

# TAKING STOCK 2001

North American Pollutant Releases and Transfers

Commission for  
Environmental Cooperation  
of North America

June 2004



## Disclaimer

The National Pollutant Release Inventory (NPRI) and the Toxics Release Inventory (TRI) data sets are constantly evolving, as facilities revise previous submissions to correct reporting errors or make other changes. For this reason, both Canada and the United States “lock” their data sets on a specific date and use the “locked” data set for annual summary reports. Each year, both countries issue revised databases that cover all reporting years.

The CEC follows a similar process. For the purposes of this report, the TRI data set of June 2003 and the NPRI data set of November 2002 were used. The CEC is aware that changes have occurred to both data sets for the reporting year 2001 since this time that are not reflected in this report. These changes will be reflected in the next reports, which will summarize the 2002 data and make year-to-year comparisons with previous years’ data.

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## Preface

A decade ago, Canada, Mexico and the United States decided to come together under a common umbrella of free trade known as the North American Free Trade Agreement (NAFTA). Recognizing the need to safeguard the environment within this new paradigm, the countries also signed an environmental side accord, the first of its kind in the world, called the North American Agreement on Environmental Cooperation. The Commission for Environmental Cooperation (CEC) was established to guide its implementation. Our mission is to foster the conservation, protection, and enhancement of the North American environment in the context of increasing economic and trade links, through public involvement and collaboration among the three countries.

The CEC's annual *Taking Stock* reports continue to be a cornerstone of these efforts. Built on data collected by the national governments through their pollutant release and transfer registers (PRTRs), *Taking Stock* provides a North American perspective on the generation and handling of toxic substances by industrial facilities. The "matched" data presented in *Taking Stock*, in which we examine the sectors and chemicals that are common to the national systems, provide a common yardstick for analyzing what is happening across the continent with respect to the release, recycling and treatment of toxic chemicals generated by industry. Data from the 2001 reporting year, the most recent data publicly available at the time this report was initiated, is presented in this report, along with trend data dating back to 1995.

We are able to see, for example, the progress made by certain industrial sectors, such as the chemical manufacturing and plastics products sectors, in reducing their toxic releases, as well as areas where greater efforts are needed. With seven-year trend data now available, we can report that overall releases and transfers are in gradual decline, with this present report showing a reduction of 14 percent from 1995–2001 for the manufacturing sectors. This report confirms that the facilities that report the largest amounts are generally reducing their numbers, but we also see that the large group of facilities that report relatively smaller amounts (less than 100 tonnes per year) are increasing their releases and transfers, on average, in nearly every category. We also continue to be concerned about the huge amounts of toxic substances—over 2.95 million tonnes in 2001—that are being released and transferred into and through our communities each year. Over 13 percent of the amounts released by US and Canadian facilities in 2001 are of substances known to cause cancer, reproductive or developmental harm.

Tracking industrial pollution is a complex business, with numerous factors at play. In each *Taking Stock* report, we select a topic for special analysis. These analyses enable us to dig deeper into the data and try to get at the reasons why certain trends or results are in evidence. In this year's report, we have taken a closer look at reporting on releases of toxic substances to the air.

A factory's billowing smokestack is a commonly evoked image when we talk about industrial pollution. While great strides have been made in cleaning up this image, our special look at air releases in this year's report shows that facilities continue to release large quantities of toxic air pollution. Industrial facilities in North America reported releasing 755,500 tonnes of toxic chemicals directly to the air in 2001, about one-quarter of the total amounts of chemical releases and transfers reported to the national registers of Canada and the United States (Mexican data are not yet available). The electricity generating sector (only coal and oil-fired power plants are covered in the report) accounted for almost half of this air pollution, with hydrochloric acid and sulfuric acid topping the list in terms of quantities. Particularly potent and persistent toxicants, such as mercury, are also emitted to the air in large amounts by the facilities in this sector (almost 45,800 tonnes in 2001), as well as by other sectors, including chemical manufacturers (over 8,400 tonnes in 2001) and primary metals facilities such as steel mills (over 7,000 tonnes in 2001). With mercury's ability to cause serious and lasting neurological damage, particularly in children, these numbers should be of concern to all of us.

This year's report also features, in Chapter 3, the evolution of the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC) which, pending the passage of regulations anticipated this year, is slated to become fully mandatory and publicly accessible. This will be a crowning achievement for Mexico, and a great stride forward for continent-wide reporting and public access to information in North America.

Equally important to our ability to examine industrial pollution using a common metric, *Taking Stock* is also a vehicle for providing environmental information to communities, stakeholders and the public in the spirit of right-to-know. With North America becoming increasingly integrated through economic and social ties, it is essential that all citizens, regardless of where they live, have access to information on activities that impinge on the health of their shared environment. The data reported in *Taking Stock* are important indicators for policy makers, regulators, facility managers, CEOs, community groups, researchers and citizens to inform their various efforts to assess, reduce and prevent pollution.

As we reach the close of the first decade of NAFTA, we hope that this report will help guide our collective pursuit of a clean and sustainable economy. As always, we welcome your suggestions on how *Taking Stock* can continue to evolve and better meet your needs.

William Kennedy  
Executive Director

## Acknowledgements

Numerous groups and individuals have played important roles in bringing this report to fruition.

Officials from Environment Canada, Semarnat and the US EPA contributed vital information and assistance throughout the report's development. This past year we have worked with the following officials from these agencies: Canada—Alain Chung, François Lavallée and Anne Legault; Mexico—Sergio Sánchez Martínez, Maricruz Rodríguez Gallegos, Juan David Reyes Vázquez, Irma Fabiola Ramírez Hernández, Floreida Paz Benito, Victor Manuel Sánchez Rodríguez, Pedro Ramírez Ramírez; and the United States—John Dombrowski and Michelle Price.

Special thanks and recognition go to the team of consultants who worked tirelessly to put this report together: Catherine Miller of Hampshire Research Institute (United States), Sarah Rang of Environmental Economics International (Canada), and Isabel Kreiner and Ignacio Alfaro Luna of UV Lateinamerika S. de R.L. de C.V. (Mexico). Thanks also go to Hampshire Research Institute, in particular, to Rich Puchalski and Catherine Miller for their work in creating the *Taking Stock Online* web site <[www.cec.org/takingstock/](http://www.cec.org/takingstock/)>.

A number of CEC secretariat staff have been involved in the development and launching of this report and the companion website. Erica Phipps, in her former capacity as PRTR program manager and now as a consultant to the CEC, has coordinated the development of this report and guided the overall *Taking Stock* series. Marilou Nichols, program assistant, provided continuing assistance throughout this process. Victor Shantora, head of the Pollutants and Health program, kept us focused on the big picture, on the essential nature of this report within the pollution prevention and reduction policy arena. The CEC's Communications staff handled the tremendous task of coordinating the editing, translation and publication of the document in the three languages and was instrumental in coordinating the public release of the document.

Above all, CEC would like to thank the many individuals and groups from throughout North America who have generously given their time and ideas to the development of this report through their participation in the Consultative Group for the North American PRTR Project.

<b>Acronym</b>	<b>Meaning</b>
BAF/BCF	Bioaccumulation/bioconcentration factor
Canacindra	<i>Cámara Nacional de la Industria de la Transformación</i> (National Chamber for the Processing Industry)
CAS	Chemical Abstract Service
CEC	Commission for Environmental Cooperation
CEPA	Canadian Environmental Protection Act
CFC	Chlorofluorocarbon
C.I.	Color index
CMAP	<i>Clasificación Mexicana de Actividades y Productos</i> (Mexican Activities and Products Classification)
COA	<i>Cédula de Operación Anual</i> (Annual Certificate of Operation)
EPA	US Environmental Protection Agency
EPCRA	US Emergency Planning and Community Right-to-Know Act
HCB	Hexachlorobenzene
HCFC	Hydrochlorofluorocarbon
HPV	High production volume
IARC	International Agency for Research on Cancer
IFCS	Intergovernmental Forum on Chemical Safety
INE	<i>Instituto Nacional de Ecología</i> (Mexican National Institute of Ecology)
INEGI	<i>Instituto Nacional de Estadística Geografía e Informática</i> (Mexican National Institute of Statistics, Geography and Informatics)
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
iTEQ	International Toxic Equivalents
kg	Kilograms
LGEEPA	<i>Ley General del Equilibrio Ecológico y la Protección al Ambiente</i> (General Ecological Equilibrium and Environmental Protection Law)
LOQ	Level of Quantification
MSDS	Material Safety Data Sheet
MSTP	Municipal sewage treatment plant
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NAPRI	North American Pollutant Release Inventory
NCASI	National Council of the Paper Industry for Air and Stream Improvement

NGO	Non-governmental organization
NOM	<i>Norma Oficial Mexicana</i> (Mexican Official Standard)
NMX	<i>Norma Mexicana</i> (Mexican Standard)
NPRI	National Pollutant Release Inventory (PRTR for Canada)
NTP	US National Toxicological Program
ODP	Ozone depleting potential
OECD	Organization for Economic Cooperation and Development
OSHA	US Occupational Safety and Health Administration
PAC/PAH	Polycyclic aromatic compounds/polycyclic aromatic hydrocarbons
PBT	Persistent bioaccumulative toxicant
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PDIA	<i>Programa de Desarrollo Institucional Ambiental</i> (Program of Institutional Environmental Development)
POTWs	US publicly owned treatment works
PM	Particulate matter
PRTR	Pollutant release and transfer register
RETC	<i>Registro de Emisiones y Transferencia de Contaminantes</i> (PRTR for Mexico)
Semarnat	<i>Secretaría de Medio Ambiente y Recursos Naturales</i> (Mexican Secretariat of the Environment and Natural Resources)
SIC	Standard Industrial Classification
TCE	Trichloroethylene
TEF	Toxic equivalency factor
TEQs	Toxic equivalents
TRI	Toxics Release Inventory (PRTR for US)
UN/ECE	United Nations Economic Commission for Europe
UNITAR	United Nations Institute for Training and Research
US	United States
VOC	Volatile organic compound
WHO	World Health Organization

**Carcinogens**

The International Agency for Research on Cancer <www.iarc.fr> and the US National Toxicological Program <ntp-server.niehs.nih.gov> evaluate chemical substances for their cancer-causing potential. Fifty-eight chemicals in the matched data set have been designated as known or suspected carcinogens by one or both agencies.

**Chemical category**

A group of closely-related individual chemicals that are counted together for purposes of PRTR reporting thresholds and release and transfer calculations. The chemicals are reported to the PRTRs under a single name.

**Energy recovery**

The combustion or burning of a wastestream to produce heat.

**Environmental management hierarchy**

The types of waste management plus source reduction prioritized as to environmental desirability. In order of preference, the one most beneficial to the environment is source reduction (prevention of pollution at its source), followed by recycling, energy recovery, treatment, and disposal as the least desirable option.

**Form**

The standardized data that are submitted for each chemical by a facility. In NPRI one form is submitted for each chemical. In TRI generally one form is submitted for each chemical. However, more than one may be submitted in cases where different operations at a facility use the same chemical.

**Fugitive emissions**

Air emissions that are not released through stacks, vents, ducts, pipes, or any other confined air stream. Examples are equipment leaks or evaporation from surface impoundments.

**Incineration**

A method of treating solid, liquid, or gaseous wastes by burning.

**Matched data set**

Compilation of data for reporting elements that are comparable among the PRTRs. The “matched” data set selects from each PRTR only those industry sectors and those chemicals that are reported the same under both systems. Which industries and chemicals are included in the matched data set may differ from year to year depending on changes in reporting in one or the other of the systems.

**Nonpoint sources**

Diffuse sources such as from mobile sources (that is, motor vehicles and other forms of transportation), area sources (such as, agriculture or parking lots), or small sources (such as, dry cleaners or automobile service stations). These sources are not generally covered in PRTRs but may be substantial contributors to pollution of the chemicals reported under PRTRs.

**Nonproduction-related waste**

Waste that is generated as a one-time event, including large accidental spills, waste from a remedial action to clean up the environmental contamination from past disposal practices, or other wastes not occurring as a routine part of production operations. This does not include spills that occur as a routine part of the production operations that could be reduced or eliminated by improved handling, loading or unloading procedures.

**Off-site releases**

Chemicals in waste that are moved off the grounds of the facility and sent to other facilities or other locations for disposal. They are activities that are similar to on-site releases, but that occur at other locations. They also include metals sent to disposal, treatment, sewage, and energy recovery. This approach recognizes the physical nature of metals and acknowledges that metals in such wastes are not likely to be destroyed or burned and so may eventually enter the environment.

**Off-site transfers**

Chemicals in waste that are moved off the grounds of the facility, including transfers of waste sent to other facilities or other locations, such as hazardous waste treatment facilities, municipal sewage treatment plants or landfills. See also off-site releases and transfers for further management.

**On-site**

Within the boundaries of the facility, including areas where wastes may be stored, treated or disposed of that are separate from the production processes but still within the boundaries of the reporting facility.

**On-site releases**

Chemicals in waste released on-site to air, water, underground injection, or land at the location of the reporting facility.

**Otherwise used**

Any use of a chemical that is not manufacturing or processing, such as the use as a chemical processing aid, a manufacturing aid or an ancillary use during the production process.

**Ozone depleter**

A substance that contributes to the destruction of the stratospheric ozone layer, a layer of the atmosphere which lies approximately 15–40 kilometers above the Earth’s surface.

**Point source**

The origin of known or deliberate environmental releases from fixed points such as smokestacks and wastewater discharge pipes.

**Pollution prevention**

A strategy for reduction of pollution that involves preventing the generation of waste in the first place, rather than cleaning it up, treating it, or recycling it after it has been produced. TRI and NPRI indicate actions undertaken to reduce the generation of waste. NPRI facilities may also indicate on-site reuse, recycling or recovery as a category of action to prevent pollution; TRI source reduction (pollution prevention) reporting does not include this category. See also source reduction activity.

**Processing use**

The use of a chemical as part of a chemical or physical process, including as a reactant, in processing a mixture or formulation, or as an article component.

**Production ratio/activity index**

The ratio of the production level associated with the chemical in the current reporting year to the previous year's level.

**Production-related waste**

A term used by the US EPA to denote chemical waste generated as a result of routine production that could potentially be reduced or eliminated by improved handling, more efficient processes, change of product or in product quality, or change in raw materials. This does not include spills resulting from large-scale accidents or waste from remedial actions to clean up contamination. As used by the US EPA, it includes chemicals released, sent off-site for disposal, recycling and energy recovery, and recycled or used for energy recovery on-site.

**Recycling**

Extraction of a chemical from a manufacturing process stream that would otherwise have been treated as waste, with the extracted chemical being reused in the original production process, in another production process, or sold as a separate product.

**SIC codes**

The standard industrial classification codes used to describe the types of activities or operations performed by an industrial facility. The actual groups of activities or operations (and, therefore, the codes) differ from country to country. The North American Industrial Classification System (NAICS) has been established and is in the process of being adopted by the United States, Canada and Mexico.

**Source Reduction Activity**

The types of activities undertaken to accomplish source reduction. The term includes equipment or technology modifications, process or procedure modifications, reformulations or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. See also pollution prevention.

**Total Releases**

The sum of on-site and off-site releases, including the amounts released to the air, water, land and underground injection at the facility and all chemicals sent to other locations for disposal and any metals sent to treatment, sewage or energy recovery.

**Total Reported Amounts**

The sum of on- and off-site releases and transfers to recycling and other transfers for further management. This is the best estimate of a facility's total amount of chemicals requiring management that is available for the PRTR data.

**Tonne**

A metric tonne, which is 1,000 kilograms or 1,1023 short tons or 0.9842 long tons.

**Transfers for further management**

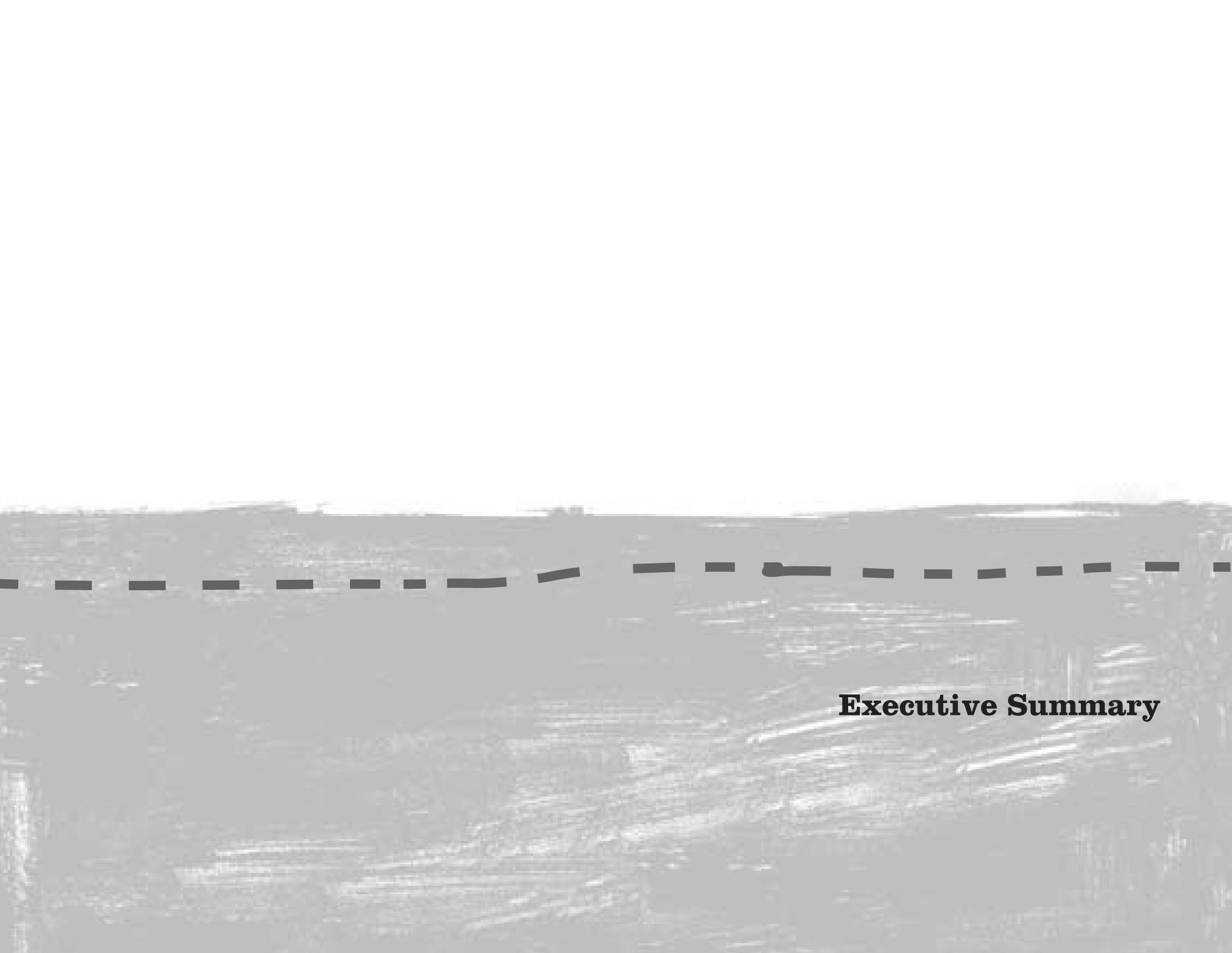
Chemicals in waste that are sent from the reporting facility to a facility that treats (including sewage treatment plants) or burns the chemical for energy recovery.

**Treatment**

A variety of processes that change the chemical in waste into another substance. Treatment also includes physical or mechanical processes that reduce the environmental impact of the waste. This is the term used in TRI reports to summarize chemical, physical, biological treatment and incineration.

**Waste**

The amount of the chemical that does not become a product and is not consumed or transformed during the production process. PRTRs differ as to whether materials destined for recycling or energy recovery are included or not in their definition of waste.



## **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/sedes0](http://www.aguascalientes.gob.mx/sedes0)>.

### 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	1997 Number	Number of Facilities Reporting			2001 Number
		1998 Number	1999 Number	2000 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.

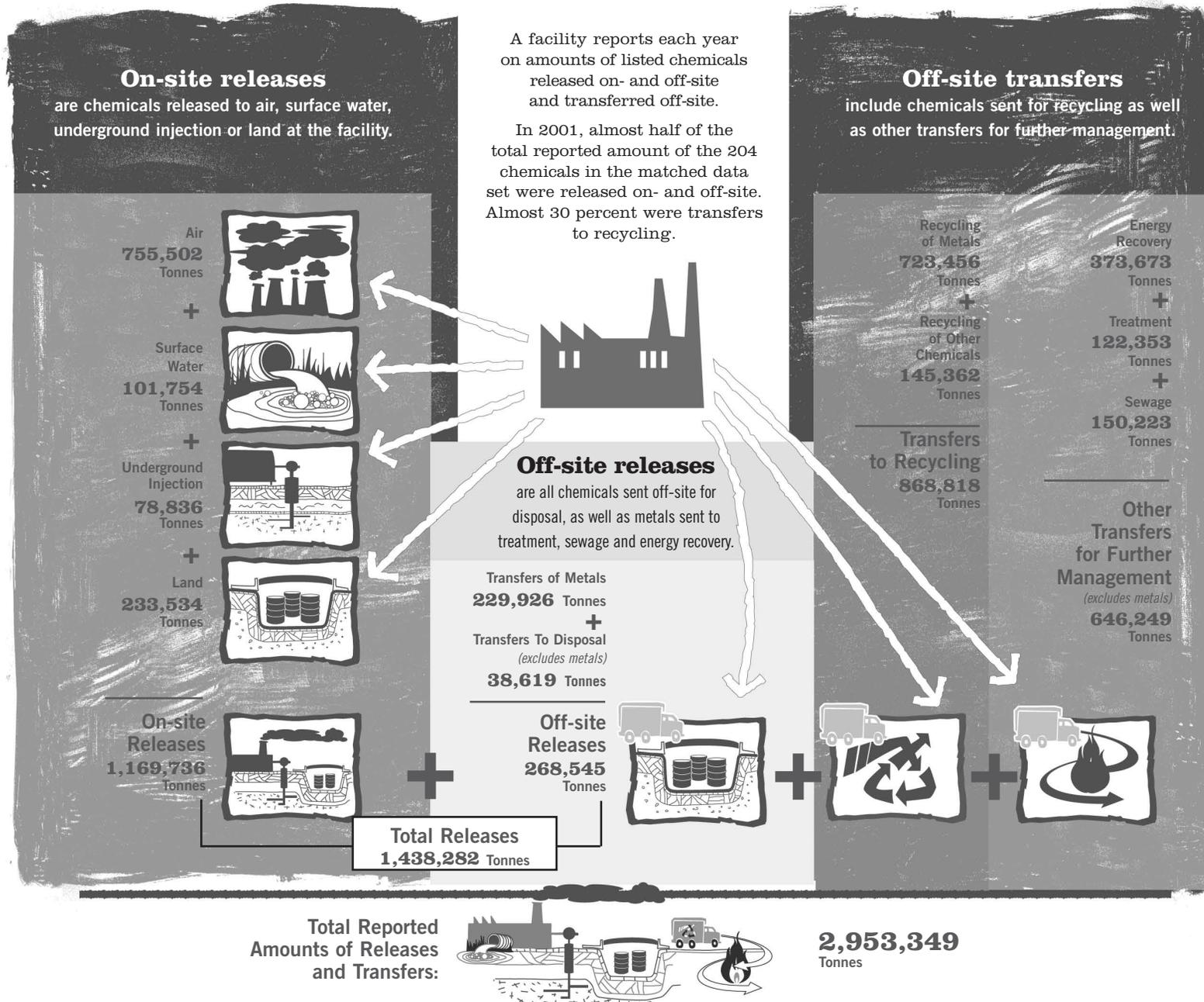
\* The first year of reporting found many submissions incomplete.

