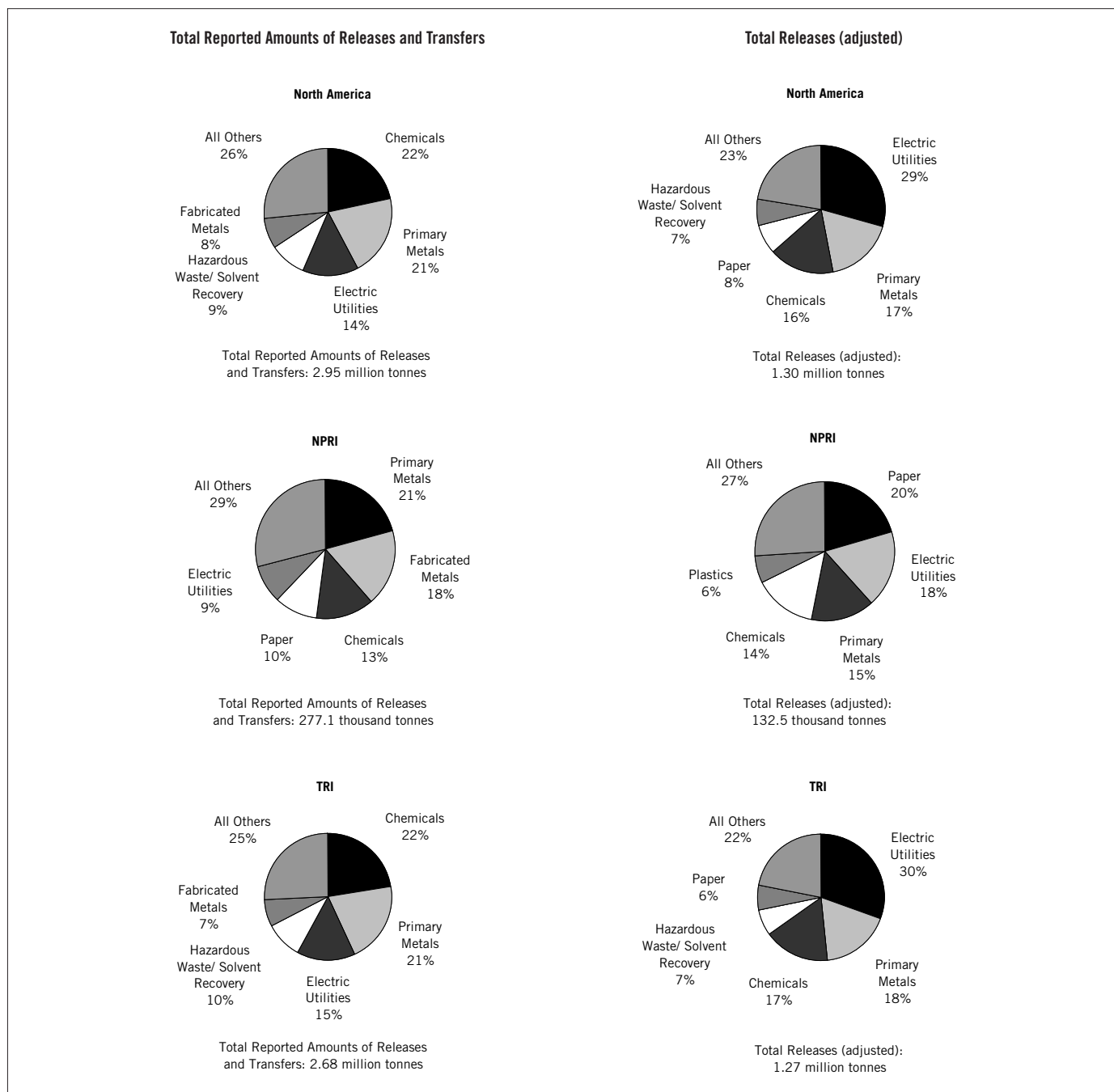
## Industry Sectors with the Largest Amounts in North America in 2001

Five industries—chemical manufacturing, primary metals, electric utilities, hazardous waste management/solvent recovery and fabricated metals products—accounted for almost three-quarters of total releases and transfers in North America in 2001 (Figure 3 and Chapter 4, Table 4–3). In TRI, the sectors with the largest totals were chemical manufacturers and primary metals; in NPRI, the primary metals and fabricated metals sectors had the largest totals.

Looking at releases alone, electric utilities reported almost 30 percent of total releases in North America. The primary metals, chemical manufacturing, paper products, and hazardous waste management/solvent recovery sectors had the next-largest total releases (Figure 3 and Chapter 5, Table 5–4).

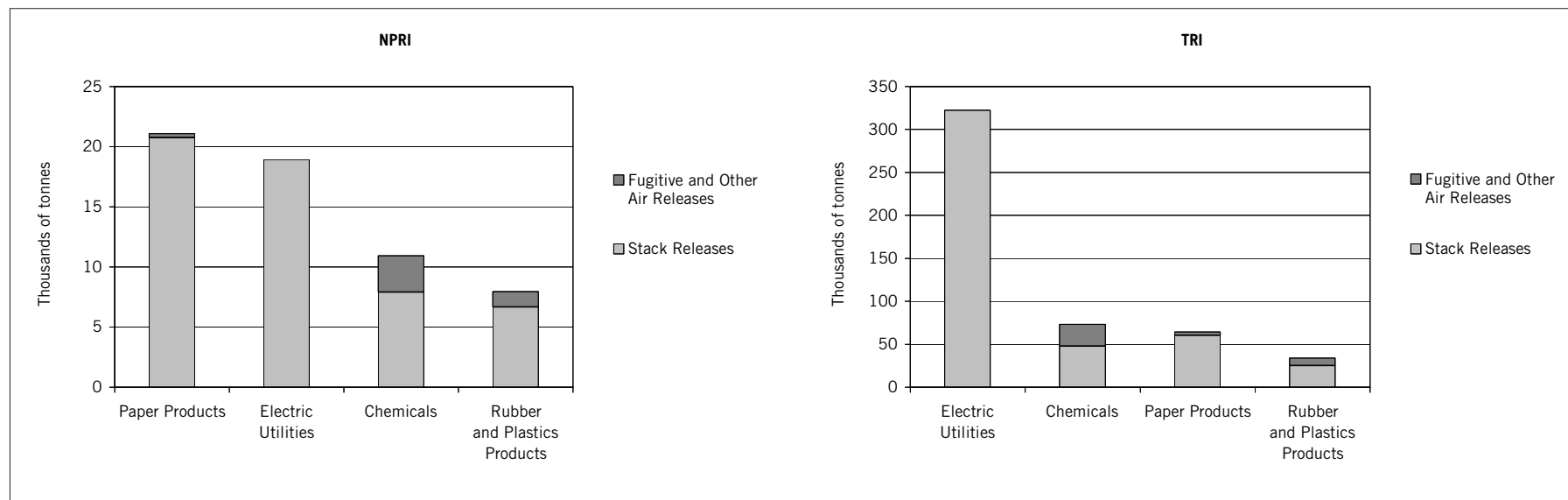
In TRI, electric utilities and the primary metals and chemical manufacturing sectors reported the largest total releases. These three sectors accounted for over 60 percent of total TRI releases. For NPRI, paper products, electric utilities and primary metals facilities reported the largest total releases. These three sectors accounted for over half of total NPRI releases.

Figure 3. Contribution of Top Industry Sectors to Total Reported Amounts of Releases and Transfers and to Total Releases, 2001



Note: Canada and US data only. Mexico data not available for 2001.

Figure 4. Industry Sectors with Largest Total On-site Air Releases, NPRI and TRI, 2001



### On-site Air Releases in 2001

Over one-quarter of total releases and transfers in 2001—755,500 tonnes of matched chemicals—were released into the air at the facility site. NPRI air releases were 87,700 tonnes, with 13 percent released as fugitive or other air releases; TRI air releases were 667,800 tonnes, with fugitive air releases accounting for 12 percent.