### 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).

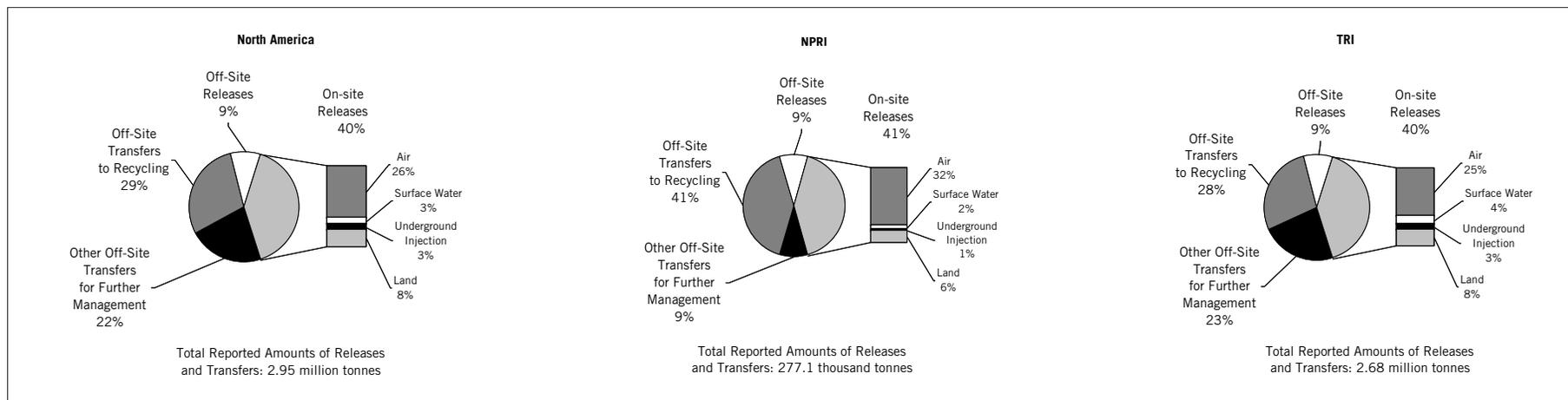
Only Sections I and II (general facility information and air emissions of criteria air contaminants) of the COA form were mandatory for the years 1997 through 2001. For the voluntary Section V, which contains information on releases and transfers of substances, about 4 percent of the facilities reported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

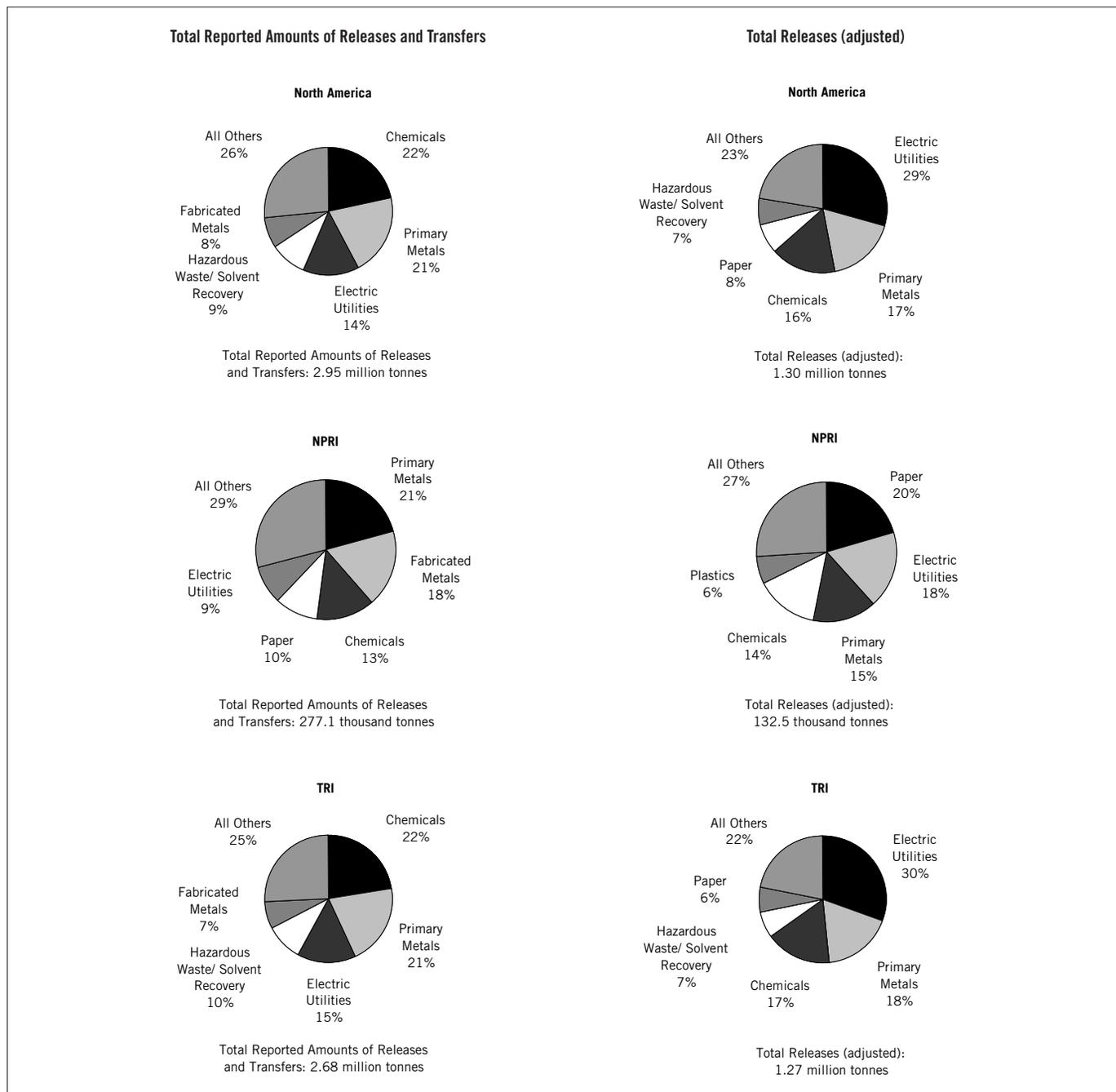
## Industry Sectors with the Largest Amounts in North America in 2001

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).

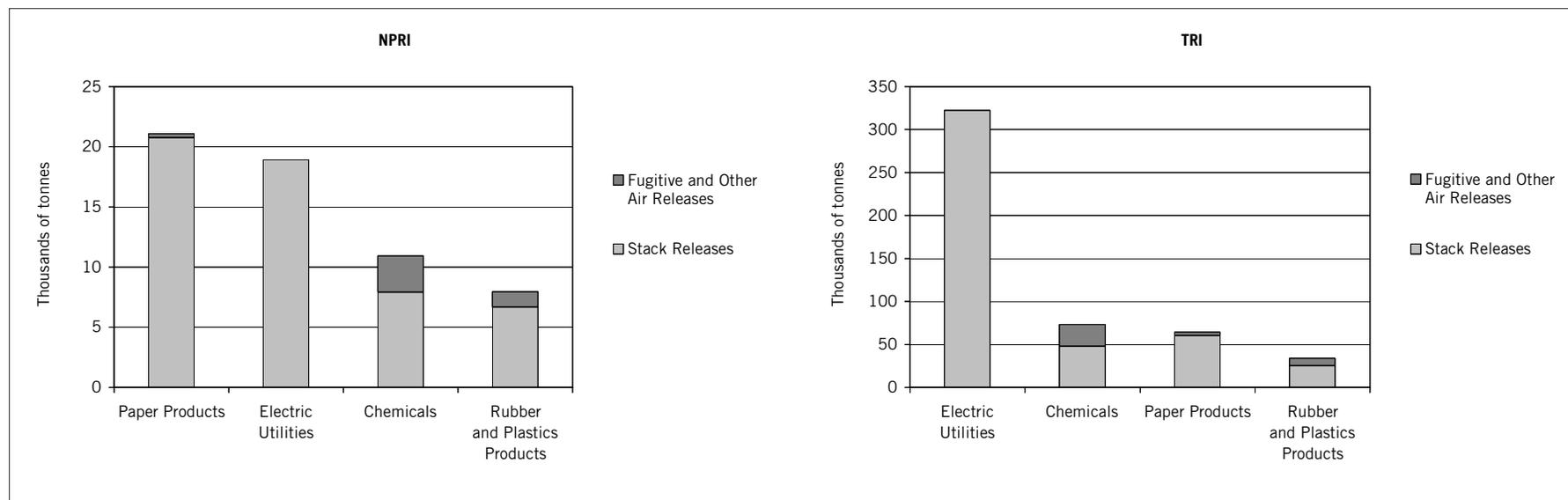
In TRI, electric utilities and the primary metals and chemical manufacturing sectors reported the largest total releases. These three sectors accounted for over 60 percent of total TRI releases. For NPRI, paper products, electric utilities and primary metals facilities reported the largest total releases.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

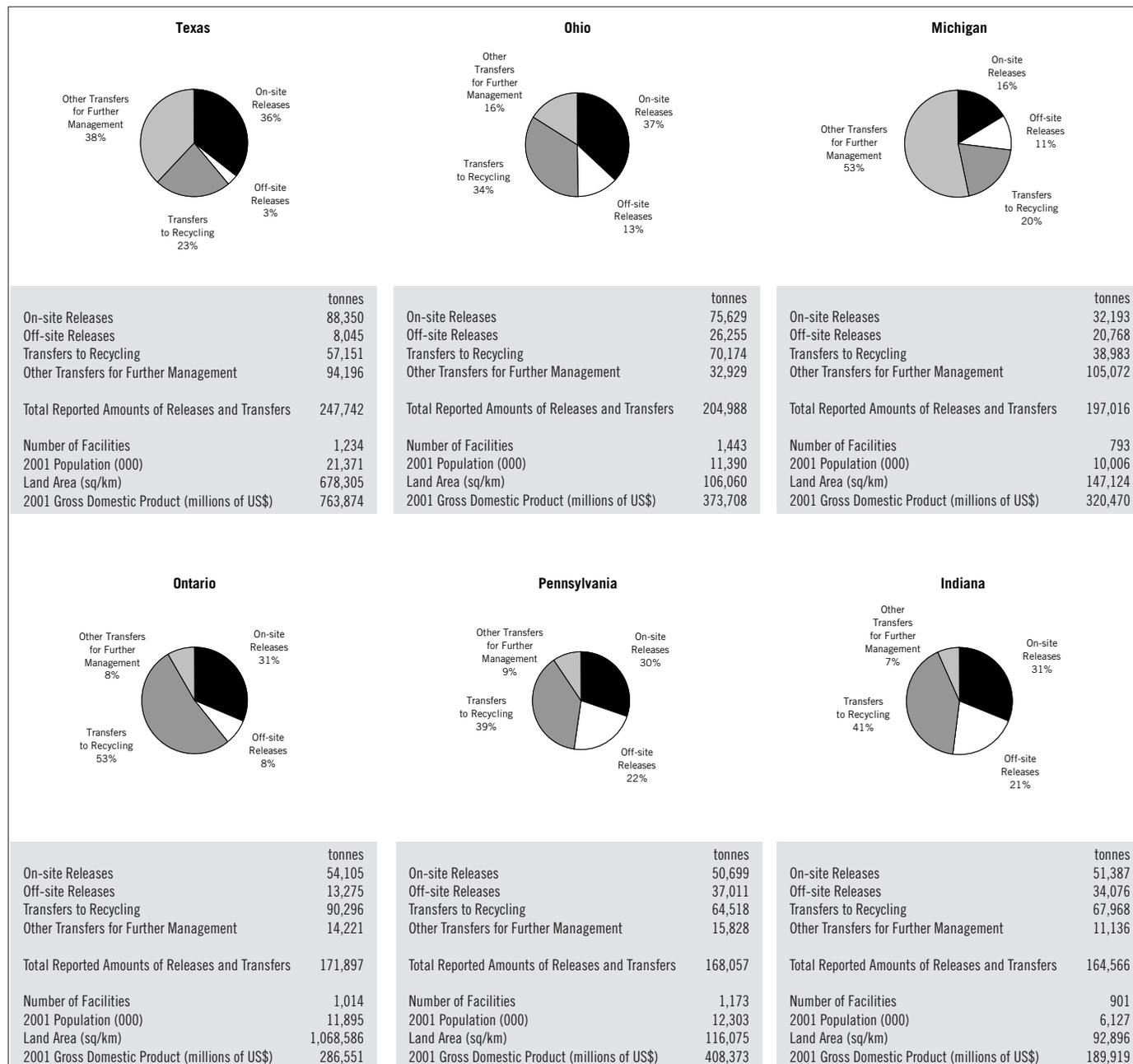
Hydrochloric acid was the chemical with the largest air releases, and the electric utility sector was the major reporter of this chemical. Most of the air releases of hydrochloric acid were through the stack; less than 1 percent was as fugitive releases. Methanol was the chemical with the second-highest 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).

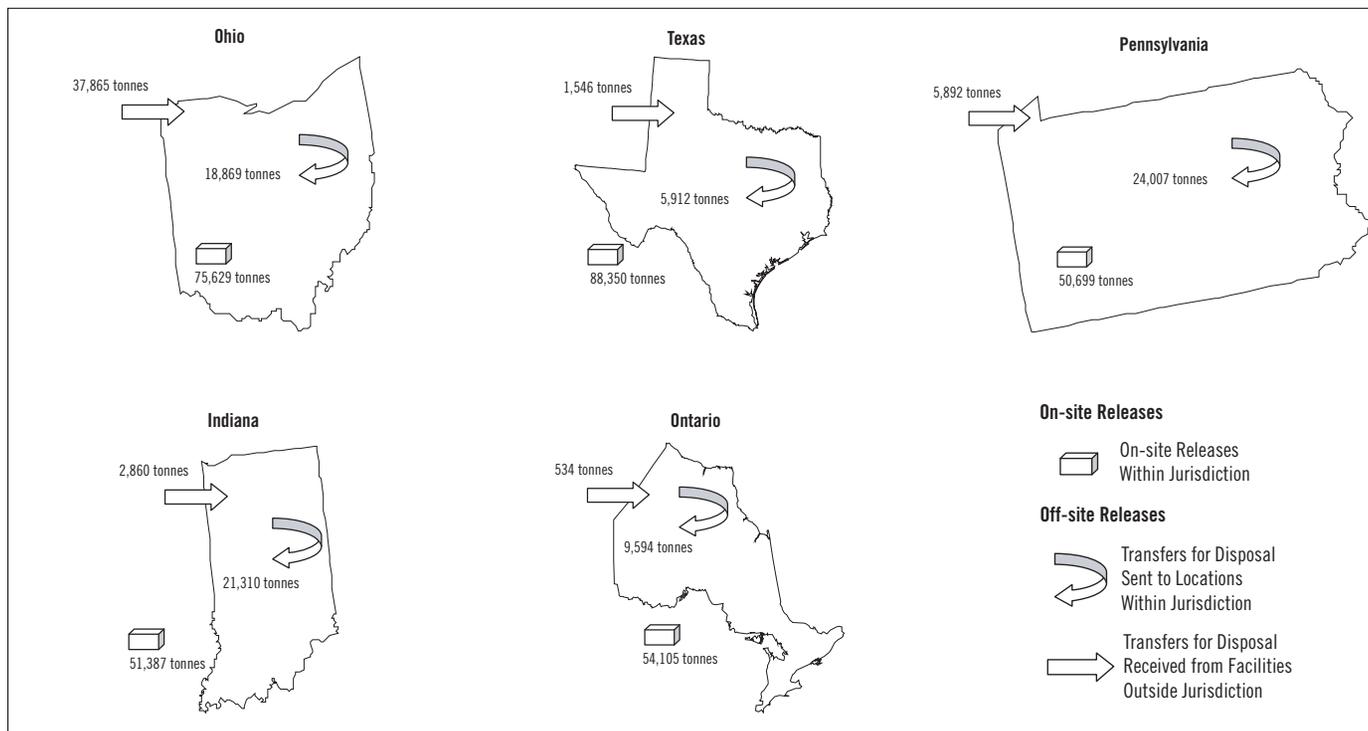
Facilities in Texas released the largest amounts of chemicals on-site. Texas facilities also reported the largest amounts of chemicals injected underground at facility sites of any jurisdiction in North America. Ohio had the largest total releases, mainly air releases from electric utilities. Michigan 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

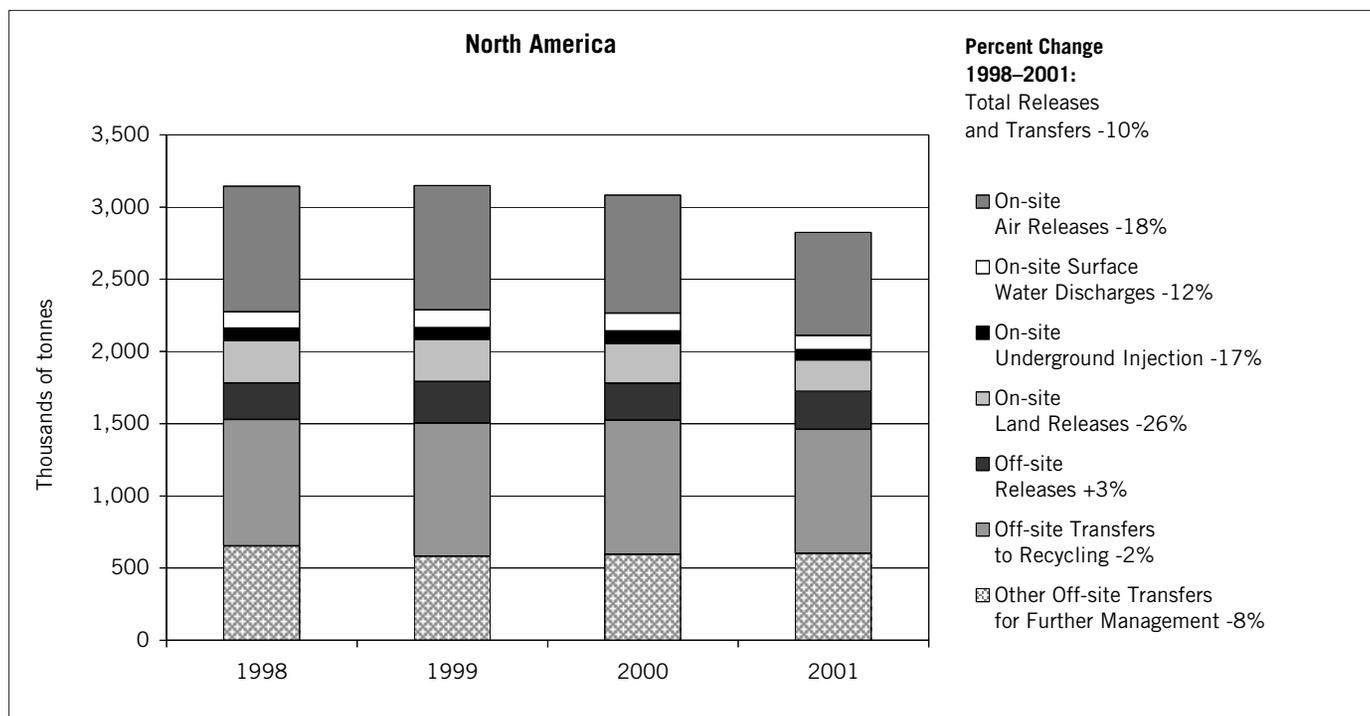
In North America, a relatively small number of facilities account for a large proportion of releases. The 15 facilities with the largest total releases (on- and off-site) accounted for 11 percent of total releases reported in 2001 (Table 3). Fourteen of the 15 facilities were located in the US. Six were 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 (UII)
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 (UII)
<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. UII=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 developmental 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.cec.org/takingstock/>

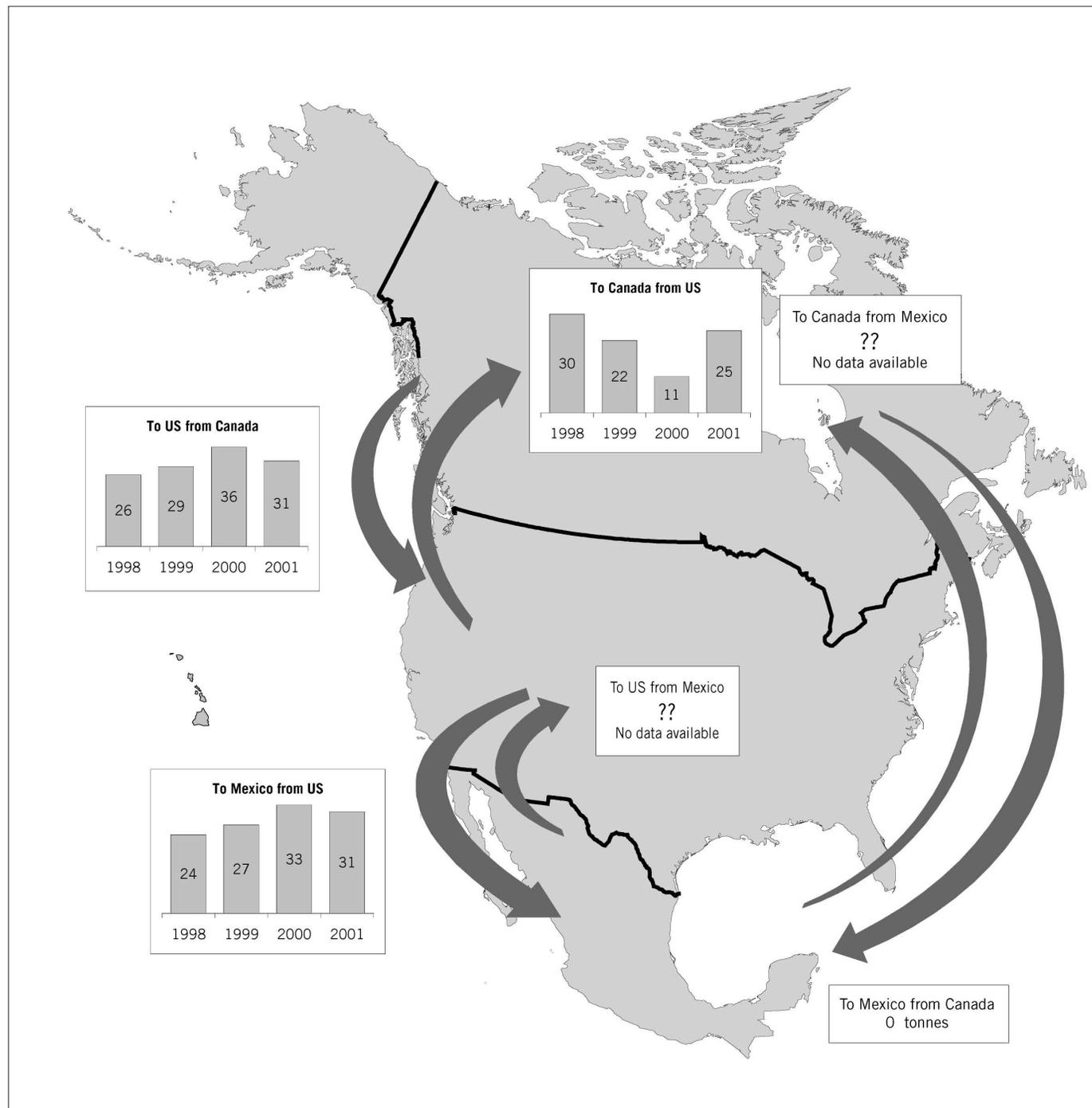
To find out which facilities had the largest change in your province or state using *Taking Stock Online*:

- 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

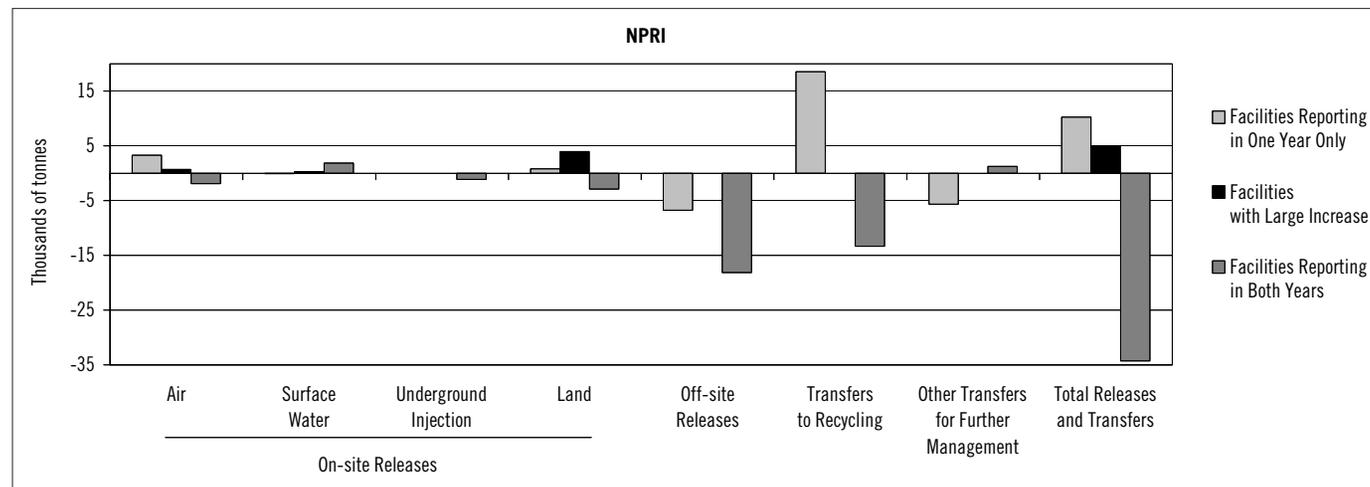
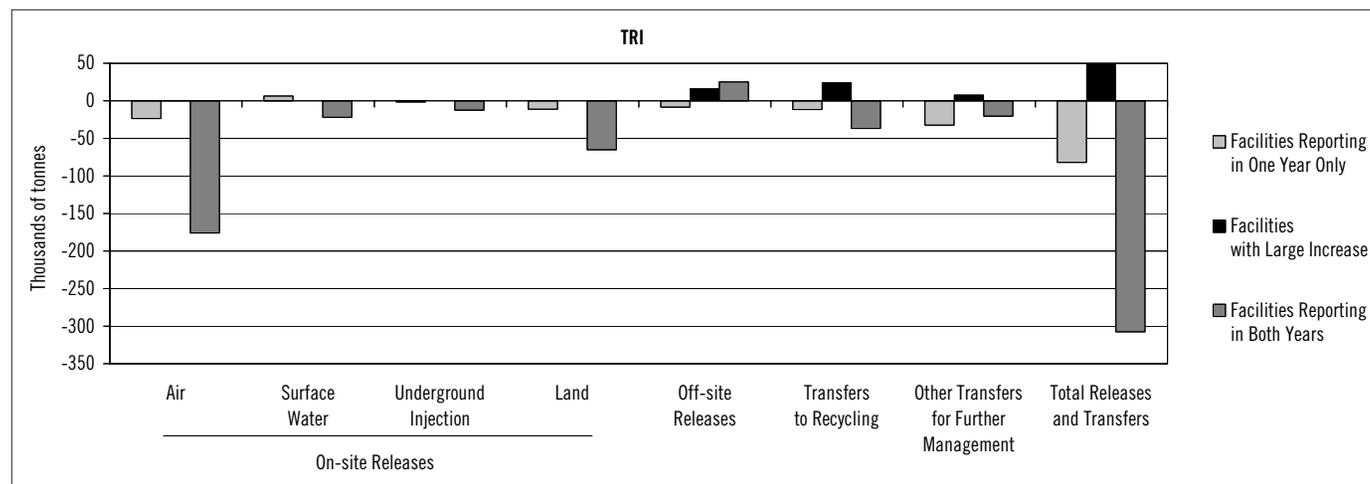
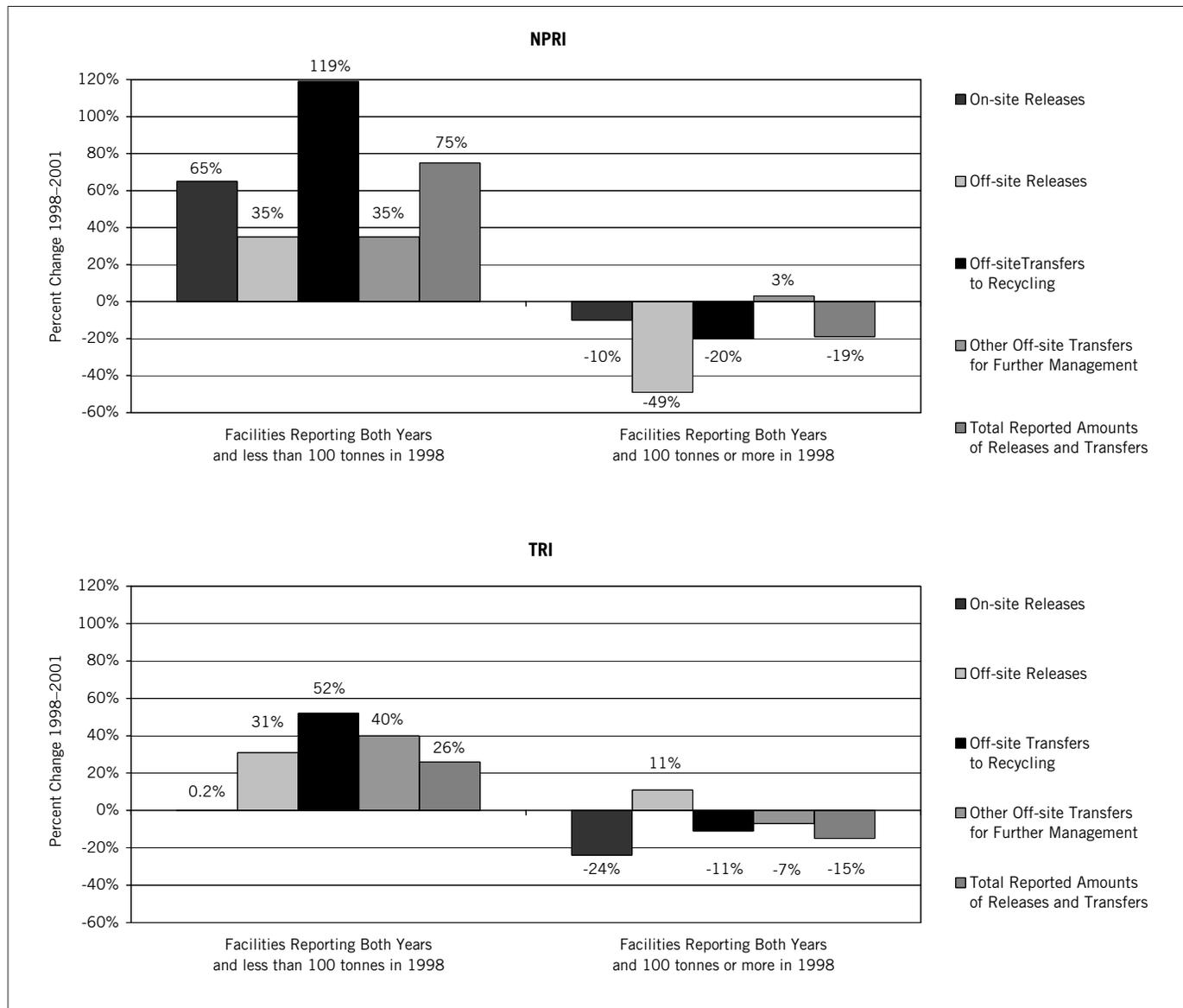


Figure 9. Change in TRI Releases and Transfers due to Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1998–2001



**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:

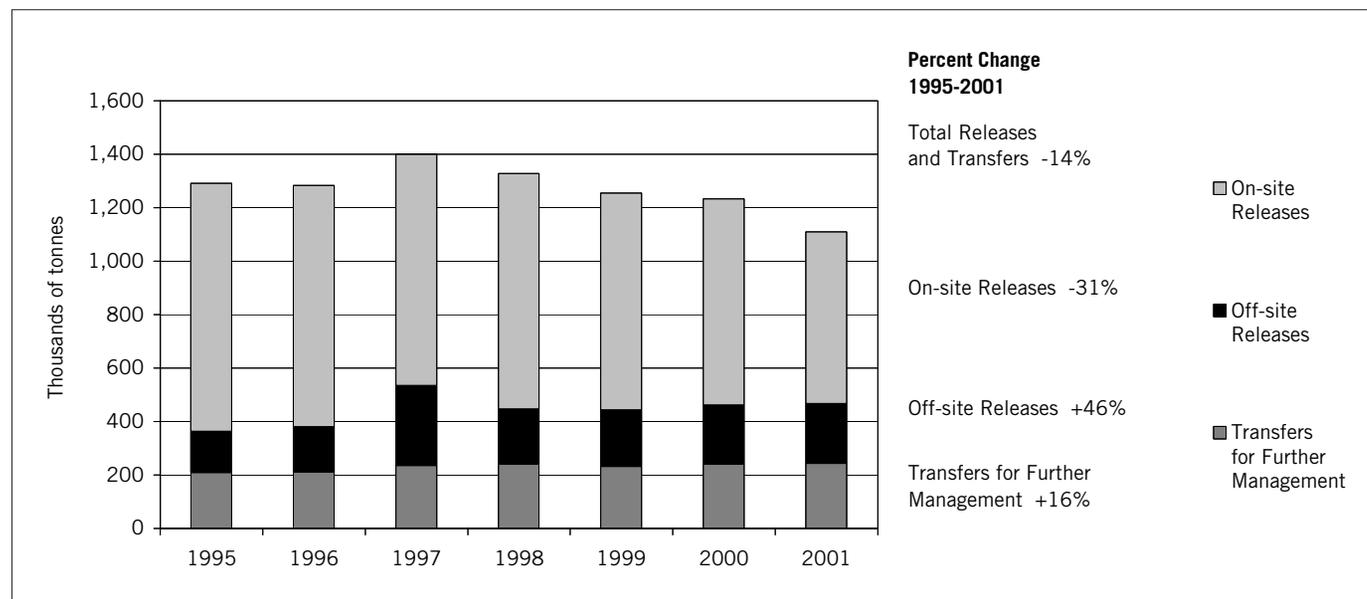
- 155 chemicals,
- manufacturing industries, and
- on- and off-site releases and transfers to treatment and sewage.

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@ccemtl.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/)>

**Overview of PRTRs in North America**



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## Key Findings

- **Chapter 1** provides an **introduction** to PRTRs, the CEC and the *Taking Stock* web site. It describes the similarities and differences in PRTR programs in the United States, Canada and Mexico, and information to assist users in understanding the data.
- **Chapter 2** describes the **methodology** for matching the common chemicals and industries from the PRTRs in Canada and the United States for this report (comparable data for Mexican facilities for 2001 are not available).
- **Chapter 3** describes the **progress in Mexico** in developing a PRTR. It discusses the historical development of the *Registro de Emisiones y Transferencia de Contaminantes* (RETC), current status and state-level efforts.
- **Chapter 4** presents data on **total releases and transfers in 2001**, based on the matched North American data set.
- **Chapter 5** presents data for **on-site and off-site releases in 2001**. These data cover releases on-site to the air, surface waters, underground injection and land. The analyses also cover off-site releases, i.e., the amounts that facilities transfer to other locations for disposal.
- **Chapter 6** presents **changes in releases and transfers for 1998–2001**. The data include chemicals commonly reported over this time period and all industry sectors and transfer categories in the matched data set.
- **Chapter 7** presents **trends in releases and transfers for 1995–2001**. The data include all chemicals commonly reported over this time period, but do not include transfers to recycling or data from the recently added industrial sectors.
- **Chapter 8** presents data on **transfers**, including cross border transfers.
- **Chapter 9** presents analyses for special groups of chemicals in the matched data set, including carcinogens and California Proposition 65 chemicals, and a special analysis of air emissions.
- **Chapter 10** presents analyses of persistent, bioaccumulative toxic (PBT) chemicals, including lead, mercury, dioxins/furans, hexachlorobenzene and polycyclic aromatic compounds.
- **Appendix A** lists the **chemicals** reported under the three national PRTRs. **Appendix B** is the list of chemicals in the **matched data set**. **Appendix C** identifies **facilities** that appear in this report. **Appendix D** indicates potential **health effects** of chemicals with large totals for releases, transfers, or both. **Appendix E** indicates **uses of chemicals** with large totals for releases, transfers, or both. **Appendices F through H** show the reporting forms for 2001 for the US TRI, the Canadian NPRI, and the Mexican RETC.

## 1.1 Introduction

North Americans are concerned about the effects of chemicals on their health and the environment. Central registries of the releases and movement of toxic substances can help provide information to the public on the sources and handling of these chemicals. Known as pollutant release and transfer registers (PRTRs), these national registries are designed to track the quantities of chemicals that are released into the air, water or land or that are transferred off-site for further management or disposal. Data on releases and transfers of chemicals are submitted by individual facilities. These data are then fed into a national, publicly available database. PRTRs are a cornerstone in the effort to provide all members of society—citizens, corporate leaders, environmental advocates, researchers, government officials—with a valuable tool for setting priorities, promoting environmental improvement and tracking progress.

This report is the eighth in the annual *Taking Stock* series prepared by the Commission for Environmental Cooperation of North America (CEC). It analyzes the amounts of chemicals released and transferred by facilities. It draws from existing publicly available data from the US Toxics Release Inventory (TRI), the Canadian National Pollutant Release Inventory (NPRI) and, to a limited extent, from the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC).

*Taking Stock 2001* is available from the CEC in hard copy or on the CEC web site at <[www.cec.org](http://www.cec.org)>. Also, searches of the database to answer customized questions about chemicals, sectors, facilities or time trends are available at *Taking Stock Online* <[www.cec.org/takingstock/](http://www.cec.org/takingstock/)>.

Through its annual *Taking Stock* report and web site, the CEC aims to:

- provide an overview of North American pollutant releases and transfers, thereby enabling citizens to better understand the sources and handling of industrial pollution;
- provide information to help national, state and provincial governments as well as industry and communities identify priorities for pollution reduction;
- invite reductions in North American pollutant releases and transfers through information comparison;
- enable a more informed dialogue among citizens, industry and government and foster collaborative actions towards a more healthy environment;
- provide analyses and contextual information to assist citizens in understanding North American PRTR data; and
- encourage enhanced comparability of North American PRTR systems.

The preparation of this *Taking Stock* report, as in previous years, has benefited from the valuable input and suggestions provided by a broad range of stakeholders through the annual consultative process. The CEC would like to thank those groups and individuals who have contributed their ideas, time and enthusiasm to the continued development of the *Taking Stock* series.

### 1.1.1 What are Pollutant Release and Transfer Registers?

Pollutant release and transfer registers (PRTRs) are databases instituted by legal mandate from government that require periodic reporting on specified chemical substances by facilities in certain industrial and commercial sectors. The facilities provide data, usually on an annual basis, on the amounts of these chemicals released to the air, water, land and injected underground and transferred off-site for recycling, treatment or disposal.

PRTRs are an innovative tool that can be used for a variety of purposes. PRTRs track certain chemicals and, thereby, help industry, government and citizens identify ways to decrease releases and transfers, increase responsibility for chemical use, prevent pollution and reduce waste generation. For example, many corporations use the data to report on their environmental performance and to identify opportunities for reducing/preventing pollution. Governments can use PRTR data to guide program priorities and evaluate results. Communities and citizens use PRTR data to gain an understanding of the sources and management of pollutants and as a basis for dialogue with facilities and governments.

While there are many different environmental reporting databases, the CEC Council Resolution 00-07 identified a set of basic elements that are central to the effectiveness of PRTR systems:

- reporting on individual substances;
- reporting by individual facilities;
- covering all environmental media (i.e., releases to air, water, land and underground injections, 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 indicating what is being held confidential;
- comprehensive scope; and
- mechanism for public feedback for improvement of the system.

PRTRs collect data on **individual chemicals**, rather than on the volume of wastestreams containing mixtures of substances, because this allows the compilation and tracking of data on releases and transfers of individual chemicals. **Reporting by facility** is key to locating where releases occur and who or what generated them. Much of the power of a PRTR comes from **public disclosure** of its contents. Active dissemination to a wide range of users in both raw

and summarized form is important. Publicly available, chemical- and facility-specific data allow interested persons and groups to identify local industrial sources for releases of chemicals and support regional and other geographically based analyses.

### PRTRs: A Priority Focus for CEC

The Commission for Environmental Cooperation (CEC) of North America, mandated under the terms of the North American Agreement on Environmental Cooperation, facilitates cooperation and public participation in fostering the conservation, protection and enhancement of the North American environment for the benefit of present and future generations, in the context of increasing economic, trade and social links between Canada, the United States and Mexico. The CEC recognizes the importance of pollutant release and transfer registers—such as the Toxics Release Inventory (TRI) in the United States, the National Pollutant Release Inventory (NPRI) in Canada and the *Registro de Emisiones y Transferencia de Contaminantes* (RETC) in Mexico—for their potential to enhance the quality of the North American environment.

At the Second and Third Regular Sessions of the CEC Council in 1995 and 1996, the top-ranking environmental officials of the three North American countries (the Council) committed to the creation of a North American Pollutant Release Inventory which will bring together, for the first time, existing national public information from the three countries, help improve the quality of the environment by providing the public with information to assess North American pollutant sources and risks, and serve as a model for similar efforts in other parts of the world.

At its Fourth Regular Session, in June 1997, the Council adopted Resolution 97-04, “Promoting Comparability of Pollutant Release and Transfer Registers (PRTRs),” which commits the three governments to work toward adopting more comparable PRTRs.

At its Seventh Regular Session, in June 2000, the Council passed Resolution 00-07 on “Pollutant Release and Transfer Registers,” through which it emphasized the value of PRTRs as tools for sound management of chemicals, for encouraging improvements in environmental performance, and for providing the public with access to information on pollutants in their communities.

Resolution 02-05, adopted at the Ninth Regular Session of the CEC Council in June 2002, provided for an “Action Plan to Enhance Comparability Among Pollutant Release and Transfer Registers (PRTRs) in North America” to focus, as a matter of priority, on:

adopting the use of the North American Industrial Classification System codes...; pursuing comparability in the manner in which PRTR data on persistent bioaccumulative toxic substances are reported; exploring the adoption, where appropriate and in light of national priority substances, of activity-based reporting thresholds under the Mexican RETC...; and supporting Mexico in its efforts to achieve a mandatory PRTR reporting system.

## 1.2 Overview of National PRTR Programs in North America

Each of the three North American countries has a PRTR program. They are:

- the Toxics Release Inventory (TRI) in the United States;
- the National Pollutant Release Inventory (NPRI) in Canada; and
- the *Registro de Emisiones y Transferencia de Contaminantes* (RETC) in Mexico.

### 1.2.1 The US TRI

The 2001 reporting year is the fifteenth year of the US TRI. TRI was created under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986. The original TRI list contained over 300 chemicals, covered the manufacturing sectors, and required information on on-site releases, transfers off-site for disposal and transfers off-site for treatment. Passage of the Pollution Prevention Act of 1990 broadened the information TRI collects to include off-site transfers to recycling and energy recovery as well as facilities' management of toxic chemicals in waste on-site, such as on-site treatment, recycling and energy recovery, as well as qualitative information on pollution prevention activities (e.g., source reduction) at the facility. The first year for the expanded information reporting was 1991.

There have also been changes to the TRI chemical list as the public and industry petitioned EPA to add or remove chemicals. One of the most significant expansions to the TRI list of chemicals was the addition of nearly 300 chemicals starting with the 1995 reporting year. There are now more than 600 chemicals and 30 chemical categories on the TRI list.

Section 313 of EPCRA, the law that created TRI, identified the manufacturing sectors as the original set of industries required to submit TRI reports. Beginning with the 1998 reporting year, several other industries were added to capture information from industries closely related to the manufacturing sector, providing energy or services or further managing products or waste from the manufacturing sector. The seven sectors added to TRI were metal mines, coal mines, electricity generating facilities, petroleum bulk storage terminals, chemical wholesale distributors, hazardous waste management facilities and solvent recovery facilities.

For the 2000 reporting year, TRI lowered the reporting thresholds for chemicals that are persistent, bioaccumulative and toxic (PBT), such as mercury and its compounds. TRI also added other PBTs such as dioxins and furans. Reporting for another PBT, lead and lead compounds, at a lowered threshold began with the 2001 reporting year.

EPA is working on implementing the North American Industrial Classification System (NAICS) codes in TRI and aims to have a rule ready for the reporting year 2004. In addition, the TRI program has proposed to collect information for dioxin and dioxin-like compounds in toxic equivalents (TEQs), in addition to mass quantities. Adding the reporting of World Health Organization (WHO)-TEQ (1998) values for dioxins/furans is under discussion for TRI for the 2005 or 2006 reporting year. Such reporting would be in addition to what is currently reported (grams and distribution of congeners).

TRI is also working on rulemaking with regard to mining in light of the courts' responses to several lawsuits and, in particular, how reporting requirements may apply to extraction and beneficiation. Under TRI the contents of overburden and waste rock are not considered for the purposes of reporting threshold calculations. However, if the threshold is otherwise exceeded by the facility, then releases or transfers of TRI substances in waste rock must be reported. Releases and transfers of chemicals found in the unconsolidated material in overburden are not required to be reported. In April 2003, the US District Court for the District of Columbia upheld EPA's interpretation that mine tailings are not eligible for the *de minimis* exemption to TRI reporting. However, the Court set aside EPA's interpretation of the exemption as it applied to waste rock.

As a result EPA has stated that listed chemicals in *de minimis* concentrations in a mine's waste rock may now be eligible for exemption from TRI reporting requirements.

The basis of the TRI Lead rule, promulgated in 2001 (66 *Federal Register* 4499), is EPA's determination that lead and lead compounds are persistent, bioaccumulative, and toxic (PBT) chemicals. EPA preliminarily concluded in its August 1999 proposal that lead and lead compounds met the criteria for being classified as highly persistent, highly bioaccumulative toxic chemicals. In determining whether lead and lead compounds are highly bioaccumulative, EPA has undertaken a more comprehensive review than originally set out in the TRI lead rule. US EPA has initiated the development of a framework for assessing the hazards and risks of metals. The approach envisions a two-phase process: development of a Metals Action Plan and then development of specific documents (a metals framework document and a metals characterization/ranking guidance document) called for in that Plan. In December of 2003, EPA completed an interim draft version of the metals framework document. In the spring of 2004, EPA plans to submit the draft metals framework document for peer review by its Science Advisory Board (SAB) and then release the final document in the summer of 2004. Issuance of the metals characterization/ranking guidance document will follow soon thereafter. It is the intent of the EPA's TRI Program to take the final documents and apply them to the TRI program, as appropriate.