Four jurisdictions accounted for almost one-quarter of all air releases in 2001. They were:

- North Carolina, with 50,100 tonnes, mainly from electric utilities;
- Ohio, with 45,900 tonnes, mainly from electric utilities;
- Ontario, with 45,500 tonnes, mainly from electric utilities, chemical manufac-

turers, paper products, and rubber and plastics products; and

- Texas, with 42,700 tonnes, mainly from chemical manufacturers and electric utilities.

See **Chapter 9**, Table 9–11.

The four industry sectors with the largest air releases in 2001 were:

- electric utilities, with 341,400 tonnes,
- chemical manufacturers, with 83,900 tonnes,
- paper products, with 85,500 tonnes, and
- rubber and plastics products, with 41,900 tonnes.

Electric utilities reported almost half of the air releases in the US, while the paper products sector had the largest air releases in Canada, with almost one-quarter of all

NPRI air releases (Figure 4 and **Chapter 9**, Table 9–13).

Two electric utilities, CP&L Roxboro Steam Electric Plant owned by Progress Energy and located in Semora, North Carolina, (with 8.7 thousand tonnes) and Reliant Energies Inc., Keystone Power Plant in Shelocta, Pennsylvania, (with 7.9 thousand tonnes) reported the largest air releases in the US in 2001. In Canada, the electric utility, Ontario Power Generation's Nanticoke Generating Station in Nanticoke, Ontario, (with 6.9 thousand tonnes) and the paper products facility, Bowater Pulp and Paper Canada Inc., in Thunder Bay, Ontario, (with 2.7 thousand tonnes) had the largest air releases in 2001. (See **Chapter 9**, Table 9–14.)

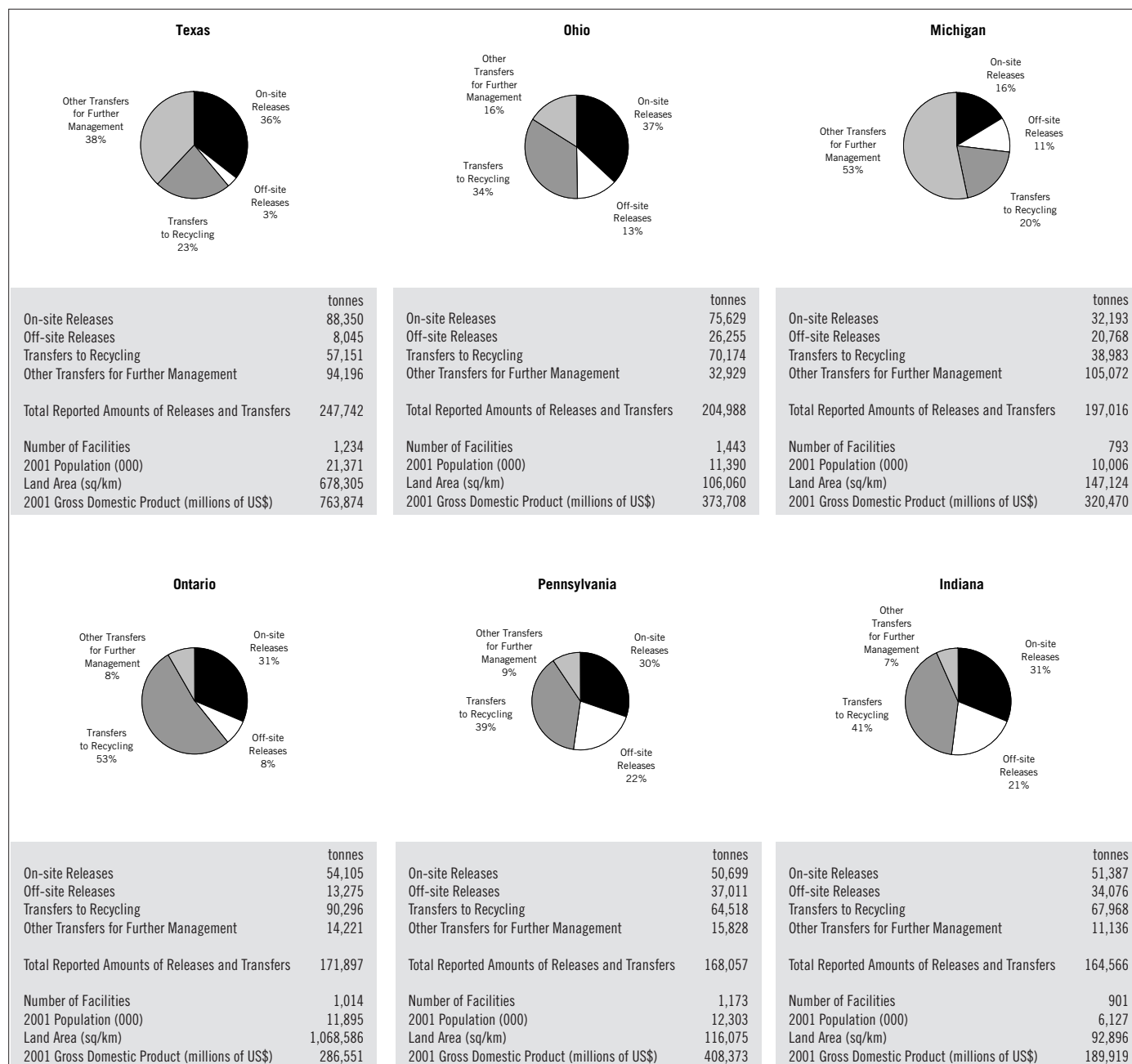
Hydrochloric acid was the chemical with the largest air releases, and the electric utility sector was the major reporter of this chemical. Most of the air releases of hydrochloric acid were through the stack; less than 1 percent was as fugitive releases. Methanol was the chemical with the second-highest air releases, reported mainly by the paper products sector. Fugitive releases of methanol accounted for 10 percent of the total. The carcinogen with the largest air releases was styrene, reported mainly by the rubber plastics products sector. Fugitive releases accounted for 24 percent of the air releases of styrene. (See **Chapter 9**, Table 9–12.)

## States and Provinces with the Largest Releases and Transfers in North America in 2001

In 2001, the jurisdictions with the largest total releases and transfers of the matched chemicals were Texas, Ohio, Michigan, Ontario, Pennsylvania, and Indiana, each reporting more than 160,000 tonnes. These six jurisdictions were responsible for almost 40 percent of all releases and transfers of chemicals in North America in 2001 and over one-third of all releases on- and off-site (Figure 5 and Chapter 4, Table 4-2).