EPA has developed interactive, user-friendly software, TRI - *Made Easy* software, or *TRI-ME*, that guides those reporting to TRI through the process with a series of questions that help determine if a facility needs to comply with the TRI reporting requirements. For facilities required to report, the software provides guidance for each data element on the reporting forms. For reporting year 2002, more than 92 percent of the facilities that reported used *TRI-ME*. Facilities also took advantage of the new electronic signature feature of *TRI-ME* that allows them to submit forms and certification statements via the Internet. Almost one-quarter of the reports were filed via the Internet in 2002.

On 5 November 2003, EPA initiated an online stakeholder dialogue requesting comment on a number of options for reducing the burden associated with TRI reporting. The comment period for this stakeholder dialogue closed on 4 February 2004. The Agency's electronic docket shows that more than 400 comments were received. The TRI Program is reviewing all comments received, with the goal of arriving at a burden reduction initiative that provides meaningful burden relief while at the same time continuing to provide valuable information to the public.

### 1.2.2 Canada's NPRI

Canada's NPRI was established with the help of a multi-stakeholder advisory committee, which included representatives from industry, environmental and labor organizations, and provincial ministries as well as federal departments. The 1999 renewal of the Canadian Environmental Protection Act (CEPA) included provisions that enshrine mandatory NPRI reporting and the annual publication of a summary report. The 2001 data are the ninth such set reported to NPRI.

Ongoing stakeholder consultations have modified reporting requirements since the first reporting year 1993. NPRI initially required information on on-site releases and off-site transfers to treatment and disposal. Off-site transfers to recycling and energy recovery were made mandatory, beginning with the 1998 reporting year. Starting with the 1997 reporting year, Environment Canada required mandatory reporting on pollution prevention activities. Facilities are asked to identify the measures they have taken to prevent the generation of pollutants or wastes. This provides information on the types of activities undertaken, such as product redesign or good operating practices, but not a numerical estimate of the amounts of waste reduced through

pollution prevention activities. A more detailed breakdown of pollution prevention activities is required for 2002 reporting.

There were four small changes to NPRI for the 2001 reporting year. The description of vanadium and its compounds was changed, several cresols were amalgamated into one category, phosphoric acid was delisted and the chemical, N,N-dimethylformamide was added.

For 2002, for the first time, NPRI required reporting of criteria air contaminants (nitrogen oxides, sulfur oxides, particulate matter, carbon monoxide, and volatile organic compounds). This major change greatly increased the number of facilities reporting. Also for 2002, the reporting thresholds have been lowered for lead, hexavalent chromium, cadmium and arsenic. Several exemptions have also been revised, and now facilities that operate stationary combustion equipment must report criteria air contaminants, facilities involved in fuel distribution, storage, or retail sale and facilities involved in painting and stripping of vehicles will report all listed contaminants to NPRI. In addition, municipal wastewater facilities will report to NPRI, regardless of the number of employees and based on an effluent trigger of 10,000 cubic meters per day. Biomedical/ hospital and non-hazardous incinerators will also report at lower thresholds (formerly 100 tonnes, now 26 tonnes per year).

NPRI is also reviewing the mining exemption, and developing a framework for alternative reporting thresholds. A new method of classification of releases and transfers has been put in place. These changes to the NPRI program result from Environment Canada's ongoing consultations with industry, environmental groups and other federal and provincial governments. Reports on stakeholder recommendations and Environment Canada's response to these recommendations can be found on the Environment Canada web site at <[www.ec.gc.ca/pdb/npri](http://www.ec.gc.ca/pdb/npri)>.

### 1.2.3 The RETC in Mexico

Industrial facilities in Mexico under federal jurisdiction voluntarily report their annual releases and transfers of pollutants in Section V of the Annual Certificate of Operation (*Cédula de Operación Anual*—COA). Because of the recent advances in the Mexican RETC, including the establishment a legal framework for mandatory reporting and collaboration with state authorities, these activities are profiled in more detail in **Chapter 3**.

## 1.3 Overview of PRTR Reporting in North America

The PRTRs have many basic similarities since they stem from the same primary purpose—to provide publicly available information on a facility's releases and transfers to air, water and land. The Mexican RETC is part of an integrated reporting form called *Cédula de Operación Anual* (COA). Section V of the COA is the section providing data on pollutant releases and transfers and is the section most similar to NPRI and TRI. Reporting under Section V is currently voluntary and, thus, the data are not comparable to the mandatory data collected under TRI and NPRI. The Mexican data are also not made publicly available on a facility-specific basis. Thus, while there are similarities among the three North American PRTRs, each inventory also has its unique aspects, which result from its historical development and the special industrial characteristics of the country.

### 1.3.1 Who reports to PRTRs in North America?

PRTRs require specific types of businesses to report. In general, manufacturing facilities are required to report. Canada's NPRI covers all business activities, with very few exceptions. Canada currently exempts those involved with the distribution, storage or retail sale of fuels; dentistry,

### CEC Action Plan to Enhance the Comparability of PRTRs in North America

The three North American countries are committed to creating a more complete picture of industrial pollution in North America. The *Action Plan to Enhance the Comparability of PRTRs in North America* (available at <[www.cec.org](http://www.cec.org)>) was adopted by the CEC Council in June 2002. It examines areas in which the three systems differ and sets forth actions to be pursued by the countries to reduce those disparities. Collaboration around the *Action Plan* enables the countries to share information on their unique approaches and to learn from each other.

Since the countries started working cooperatively, there have been some notable successes, including the mandatory reporting of off-site transfers in NPRI, the standardization of pollution prevention activity reporting in NPRI, the addition of PBT chemicals in NPRI and TRI and expansion of NPRI list of chemicals.

One of the most important achievements towards increased comparability of North American PRTRs has been the adoption of a mandatory requirement for RETC reporting and a provision requiring the RETC data to be made publicly accessible by chemical and facility. Although significant challenges remain due to the differing thresholds proposed by Mexico, the availability of mandatory data is a prerequisite for comparability and thus a key step forward.

All three countries have committed to looking to the other PRTRs to learn about reporting of chemicals that are not currently on their national lists. Only about 56 chemicals are common to all three PRTR lists. Some chemical such as hydrogen sulfide on NPRI list account for over two-thirds of releases and transfers. Other TRI chemicals, such as pesticides, are not on the NPRI list. Mexico's list does not contain many chemicals released and transferred in large quantities in TRI and NPRI, such as copper, zinc, hydrochloric acid, toluene and xylene. TRI and NPRI both reviewed the results of dioxin and furan reporting in each other's countries, identified gaps and have proposed changes that will increase comparability.

A similar situation exists for industries. Each PRTR requires reporting from a unique set of industries. NPRI reporting requirements include municipal incinerators and sewage treatment plants, two significant sources of pollutants that are not required to report to TRI or RETC. Mexico's PRTR will have counterparts at the state and municipal levels, providing for more extensive coverage of types of facilities.

agriculture, mining and oil and gas well drilling, if these facilities do not process or otherwise use the substances; research and training institutions; and vehicle repair facilities.

In the United States, manufacturers have been required to report to TRI since its inception, and federally owned facilities were added in 1994. Beginning with reporting for 1998, several additional industries associated with manufacturing including metal mines, coal mines, electricity generating facilities, petroleum bulk storage terminals, chemical wholesale distributors, hazardous waste management facilities and solvent recovery facilities also have to report to TRI.

Mexico's reporting applies to any facility under federal jurisdiction. These include the following industrial sectors: petroleum, chemical and petrochemical, paints and inks, metallurgical, automotive, cellulose and paper, cement and limestone, asbestos, glass, electric power genera-

tion, and hazardous waste management. Other facilities are regulated by the states or municipalities, and some Mexican states have recently started to collect data from these industries.

Although some companies may centralize reporting procedures for all their facilities, individual submissions must be made for each facility. Both NPRI and TRI ask facilities to identify their parent companies.

### 1.3.2 Which Chemicals must be Reported?

Each PRTR system covers a specific list of chemicals. NPRI covers over 260 chemicals, TRI approximately 650 and RETC approximately 100. (Counts of the number of substances on a list vary, as some observers may count individual substances within a chemical category and others may not.) The Chemical Abstracts Service lists more than 19 million chemical substances and identifies more than 225,000 of them as regulated or covered by chemical inventories worldwide <[www.cas.org/cgi-bin/regreport.pl](http://www.cas.org/cgi-bin/regreport.pl)>.

Seven air pollutants are listed in the section of the Mexican COA (Section II) that is currently required to be filled out. These are sulfur oxides, nitrogen oxides, particulates, volatile organic compounds, unburned hydrocarbons, carbon monoxide, and carbon dioxide, although only reporting on the first four is mandatory. None of these are on the TRI lists, however NPRI added the criteria air contaminants sulfur oxides, nitrogen oxides, particulate matter, carbon monoxide, and volatile organic compounds for the 2002 reporting year. For a detailed comparison of the chemical lists in the three countries, see **Appendix A**.

In PRTRs, the amount of the chemical is reported and not the total volume of the mixture. This feature sets PRTRs apart from hazardous waste inventories or manifest systems, which generally report on the total volume of the mixture.

Chemicals often have more than one name (synonyms). Methyl bromide and bromomethane, for example, are names for the same substance. PRTRs rely on the identification systems of various authorities to specify the exact chemicals that are to be reported. NPRI and TRI use Chemical Abstracts Service (CAS) Registry Numbers. The CAS number of bromomethane, for example, is 74-83-9.

Facilities submit one form for each chemical. A facility reporting on 10 chemicals files 10 forms (electronically in Canada and electronically or on hard copy in the United States). Mexican facilities submit one form per facility listing all chemicals released or transferred. They can submit using hard copy or electronically.

### 1.3.3 When Is a Facility Required to Report?

Only facilities meeting specific reporting thresholds are required to report to PRTRs. Typically, the reporting threshold is based on the amount of chemical manufactured, used in a process (for example, as a reagent or catalyst), or otherwise used (for example, in cleaning industrial equipment). For NPRI, if 10 tonnes (22,050 lbs.) or more of the substance is manufactured, processed or “otherwise used,” then releases and transfers must be reported. For TRI, the thresholds are more than 25,000 lbs. (11.34 tonnes) if a substance is manufactured or processed and 10,000 lbs. (4.54 tonnes) if it is “otherwise used.”

For the 1995 and subsequent reporting years, both Canada and the United States have required that the total weight of the byproduct, regardless of concentration, be included in the calculation of the reporting threshold.

Both NPRI and TRI also have an employee threshold. In general, only facilities where employees worked 20,000 hours or more (usually 10 or more full time employees) are required to report. Recently, NPRI has required that for some chemicals such as dioxins and furans, all

facilities of certain types (such as incinerators) report regardless of employee size. RETC does not have an employee threshold.

Both TRI and NPRI require reporting if the amount of a substance in a mixture equals or exceeds one percent by weight. However, the United States has an additional lower threshold for carcinogenic chemicals: chemicals identified as carcinogens by the Occupational Safety and Health Administration standard must be reported at levels of 0.1 percent.

The net effect of these differences in reporting threshold is that, in general, US facilities will meet the threshold at slightly lower levels of chemical activity/use than Canadian ones.

While most of the chemicals on NPRI and TRI are subject to a “manufacture, process or otherwise use” threshold, all chemicals on the Mexican RETC list are subject to an “on-site release” threshold. Also, the RETC reporting thresholds vary by type of substance. For example, the threshold for organohalogenes, including ozone depleters, is 1,000 kg/year whereas the threshold for metals, such as lead or mercury is 1 kg/year. Unlike in NPRI and TRI, amounts transferred off-site are not included when calculating whether the reporting threshold has been met. The mandatory portion (Section 2) of the Mexican COA does not have reporting thresholds. However, only facilities under federal jurisdiction must report, and smaller facilities are not expected to fall under this classification. Reporting thresholds are under review as the Mexican RETC moves toward mandatory reporting.

The United States also has a different reporting requirement for facilities with relatively small reportable amounts of a listed chemical. If a facility does not manufacture, process, or otherwise use more than 1 million pounds (454 tonnes) of the chemical, and if the facility’s “total reportable amount”—all on- and off-site recycling, energy recovery, and treatment, plus production-related on-site releases and off-site transfers for disposal—is less than 500 pounds (227 kg), the facility may file a short certification statement that identifies the chemical but does not supply any quantitative information.

As our knowledge of the potential for some chemicals such as persistent bioaccumulative toxics (PBTs) to have health and/or environmental effects at very low concentrations, both NPRI and TRI established new, lower reporting thresholds. For the reporting year 2000, lower thresholds were established for dioxins and furans, hexachlorobenzene (HCB), polycyclic aromatic compounds and mercury and its compounds, and for lead in 2001 in TRI and 2002 in NPRI. However, dioxin and furans, HCB and polycyclic aromatic compounds are reported differently in TRI and NPRI and are difficult to compare. See **Chapter 10** for a discussion of the PBTs.

Reporting instructions give detailed information on the releases and transfers that facilities must report, and supply guidance to specific industries in published manuals and/or training sessions. Reporting instructions are available on the NPRI, TRI and RETC web sites, respectively, at <[www.ec.gc.ca/pdb/npri/npri\\_gdocs\\_e.cfm](http://www.ec.gc.ca/pdb/npri/npri_gdocs_e.cfm)> for NPRI guidance documents; at <[www.epa.gov/tri/topics.htm](http://www.epa.gov/tri/topics.htm)> for TRI reporting materials and guidance, and at <[sat.semarnat.gob.mx/dggia/retc/](http://sat.semarnat.gob.mx/dggia/retc/)> for RETC reporting instructions.

### 1.3.4 How Does a Facility Estimate its Releases and Transfers?

Facilities can use a variety of methods to report releases and transfers. Amounts reported to NPRI and TRI are estimates. These estimates may reflect monitoring, engineering calculations, emission factors (which identify the amounts of a chemical that can be expected to result from particular industrial processes or from use of specific equipment), or other estimation techniques.

Facilities that report to PRTRs are free to revise their previous years’ submissions at any time. They may correct previous errors, or they may re-calculate data from earlier years using a different estimation method. Some facilities that adopt new methods of estimating reportable

amounts find that their results for the current year give a very different picture of releases and transfers from previous years. They may appear to have made large increases or decreases in reportable amounts, when in fact only the estimation methods have changed. These facilities may choose to revise earlier submissions so that their totals over time reflect consistent assumptions and approaches.

For releases of a substance that total less than one tonne, NPRI allows facilities to report just the total amount released and not the individual amounts released to air, water, land or underground injection. Therefore, in summary tables in this report, total releases will be more than the sum of the separate release categories. In contrast, the amounts of the individual releases for each medium are reported in TRI. Both NPRI and TRI require reporting of the amounts of individual types of transfers.

### 1.3.5 How Are Sectors Identified in PRTR Reporting?

Facilities are asked to report on the type of industrial operations they carry out. This allows facilities within the same sector to be grouped together. Currently both the United States and Canada use a “Standard Industrial Classification” system, such that industries are identified by their “SIC code.” These systems, however, are not the same. The Mexican COA uses the Mexican Activities and Products Classification (*Classification Mexicana de Actividades y Productos*—CMAP code), which is different yet again.

All three countries are moving towards a common North American Industry Classification System (NAICS). In reporting year 1998, NPRI facilities began reporting their NAICS code, along with the Canadian and US SIC codes. The US TRI is expected to require NAICS codes for the 2004 reporting year and the Mexican RETC are expected to implement the NAICS sometime in the future.

### 1.3.6 Are All of the Data Made Publicly Available?

A primary purpose of a PRTR is to provide the public with data about chemicals arising from industrial activities, so in general, both the NPRI and TRI programs limit the type of information that facilities can claim as secret and withhold from public disclosure. In the United States, the only claim of trade secrecy that can be made is for the identity of the chemical. All data on release and transfer amounts are part of the database. Claiming trade secrecy is not widespread: only 2 TRI forms out of 95,513 submitted for 2001 contained such claims. The trade secrecy claims were for substances for which there were zero releases and transfers. In Canada, all information in a report, including the identity of the facility, may be held confidential if it conforms to the criteria under the Federal Access to Information Act. According to the NPRI overview report, 10 facilities and 56 forms out of the national total of 11,810 forms (0.5%) were given confidential status for the 2001 NPRI reporting year. This represented 7,959 tonnes of releases and transfers.

## 1.4. Using and Understanding PRTR Data

### 1.4.1 Limitations of the PRTR Data

A principal factor in making good use of PRTR data is to know their limitations. PRTR data:

- do not encompass all potentially harmful chemicals (not all toxics or greenhouse gases),
- do not address all sources of chemicals such as mobile sources (cars, trucks, offroad vehicles), agricultural activities or natural sources such as forest fires,
- do not include all facilities—only those that meet reporting requirements (generally 10 tonnes of chemical manufactured, processed or otherwise used),

- do not generally include facilities with less than 10 employees,
- do not describe daily or weekly releases or transfers, but provide annual summaries,
- do not identify all on-site releases and off-site transfers from a facility (only for listed chemicals for which reporting thresholds are met),
- do not always represent measurements of releases and transfers—they may be estimates derived using a variety of methods,
- do not describe the ultimate environmental fate of chemical substances,
- do not indicate risks from substances released or transferred by reporting facilities,
- do not identify exposures of human or wildlife populations to substances released or transferred by reporting facilities,
- do not indicate the amount of chemicals allowed to be released under permits, licenses or agreements.

### 1.4.2 Toxicity and Human Health Effects

PRTR data supply information on amounts of substances released to the environment at specific locations. Identifying and assessing potential harm from particular releases of a chemical to the environment is a complex task, requiring information additional to that given in PRTRs, and the results are always tentative or, at best, relative.

The potential of a substance to cause harm arises from both:

- its inherent toxicity—how harmful is it?—and
- exposure to it—how much and by what route?

What is known about the toxicity and ill effects of various chemicals results principally from studies of animals and human beings that have been exposed to them (ranging from laboratory tests to accidental exposures of human populations, such as workers). Various authoritative bodies have collected such data and, while PRTR data do not contain such information, the NPRI and TRI web sites link users to various sources of it.

The NPRI web site <[www.ec.gc.ca/pdb/npri/npri\\_links\\_e.cfm#Sub](http://www.ec.gc.ca/pdb/npri/npri_links_e.cfm#Sub)> directs users to:

- the US Agency for Toxic Substances and Disease Registry for ToxFAQs summaries about hazardous substances <[www.atsdr.cdc.gov/toxfaq.html](http://www.atsdr.cdc.gov/toxfaq.html)>;
- the HazDat database, which includes information on the effects of hazardous substances on human health <[www.atsdr.cdc.gov/hazdat.html](http://www.atsdr.cdc.gov/hazdat.html)>;
- the International Agency for Research on Cancer <[www.iarc.fr/](http://www.iarc.fr/)>; and
- Toxicology Excellence for Risk Assessment <[www.tera.org/](http://www.tera.org/)>, which compiles human health risk values from various international health organizations.

US EPA’s TRI web site offers links to:

- summaries of effects, exposures, and environmental fate for some 40 selected TRI chemicals <[www.epa.gov/chemfact/](http://www.epa.gov/chemfact/)> and
- the ToxFAQs summaries mentioned above <[www.atsdr.cdc.gov/toxfaq.html](http://www.atsdr.cdc.gov/toxfaq.html)>.

Other sources of health and safety information about chemical substances include:

- Canadian Centre for Occupational Health and Safety—<[www.ccohs.ca/oshanswers/](http://www.ccohs.ca/oshanswers/)>
- State of New Jersey, Department of Health, Right-to-Know Hazardous Substances Fact Sheets—<[www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm](http://www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm)>
- National Safety Council, Crossroads on Chemical Databases and Material Safety Data Sheets (MSDSs)—<[www.nsc.org/library.htm](http://www.nsc.org/library.htm)>

In its Scorecard <[www.scorecard.org/](http://www.scorecard.org/)>, Environmental Defense has online information about potential ecological and human health effects for more than 6,500 chemicals. Scorecard reports on recognized and suspected health hazards associated with the chemical in several different categories, including cancer, cardiovascular or blood toxicity, developmental toxicity, endocrine toxicity, neurotoxicity, and reproductive toxicity, among others.

## 1.5 PRTRs Worldwide

PRTRs are gaining increasing interest and policy support worldwide. Following are some of the key developments at the international level:

- **Chapter 19** of Agenda 21, adopted by some 150 heads of state and government during the 1992 United Nations Conference on Environment and Development (the “Earth Summit”), calls for the establishment of pollutant emission registers and promotes the principle of right-to-know;
- The OECD, through a 1996 Council Recommendation, has called on member countries to take steps to establish, implement and make publicly available a PRTR system. In 2003, OECD amended the Recommendation to add the core elements of a PRTR to provide additional county guidance. OECD has also published a Guidance Manual for Governments, guidance for reporting industries on techniques for estimating releases and transfers of pollutants and is finalizing reports on Uses of PRTRs and Quality Control and Assurance in PRTRs. See the OECD PRTR web site at <[www.oecd.org/department/0,2688,en\\_2649\\_34411\\_1\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/department/0,2688,en_2649_34411_1_1_1_1_1,00.html)>.
- The Intergovernmental Forum on Chemical Safety (IFCS) discussed the need for a more strategic international approach for chemical management (SIACM) at Forum IV in Bangkok, 2003. PRTRs were recognized as a source of valuable environmental information for industry, governments and the public and as a mechanism to stimulate reductions in emissions. The previous Forum III meeting recommended that countries without a PRTR take steps to initiate a process to design national PRTRs that involve all affected and interested parties in the design, that take into account national circumstances and needs, and to link reporting requirements of international agreements to the national PRTRs <[www.who.int/ifcs](http://www.who.int/ifcs)>.
- A Working Group on PRTRs was established under the United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, known as the Aarhus Convention. The Convention came into force in October 2001. In 2003, a PRTR Protocol on developed under the Convention was signed by 36 countries and the European Community. This Protocol is the first legally binding international agreement on PRTRs. Canada, US and Mexico have not signed the Protocol. See <[www.unece.org/env/pp/prtr.htm](http://www.unece.org/env/pp/prtr.htm)>.
- Another international mechanism, the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), has a PRTR Coordinating Group that seeks to improve coordination between international organizational, governments and other interested parties on PRTRs. For more information, see <[www.who.int/iomc/en](http://www.who.int/iomc/en)>.
- The Health and Environmental Ministers of the Americas held a follow-up to the April 2001 Summit of the Americas in which they agreed to consider working towards developing PRTRs as a tool to manage exposure to chemical releases (see <[www.ec.gc.ca/international/regorgs/hema\\_e.htm](http://www.ec.gc.ca/international/regorgs/hema_e.htm)>).
- The 2002 World Summit on Sustainable Development meeting in Johannesburg, South Africa, included support for the development of PRTRs as part of promoting the development of coherent and integrated information on chemicals.
- Mexico hosted a workshop on PRTRs for the Americas region on 21–22 April 2004, organized by UNEP and UNITAR with support from the Government of Canada. A number of Latin American countries are considering or have initiated PRTR development.

## 1.6 North American PRTR Contacts

### Public Access to Canadian NPRI 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

Environment Canada on the Internet: <[www.ec.gc.ca](http://www.ec.gc.ca)>

NPRI data on the Internet, in English and French: <[www.ec.gc.ca/pdb/npri](http://www.ec.gc.ca/pdb/npri)>

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

Pollutionwatch at [www.pollutionwatch.org](http://www.pollutionwatch.org)

### Additional Information on the Mexican RETC

Semarnat

Dirección de Gestión Ambiental

Av. Revolución 1425 – 9

Col. Tlacopac, San Angel

01040 Mexico, D.F.

Tel: (525) 624–3470

Fax: (525) 624–3584

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

Semarnat’s English section: <[carpetas.semarnat.gob.mx/dgeia/web\\_ingles/](http://carpetas.semarnat.gob.mx/dgeia/web_ingles/)>

Web site for the RETC on the Internet, in Spanish: <[sat.semarnat.gob.mx/dggia/retc/](http://sat.semarnat.gob.mx/dggia/retc/)>

RETC documents on the Internet, in English:

<[sat.semarnat.gob.mx/dggia/retc/ingles/ingles.html](http://sat.semarnat.gob.mx/dggia/retc/ingles/ingles.html)>

### Public Access to US TRI 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.

EPA on the Internet: <[www.epa.gov](http://www.epa.gov)>

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)>

Citizens for the Right to Know (RTK-NET): <[www.rtk.org](http://www.rtk.org)>

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/)>



**Methods Used in *Taking Stock***



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## Key Findings

- *Taking Stock* compiles comparable data from US and Canada PRTR systems to give a North American perspective of the amounts of chemicals released to the air, water, and land, and transferred off-site for recycling or other management. A “matched” data set is prepared that includes only those chemicals and industrial sectors for which comparable data are available from both systems. Data from Mexico’s RETC are not available for the 1995–2001 reporting years.
- Over half of the chemical reports under NPRI and over two-thirds under TRI are included in the *Taking Stock* matched data set for 2001. These comparable reports represent approximately 18 percent of NPRI total reported amounts and 61 percent of TRI amounts. One chemical, hydrogen sulfide, is not on the current TRI list but is on the NPRI list and represents 67 percent of the amounts reported to NPRI for 2001. Excluding hydrogen sulfide, the matched data set represents 56 percent of the total reported amounts in NPRI.
- Data for previous years (1995 to 2000) are also included in this *Taking Stock* report. There are three different matched data sets: (1) the 2001 matched set of chemicals and industries, (2) the 1998–2001 matched data set, which is used to look at changes from 1998 to 2001, and (3) the 1995–2001 matched data set, which is used for analyses of seven-year trends from 1995 to 2001. The 1998–2001 matched data set excludes chemicals added to NPRI and chemicals whose reporting definition has changed, such as mercury and lead and their compounds. The 1995–2001 matched data set excludes industry sectors added to TRI for 1998, chemicals added to NPRI, chemicals whose reporting definition has changed, such as mercury and lead and their compounds, and transfers to recycling and energy recovery. These exclusions make it possible to compare across years during which reporting requirements have changed.

## 2.1 Introduction

One of the products of the CEC PRTR program is the development of the annual *Taking Stock* reports and web site. From the beginning, public feedback has been an essential component of the report and web site development process. Although comments on the project are welcome at any time, the formal public consultative process includes:

- Distribution of a discussion paper to members of the Consultative Group outlining options for the upcoming report. The Consultative Group is composed of representatives of industry, government, public interest and environmental groups and other interested parties from all three countries.
- Convening of a public meeting of the Consultative Group during which stakeholders have the opportunity to discuss the options for the upcoming report and to provide input on other relevant aspects of the North American PRTR Project.
- Receipt of written comments from members of the Consultative Group and other interested individuals and organizations.
- Preparation and dissemination of a “Response to Comments” based on the written and verbal comments received and explaining how CEC plans to incorporate the comments into the report and web site.

If you are interested in participating in the consultative process, please contact:

Victor Shantora

Head, Pollutants and Health

Commission for Environmental  
Cooperation

393, rue St-Jacques Ouest, Bureau 200  
Montreal (Quebec), Canada H2Y 1N9

E-mail: <vshantora@ccemtl.org>

## 2.2 Creating the *Taking Stock* 2001 Matched Data Set

The data used in this report are collected by the national governments under Canada's NPRI program and the US TRI, respectively. Comparable data are not yet available under the Mexican PRTR program, the RETC. Reporting under Section V of the Mexican reporting form was voluntary for 2001 and, thus, the data are not comparable to the mandatory data collected under TRI and NPRI. The Mexican data are also not made publicly available on a facility-specific basis. **Chapter 3** describes the current state of Mexico's PRTR. As Mexican data become available, they will be incorporated into this report.

Each country's PRTR has evolved with a different list of chemicals and industries. In order to obtain a North American picture of releases and transfers of chemicals, not all data submitted to the individual countries' PRTR systems can be used, however; only those data common to both systems. This matching process eliminates chemicals reported under one system but not the other. It also eliminates data from industry sectors covered by one PRTR but not the other. Thus, the North American database used in this report consists of a matched data set of industries and chemicals common to NPRI and TRI.

These PRTR reports were submitted by facilities during the summer of 2002. The US EPA released the TRI data to the public in June 2003. The NPRI data used in this report were obtained from the Environment Canada web site in November 2002. At the same time updated versions of previous years' data for TRI and NPRI were also made available and used in this report.

### Descriptions of Releases and Transfers Used in this Report

#### Releases On- and Off-site

A release is the entry of a chemical substance into the environment. Facilities report amounts of the listed chemicals they have released to the environment at their own location ("on-site"). Amounts are reported separately for each environmental medium:

- **Air emissions**—Releases to air that occur through identified outlets such as stacks ("smokestacks") or vents are labeled "stack" or "point" emissions. Air releases that occur because of leaks or valves are labeled "fugitive" or "non-point" emissions.
- **Surface water discharges**—Releases to surface water bodies such as rivers and lakes generally occur through discharge pipes. Wastewater is usually treated first, to remove or minimize its pollutant content. Rainwater may also wash pollutants from on-site waste storage areas into surface waters. These releases from run-off are also reportable.
- **Underground injection**—Facilities may inject listed chemicals in waste into deep underground wells, a practice more common in certain parts of the United States than in Canada. Underground injection is regulated, and deep wells that receive toxic waste are intended to isolate the pollutants from groundwater sources. Underground injection is not practiced in Mexico.
- **On-site land releases**—Releases to land at the facility include burying chemical waste in landfills, incorporating it into soil ("land treatment"), holding it in surface impoundments, accumulating it in waste piles, or disposing of it by other methods.

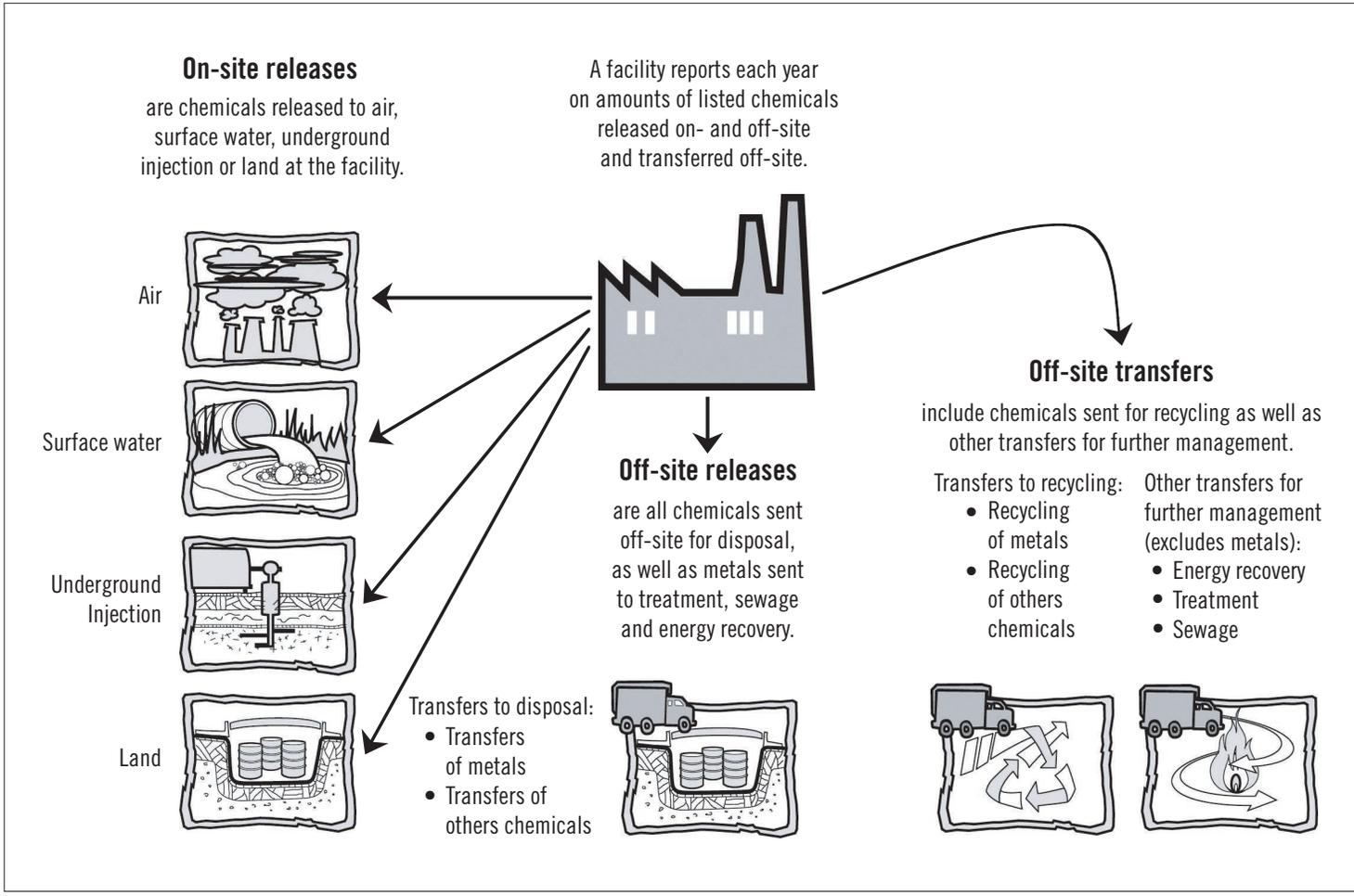
Facilities also report transfers off-site that represent releases to the environment at the off-site location. These include:

- **Disposal**—Waste sent off-site to another facility for disposal may be disposed of on land or by underground injection. These methods are the same as on-site land releases and underground injection, although they occur at locations away from the originating facility.
- **Transfers of Metals**—In the *Taking Stock* analyses, transfers of metals to disposal, sewage, treatment, and energy recovery are included in the off-site releases category to make the TRI and NPRI data comparable. TRI classifies all transfers of metals as transfers to disposal because metals sent to energy recovery, treatment, or sewage treatment may be captured and removed from waste and disposed of in landfills or by other disposal methods, but are not destroyed by treatment processes or burned in energy recovery units.

#### Transfers for Further Management

- **Recycling**—Chemicals in the materials sent off-site for recycling are generally recovered by a variety of recycling methods, including solvent recovery and metals recovery. They can be sent off-site for processing, cleaning, or reclamation and returned to the originating facility or made available for use by other facilities.
- **Energy Recovery**—Chemicals in materials sent off-site for energy recovery are combusted in industrial furnaces (including kilns) or boilers that generate heat or energy for use at the off-site location. Energy recovery is applicable only when the material has a significant heating value and when it is used as an alternative for fossil fuels or other forms of energy.
- **Treatment**—Chemicals can be sent for physical, chemical, or biological treatment. Neutralization is an example of chemical treatment and incineration is an example of physical treatment. Treatment is intended to alter or destroy the chemical. Treatment processes must be appropriate for the particular substance—a chemical that will not burn, for example, cannot be successfully incinerated.
- **Sewage Treatment**—Facilities may send their chemical waste to sewage treatment facilities—municipal sewage treatment plants (MSTPs) in Canada or publicly owned treatment works (POTWs) in the United States. Effectiveness of sewage treatment depends on both the substance and the sewage plant's processes. Volatile chemicals are likely to evaporate (releases to air). Typically, secondary treatment processes apply microorganisms (with aeration or oxygenation) to biodegrade organic compounds.

Figure 2-1. PRTR Releases and Transfers in North America



## 2.2.1 Matching for Industry Sectors

Only sectors that are common to both TRI and NPRI are part of the matched data set.

There are three different data sets used in this report. For the 2001 and 1998–2001 data set, *Taking Stock 2001* includes the following industry sectors:

- manufacturing (US SIC codes 20–39),
- coal mining,
- electric utilities,
- chemical wholesalers, and
- hazardous waste treatment and solvent recovery facilities.

For the 1995–2001 data set, only manufacturing industries are included. This data set, therefore, does not include coal mining, utilities, chemical wholesalers and hazardous waste/solvent recovery facilities. Reporting from these sectors was required beginning in the 1998 reporting year in TRI.

Some sectors with significant releases and transfers, such as mining, are not included in this matched data set. The reporting criteria for the metal mining sector differ between TRI and NPRI. Under TRI, but not under NPRI, releases and other waste management activities of TRI chemicals in waste rock were reportable. Waste rock consists of barren or submarginal rock that is removed in order to gain access to the ore.

TRI facilities can use up to six SIC codes to identify the business activities or industry sectors associated with each reported chemical. A facility may use the same SIC codes on all its TRI forms or it may use different SIC codes to describe its industrial activities for various chemicals. For example, a petrochemical facility may indicate petroleum refining as the industrial activity associated with one chemical, while it reports chemical manufacturing for another. One chemical form will be analyzed with other forms in the petroleum refining sector and the second in chemical manufacturing sector. However, the facility itself—with the sum of all its reports—cannot be accounted

as either a petroleum refinery or a chemical manufacturing plant for purposes of industrial sector-based analyses of TRI data. In the analyses in *Taking Stock*, such facilities will appear in the industry category called “multiple SIC codes.”

## 2.2.2 Matching for Chemicals

The matched data set includes only those substances on both the TRI and NPRI lists. NPRI covers over 260 chemical substances and TRI approximately 650. The matched data set for 2001 includes 204 substances.

New for this year’s report is the elimination of lead and its compounds in all matched data sets. The threshold for reporting lead was lowered in TRI in 2001 and so no longer matches the NPRI threshold. NPRI has lowered the reporting threshold for lead and its compounds for 2002 reporting, which will make the reporting again comparable. Lead and its compounds are reported in large quantities and so this will significantly change some of the results from previous *Taking Stock* reports.

Over the years, PRTRs have added new chemicals and changed reporting requirements. To look at changes over time, it is necessary to select only those chemicals that have been consistently reported over time. The two data sets (1995–2001 and 1998–2001) that look at changes over time both contain 155 chemicals. (See **Appendix B** for the list of chemicals.)

While certain chemicals may be reportable in both systems, they may be defined differently. For sulfuric acid and hydrochloric acid, for example, under TRI only aerosol forms are reportable; these are released only to air. All forms of these acids are reportable to NPRI. For comparing TRI and NPRI data then, the matched data set includes only air emissions of these two chemicals.

In addition, while ammonia and isopropyl alcohol appear on both lists, they are not included in the matched data set because the

### List of Industry Sectors Covered in the Matched Data Set of *Taking Stock 2001*

US SIC Code*	Industry
<b>Manufacturing Industry Sectors</b>	
20	Food Products
21	Tobacco Products
22	Textile Mill Products
23	Apparel and Other Textile Products
24	Lumber and Wood Products
25	Furniture and Fixtures
26	Paper Products
27	Printing and Publishing
28	Chemicals
29	Petroleum and Coal Products
30	Rubber and Plastics Products
31	Leather Products
32	Stone/Clay/Glass Products
33	Primary Metals
34	Fabricated Metals Products
35	Industrial Machinery
36	Electronic/Electrical Equipment
37	Transportation Equipment
38	Measurement/Photographic Instruments
39	Misc. Manufacturing Industries
--	Multiple codes 20–39**
<b>TRI Industry Sectors that Match NPRI Reporting (Added for 1998 TRI Reporting)</b>	
12	Coal Mining (except US SIC code 1241)
491/493	Electric Utilities (limited to those that combust coal and/or oil, US SIC codes 4911, 4931 and 4939)
7389/4953	Hazardous Waste Treatment and Disposal/Solvent Recovery (US SIC codes 4953 and 7389)
5169	Chemical Wholesalers

\* US SIC codes are used because NPRI facilities report both the Canadian SIC code and the equivalent US SIC code and TRI facilities report only the US Sic codes.

\*\* Multiple SIC codes reported only in TRI.

definitions for these substances differ. Total ammonia is reportable to NPRI, while only 10 percent of aqueous forms of ammonia along with all anhydrous forms are reportable to TRI. Only forms of isopropyl alcohol manufactured by the strong acid process are reportable to TRI, while all forms are reportable to NPRI.

TRI facilities report separately for certain chemicals and their compounds, while in

NPRI, a chemical and its compounds count as one category. For example, TRI lists both nickel and nickel compounds, counting them as two separate substances, while NPRI lists the single category, nickel and its compounds. All the analyses in *Taking Stock 2001* add the TRI amount reported for the given chemical to the amount reported for its compounds, to correspond with NPRI practice.

### Reporting of Ammonia

As in previous years, the substance ammonia is not included in the analyses in this report. While facilities in both countries must report on ammonia, TRI facilities determine their threshold for reporting and report amounts based on 100 percent of anhydrous ammonia and 10 percent of total aqueous ammonia in use or manufactured at their site. Canadian facilities, on the other hand, determine their threshold and report based on 100 percent of total ammonia, anhydrous and aqueous.

After discussions with governmental representatives, ammonia is not included in the matched chemical set and, hence, this *Taking Stock* report for two reasons:

1) Differences in reporting threshold means it is not possible to account for those facilities not reporting under TRI:

For example, imagine a facility that releases 8 tonnes of ammonia to air and 10 tonnes to water. Under the NPRI system, this facility would calculate the reporting threshold as  $10 + 8 = 18$  tonnes of ammonia. The facility would have to report its releases to NPRI since they are above the 10-tonne reporting threshold. However, under the TRI system, this same facility would calculate the reporting threshold as:  $8 + 1 = 9$  tonnes (8 tonnes to air plus 10 percent of 10 tonnes to water). The facility would not report since its releases are below the reporting 11-tonne (25,000 pounds) reporting threshold.

2) Differences in amount reported:

For example, take a facility that releases 10 tonnes to air and 50 tonnes to water. Under NPRI, this facility would report  $10 + 50 = 60$  tonnes of ammonia released. But under TRI, this same facility would report 10 tonnes to air plus 10 percent of 50 tonnes to water:  $10 + 5 = 15$  tonnes of ammonia released.

Therefore the same facility would report four times more ammonia under NPRI than it would under TRI. Therefore, because of the differences in reporting, ammonia is not included in the matched list of chemicals in *Taking Stock*.

### 2.2.3 Three Matched Data Sets: 2001, 1998–2001 and 1995–2001

Each country has added new requirements for additional chemicals and sectors over the years. Because of changes in NPRI and TRI over the years, *Taking Stock* has three “matched” data sets.

- The *2001 matched chemicals and industries* data set includes all matched industries, chemicals and types of transfers now reported to both NPRI and TRI (**Chapters 4, 5, 8 and 9**).
- The *1998–2001 matched chemicals and industries* data set includes all industries and types of transfers but does not include the new chemicals added to NPRI for 1999 or chemicals whose reporting definition has changed, such as mercury or lead and its compounds (**Chapters 6, 8 and 9**). It is used for looking at changes from 1998 to 2001.
- The *1995–2001 matched chemicals and industries* data set includes only manufacturing industries, only transfers to disposal, treatment, and sewage, and only chemicals reportable 1995 through 2001. It does not include TRI industries added for 1998 reporting, transfers to recycling or energy recovery, NPRI

chemicals added for 1999 reporting, or chemicals whose reporting definition has changed, such as mercury or lead and its compounds (**Chapters 7 and 9**). It is used for seven-year trend analyses (1995–2001).

For comparisons across years, 1995 is used as the base year. Environment Canada considers 1995 as a base year for NPRI, while EPA considers 1988 as a base year for TRI. TRI has also adopted 1995 as an additional baseline for tracking progress because more than 250 substances were added to the TRI list for reporting that year.

Throughout *Taking Stock 2001*, each table and figure indicates which data set is in use. Only tables and figures based on the same data set can be meaningfully compared with one another.

Facilities that report to PRTRs are free to revise their previous years’ submissions at any time. They may correct previous errors, or they may re-calculate data from earlier years using a different estimation method. Thus, some of the data in previous editions of *Taking Stock* may have been revised. Readers should use the current report or the current databases (available online at <[www.cec.org/takingstock/](http://www.cec.org/takingstock/)>).

## 2.2.4 Results of Matching for Industries and Chemicals

In 2001, 2,617 Canadian facilities in all industries reported 1.57 billion kg of releases and transfers to NPRI, and the 24,898 United States facilities reported 4.38 billion kg of releases and transfers. However, not all of these reports match the reporting in the other country.

In 2001, Canadian facilities in the matched industry sectors reported 156.3 million kg of releases and transfers for substances reportable to NPRI but not covered in TRI—or reportable in both systems but defined differently. These reports were eliminated from the matched data set (“excluded due to chemical only”). Canadian facilities in industry sectors not in the matched data set reported 58.0 million kg of releases and transfers for substances covered in both PRTRs (“excluded due to industry only”). In addition, some reports in the NPRI database fell into both categories (“excluded due to both industry and chemical”), and their 1.08 billion kg of total releases and transfers were also excluded.

In TRI, matching for common chemicals eliminated 417.9 million kg of releases and transfers. Matching for industries excluded a much larger amount—1.13 billion kg. The metal mining industry’s reporting accounted for the vast majority of this amount. A total of 155.5 million kg was excluded because both the chemical and the industry were not comparable to NPRI.

Over half (57 percent) of the chemical reports under NPRI and over two-thirds (70 percent) under TRI are included in the *Taking Stock* matched data set for 2001. These comparable reports represent 18 percent of NPRI total reported amounts and 61 percent of TRI amounts.