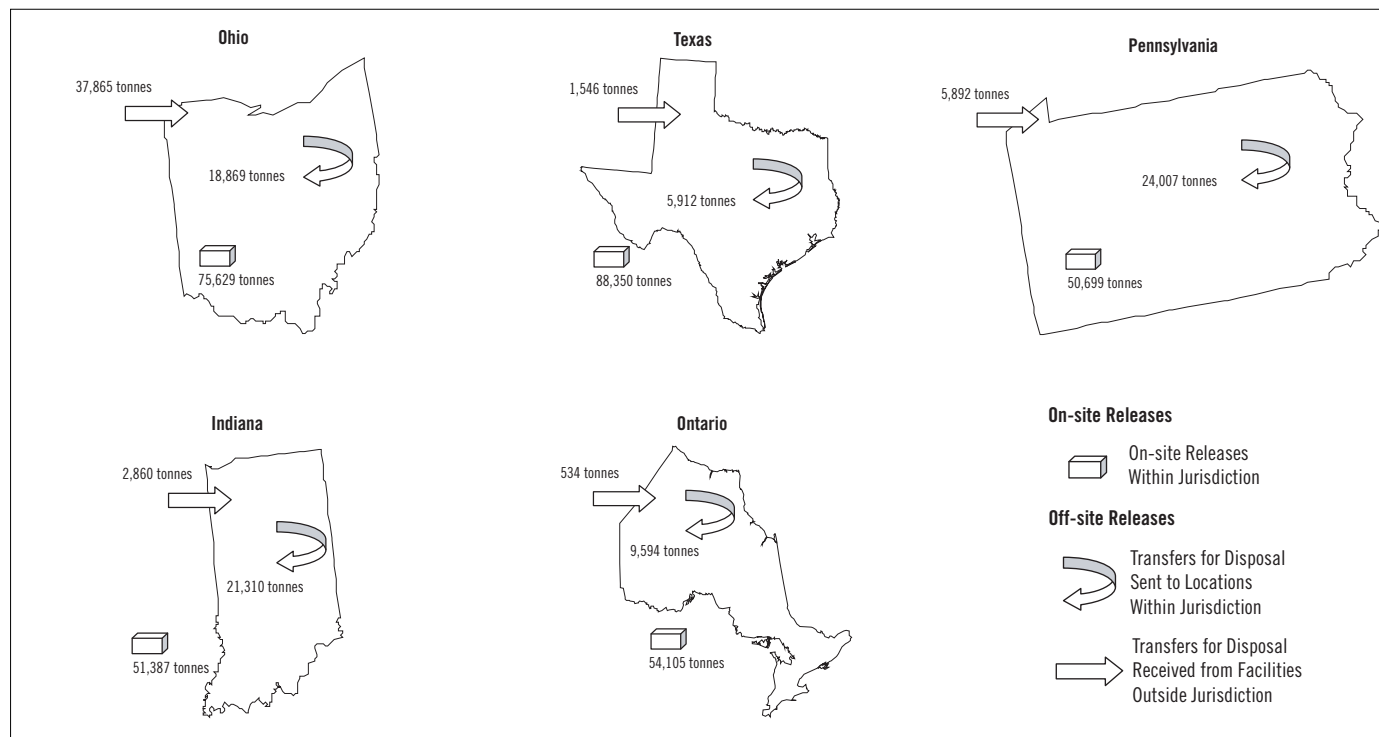
Facilities in Texas released the largest amounts of chemicals on-site. Texas facilities also reported the largest amounts of chemicals injected underground at facility sites of any jurisdiction in North America. Ohio had the largest total releases, mainly air releases from electric utilities. Michigan had the largest other off-site transfers for further waste management, particularly transfers to energy recovery. Ontario facilities had the largest transfers to recycling. Pennsylvania had the highest off-site releases, mainly transfers of metals to disposal. Indiana facilities reported releasing the second-largest amount off-site in North America, also mainly transfers of metals to disposal.

Figure 5. States/Provinces with Largest Total Releases or Total Reported Amounts in 2001 (Ordered by Total Reported Amounts)



Note: Canada and US data only. Mexico data not available for 2001. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals.

Figure 6. Jurisdictions with the Largest Chemical “Loadings” in 2001



Two of these six jurisdictions also had the largest on-site releases in 2001 in North America. In order, they were Texas and Ohio—each reporting more than 75,000 tonnes. These two jurisdictions were responsible for 14 percent of all on-site releases of chemicals in North America in 2001 (Figure 5 and Chapter 5, Table 5-2).

Chemicals that end up within a jurisdiction's borders include (1) amounts released by facilities located within the state/province, (2) amounts that facilities within the state/province sent to other facilities also located within the jurisdiction, and (3) amounts received by facilities within the state/province from facilities outside its borders. These amounts provide an estimate of chemical “loadings” within a state or province. Ohio, Texas, Pennsylvania, Indiana and Ontario had the largest amounts of chemical “loadings” (Figure 6 and Chapter 5, Table 5-3).

## Facilities Reporting the Largest Releases

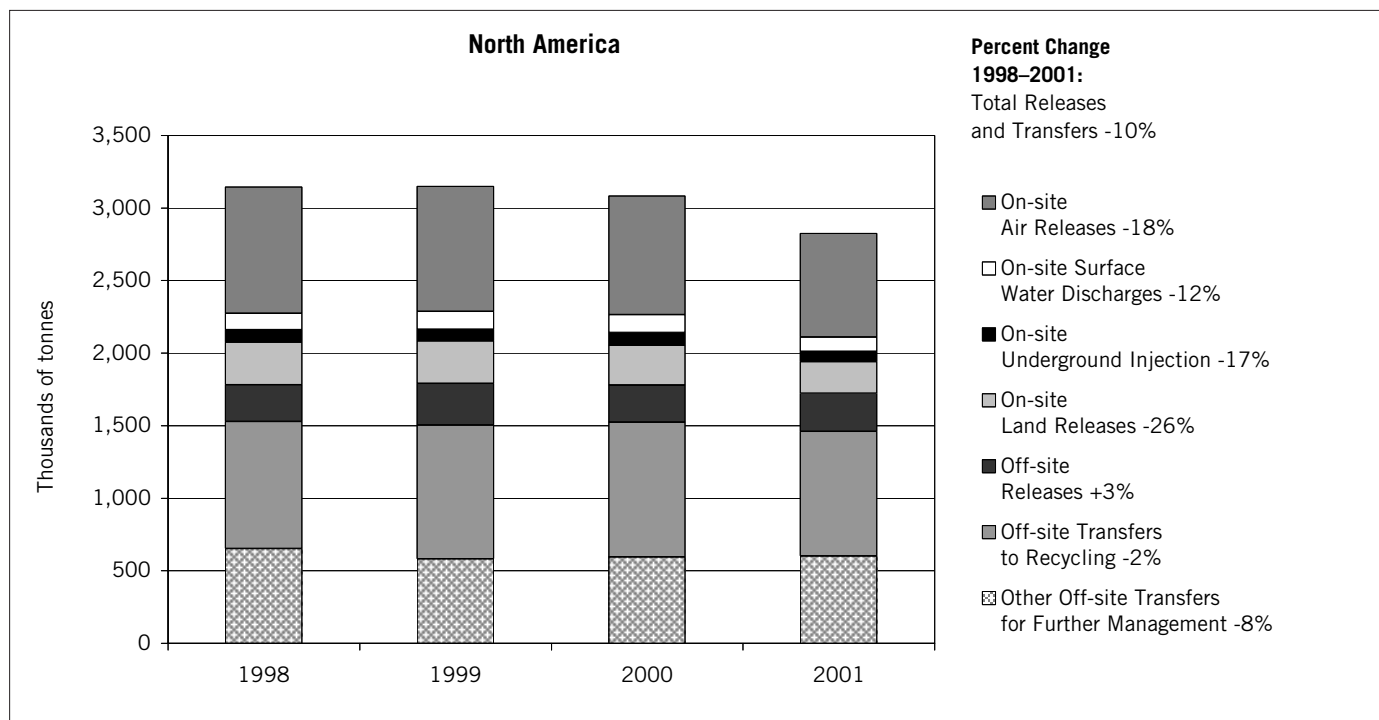
In North America, a relatively small number of facilities account for a large proportion of releases. The 15 facilities with the largest total releases (on- and off-site) accounted for 11 percent of total releases reported in 2001 (Table 3). Fourteen of the 15 facilities were located in the US. Six were primary metals facilities, four were electric utilities, three were hazardous waste management/solvent recovery facilities and two were chemical manufacturers. (See Chapter 5, Table 5-6 for additional top facilities.)