Table 2–1. All Releases and Transfers Reported to NPRI and TRI, 2001

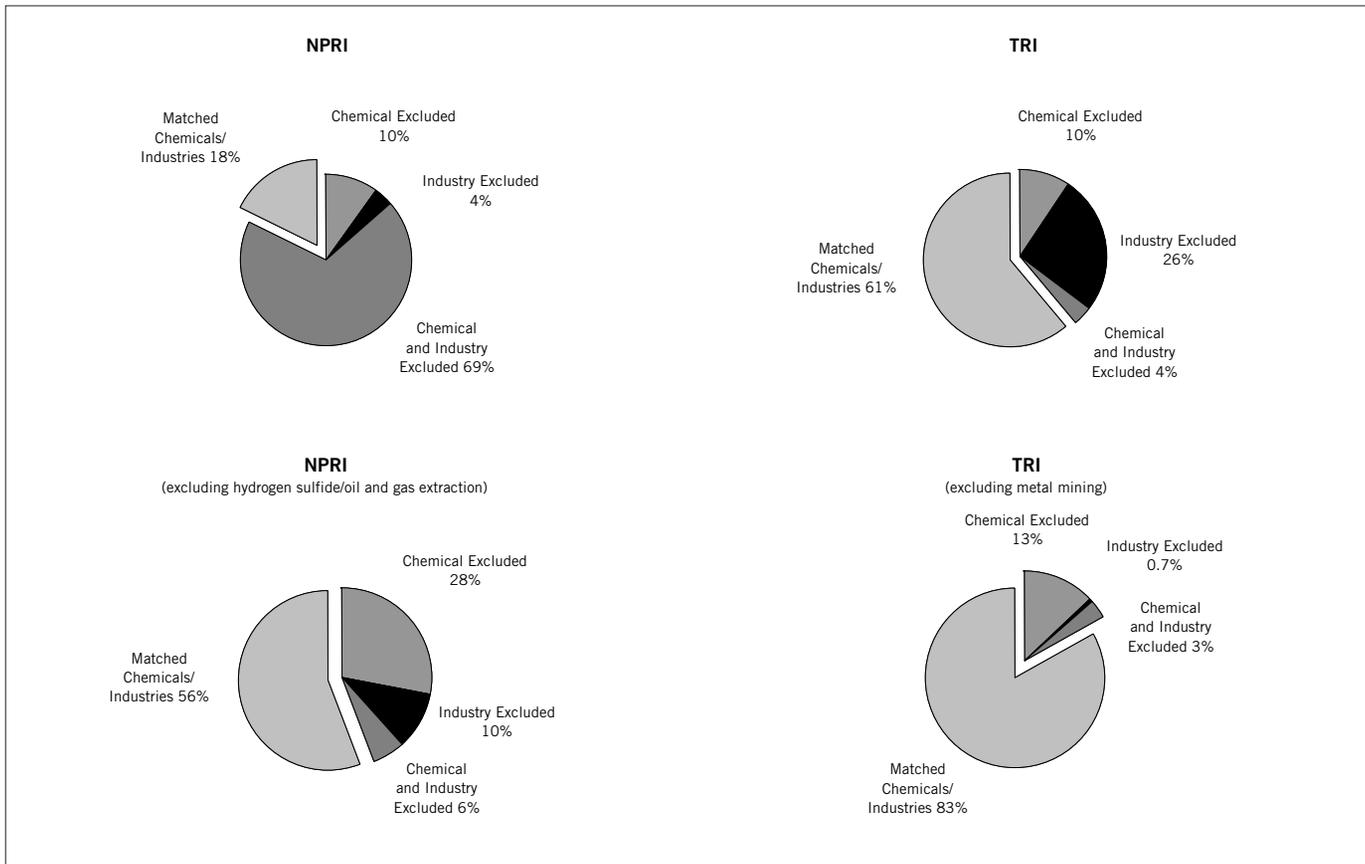
	NPRI* Number	TRI Number
Total Facilities	2,617	24,898
Total Forms	11,808	95,529
<b>Releases On-site and Off-site</b>	<b>kg</b>	<b>kg</b>
<b>On-site Releases</b>	<b>362,864,882</b>	<b>2,530,899,756</b>
Air	124,016,546	761,620,550
Surface Water	51,600,816	99,678,443
Underground Injection	154,104,297	97,698,089
Land	32,966,700	1,571,902,674
<b>Off-site Releases</b>	<b>42,496,764</b>	<b>303,098,346</b>
Transfers to Disposal (except metals)	21,245,651	39,241,636
Transfers of Metals**	21,251,113	263,856,710
<b>Total Releases</b>	<b>405,361,646</b>	<b>2,833,998,102</b>
<b>Off-site Transfers for Further Management</b>		
<b>Off-site Transfers to Recycling</b>	<b>1,117,863,117</b>	<b>884,734,917</b>
Transfers to Recycling of Metals	121,719,149	740,330,034
Transfers to Recycling (except metals)	996,143,968	144,404,883
<b>Other Off-site Transfers for Further Management</b>	<b>44,157,829</b>	<b>661,098,389</b>
Energy Recovery (except metals)	8,459,902	381,103,334
Treatment (except metals)	21,793,364	126,841,948
Sewage (except metals)	13,904,562	153,153,107
<b>Total Reported Amounts of Releases and Transfers</b>	<b>1,567,382,592</b>	<b>4,379,831,409</b>

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

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

**Figure 2-2. Percentage of Total Releases and Transfers Included/Excluded when Matching NPRI and TRI for Chemicals and Industries, 2001**



The greatest portion of releases and transfers excluded from the 2001 matched data set were due to different types of reporting in NPRI and TRI.

- For NPRI, the exclusions were primarily due to reports from three natural gas extraction facilities belonging to one parent company that reported a total of 901.5 million kg of hydrogen sulfide. TRI includes neither the industry sector nor the chemical. These three reports accounted for 57 percent of the entire NPRI database for 2001.
- Ammonia is reported to both NPRI and TRI, but is not in the matched data set, as explained above, because of different reporting requirements. Releases and transfers of ammonia accounted for over 3 percent of all NPRI and of all TRI releases and transfers.
- Non-air releases and transfers of hydrochloric acid and sulfuric acid are also not included in the matched data set because non-aerosol forms of these chemicals are not required to be reported to TRI. Non-air releases and transfers from the matched industries accounted for 6 percent of the NPRI 2001 total.
- For TRI, the exclusions were primarily due to the type of industry. The metal mining sector, as explained above, is not included in the matched data set because of different reporting requirements. Metal mines reported 26 percent of all releases and transfers to TRI in 2001 (for chemicals in the matched data set).

## 2.2.5 Adjustment of Total Releases in North America

Facilities transfer chemicals to other facilities for disposal. These amounts are considered as off-site releases in *Taking Stock*. The receiving facilities (usually, hazardous waste management facilities) can dispose of the chemicals in on-site landfills or underground injection wells; if they are metals sent to wastewater treatment facilities, they may be discharged to surface waters. These are types of on-site

**Table 2–2. Creating the Matched Dataset for *Taking Stock 2001*: Effects of Matching NPRI and TRI for Chemicals and Industries, 2001**

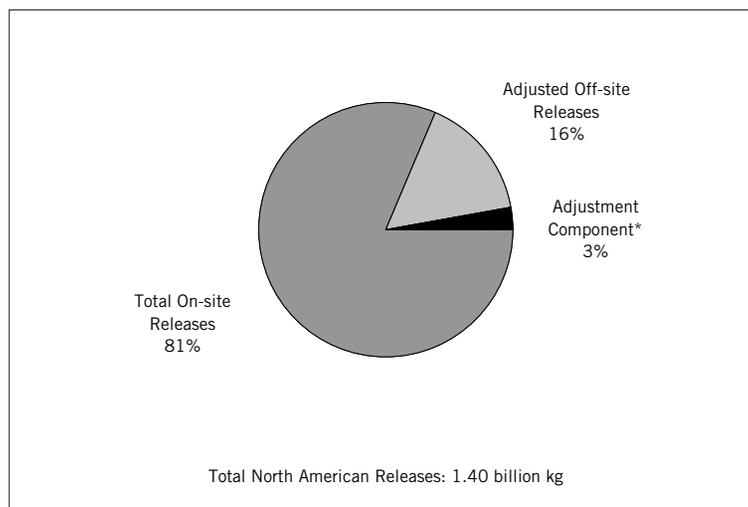
	NPRI				TRI			
	Forms		Total Reported Amounts of Releases and Transfers		Forms		Total Reported Amounts of Releases and Transfers	
	Number	%	kg	%	Number	%	kg	%
<b>Total in Individual Database</b>	<b>11,808</b>	<b>100</b>	<b>1,567,382,592</b>	<b>100</b>	<b>95,529</b>	<b>100</b>	<b>4,379,831,409</b>	<b>100</b>
<b>Excluded Due to Chemical Only</b>	<b>3,118</b>	<b>26</b>	<b>156,284,048</b>	<b>10</b>	<b>22,608</b>	<b>24</b>	<b>417,946,730</b>	<b>10</b>
Chemicals with Differences in Reporting Definition								
Hydrochloric and Sulfuric Acid: Non-air Releases	321	3	88,079,094	6	263	0.3	5,415,475	0.12
Isopropyl Alcohol	241	2	3,679,639	0.23	16	0.02	232,946	0.01
Ammonia	301	3	26,284,347	2	2,616	3	81,755,287	2
Lead and its Compounds	160	1	13,276,659	1	7,977	8	167,172,371	4
Dioxins/Furans	270	2	0.30	0	1,301	1	198	0.00
PAHs	1,012	9	811,681	0	3,275	3	2,374,520	0.05
Hexachlorobenzene	265	2	58	0	96	0.1	36,310	0.00
Chemicals on One List but not on the Other List	548	5	24,152,570	2	7,064	7	160,959,623	4
<b>Excluded Due to Industry Only</b>	<b>1,497</b>	<b>13</b>	<b>58,012,265</b>	<b>4</b>	<b>4,981</b>	<b>5</b>	<b>1,130,118,110</b>	<b>26</b>
Metal Mining	242	2	9,231,715	0.6	517	1	1,109,013,531	25
Other Industries	1,255	11	48,780,550	3	4,464	5	21,104,578	0.5
<b>Excluded Due to Both Chemical and Industry</b>	<b>502</b>	<b>4</b>	<b>1,075,940,314</b>	<b>69</b>	<b>1,343</b>	<b>1</b>	<b>155,563,592</b>	<b>4</b>
Hydrogen Sulfide/Oil and Gas Extraction	75	1	1,043,599,088	67	NA	NA	NA	NA
Other Chemicals/Industries	427	4	32,341,226	2	1,343	1	155,563,592	4
Hydrochloric and Sulfuric Acid	94	1	2,233,225	0	34	0.04	622,788	0.01
Isopropyl Alcohol	10	0	211,441	0	0	0	0	0.00
Ammonia	97	1	29,404,764	2	56	0.06	1,031,138	0.02
Lead and its Compounds	41	0	474,265	0	584	1	153,888,029	4
Dioxins/Furans	58	0	0.07	0	19	0.02	0.4	0.00
PAHs	57	0	403	0	647	1	21,619	0.00
Hexachlorobenzene	57	0	10	0	3	0.00	18	0.00
Chemicals on One List but not on the Other List	13	0	17,117	0	0	0	0	0
<b>Excluded Due to Number of Employees Only</b>	<b>4</b>	<b>0.03</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NA</b>	<b>0</b>	<b>NA</b>
<b>Total for Matched Chemicals/Industries</b>	<b>6,687</b>	<b>57</b>	<b>277,145,965</b>	<b>18</b>	<b>66,597</b>	<b>70</b>	<b>2,676,202,977</b>	<b>61</b>

**Table 2–3. Effect of Adjustment in Off-site Releases on North American Total Releases, NPRI and TRI, 2001**

Releases On- and Off-site	North America		NPRI*		TRI	
	kg	%	kg	%	kg	%
<b>Total On-site Releases</b>	<b>1,169,736,346</b>	<b>84</b>	<b>113,998,488</b>	<b>86</b>	<b>1,055,737,858</b>	<b>83</b>
<b>Total Reported Off-site Releases</b>	<b>268,545,275</b>		<b>23,587,802</b>	<b>9</b>	<b>244,957,473</b>	<b>9</b>
Adjustment Component (Off-site Transfers to Disposal Reported as On-site Release by Other NPRI or TRI Facilities)	39,808,385	(15% of total reported off-site releases)	5,080,841	(22% of total reported off-site releases)	34,727,544	(14% of total reported off-site releases)
<b>Adjusted Off-site Releases*</b>	<b>228,736,890</b>	<b>16</b>	<b>18,506,961</b>	<b>14</b>	<b>210,229,930</b>	<b>17</b>
<b>Total Adjusted Releases*</b>	<b>1,398,473,236</b>	<b>100</b>	<b>132,505,448</b>	<b>100</b>	<b>1,265,967,788</b>	<b>100</b>

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

\* Adjusted to exclude off-site releases reported as on-site releases by other NPRI or TRI facilities.

**Figure 2–3. Effect of Adjustment in Off-site Releases on North American Total Releases, 2001**

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

\* Amount of off-site transfers to disposal reported as on-site releases by other NPRI or TRI facilities.

releases. Therefore, one facility may report chemicals as off-site releases (sent off-site for disposal) while another facility reports the same quantity as an on-site release. With the inclusion of hazardous waste management facilities in the matched data set (beginning with the 1998 reporting year), such on-site releases are now included as well. When considering total releases, an adjustment should be made so that the release is counted only once.

The 2001 data were analyzed to determine how much of the off-site releases were also reported as on-site releases at another facility (see **Table 2–3** and **Figure 2–3**). In all, 5.1 million kg of off-site releases in NPRI (of the total reported off-site releases of 23.6 million kg, or 22 percent) and 34.7 million kg of off-site releases in TRI (of the total reported off-site releases of 245.0 million kg, or 14 percent) were found to match up with on-site releases also reported for 2001 by facilities in North America.

Why are there these differences between the amounts reported as sent off-site for disposal and the amounts reported as disposed of on-site? There are several reasons why off-site releases may not be reported as on-site releases: the transfer site may not have met the thresholds or other reporting criteria for reporting that chemical, the transfer site may not have reported when it should have, the facility may have reported the ultimate disposition of the waste incorrectly, or the transfer amount may have actually been disposed of in a different calendar year. In addition, since matching was based largely on names and addresses of transfer sites, matches may have been missed in the analysis.

Releases are not adjusted when the analysis focuses on total reported releases and transfers (see **Chapter 4**) because the purpose of such an analysis is to present the total amounts of the chemicals that are managed by the facilities. Other chapters (**Chapters 7** and **8**) also do not include an adjustment because they deal with other types of transfers than transfers to disposal or they deal with data prior to 1998 when hazardous waste facilities were not included in the reporting.



**PRTR in Mexico**



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## Key Findings

- Many organizations have been active in the promotion of a mandatory PRTR in Mexico. Early efforts resulted in a National Executive Proposal and a pilot project in Querétaro.
- Facilities in Mexico started to report on a voluntary basis in 1997. The list of chemicals included 185 substances. The current list, published in the NMX-AA-118-SCFI-2001, includes 104 substances.
- In late 2001, Mexico took an important step forward with new legislation setting the framework for mandatory reporting and requiring that the data be made publicly available.
- A new regulation to put into place the requirement for mandatory reporting is expected in 2004.
- Because many environmental responsibilities are shared, the federal and state governments are cooperating in developing state-level PRTR programs. States such as Aguascalientes have developed a state PRTR and that state has published its first annual report.
- Mexico is developing a new regulation to guide reporting in the future which will propose a new list of chemicals and reporting thresholds.

## 3.1 Introduction

This chapter discusses the Mexican PRTR program, its development and current status. A brief history of the development of the PRTR program in Mexico is followed by the current legislative and administrative actions among the federal and state authorities as they move from voluntary to mandatory reporting. The example of reporting from the state of Aguascalientes, the state with the longest such record, and examples of two institutional efforts to further the PRTR program during its development are also included.

## 3.2 History of RETC in Mexico

In the early 1990s, 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 (PRTRs) 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. The Czech Republic, Egypt and Mexico were selected to develop country-based pilot studies in order to gain practical experience with the opportunities and challenges of establishing national PRTR systems.

The Mexican effort began with a National Coordinating Group, a committee of 38 representatives from academic and research institutions, industrial chambers, consultants, environmental NGOs, and governmental institutions related to the management of toxic substances and pollution prevention. This group, initiated in 1994, focused on the needed activities for the development of an integrated environmental reporting system.

### 3.2.1 Pilot Study

The principles for the reporting system were tested in a case study in one Mexican state, Querétaro. The aim of the case study, which began in 1995 and successfully ended in 1996, was to identify all elements needed for the implementation of a PRTR. The results of that experience contributed to the development of an executive proposal for the implementation of a national PRTR.

The main results of the study were:

- the creation of an integrated register of releases and transfers of contaminants (the *Registro de Emisiones y Transferencia de Contaminantes*—RETC) based on the information given by companies;
- the evaluation of the separate elements of the RETC, which enabled targeted improvements to be made in its design;
- a demonstration that a PRTR could be implemented in Mexico with cooperation among diverse sectors of civil society;
- the usefulness of a multimedia focus to rationalize the requirements for reporting of environmental information;
- an estimation of the the average time it takes for a facility to complete one RETC reporting cycle (approximately 18–40 person-hours);
- assessment of the need for knowledge, technology and capacity building to manage and prevent pollution;
- the development of improved reporting format and guidance documents;
- the development of supportive information on data estimation techniques and methods for pollution prevention for the reporting industries;
- the revision of the substances list; and
- a demonstration of the utility of an integrated reporting system in order to get a full picture of the environmental loads.

The original participants in the study were the National Ecology Institute (INE), the regional delegation of federal Ministry of Environment, Natural Resources and Fisheries (Semarnap), the Ecology Department of the State of Querétaro, the Querétaro Ministry of Economic Development, the National Chamber for the Processing Industry (*Cámara Nacional de la Industria de la Transformación*—Canacindra) of Querétaro, the 80 voluntarily participating

industrial facilities of the state of Querétaro, UNITAR and the CEC. It is important to mention that one of the objectives of the pilot study was to release the data and facilitate public access to the RETC. However, this could not be achieved as the reports given by the industry were voluntary and they had submitted a confidentiality petition regarding the reported data. Therefore, only a summary of the individual data could be published.

### 3.2.2 The National Executive Proposal for the RETC

The National Coordinating Group worked for two and a half years, from 1994 on, designing the technical, administrative and jurisdictional implementation of the RETC taking into consideration the experiences of the Pilot Study. In 1997, on the basis of their work, the first substance list with 185 chemicals<sup>1</sup> was defined and published in the National Executive Proposal for the RETC, which included the development of the necessary elements for an electronic register with annual data on releases and transfers of contaminants to air, water and soil, detailed by individual substance and by type of industry and geographic region. The intention was to create a multimedia environmental inventory. The proposal included a reporting format (later called *Cédula de Operación Anual* (COA) or Annual Certificate of Operation) and guidance documents, the selection criteria for the list of substances to be reported, as well as administrative procedures.

Members of this National Coordinating Group included:

- *Cámara Nacional de la Industria de la Transformación* (Canacindra—National Chamber for the Processing Industry)
- *Cámara Regional de la Industria de Curtiduría en Jalisco* (Regional Chamber of the Tannery Industry of Jalisco)
- *Centro Nacional de Prevención de Desastres* (Cenapred—National Center for Disaster Prevention)
- *Comisión Nacional del Agua* (CNA—National Water Commission)
- *Comité Cívico de Divulgación Ecológica* (Civic Committee for Ecological Information and Communication)
- *Confederación de Cámaras Industriales de los Estados Unidos Mexicanos* (Concamin—Confederation of Industrial Chambers of the United States of Mexico)
- *Confederación Patronal de la República Mexicana* (Coparmex—Confederation of Employers of the Mexican Republic)
- *Corporación Radian, S.A. de C.V.* (Radian Corporation)
- *Departamento del Distrito Federal* (Department of the Federal District)
- *Enlace Ecológico, A.C.* (Ecological Link, A.C.)
- *Gobierno del Estado de México* (Government of the State of México)
- *Gobierno del Estado de Querétaro* (Government of the State of Querétaro)
- *Instituto Nacional de Ecología* (National Institute of Ecology)
- *PEMEX Corporativo de Administración* (PEMEX, Corporate Administration)
- *PEMEX Gas y Petroquímica Básica* (PEMEX, Gas and Basic Petrochemistry)
- *PEMEX Refinación* (PEMEX, Refining)
- *Proyecto Fronterizo de Educación Ambiental, A.C.* (Border Project for Environmental Education, A.C.)
- *Santamarina y Steta, S.A. de C.V.*

<sup>1</sup> Later a list of 104 substances was defined in the NMX-AA-118-SCFI-2001, which is also a voluntary standard. The list in the guidelines for filling out the federal COA, however, was never changed and, thus, the original list, consisting of 185 substances, has been the one with which industry has continued to work.

- *Secretaría de Relaciones Exteriores* (SRE—Foreign Affairs Ministry)
- *Secretaría de Salud* (SSA—Health Ministry)
- *Universidad Autónoma Metropolitana, Unidad Azcapotzalco* (UAM-AZC) (Autonomous Metropolitan University, Azcapotzalco Campus)
- United Nations Institute for Training and Research (UNITAR)

The National Coordinating Group was later replaced by a Consultative Committee for the RETC, which currently consists of representatives from industry and NGOs. At this time the only governmental members who participate are representatives from Semarnat. Other governmental representatives, for example from the Health Ministry and the state governments such as Aguascalientes, are expected to be included in the near future. The group's purpose is to ensure the transparency of the process for the development and implementation of the RETC through its oversight and guidance. At times, maintaining a balance in the group has been a challenge given the difficulties faced by the NGOs in fully participating in the process due to resource constraints and other factors. The group is divided into three subcommittees tasked with the different technical, legal and health aspects related to the RETC.

The Consultative Committee started work in October 2002 by reviewing the proposed modifications to the format of the *Cédula de Operación Anual* (COA), considering the preparations for a new standard concerning the RETC, and analyzing the substance list and reporting thresholds. The comments and observations from the Committee members regarding the proposed rule were discussed at a second meeting in November 2002. The comments and observations are in general the result of the internal discussions in each of the three groups. Semarnat reviews the comments and decides if they will be included in the new standard and reporting format. Minutes from the meetings, which include the agreements made, are kept by Semarnat and can be obtained by request. There have been no further meetings since November 2002, but comments on the proposed new standard and format continued to be received.

The participants in the Consultative Committee, from the industry sector are Canacintra (National Chamber for the Processing Industry), Canacem (National Chamber of Cement), Ford Motor Company, several divisions of Grupo Alfa, Canacero (National Chamber of Steel Industry), PEMEX, Grupo Nissan México, ANIQ (National Association of Chemical Industry), the *Cámara Nacional de la Industria Hulera* (National Chamber of Rubber Industry), Anafapyt (National Association of Paint and Varnish Industry), the *Cámara Nacional de las Industrias de la Celulosa y Papel* (National Chamber of the Cellulose and Paper Industries), the *Cámara de la Industria Minera* (Chamber of Mining Industry), Cespedes (Study Center of the Private Sector for Sustainable Development), Coparmex (Employers Confederation of the Mexican Republic), *Comisión Federal de Electricidad* (Employers Electricity Commission), Iniciativa GEMI (Global Environmental Management Initiative), Conieco (National Counsel of the Ecology Industry), Canifarma (National Chamber of the Pharmaceutical Industry), Grupo Alpha, San Luis Corporación.

From the social sector (NGOs), representatives are from *Proyecto Fronterizo de Educación Ambiental*, A.C. (Border Project for Environmental Education), *El Colectivo Ecologista de Jalisco*, A.C. (Ecological Group of Jalisco), *Periodismo para Elevar la Conciencia Ciudadana* (Journalism to Enhance the Civil Conscience), *Enlace Ecológico*, A.C. (Ecological Link), Informa, A.C., Greenpeace Mexico, Laneta and *Presencia Ciudadana* (Civil Presence).

The representatives from the governmental sector are from the *Secretaría del Medio Ambiente y Recursos Naturales* (Semarnat).

### 3.2.3 Voluntary Reporting

National implementation of the RETC started in 1998 with facilities reporting their previous year's releases and transfers to the federal authorities on a voluntary basis. The Secretariat of

Environment and Natural Resources (Semarnat, formerly Semarnap) is the federal environmental authority in charge of the collection, management and analysis of environmental information and the national inventory data.

The reporting format for the national inventory is called *Cédula de Operación Anual* (COA) and is used at the federal reporting level. (See **Appendix H** for a copy of the COA for 2001.) The COA consists of the following sections:

- Section I, which is mandatory, contains general facility information.
- Section II, some of which is mandatory, requires reporting on air emissions of sulfur dioxide, nitrogen oxide, particulates and volatile organic compounds for which emissions standards exist. The operational permits for these facilities take into account these standards. Other criteria air contaminants, whose reporting is voluntary, include unburned hydrocarbons, carbon monoxide, and carbon dioxide, can also be reported in Section II.
- Section III contains information on "Water Usage and Wastewater Discharge" and is optional. Concentrations of heavy metals in the waste water volumes, rather than specific amounts of substances, are reported.
- Section IV, "Hazardous Waste Generation, Treatment and Transfer," is also optional but, when submitted, the facility is exempt from having to submit the corresponding hazardous waste manifest to Semarnat during the same period of the COA. The reports cover volumes of hazardous waste that contain hazardous substances, but do not detail the amounts of substances contained in the waste.
- Section V, "Pollutant Releases and Transfers," is the portion of the COA that contains information on releases to all media and transfers off-site and corresponds to the PRTR data from Canada and the US. Reporting under Section V is currently voluntary and, thus, the data are not comparable to the mandatory data collected under TRI and NPRI.