**Table 3. The 15 North American Facilities with the Largest Total Reported Amounts of Releases On- and Off-site, 2001**

Rank	Facility	City, Province/State	SIC Codes		Number of Forms	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total On-site and Off-site Releases Reported (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported releases from the facility)	
			Canada	US						
1	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ		33	12	22,603,852	28,079	22,631,931	Copper and compounds, Zinc and compounds (land)	
2	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID	495/738		15	13,300,155	0	13,300,155	Zinc and compounds (land)	
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	12	361,030	11,952,117	12,313,147	Zinc and compounds (transfers of metals)	
4	Steel Dynamics Inc.	Butler, IN		33	10	22,881	11,580,723	11,603,604	Zinc and compounds (transfers of metals)	
5	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	11,275,045	12,771	11,287,816	Copper and compounds, Zinc and compounds (land)	
6	Solutia Inc.	Cantonment, FL		28	21	10,768,870	760	10,769,630	Nitric acid and nitrate compounds (UI)	
7	Precision Kidd Steel Co.	West Aliquippa, PA		33	3	4	10,676,447	10,676,451	Manganese and compounds (transfers of metals)	
8	Nucor Steel	Crawfordsville, IN		33	9	17,261	10,505,598	10,522,859	Zinc and compounds (transfers of metals)	
9	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC	491/493		13	9,175,987	30	9,176,017	Hydrochloric acid (air)	
10	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL	495/738		8	8,260,182	5	8,260,188	Zinc and compounds (land)	
11	Reliant Energies Inc. Keystone Power Plant	Shelocta, PA	491/493		11	8,171,018	0	8,171,018	Hydrochloric acid (air)	
12	BASF Corp.	Freeport, TX		28	28	8,025,503	7,463	8,032,967	Nitric acid and nitrate compounds (water)	
13	Georgia Power Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA	491/493		13	7,801,673	8	7,801,681	Hydrochloric acid (air)	
14	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	13	7,467,826	0	7,467,826	Hydrochloric acid (air)	
15	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH	495/738		16	7,225,057	23,441	7,248,498	Nitric acid and nitrate compounds, Hydrogen fluoride, Manganese and compounds (UI)	
<b>Subtotal</b>						<b>202</b>	<b>114,476,343</b>	<b>44,787,444</b>	<b>159,263,787</b>	
<b>% of Total</b>						<b>0.3</b>	<b>10</b>	<b>17</b>	<b>11</b>	
<b>Total</b>						<b>73,284</b>	<b>1,169,736,346</b>	<b>268,545,275</b>	<b>1,438,281,621</b>	

Note: Canada and US only. Mexico data not available for 2001. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements. UI=underground injection.

Figure 7. Change in Releases and Transfers in North America, 1998–2001



Note: Canada and US data only. Mexico data not available for 1998–2001. Data include 155 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

## Changes over Time, 1998–2001

*Taking Stock* has the opportunity to analyze changes in releases and transfers over time. The data in this section have been consistently reported over the 1998–2001 period and include:

- 155 chemicals; and
- manufacturing facilities, electric utilities, hazardous waste management facilities, chemical wholesalers, and coal mines.

These data are therefore a subset of the 2001 data presented earlier. Analyses of 1998–2001 data are presented in **Chapter 6**.

### Changes in Releases and Transfers from 1998 to 2001

Total releases and transfers of chemicals in North America decreased by 10 percent from 1998 to 2001. Total releases decreased by 16 percent, on-site releases decreased by 19 percent, other transfers for further management decreased by 8 percent, and transfers to recycling decreased by 2 percent. However, off-site releases increased by 3 percent (Figure 7 and **Chapter 6**, Table 6–1).

Compared with a decrease in total releases of 16 percent for all matched chemicals from 1998 to 2001, releases of carcinogens decreased by 20 percent and chemicals known to cause cancer, reproductive or development harm (California Proposition 65 chemicals) decreased by 26 percent. (See **Chapter 9**, Figures 9–2 and 9–5.)

### Industry Sectors with the Greatest Change from 1998 to 2001

The industry sectors with the largest total releases and transfers in both 1998 and 2001 were:

- primary metals, chemicals and electric utilities, each reporting an approximately 10-percent decrease; and
- the hazardous waste management/solvent recovery sector, with a 23-percent reduction.

The food products and industrial machinery sectors had the largest increases; each reported a 10-percent increase of more than 4.5 thousand tonnes. (See **Chapter 6**, Table 6–3.)

## States and Provinces with Largest Change in Releases and Transfers from 1998 to 2001

The states and provinces with the largest decreases from 1998 to 2001 were (see **Chapter 6**, Table 6–2):

- Ohio, with a decrease of 72,000 tonnes (27 percent) in releases and transfers. Ohio had the largest total releases and transfers in 1998 and the second-largest behind Texas in 2001. Ohio also had the largest decreases in total reported releases, with a reduction of 38,000 tonnes, or 28 percent. One hazardous waste management facility, EnviroSAFE Services of Ohio, in Oregon, Ohio, reported a reduction of more than 16,500 tonnes, mainly in on-site land releases.
- Michigan, with a decrease of almost 34,000 tonnes (15 percent) in releases and transfers, including a decrease of 16,500 tonnes of transfers to recycling and 16,000 of transfers to treatment.
- Utah, with a decrease of 25,000 tonnes, including the second-largest decrease in total releases behind Michigan. One facility, Magnesium Corp. of America in Rowley, Utah, reported a reduction of almost 20,000 tonnes, primarily of chlorine air releases.

The states and provinces with the largest increase from 1998 to 2001 were (see **Chapter 6**, Table 6–2):

- Arkansas, with an increase of 18,000 tonnes (42 percent) in total releases and transfers, mainly in other transfers for further management (transfers to energy recovery). Total releases in Arkansas decreased by almost 2,000 tonnes.
- Kansas, with an increase of 12,500 tonnes (45 percent) in total releases and transfers. Kansas had an increase in transfers for further management of 19,000 tonnes, but total releases decreased by almost 5,000 tonnes.
- British Columbia reported the largest increase in total releases—4,900 tonnes (73 percent). Four pulp and paper mills in British Columbia were among the ten facilities in NPRI with the largest increases in total releases. These facilities indicated that the increases were due to improved estimates and production increases.

## Change in On-site Air Releases from 1998 to 2001

In North America, on-site air releases decreased by 18 percent from 1998 to 2001, including a 17 percent decrease in stack air releases and a 27 percent decrease in fugitive and other air releases.

In NPRI, the paper products sector reported the largest air releases in both 1998 and 2001, with an increase of 5 percent (see **Chapter 9**, Table 9-17). Electric utilities reported the second largest air releases in both years, with an increase of 10 percent from 1998 to 2001 in NPRI.

In TRI, electric utilities reported the largest air releases in both 1998 and 2001, with a decrease of 10 percent over that time period (see **Chapter 9**, Table 9-18). The paper products sector reported the second-largest air releases to TRI in both years, with a decrease of 10 percent from 1998 to 2001.

Ontario Power Generation's Nanticoke Generating Station in Nanticoke, Ontario, reported the largest increase in air emissions in Canada, with an increase of 2.1 thousand tonnes from 1998 to 2001. The facility in the US with the largest increase in air emission was also an electric utility. Reliant Energy's Keystone Power Plant in Shelocta, Pennsylvania, reported an increase in air emissions of 3.9 thousand tonnes. However, the reported increase was primarily due to a change in estimation technique used.