The Mexican data are not currently publicly available on a facility-specific basis. The reporting cycle covering voluntary data for the 2002 reporting year will be the first data set to be made publicly available and will include all sections of the COA form.

### 3.3 Toward Mandatory Reporting: Current Status

During 2001, Mexico made some important advances in the establishment of its PRTR, including implementation of changes in the legal framework and collaboration with state authorities.

In December 2001, the Mexican Congress approved legislative changes aimed at establishing reporting on a mandatory basis. As a result of these changes to Article 109bis of the *Ley General del Equilibrio Ecológico y Protección al Ambiente* (LGEEPA—General Law of Ecological Equilibrium and Environmental Protection), Semarnat, the states, the Federal District and municipalities are now required to integrate the data and documents contained in the environmental authorizations, licenses, reports, permits and concessions received by these different authorities into a RETC.

It is expected that a rule and a revised COA format will be published during 2004 to support enforcement of the changes made to the federal environmental law. The COA format was simplified to facilitate the reporting of the data and will include the following:

- The general information of the company and process description will be given only once, or in case of modifications. Subsequent reporting cycles, therefore, will include primarily data reflecting changes in substance quantities.
- The tables were restructured to reduce the use of separate annexes and reporting guidance.
- Some of the more detailed information, meant to assist the reporter, but not used by them and even regarded as a burden, was eliminated.

- New guidelines and information requirements were included to enhance the comparability with other countries.
- The adoption of the North American Industrial Classification System (NAICS) codes and the identification of the parent company is also envisaged.

A substance list, which is established in the Mexican standard NMX-AA-118-SCFI-2001 (*Registro de Emisiones y Transferencia de Contaminantes, Lista de Sustancias e Informe*) includes 104 substances. During the year 2004, it is expected that an official Mexican standard (NOM) to replace the NMX will be developed and published. The NOM will establish the procedures to add or delete substances from the list and, if required, the updating of a listing. Any modifications to the NOM will be done according to what is established in the *Ley sobre*

#### Timeline of Key Stages in RETC Development from 1994 to the Present

- |      |   |
|------|---|
| 1992 | Designation of Mexico as pilot project for the RETC by UNITAR, as a result of the recommendation of the United Nations Conference for Environment and Development held in Rio de Janeiro. (June)  |
| 1994 | Beginning of the technical, administrative and legal design through the National Coordinating Group of the RETC. (May)  |
| 1995 | CEC Council Resolution supporting a North American PRTR   |
| 1996 | Pilot study of the RETC in the state of Querétaro. (January to June)  |
| 1997 | National Executive Proposal for the Pollution Release and Transfer Register (RETC), including a form and a first list of 185 substances to be reported. (March)   |
|      | Publication of an agreement by Semarnap to require the unique environmental license (LAU) and the annual certificate of operation (COA), including a list of 120 substances to be reported. (April)   |
|      | CEC Council Resolution which commits the three governments to work toward adopting more comparable PRTRs. (June)  |
|      | Beginning of the first reporting cycle of the COA and beginning of training for the industry. (September)   |
| 1998 | First COA reporting cycle. (January to July)  |
|      | Publication of an agreement by Semarnap which establishes that Section I (general information) and II (air emissions) of the COA are compulsory and the other sections are voluntary. (April)   |
|      | Collection and sending of the reports received by the state delegation of Semarnap to the central office (four percent contained some information on releases and transfers in Section V). (August to December)   |
| 1999 | Second reporting cycle with a slightly modified COA form asking for more detailed information on annual air emissions estimations for criteria air pollutants (Section II) and reporting of heavy metals in wastewater discharges (Section III). (January to April) |

- |      |   |
|------|---|
| 1999 | Implementation of a geographic information system to create maps based on COA data. (May to November)   |
|      | Publication of rules for the coordination and decentralization of the RETC at state level. (October)  |
|      | Publication of the first report of the RETC, for the reporting period 1997–1998. Report described implementation process and legislative and administrative issues. Summarized monitoring data on criteria air contaminants, estimates of greenhouses gases, hazardous waste generation volumes but no COA data. (December)   |
| 2000 | Publication of the second report of RETC, for the reporting period 1998–1999. The report did not include data on Section V reporting on releases and transfers. (September)   |
| 2001 | Roundtable Discussion on the Development of the Mexican PRTR Program organized by CEC with participation of industry, NGOs, academics, governmental officials and interested citizens from the three countries. (March)   |
|      | Publication of the Mexican standard NMX-AA-118-SCFI-2001. This standard establishes the list of 104 substances and chemical compounds, to be reported to the RETC, as well as the procedure and specifications for reporting and modifying the substance listing. (18 April)  |
|      | Publication of the Federal Environmental Law ( <i>Ley General del Equilibrio Ecológico y la Protección Ambiental</i> ) modified in Article 109bis referring to the RETC, in which the focus is on the national RETC integration and on rendering this information public. (31 December)   |
| 2002 | CEC Council Resolution places priority focus on supporting Mexico in its efforts to achieve a mandatory PRTR reporting system. (June)   |
|      | RETC staff visited Canadian NPRI and US TRI program offices to learn from their experiences in developing a PRTR. (Fall)  |
| 2003 | Publication of the first state RETC by Aguascalientes for data from 2000 of 106 facilities of state jurisdiction reporting releases and transfers of criteria air contaminants, pollutants to air, water and soil, municipal waste and hazardous waste generation. The information is aggregated by industrial sector, by municipality, and by substance. (Report available at < <a href="http://www.aguascalientes.gob.mx/sedes">www.aguascalientes.gob.mx/sedes</a> >). (2 September) |
| 2004 | Publication of the second state RETC by Aguascalientes for 2001 data. It contains the same kind of information as the one of the previous year, but also includes environmental indicators. (10 March)  |
|      | Expected publication of the federal rule supporting the modified law which will support the enforcement of the Law.   |

*Metrología y Normalización*, published in the *Diario Oficial de la Federación* (Official Gazette of the Mexican Federation) of 01-07-1991.

The transition from a voluntary Mexican standard (NMX) to an official, mandatory one (NOM) is currently going on and special attention is paid to what must be reported, by who and to whom. The adoption of a mandatory requirement for RETC reporting and making the data publicly accessible are considered the most important steps towards achieving comparability among the three national PRTRs.

### 3.3.1 List of Substances

Currently, 104 substances are on the substance list and subject to reporting (see Appendix A). These can be classified as criteria air contaminants, greenhouse gases, air toxics, persistent organic pollutants, halogenated compounds, and pesticides. This substance list was initially developed based on discussions among government, industry and NGO representatives, which were members of the National Coordinating Group. The list, originally containing 185 substances, was subsequently revised by Semarnat.

Reporting on four criteria air contaminants by Mexican facilities is mandatory under Section II of the (COA): nitrogen oxide, particulates, sulfur oxide, and volatile organic compounds. TRI does not have reporting on these substances. NPRI has added seven criteria air contaminants starting with the 2002 reporting year. Indeed, each country has a different listing of substances that are considered to be criteria air contaminants. Only three, particulates, volatile organic compounds and carbon monoxide (which is listed but is voluntary under the COA), are considered criteria air contaminants by all three countries.

### 3.3.2 Who Reports and at What Thresholds

The Mexican industrial facilities under federal jurisdiction must fill out the federal COA. This includes the following industrial sectors: petroleum and petrochemical, chemical, paints and dyes, metallurgy (including the iron and steel industry), automobile manufacture, cellulose and paper, cement and limestone, asbestos, glass, electric power generation, and hazardous waste management. They were chosen based on characteristics of their processes that may emit gases, solid or liquid particles to the atmosphere and that may involve chemical reactions or thermal operations or foundry or metal tempering processes. Under the new legislation, additional sectors may be reporting through state and municipal systems.

The number of employees at the facility is not currently a determination for reporting. However, all chemicals on the RETC list are subject to an on-site “release” threshold, whereby the facility must report if the chemical is released on-site in quantities greater than a certain amount.

The way in which the reporting thresholds are defined under the RETC, which fundamentally differs from the approach used by Canada and the US, poses an important challenge to comparability among the three North American systems. Most chemicals on the NPRI and TRI lists are subject to a “manufacturing, processing and use” threshold. This threshold requires a facility to report on the chemical if it manufactures processes or otherwise uses the chemical above a certain amount. Under the current RETC reporting scheme, the thresholds are based on the amount of the chemical released on-site during the reporting year, i.e., “release” thresholds. The thresholds vary from 1 kg to 1,000 kg per year, depending on the substance (see Appendix A in the NMX-AA-118-SCFI-2001). The amount that the facility might have transferred off-site is not included when calculating whether the threshold has been met. As stated in CEC Council Resolution 02–05, Mexico is considering the adoption of activity-based chemical reporting thresholds as a step towards increased trilateral comparability.

### 3.3.3 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. Some of these activities include the improvement and accessibility of the guidelines for filling in the COA form, the 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 the industry representatives as well as for consultants.

Currently, there exist 15 guidelines to support the industry in the reporting efforts covering the industrial sectors under federal jurisdiction. The guidelines provide necessary information for obtaining the unique environmental license (*Licencia Ambiental Unica*), for filling out the COA, as well as information on pollution prevention within the industry sectors. The guidelines are available electronically through the Semarnat web site.

Semarnat is also developing reporting software for the COA that facilities will use in submitting their annual report, with the intention that gradually all reports will be submitted electronically. Currently the COA report is submitted mostly in paper format, only the COAs from the state of Hidalgo and Puebla are submitted in electronic form.

For the first reporting period from 1997–1998, several training courses took place based on the multimedia format of the COA. These courses were mostly directed to the industry in collaboration with the following industrial chambers in Mexico: Coparmex, Canacintra, the *Cámara Nacional de las Industrias de la Celulosa y Papel* (National Chamber of the Cellulose and Paper Industries), and through the *Cámara Nacional de la Industria Hulera* (National Chamber of the Rubber Industry). Nine courses were given in Monterrey, Reynosa, Chihuahua, Guadalajara, Puebla, Querétaro, Coahuila, Tijuana and Aguascalientes. During 1999, the *Colegio de Ingenieros Ambientales* (College of Environmental Engineers), in coordination with Semarnat, organized and taught another 13 courses in different cities. Further, during 2001 and 2002, Semarnat conducted sessions on the COA reporting format and guidelines through 25 industrial chambers, with financial support from CEC.

Groups from the industrial sector have also worked to encourage reporting. For example, ANIQ organized a workshop for companies in Cuernavaca City in 2001. The workshop’s objective was to increase reporting under the COA Section V by the companies.

#### PRTR Reporting Triggers Action by the Rubber Industry to Reduce Its Use of Benzene

An interesting example of how the RETC contributes to industry’s understanding of their environmental situation as well as the detection of pollution prevention and modernisation opportunities is the experience of the Mexican Chamber of Rubber. In May 2002, Semarnat made a presentation to the Chamber of Rubber which explained the RETC and included a demonstration of reporting software. Semarnat also prepared an analysis of the data that it had received from member companies of the chamber for 2000. As a result of the data presented at this meeting, Chamber members discovered that one company was still using benzene in its processes. In response, the Chamber began work on finding substitutes for benzene. As of December 2002, the industry reported considerable progress in this area.

From 1995 on, NGOs have also made major efforts to enhance the implementation of the RETC (as Section V of the COA), and to publish, distribute and disseminate the information. *Colectivo Ecologista Jalisco, A.C. (CEJ)*, in 1997, disseminated information documents to raise awareness of the RETC in Guadalajara and, in 1999, conducted sessions to raise awareness of the RETC within industry. Both efforts were supported by the CEC. Another event was the workshop “The Private Sector Confronting the Right to Environmental Information,” organized by *Alternativa Ciudadana 21*, together with *Presencia Ciudadana* and the CEC, in Mexico City, in March 2001.

There have been other important efforts from social organizations to foster the development of the RETC program, with participation of industry, NGOs, academics, government officials and interested citizens from the three countries. Among these efforts was the campaign carried out by the *Colectivo Ecologista de Jalisco, A.C.*, in collaboration with the National Institute of Ecology (INE) and the CEC, which involved a series of events from October 2000 to March 2001, called the “National Campaign for the Accurate and Complete COA Reporting and the RETC Mexican Standard.” This campaign held seminars for industrialists in the cities of Querétaro, Aguascalientes, Monterrey and Guadalajara.

The CEC has played an important supporting role in the implementation of the Mexican RETC including:

- fostering the exchange of experiences among the three national PRTR programs which has contributed to the development of Mexico’s reporting system,
- supporting the development and dissemination of information for the public and stakeholders to promote the development and implementation of the RETC,
- supporting the development of guidance materials for reporting facilities,
- sponsoring the participation of NGO representatives in international and national PRTR meetings,
- providing direct support for workshops organized by NGOs, industrial associations and the government, including workshops for the states, and
- Providing capacity building support, such as hiring consultants to provide technical advice and support to the RETC program.

For example, the CEC organized a trilateral, multi-stakeholder “Workshop on Tools that Use PRTR Data,” in Tijuana, Mexico, in 2000 as a means of exchanging experiences and fostering advances in the use of PRTR data for a variety of purposes. The CEC organized a Roundtable Discussion on the Development of the Mexican PRTR Program in Mexico City in March 2001, which was attended by more than 200 people from all sectors of civil society from the three countries. The event highlighted the progress made by Mexico in establishing its PRTR and provided for an exchange of views and experiences to further support the advancement of PRTR and right-to-know in Mexico. These kind of events have helped to increase awareness and understanding of PRTR reporting and its benefits.

### 3.3.4 Public Access to Information

#### Passage of Access to Information Law, 2001

Parallel to the revision of the *Ley General del Equilibrio Ecológico y Protección al Ambiente* in 2001, legislation was enacted to allow public access to information which had previously been for official use only. The federal *Ley Federal de Transparencia y Acceso a la Información Pública Gubernamental* (Law on Transparency and Access to Public Governmental Information) was published in the *Diario Oficial de la Federación* on 11 June 2002. The purpose of this law is to provide whatever is necessary to grant any person access to information possessed by any

federal government institution, any constitutionally autonomous organ or any entity with legal autonomy, or any other federal entity (these are called “obliged subjects” in the law).

Chapter II “Transparency Obligations,” Articles 8 and 15 are especially important regarding RETC data. Other important chapters of this rule are: Chapter I “General Dispositions,” Chapter IV “Classification of the Information,” Chapter IX “Reproduction and Shipment Information Costs,” Chapter XIII “Access to Information and Correcting Data Procedures.” All the obliged subjects are requested to actively encourage citizens to exercise their rights under this law. Article 15 of this rule establishes that the obliged subjects of this law will have to publish their administrative paperwork (trámites) or formats either on the web page of the *Registro Federal de Trámites y Servicios* (see <[www.apps.cofemer.gob.mx](http://www.apps.cofemer.gob.mx)>) or on their own web page.

On the Semarnat web page <[www.semarnat.gob.mx](http://www.semarnat.gob.mx)>, anyone interested in exercising her/his right to environmental information by invoking the *Ley Federal de Transparencia y Acceso a la Información Pública Gubernamental* can access this law through the link (named *Portal de Transparencia*).

The objectives of this federal law regarding the RETC are:

- to make government information management systems of the “obliged subjects” transparent to those who must report or deal with the government, and
- to make the detailed information/rendition of accounts available to the citizens so that they can evaluate the performance of the obliged subjects.

#### Public Access to RETC Data

RETC data collected after June 2002 is available to the public. The information that was received in 2003 will also be made publicly available, plant by plant, and substance by substance. The name of the facility, its location, emissions and transfers will be made public. Information on processes and inputs will not be made public because it is considered proprietary information.

So far, the information originating through the COA has been requested (apart from the governmental institutions themselves) by some NGOs, some students in support of their bachelor and doctorate theses, and by two industries with an interest in benchmarking. Responses and reports from the database are presently being made by personnel from the *Dirección General de Gestión de la Calidad del Aire y Registro de Emisiones y Transferencia de Contaminantes*, of the *Subsecretaría de Gestión para la Protección Ambiental* (Undersecretariat for Environmental Protection Management) of Semarnat.

In 1999, *Presencia Ciudadana, A.C.* carried out a project that analyzed the access to and provision of information considered to be of public interest. This project was called “*Acceso y uso de información sobre emisiones contaminantes*” (Access and use of information about pollutant releases) and consisted of 14 case studies. One objective of the project was to understand the experience of those requesting environmental information about pollutant releases and transfers under Article 159bis3 of the LGEEPA. The case studies found that 9 out of the 14 requests (64 percent) were not answered. Only 5 requests (36 percent) were answered, but the study found that the responses were mostly late and incomplete. For this project, *Presencia Ciudadana* collaborated with other NGOs, such as the *Unión de Grupos Ambientalistas, I.A.P.*, the *Colectivo Ecologista de Jalisco, A.C.*, and of the *Grupo Ecologista El Manglar* and was supported financially by the CEC.

The result of the case studies led to recommendations on training the authorities to know what their obligations are, to know how to respond, and to have the required information readily available. The study also found that most NGOs do not know about the mechanisms available to access the information, the new governmental structures or their new right to have access to environmental information.

In order to carry out the *Ley Federal de Transparencia y Acceso a la Información Pública Gubernamental* (Law on Transparency and Access to Public Governmental Information) and its Rule, the federal government has developed and established procedures on how, in time and manner, to supply the requested information. Information can be requested through <uenlace@semarnat.gob.mx>. If information is denied by the authority, a Semarnat internal committee reviews the reasons for denial before the denial is sent to the requester.

### NGO Action to Promote Right-to-Know in Mexico

One example among many of NGO efforts to promote and support the right to information is the *Presencia Ciudadana, A.C.* Since 1998, *Presencia Ciudadana* has combined the fostering of a democratic culture with that of an ecological culture. It has developed an active strategy to promote the right to access of environmental information. To this end, *Presencia Ciudadana* has prepared seminars and workshops to promote the RETC and other activities including:

- Development of a manual to access the information on pollutant emissions
- Workshops on Access and Use of Information on Pollutant Releases in Mexico City and Tijuana
- 14 case studies on requesting environmental information prior to the modification of the federal environmental law which included the right to information (1999)
- Workshop on the Private Sector Facing the Right to Environmental Information
- Workshop to Promote the Implementation of the RETC in Mexico (2001)
- 27 case studies on requesting environmental information after the modification of the federal environmental law

*Presencia Ciudadana* has maintained efforts to enhance mechanisms to access the environmental information and the fostering of the complete reporting of the COA. Further information can be found in: <www.presenciaciudadana.org.mx/medio/medio.htm>.

## 3.4 RETC Data to Date

The integrated COA form has been used for reporting since 1997. For the reporting year 2001, over 2,000 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). **Table 3-1** shows the number of COA forms submitted up through reporting year 2001.

The first report, *Informe Nacional de Emisiones y Transferencia de Contaminantes 1997-1998*, developed and published by the federal environmental ministry, Semarnap (now Semarnat) in 1999, contains data from 1997-1998. The report includes monitoring data on criteria air contaminants collected from other sources, like the emission inventories which include also data from the transportation sector and the “program for the minimization and comprehensive management of hazardous waste.” No data from the COA are included except for the number of facilities submitting reports. It is based on the information given by 1,129 facilities under federal jurisdiction that completed the COA form (the number of COA forms available at the time the report was published). Of these, 95 percent filled in the mandatory Sections I and II and only 5 percent filled in Section V, the one containing data on releases and transfers of individual substances and which is most similar to the PRTs in Canada and the US. Although 95 percent filled in the mandatory sections of the COA, about 70 percent of the information

**Table 3-1. Reporting to Mexican COA, 1997-2001**

Section of COA	Year				
	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: Information from Semarnat, April 2004.

\* The first year of reporting found many submissions incomplete, the numbers reflect the “good” registered forms.

contained in the first two sections was missing or incomplete, which made it unsuitable for statistical purposes.

The next reporting year (1999) showed an increase in those submitting information in Section V. The industrial sectors under federal jurisdiction submitted 1,525 COA forms for 1999. About 18 percent of these forms contained basic information in Section V. However, only about 8 percent voluntarily reported data on amounts of releases and/or transfers, with the others submitting only identification information for Section V. For reporting year 2001, about 12 percent (244 of the 1,968 facilities) of facilities submitting the COA form filled out information on releases and/or transfers in Section V of the form.

The number of COAs received from the facilities under federal jurisdiction from 1998 to 2001 increased by over 80 percent. **Table 3-2** shows the distribution of facilities reporting by state. Facilities in the state of Mexico submitted 21 percent of all COA forms, those in the Federal District had 13 percent and Jalisco had 10 percent in 2001.

**Table 3-3** gives the distribution of facilities reporting by industry sector. The chemical manufacturing sector had the largest number of facilities in each year, representing 38 percent of all facilities in 2001. The metallurgic sector (which includes steel mills) had the second largest, with 19 percent of all facilities in 2001. The petroleum refining and petrochemical sector had the third-largest number of facilities in 2001, with 11 percent of all facilities. The number of facilities reporting for this sector in 2001 was more than four times the number that reported in 1998.

As shown in **Table 3-4**, in 2001 12 percent of the facilities submitting a COA volunteered information on releases and transfers of toxic substances (Section 5.2 or Section 5.3 of the COA). The asbestos sector had the largest percentage reporting data in Section 5 (8 out of 24 facilities or 33 percent). The metallurgical sector (which includes steel mills) had the smallest percentage (21 out of 373 facilities or less than 6 percent).

While reporting for the years 2001 and 2002 was still voluntary, reporting for the year 2003 will be compulsory for the whole COA, including all parts of Section V. Preliminary estimates are that about 1,800 facilities from the 11 federally regulated sectors will be required to report to the federal government by 2005. Approximately 20,000 additional facilities from the state regulated industrial sectors such as food and service sectors will be required to report to state governments. The smaller number of facilities expected to report to the federal authorities, compared to 2001, is due to the ongoing examination of the reports and a better correlation between reporting to federal and to state authorities.

Table 3–2. Number of COAs Received, by State, 1998–2001

State	Year			
	1998 Number	1999 Number	2000 Number	2001 Number
México	251	323	353	417
Federal District	177	179	200	258
Jalisco	82	137	189	188
Nuevo León	106	97	104	96
Tabasco	0	76	87	93
Tamaulipas	55	48	86	92
Chihuahua	17	37	69	71
Guanajuato	38	39	45	63
Puebla	27	61	62	62
Querétaro	46	70	66	59
Coahuila	40	43	43	56
Veracruz	24	47	50	56
Hidalgo	47	42	51	54
San Luis Potosí	45	50	47	54
Morelos	3	18	31	42
Sonora	26	32	30	42
Tlaxcala	36	38	47	42
Michoacan	1	28	34	40
Durango	27	37	39	36
Aguascalientes	18	26	30	28
Chiapas	0	20	22	22
Baja California	4	18	17	19
Colima	6	8	9	13
Sinaloa	0	13	13	12
Yucatán	0	9	8	12
Baja California Sur	6	10	8	8
Zacatecas	0	6	9	8
Guerrero	4	6	8	7
Campeche	0	0	6	6
Oaxaca	4	7	5	5
Quintana Roo	0	0	5	5
Nayarit	0	0	2	2
<b>Total</b>	<b>1,090</b>	<b>1,525</b>	<b>1,775</b>	<b>1,968</b>

Note: Information from Semarnat, April 2004.