## Query Builder

<http://www.eec.org/takingstock/>

To find out which facilities had the largest change in your province or state using *Taking Stock Online*:

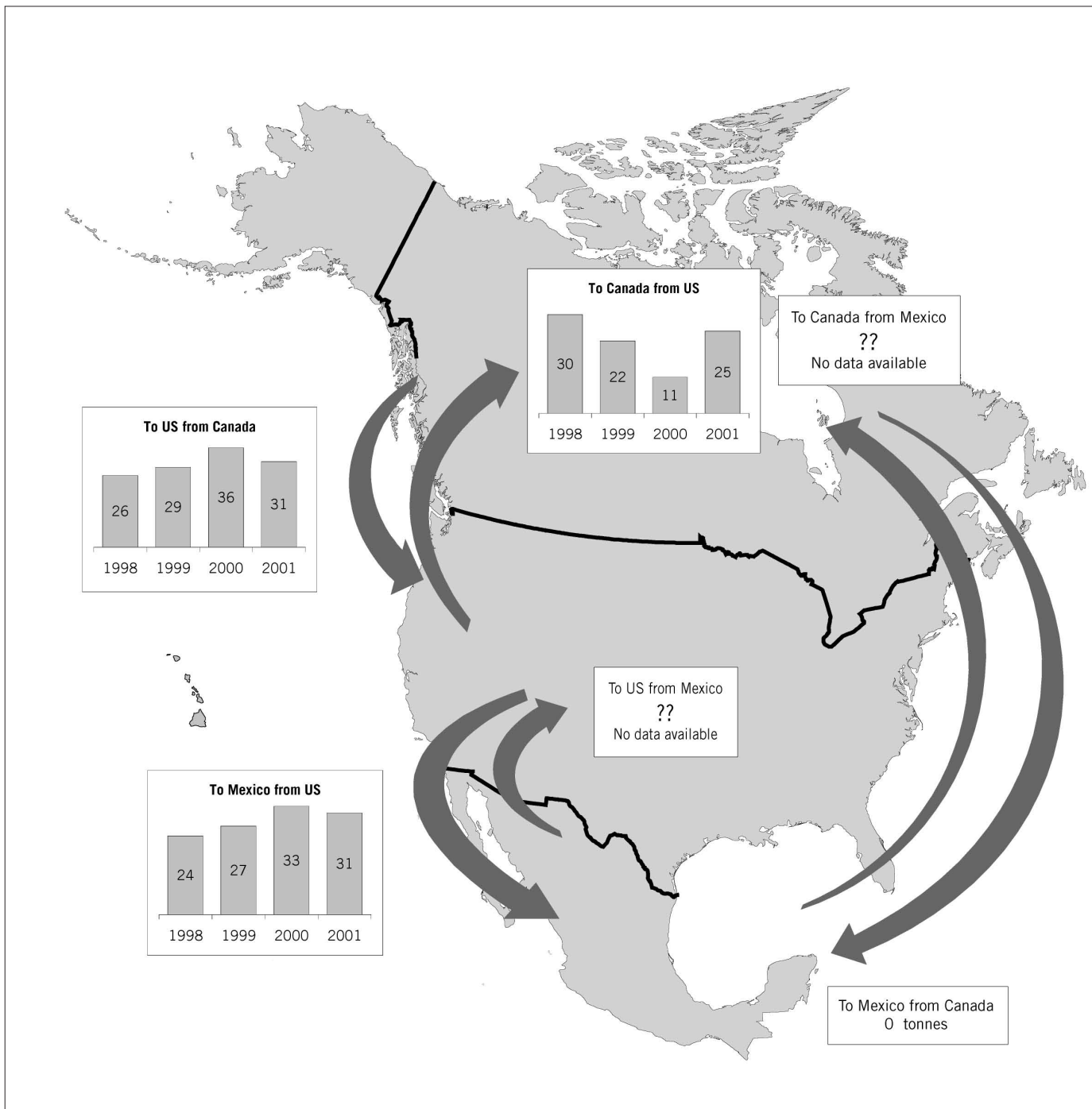
- 1 select **Facility** report.
- 2 select the **years 1998 and 2001**.
- 3 select **Your Province or State** for the geographic area, select **All** for the chemical, select **All industries** for the industrial sector.
- 4 select **Total releases and transfers**.

Then click on  **Run the query**

Then go to the column titled "Change from 1998–2001" and click on the **up arrow** to get the 10 facilities with the largest decrease. Once you get the report, then click on the **down arrow** in the column titled "Change from 1998–2001" to get the 10 facilities with the largest increase.



Map 1. Off-site Transfers Across North America, 1998–2001 (Amounts in Thousand Tonnes)



### Changes in Cross-Border Transfers from 1998 to 2001

Chemicals may be transferred off-site for disposal, treatment, energy recovery, or recycling. Most materials are transferred to sites within state and national boundaries. However, each year, some materials are sent outside the country.

Cross-border transfers to the US from Canada increased by 20 percent from 1998 to 2001. The increase in transfers sent to the US from Canada occurred in the early years. The most recent period, 2000–2001, saw a decrease of 13 percent. Most transfers to the US are of metals for recycling. (See Map 1 and **Chapter 8**, Table 8–8.)

Cross-border transfers to Canada from the US decreased by 18 percent from 1998 to 2001, even though they more than doubled from 2000 to 2001, largely due to a reported increase of 14,000 tonnes in transfers to energy recovery from one facility, Petro-Chem Processing Group/Solvent Distiller Group in Detroit, Michigan.

Transfers to Mexico from the US increased by 29 percent. More than 99 percent of such transfers are of metals for recycling. There was a decrease of 6 percent from 2000 to 2001, after increases in each of the two prior years. Canadian facilities did not report any transfers to Mexico. Data on the amount of transfers to the US from Mexico are not available for the years 1998–2001.

The changes in cross-border transfers are largely a result of changes at a few facilities. Facilities in primary and fabricated metals sectors often change their transfer sites due to changes in metal prices offered by recyclers. Facilities in the hazardous waste sector have changed their transfer sites as a result of business consolidation, price or changes in services offered. **Chapter 8** offers additional details on specific facilities and their transfers.

## NPRI and TRI Differed in Changes in Releases from 1998 to 2001

Over the years, facilities can start or stop reporting for a number of reasons: they change processes, production levels or chemicals, which then affects whether they meet thresholds; they start up or shut down; they change estimation methods; they begin to meet new reporting requirements; or they become aware of the need to report. NPRI and TRI differed in the change in the number of facilities reporting. NPRI saw an increase of 22 percent in the number of facilities reporting, compared to a decrease of 7 percent in TRI facilities. Nonetheless, total reported amounts of releases and transfers decreased by 7 percent for NPRI and by 11 percent for TRI.

Overall, total releases decreased by 13 percent for NPRI. There were 520 NPRI facilities that reported in 2001 but not in 1998, and these facilities had the greatest effect on air emissions, reporting over 6,000 tonnes (7 percent of NPRI air releases in 2001). In addition, two facilities reported large increases of over 100 tonnes (Figure 8 and Chapter 6, Table 6–10).

Without these facilities, NPRI facilities that reported in both 1998 and 2001, reported a decrease of 16 percent in total releases from 1998 to 2001, including a decrease of 2 percent in on-site air emissions.

Total releases for TRI decreased by 16 percent from 1998 to 2001, with on-site releases decreasing 21 percent (265,800 tonnes) and off-site releases increasing 16 percent (33,100 tonnes). Some of the decrease was due to facilities that no longer reported in 2001. Countering this trend were a small number of facilities (18 facilities) that reported large increases (over 100 tonnes) from 1998 to 2001. In particular, the 18 facilities reported substantial increases in off-site releases (of 16,000 tonnes). Nonetheless, TRI facilities that reported in both 1998 and 2001, not including the 18 facilities with large increases, reported a decrease of 15 percent in total releases from 1998 to 2001, including an increase of 13 percent in off-site releases (Figure 9 and Chapter 6, Table 6–11).

Figure 8. Change in NPRI Releases and Transfers due to Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1998–2001

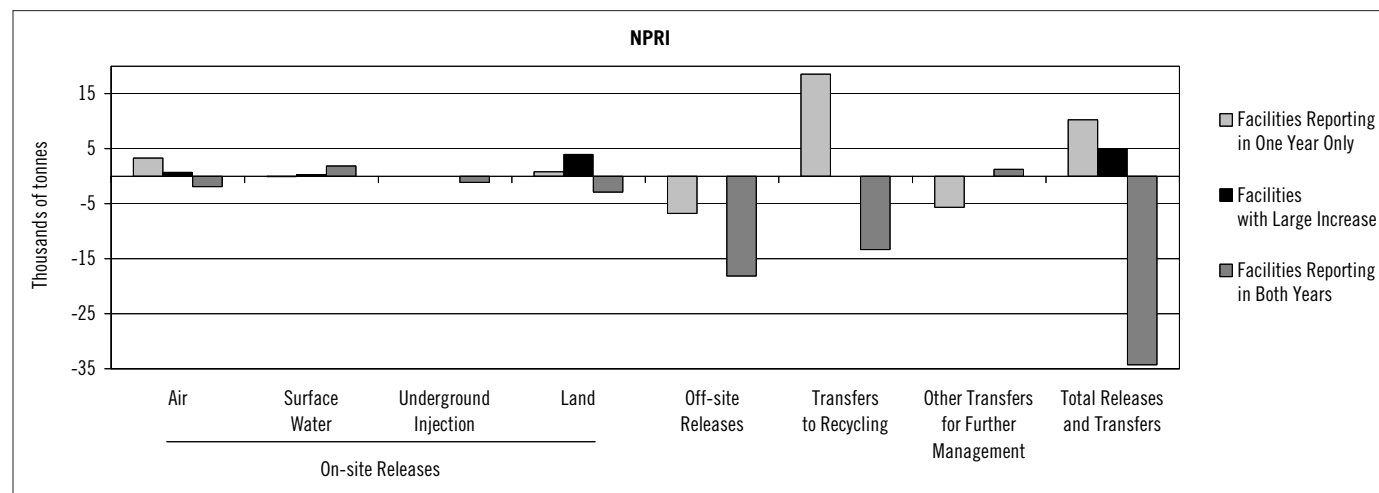
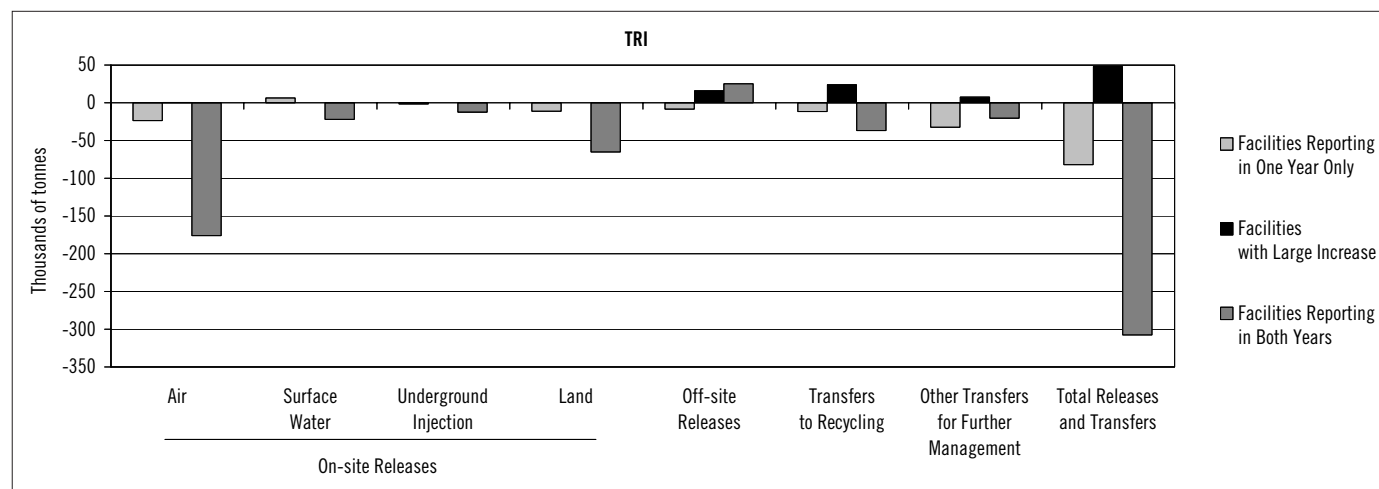
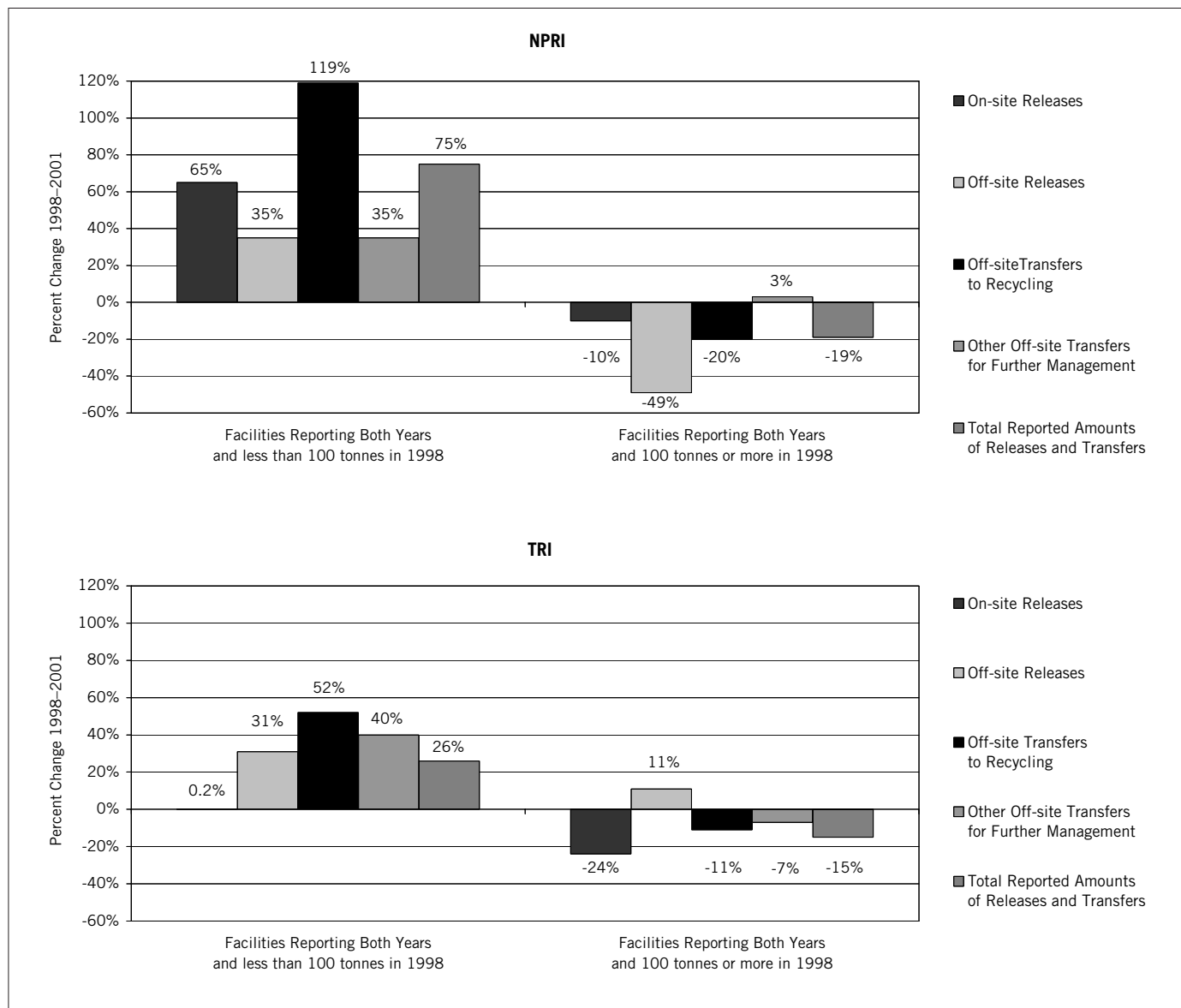


Figure 9. Change in TRI Releases and Transfers due to Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1998–2001



**Figure 10. Percent Change in Releases and Transfers by Facilities Reporting less than 100 Tonnes Compared to Facilities Reporting more than 100 Tonnes in 1998, 1998–2001**



**Top-Reporting Facilities Reported Decreases while others Showed Overall Increases**

The overall changes in releases and transfers within a jurisdiction, nation or sector are often dominated by changes in the group of facilities reporting the largest releases and transfers. However, the facilities reporting smaller releases and transfers also tell an important story. These much more numerous facilities, located in communities throughout Canada and the US, are increasing in every category: on-site releases, off-site releases and transfers.

There were approximately 3,500 facilities that reported 100 tonnes or more of releases and transfers in 1998. This group of larger reporters released and transferred almost 2.7 million tonnes in 1998 and had reductions of almost 373,000 tonnes, or 14 percent, from 1998 to 2001. The larger reporters represented almost 92 percent of the releases and transfers in 2001 but just 20 percent of the facilities reporting in both 1998 and 2001 (Figure 10 and Chapter 6, Tables 6–13, 6–14 and 6–15).

In contrast, the 14,000 facilities reporting less than 100 tonnes in 1998 showed remarkably different patterns over the period from 1998 to 2001<sup>1</sup>. While the group of larger reporters reported an overall decrease in their releases and transfers, the group of smaller reporters reported an overall increase of 29 percent, or 70,000 tonnes, from 1998 to 2001.

Indeed, this group of smaller reporters had overall increases in all types of on-site releases and off-site transfers except for a 1-percent decrease in on-site air emissions from 1998 to 2001. For this group of smaller reporters, on-site releases increased by 5 percent, off-site releases by 31 percent, off-site transfers to recycling by 57 percent, and other off-site transfers for further management by 40 percent. The overall pattern of increases was true for both NPRI and TRI.

<sup>1</sup>This does not include 20 facilities reporting less than 100 tonnes in 1998 and greater than 1,000 tonnes in 2001.

## Seven-Year Trends: 1995–2001 Results

*Taking Stock 2001* has a unique opportunity to analyze trends in releases and transfers of chemicals in North America over the seven years from 1995 to 2001. The data in this section have been consistently reported over this seven-year period and include:

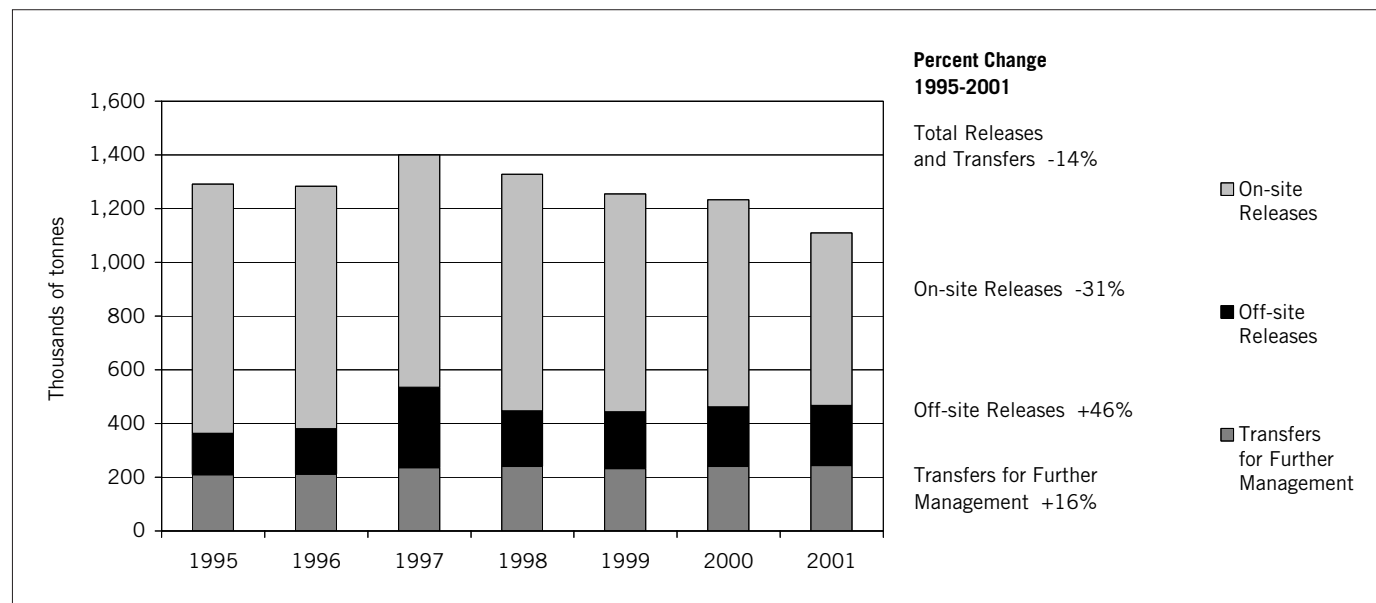
- 155 chemicals,
- manufacturing industries, and
- on- and off-site releases and transfers to treatment and sewage.

These data are, therefore, a subset of the larger 2001 data set and the 1998–2001 data set. The 1995–2001 data set does not include some chemicals and some industry sectors such as electric utilities and hazardous waste /solvent recovery sectors, which have significant releases and transfers. These chemicals and sectors have not been consistently reported over this time period and so are not included in this data set. Analyses of the 1995–2001 trends are presented in **Chapter 7**.

Over the seven-year period from 1995 to 2001, total releases and transfers decreased by 14 percent, including a decrease of 13 percent for NPRI and 14 percent for TRI. On-site releases decreased by 31 percent, with a 15-percent decrease reported by NPRI facilities and a 33-percent decrease by TRI facilities. However, off-site releases (transfers to disposal, mainly in landfills) decreased by 27 percent in NPRI but increased by 59 percent in TRI, for a North American total increase of 46 percent. Transfers off-site for further management increased in both countries, with NPRI showing a 36-percent increase and TRI a 15-percent increase (Figure 11 and **Chapter 7**, Table 7–1).

Most manufacturing industry sectors reported overall decreases. Chemical manufacturers reported the largest releases and transfers in both 1995 and 2001, despite a reduction of 18 percent. The primary metals sector, however, reported a 2-percent increase and had the second-largest totals in both 1995 and 2001. (See **Chapter 7**, Table 7–5.)

Figure 11. Change in Releases and Transfers in North America, 1995–2001



Note: Canada and US only. Mexico data not available for 1995–2001.

## Persistent Bioaccumulative Toxic Chemicals

Many persistent bioaccumulative toxic (PBT) chemicals were required to be reported to the North American PRTRs for the first time in 2000. These chemicals have properties that make them a long-term environmental and health threat. Even small quantities are a concern because when PBTs are released into the environment, they persist (i.e., they do not break down easily into other compounds), meaning their exposure to humans and the environment can potentially occur over longer periods of time than with other chemicals. They can be transported in the atmosphere over long distances and end up far from the source of their release. They bioaccumulate in the food chain, so exposure to these chemicals may arise through food consumption. They are also toxic, often causing damage to humans, plants and wildlife.

Because of reporting differences, PBT chemicals are generally not in the matched data set. Nevertheless, **Chapter 10** presents information available for mercury, dioxins and furans, hexachlorobenzene, and polycyclic aromatic compounds. The impacts of the reporting differences are presented as part of the continuing effort to enhance the comparability of the data.

### Mercury and its Compounds

Mercury can cause neurological and developmental damage, especially in children. A major pathway of human exposure to mercury is through the food chain. Mercury in the air is deposited in water or runs off the land into water. It bioaccumulates in fish, and humans are exposed through their consumption of fish, shellfish and marine mammals.

Both TRI and NPRI lowered the reporting threshold for mercury and its compounds for the 2000 reporting year. Based on the matched TRI and NPRI data, 1,691 facilities in North America reported almost 384,000 kg of releases and transfers of mercury and its compounds in 2001. This was a reduction of

44 percent from 2000. However, this was due to a decrease of almost 261,500 kg, mainly in transfers to disposal, by one TRI hazardous waste management facility. Without the reporting of this one facility, TRI facilities reported a decrease of 6 percent in total releases of mercury and its compounds, and NPRI facilities reported an increase of 31 percent. (See **Chapter 10**, Table 10-1.)

The hazardous waste management/solvent recovery sector had the largest total releases of mercury and its compounds in 2001, with 95,800 kg, primarily as land disposal both on- and off-site. (See **Chapter 10**, Table 10-3.)

On-site air releases of mercury and its compounds decreased by 7 percent (5,262 kg), with NPRI air releases decreasing by 2 percent (128 kg) and TRI air releases decreasing by 8 percent (5,134 kg). Electric utilities reported 64 percent of air releases of mercury and its compounds in 2001. The two electric utilities with the largest air releases of mercury in 2001 in the US were Reliant Energies Inc. in Shelocta, Pennsylvania, with 819 kg and Mt. Storm Power Station, Dominion Resources Inc. in Mount Storm, West Virginia, with 635 kg. The electric utilities with the largest air releases of mercury and its compounds in Canada were TransAlta Corporation's Sundance Thermal Generating Plant in Duffield, Alberta, with 279 kg and Ontario Power Generation's Nanticoke Generating Station in Nanticoke, Ontario, with 226 kg.

### Dioxins and Furans

Dioxin and furans are persistent, bioaccumulative toxics. They are a family of chemicals some members of which are considered to be carcinogens or suspected to be neurotoxicants, developmental toxicants and endocrine disruptors. Dioxins and furans can come from a number of sources, including incomplete combustion such as backyard burning, agricultural field burning, incineration, and industrial sources. Dioxins and furans can travel far from their source. Human exposure to dioxins and furans occurs largely

through food. Dioxins and furans enter the food chain when animals eat contaminated plants or feed, or when fish consume contaminated water or food.

Dioxins and furans were required to be reported to NPRI and TRI for the first time in the 2000 reporting year. However, the reporting requirements differed so the data on dioxins and furans are not comparable.

About 5 percent of all TRI facilities reported releasing or transferring dioxins and furans in 2001. TRI facilities reported an increase of 7 percent in total releases on- and off-site of dioxins and furans from 2000 to

2001 (in grams-iTEQ), with chemical manufacturers reporting the largest amounts. (See **Chapter 10**, Table 10-9.)

Only certain NPRI facilities must report on dioxins and furans based on activities or processes used at the facility. About 13 percent of all NPRI facilities reported on dioxins and furans in 2001. NPRI facilities reported a 44-percent decrease in total releases on- and off-site from 2000 to 2001, with the paper products industry reporting the largest amount of releases in 2001. (See **Chapter 10**, Table 10-11.)

### Sound Management of Chemicals Program

The CEC Sound Management of Chemicals (SMOC) program is in the process of implementing the North American Regional Action Plan (NARAP) on mercury and is developing a NARAP on dioxins, furans and hexachlorobenzene. A Decision Document has been prepared on lead, and it contains recommendations for specific actions by the three countries. The SMOC substance-specific NARAPs outline:

- specific objectives for reducing exposure to the substances of North American ecosystems, fish and wildlife, and especially humans, and preventing and promoting continuing reductions in anthropogenic releases to the environment of the substances;
  - current conditions in each country; and
  - joint and individual actions the three governments can take to improve the capacity in the region to reduce the use and release of, and exposures to, the chemical.
- See <[www.cec.org](http://www.cec.org)> for further details.

### Basic Elements of an Effective PRTR

While recognizing that individual countries will design PRTRs to meet their own needs and capacities, Resolution 00-07 of the CEC Council sets forth a set of basic elements considered central to the effectiveness of PRTR systems, which include:

- reporting on individual substances;
- reporting on individual facilities;
- covering all environmental media (i.e., releases to air, water, land and underground injection and transfers off-site for further management);
- mandatory, periodic reporting (i.e., annually);
- public disclosure of reported data on a facility- and chemical-specific basis;
- standardized reporting using computerized data management;
- limited data confidentiality and an indication of what is being held confidential;
- comprehensive scope; and
- a mechanism for public feedback to improve the system.

For more information on PRTRs in North America and their characteristics, see **Chapter 1**.

### Become Involved in the Development of *Taking Stock*

*Taking Stock* is developed with the advice of governments, industry and nongovernmental organizations from the three North American countries. Each year, a consultative meeting is held to discuss options for the upcoming report and provide updates on the national PRTR programs.

A public comment period follows the meeting. *Taking Stock* is developed taking into account the feedback from the meeting and written comments. The CEC would like to thank everyone involved in the development of the PRTR program for their contribution of ideas, suggestions and time.

For more information or to get involved in the CEC's North American PRTR project, please contact:

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Canada H2Y 1N9  
Tel: (514) 350-4300; Fax: (514) 350-4314  
<vshantora@cceintl.org>

### Public Access to Canadian National Pollutant Release Inventory Data and Information

Information on NPRI, the annual report, and the databases can be obtained from Environment Canada's national office:

Headquarters:

Tel: (819) 953-1656

Fax: (819) 994-3266

NPRI data on the Internet, in English: <[www.ec.gc.ca/pdb/npri/npri\\_home\\_e.cfm](http://www.ec.gc.ca/pdb/npri/npri_home_e.cfm)>

NPRI data on the Internet, in French: <[www.ec.gc.ca/pdb/npri/npri\\_home\\_f.cfm](http://www.ec.gc.ca/pdb/npri/npri_home_f.cfm)>

e-mail: [npri@ec.gc.ca](mailto:npri@ec.gc.ca)

Pollution Watch Scorecard home page: <[www.pollutionwatch.org/](http://www.pollutionwatch.org/)>

### Additional Information on Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC)

Semarnat

Dirección de Gestión Ambiental

Av. Revolución 1425 - 9

Col. Tlacopac, San Angel

01040 Mexico, D.F.

Tel: (525) 55 624-3470

Fax: (525) 55 624-3584

Semarnat on the Internet: <[www.semarnat.gob.mx](http://www.semarnat.gob.mx)>

Cédula de Operación Anual: <[sat.semarnat.gob.mx/dgmic/tramites/requisitos/r03-001.shtml](http://sat.semarnat.gob.mx/dgmic/tramites/requisitos/r03-001.shtml)>

### Public Access to US Toxics Release Inventory Data and Information

The EPA's TRI User Support (TRI-US), (800) 424-9346 within the United States or (202) 260-1531, provides TRI technical support in the form of general information, reporting assistance, and data requests.

TRI information and selected data on the Internet: <[www.epa.gov/tri](http://www.epa.gov/tri)>

Online Data Access:

TRI Explorer: <[www.epa.gov/triexplorer](http://www.epa.gov/triexplorer)>

EPA's Envirofacts: <[www.epa.gov/enviro/html/toxic\\_releases.html](http://www.epa.gov/enviro/html/toxic_releases.html)>

RTK-NET: <[www.rtk.net](http://www.rtk.net)>

National Library of Medicine's Toxnet (Toxicology Data Network) computer system: <[toxnet.nlm.nih.gov/](http://toxnet.nlm.nih.gov/)>

Environmental Defense Scorecard home page: <[www.scorecard.org](http://www.scorecard.org)>

### Public Access to North American Matched Data

Though the CEC's *Taking Stock Online* database: <[www.cec.org/takingstock/](http://www.cec.org/takingstock/)>