Table 3–3. Number of COAs Received, by Industry, 1998–2001

Industry	Year			
	1998 Number	1999 Number	2000 Number	2001 Number
Chemical Manufacturing	464	559	631	746
Metallurgic (Including Steel Mills)	213	307	365	373
Petroleum and Petrochemical	51	163	202	225
Automotive	157	197	219	216
Paints and Inks	57	83	77	93
Cement and Chalk	36	52	70	80
Electricity Generation	24	47	61	67
Cellulose and Paper	44	40	56	63
Hazardous Waste Management	13	30	37	51
Glass	26	24	32	30
Asbestos	5	23	25	24
<b>Total</b>	<b>1,090</b>	<b>1,525</b>	<b>1,775</b>	<b>1,968</b>

Note: Information from Semarnat, April 2004.

Table 3–4. Number of Facilities Reporting, by Industry, COA, 2001

Industry	COA Reports Number	Section 5.1 (Facility Identification)		Section 5.2 (On-site Releases)		Section 5.3 (Off-site Transfers)		Section 5.2 or 5.3 (Total Releases and Transfers)	
		Number	% of COA Reports	Number	% of COA Reports	Number	% of COA Reports	Number	% of COA Reports
Chemical Manufacturing	746	211	28	86	12	4	1	104	14
Metallurgical (Including Steel Mills)	373	69	18	14	4	10	3	21	6
Petroleum and Petrochemical	225	33	15	22	10	3	1	22	10
Automotive	216	58	27	33	15	24	11	42	19
Paints and Inks	93	29	31	13	14	3	3	14	15
Cement and Chalk	80	12	15	4	5	1	1	5	6
Electricity Generation	67	23	34	10	15	1	1	11	16
Cellulose and Paper	63	17	27	10	16	1	2	10	16
Hazardous Waste Management	51	11	22	4	8	2	4	5	10
Glass	30	8	27	2	7	1	3	2	7
Asbestos	24	15	63	8	33	3	13	8	33
<b>Total</b>	<b>1,968</b>	<b>486</b>	<b>25</b>	<b>206</b>	<b>10</b>	<b>53</b>	<b>3</b>	<b>244</b>	<b>12</b>

Note: Information from Semarnat, April 2004.

### 3.5 From a Federal Focus to All Levels of Government

During 2000, Mexico established the Program of Institutional Environmental Development (*Programa de Desarrollo Institucional Ambiental*—PDIA), to decentralize environmental responsibilities. This decentralization includes the assumption by states of responsibility for RETC for facilities under their jurisdiction. This was before the modified article 109 bis in the Federal Environmental Law was published, and the responsibilities of the diverse authorities was newly established. PDIA continues to exist but the RETC items are no longer included. As of 2001, 14 states had committed to participating in this program and to establishing their own state RETC. The first state to assume responsibility for the RETC was Aguascalientes in March 2000, followed by the Federal District and the State of Mexico.

Since 2001, when the modified law containing Article 109bis was published, two workshops to develop RETC capacities in the states were organized by Semarnat. Twenty-five of the states participated in the workshop. Currently, 22 states are developing activities in order to establish their RETC, six states have already published a legal framework, others are revising it or have already submitted it for discussion to their local legislative congresses.

#### 3.5.1 State RETC Programs

The state PRTRs cover more industry sectors than the federal one, including such sectors as vegetable and animal products, wood and its derivatives, food products, textiles and dress making, printing products, metal products, and graphic arts. Some service facilities are also required to report including public bath installations, sports centers, hotels, laundry and dry cleaners, bakeries, hospitals and doctors offices, restaurants and tortillerias and flour mills.

The establishment of agreements with the states to coordinate and support the compatibility of the information to be integrated in the nationwide RETC is underway. The state authorities will define the industrial branches under state and municipal jurisdiction which will be required to report. Semarnat is working with the State of Mexico and the Federal District to revise the forms to include at least the following information:

- general data from the facility,
- information on process and production,
- annual energy consumption including fuels, inputs and raw material,
- generation of atmospheric pollutant emissions,
- use and discharge of waste water, generation and transfer of waste, and
- report on handling, generation, releases and transfers of substances.

Presently, 27 out of the 32 Mexican states are collaborating with the federal authorities in developing and integrating the national RETC. Their work is at different levels of development. Some states have already taken a first step by establishing a basic data bank of all the facilities within their jurisdiction to define those that could be required to report to the 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. By 2006 or at the latest 2007, it is expected that information from nearly 20,000 facilities under state jurisdiction will be available.

#### 3.5.2 Aguascalientes State RETC: A Case Study

Aguascalientes is, with 5,589 km<sup>2</sup>, one of the smallest states in Mexico. The main economic activities are:

- automotive industry,
- production of machinery and equipment,
- textiles and clothing industry,
- food products, and
- beverage industry.

Aguascalientes is known as one of the cleanest of the Mexican states and where the relationship between industry and authorities is strongly cooperative. This state is far ahead of other states regarding the implementation of a state RETC. The environmental authority in charge of this state RETC is the *Subsecretaría de Ecología* (Subsecretariat for Ecology) of the Aguascalientes state government.

#### Legal Framework of Aguascalientes State RETC

The legal framework has already been established based on the *Ley de Protección Ambiental para el Estado de Aguascalientes* (Law for the Protection of the Environment in the State of Aguascalientes) and the federal *Ley General del Equilibrio Ecológico y Protección al Ambiente* (General Law of Ecological Equilibrium and Environmental Protection). These two laws provide the state environmental authorities with the mandate to lay out the requirements in developing its RETC.

Under these laws, the state ecology subsecretariat will have to:

- integrate an inventory of air emissions, waste water discharges, materials and wastes within its jurisdiction;
- coordinate the management of the inventory; and
- create a consolidated information system, based on the issued authorizations, licenses or permits.

#### Implementing the State RETC in Aguascalientes

The implementation process for the state RETC in Aguascalientes was initiated in October 2000 by personnel of the state ecology subsecretariat which belongs to the Social Development Secretariat.

The following are some of the actions carried out to obtain state RETC data:

### Actions and Achievements of Aguascalientes RETC Program

2000	<p>Personnel of the state ecology subsecretariat carried out a survey to determine which companies would fall under state jurisdiction.</p> <p>Training courses for industry were given by personnel of the subsecretariat, private teaching institutions, and Semarnat through the local Canacindra. Information from 106 facilities was collected.</p>
2001	<p>Training courses to industry were repeated.</p> <p>Information forms from 66 facilities were collected. The number of forms was reduced once data quality filters were applied to reject incomplete or inaccurate forms or forms from facilities that were not within the industrial sectors required to report to the federal or state authorities.</p>
2002	<p>The main industrial zones were visited, and facilities were notified of the requirement to report to the RETC.</p> <p>Additional training courses were given to industry.</p> <p>A presentation ceremony, presided over by the state governor and the secretary of social development, took place at the palace of state government on 2 September in which certificates were awarded to the facilities that submitted complete information for the state COA for reporting year 2000. Representatives from governmental, industrial and social sectors were present.</p>
2003	<p>110 facilities submitted the state COA form.</p> <p>A second visit to the industrial zones was carried out.</p> <p>An emissions inventory for the three media—air, soil and water—was published.</p> <p>The first state PRTR report, the “RETC AGS 2000,” was released, with data from 106 facilities of state jurisdiction, including emissions, releases and transfers of pollutants to air, water, soil, as well as air criteria contaminants, solid and hazardous waste generation. The information is aggregated by industrial sector, municipality and substance (more information at &lt;<a href="http://www.aguascalientes.gob.mx/sedes">www.aguascalientes.gob.mx/sedes</a>&gt;). (2 September)</p>
2004	<p>Publication of the second state PRTR “RETC AGS 2001,” adding environmental indicators. (10 March)</p>

For the creation of the first state COA report, an interactive process was developed to examine the data received and improve the reporting form and the data. The process included:

- identifying and applying the quality criteria for the submitted data,
- initial visits to the facilities in order to have better and updated information about the actual operations and performance conditions of the facilities,
- conducting surveys in order to discover training needs for filling out the state COA form, and
- modifying the reporting format to obtain more accurate reporting and data collection.

The Aguascalientes state RETC information is collected through its COA format, which is submitted in digital form backed up by a printed copy. The state’s COA includes, in addition to the information asked for in the federal COA, data on water consumption and solid waste generation, which are of special interest for Aguascalientes. Field data, for example, and results from laboratory analyses, are also included when applicable.

The first step is to validate the information received by analyzing the water data calculation worksheets. The second step is the integration of the received information by means of INTEGRA software which, as its name implies, integrates the information received and makes a pollution prognosis and organizes the environmental information by theme, thus facilitating data consolidation by topic. The product of this step is the initial draft for the state RETC report. The next step is validating the calculated data using engineering calculation and estimation methods. The last step is the publication of the annual COA state report.

Out of this, some important conclusions can be drawn:

- the reliability of the submitted information is guaranteed by data filters applied at the time of submission of the state COA format,
- the facilities under state jurisdiction have begun the habit of reporting their environmental information on time and accurately, and
- the state COA format can be modified to be compatible with the federal COA format in order to integrate a comprehensive RETC.

### Public Access and Citizen Participation in Aguascalientes

Citizen participation, as an exercise of right to know, has so far been rather limited. There have been some requests for information from universities, researchers, NGOs and the Consultative Committee for Environmental Management of the State of Aguascalientes.

The NGOs supported the process, although they did not participate in initiating it. Later on, *Colectivo Ecologista Jalisco* (with financial support from CEC) gave a workshop for industrialists in Aguascalientes, to demonstrate filling out of the complete COA format. Currently, NGOs are working to create ways to educate the public on the existence of the PRTR and its uses for the community.

### Resources

An important factor in the implementation process has been the issue of resources. Economic, human, and material resources, including hardware, software and office space needed to start up the state RETC in Aguascalientes were rather limited, but enough for the program to begin. Additional resources are necessary if the state RETC report is to be improved. In the recent past, nearly an additional \$700,000 had to be committed to the state RETC report. The state COA RETC team acknowledges the essential training support provided by personnel from the *Dirección General de Gestión de la Calidad del Aire y Registro de Emisiones y Transferencia de Contaminantes* of Semarnat.

### 3.6 Experiences During the Implementation of the RETC in Mexico

Many people and organizations have been involved in the development of the Mexican PRTR and enhancing access and use of the data. At times the process was difficult, with problems of communication and financing that had to be overcome by all stakeholders. The need to communicate with stakeholders was sometimes underestimated. For example, at times, the NGOs were not able to effectively participate in the process because they were informed of events or meetings only on short notice. Intense negotiations were held between the authorities and the industrialists about substances to be reported, rulemaking and public access to information. On the other hand, a learning process had to take place inside the participating organizations, to understand the RETC and its uses.

A multi-stakeholder approach was promoted by the Mexican government through the establishment of the original National Coordinating Group and more recently through the Consultative Committee for the RETC. In addition, many institutions and people have made substantial efforts over the past decade to contribute to various aspects of RETC development and implementation. The industry chambers informed their members through events, the NGOs made significant contributions to public and industry awareness and support for the RETC, and the authorities organized numerous training courses and information sessions on the national RETC and its progress.

**Total Reported Amounts of Releases and Transfers, 2001**



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## Key Findings

- In 2001, total reported releases and transfers in North America were 2.95 billion kg for the matched data set of industries and chemicals.
- Releases represented 49 percent of all reported releases and transfers. On-site releases were 40 percent, and off-site releases were 9 percent.
- Off-site transfers to recycling were 29 percent of total reported releases and transfers in North America, and other off-site transfers for further management were 22 percent.
- TRI accounted for 91 percent of both the facilities and the total reported releases and transfers in North America, and NPRI accounted for 9 percent.
- The pattern of releases and transfers differed somewhat between NPRI and TRI. While total releases were about the same proportion of the total reported amounts in both countries, on-site air releases represented a larger share of NPRI releases and transfers (32 percent) than those of TRI (25 percent). Off-site transfers to recycling were larger in NPRI than in TRI (41 percent versus 28 percent); however, other off-site transfers for further management (to energy recovery primarily but also to treatment and sewage) made up a smaller share of the total releases and transfers in NPRI (9 percent) than in TRI (23 percent).
- Three US states (Texas, Ohio, and Michigan) and one Canadian province (Ontario) each reported more than 170 million kg. Together, these four jurisdictions accounted for about one-quarter (28 percent) of total reported releases and transfers in North America in 2001.
- Two manufacturing industries, chemicals and primary metals, reported more than 600 million kg in total releases and transfers, each representing over 20 percent of the North American total reported in 2001. The electric utilities and hazardous waste management/solvent recovery sectors had the third- and fourth-largest totals.
- Fifty North American facilities, all but two of them located in the US, accounted for 18 percent of total reported releases and transfers. Two of the five facilities with the largest releases and transfers were hazardous waste management facilities, two were chemical manufacturers and one was a primary metals facility.
- The 25 chemicals with the largest total reported releases and transfers accounted for 89 percent of the North American total. The top four chemicals, ranked by amount of total releases and transfers, were copper and its compounds, zinc and its compounds, hydrochloric acid, and methanol. Copper and its compounds ranked first for transfers to recycling, zinc and its compounds ranked first for off-site releases (transfers to disposal), hydrochloric acid ranked first for on-site releases, and methanol was first for other off-site transfers for further waste management (including transfers to energy recovery, to treatment and to sewage).
- The average releases and transfers per facility was about 8 percent higher in NPRI than in TRI. The ratio of NPRI to TRI average kilograms per facility was 1.1 for total releases and transfers as well as for total releases on- and off-site, primarily due to higher NPRI average on-site air releases, transfers of substances other than metals for disposal, and off-site transfers to recycling. However, average kilograms per facility of other transfers for further management were smaller in NPRI than in TRI.

## 4.1 Introduction

**Chapter 4** examines total reported amounts of releases and transfers in North America for 2001. As explained in **Chapter 2**, this chapter analyzes data for industries and chemicals that must be reported in both the United States and Canada (the matched data set). Comparable Mexican data are not available for the 2001 reporting year.

**Releases** include on-site releases to air, water, land, and underground injection wells, as well as off-site releases (off-site transfers to disposal and all transfers of metals except those sent for recycling). In **Chapter 5**, releases are adjusted to account for off-site releases that are reported as on-site releases by other NPRI or TRI facilities. This chapter, however, analyzes all reported releases because it focuses on how facilities manage the total amounts they report.

**Transfers** include off-site transfers to recycling and other off-site transfers of substances (other than metals and their compounds) to energy recovery, treatment, and sewage.

Total reported amounts are the closest estimate we have of total amounts of chemicals arising from facilities' activities that require handling or management. Questions such as what kinds and types of waste are being sent off-site, what portion of materials are being recycled or transferred for disposal, or what portion of chemicals are being released on-site can be answered when all types of releases and transfers are considered.

## 4.2 Total Reported Amounts of Releases and Transfers, 2001

Total reported releases and transfers consist of on-site releases to air, surface water, underground injection, and land occurring at the reporting facility; off-site releases (transfers to disposal); transfers to recycling; and other types of transfers for further management (transfers to energy recovery, treatment, and sewage).

- In 2001, reported releases and transfers in North America totaled 2.95 billion kg for the matched data set of industries and chemicals.
- On- and off-site releases represented 49 percent of all reported releases and transfers in North America. On-site releases alone accounted for 40 percent of total reported amounts of releases and transfers.
- TRI accounted for 91 percent of both the facilities and the total reported releases and transfers in North America, and NPRI accounted for 9 percent.
- The pattern of releases and transfers in NPRI differed somewhat from that in TRI. While total releases were about the same proportion of the total reported amounts in both countries, on-site air releases represented a larger share of NPRI releases and transfers (32 percent) than those of TRI (25 percent). The proportion of off-site transfers to recycling was also larger in NPRI than in TRI (41 percent versus 28 percent). However, other off-site transfers for further management (to energy recovery primarily but also to treatment and sewage) made up a smaller share of the total releases and transfers in NPRI (9 percent) than in TRI (23 percent).
- Because of the large size of the TRI data set, North American percentages were close to or the same as TRI percentages—40 percent for on-site releases, 29 percent for off-site transfers to recycling, and 22 percent for other off-site transfers for further management.

Table 4–1. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 2001

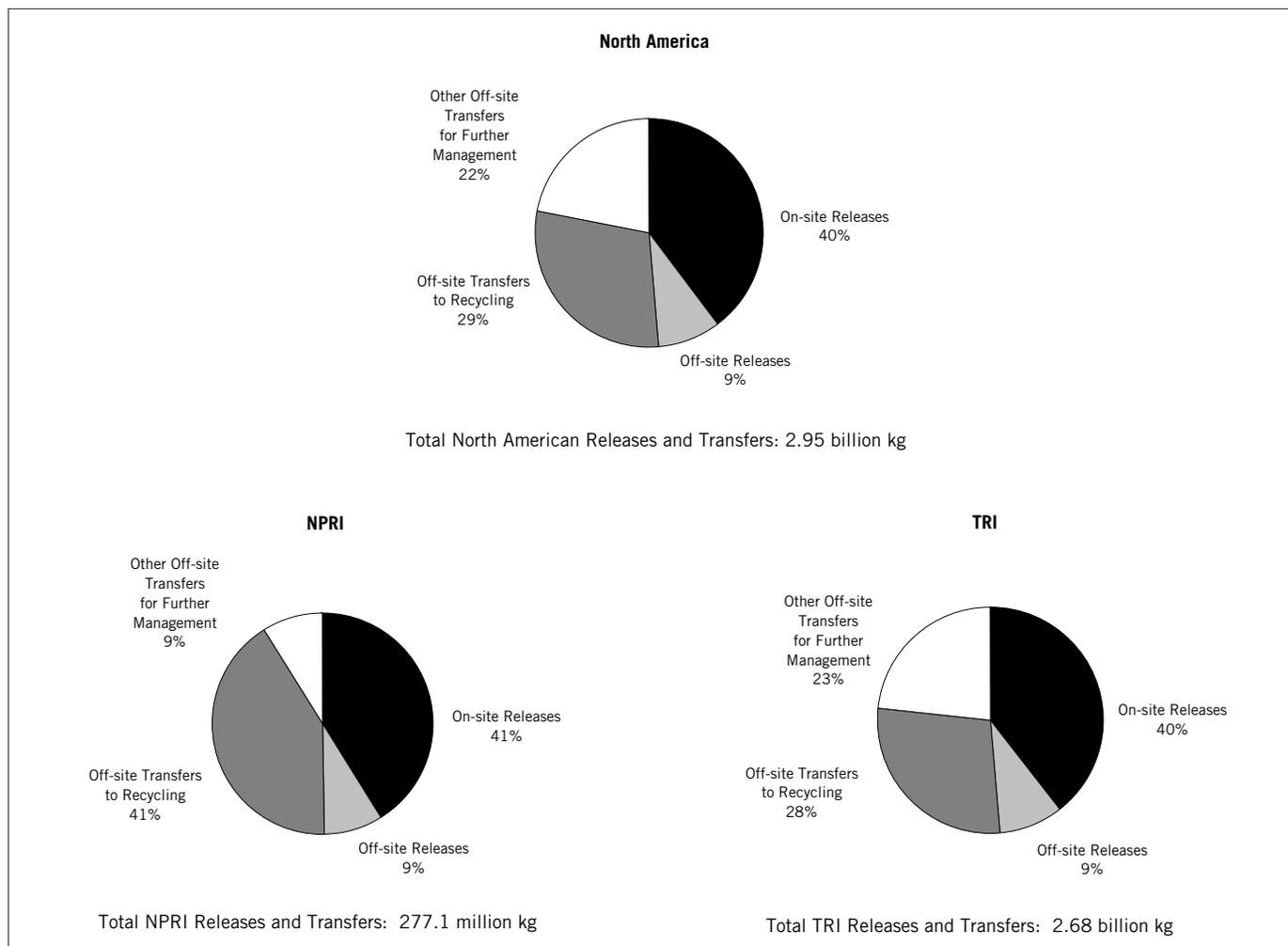
	North America Number		NPRI* Number		TRI Number		NPR as % of North American Total	TRI as % of North American Total
Total Facilities	21,254		1,864		19,390		9	91
Total Forms	73,284		6,687		66,597		9	91
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>%</b>		
<b>On-site Releases</b>	<b>1,169,736,346</b>	<b>40</b>	<b>113,998,488</b>	<b>41</b>	<b>1,055,737,858</b>	<b>40</b>	<b>10</b>	<b>90</b>
Air	755,501,676	26	87,665,608	32	667,836,068	25	12	88
Surface Water	101,754,144	3	6,903,656	2	94,850,488	4	7	93
Underground Injection	78,836,481	3	2,631,460	1	76,205,021	3	3	97
Land	233,534,136	8	16,687,855	6	216,846,281	8	7	93
<b>Off-site Releases</b>	<b>268,545,275</b>	<b>9</b>	<b>23,587,802</b>	<b>9</b>	<b>244,957,473</b>	<b>9</b>	<b>9</b>	<b>91</b>
Transfers to Disposal (except metals)	38,619,183	1	5,004,734	2	33,614,449	1	13	87
Transfers of Metals**	229,926,092	8	18,583,068	7	211,343,025	8	8	92
<b>Total Reported Releases On- and Off-site</b>	<b>1,438,281,621</b>	<b>49</b>	<b>137,586,289</b>	<b>50</b>	<b>1,300,695,332</b>	<b>49</b>	<b>10</b>	<b>90</b>
<b>Off-site Transfers to Recycling</b>	<b>868,818,143</b>	<b>29</b>	<b>115,120,102</b>	<b>41</b>	<b>753,698,041</b>	<b>28</b>	<b>13</b>	<b>87</b>
Transfers to Recycling of Metals	723,455,743	24	102,198,492	37	621,257,251	23	14	86
Transfers to Recycling (except metals)	145,362,400	5	12,921,610	4	132,440,790	5	9	91
<b>Other Off-site Transfers for Further Management</b>	<b>646,249,178</b>	<b>22</b>	<b>24,439,574</b>	<b>9</b>	<b>621,809,604</b>	<b>23</b>	<b>4</b>	<b>96</b>
Energy Recovery (except metals)	373,672,655	13	8,002,099	3	365,670,556	14	2	98
Treatment (except metals)	122,353,442	4	9,192,257	3	113,161,185	4	8	92
Sewage (except metals)	150,223,080	5	7,245,218	3	142,977,862	5	5	95
<b>Total Reported Amounts of Releases and Transfers</b>	<b>2,953,348,941</b>	<b>100</b>	<b>277,145,965</b>	<b>100</b>	<b>2,676,202,977</b>	<b>100</b>	<b>9</b>	<b>91</b>

Note: Canada and US data only. Mexico data not available for 2001. Data include 204 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.

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

**Figure 4–1. Percentage of Total Reported Amounts of Releases and Transfers in North America by Type, NPRI and TRI, 2001**



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

## Query Builder

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

To find out more details on the types of releases and transfers for NPRI and TRI using *Taking Stock Online*:

- 1 select **Country** report.
- 2 select the **year 2001**.
- 3 select **Canada & USA** for the geographic area, select **All chemicals** for the chemical, select **All industries** for the industrial sector.
- 4 check all boxes (or specific types of releases and/or transfers).

Then click on **Run the query**

## 4.2.1 Total Reported Amounts of Releases and Transfers by State and Province, 2001

In 2001, three states and one province each reported more than 170 million kg. Together, these four jurisdictions reported about one-quarter (28 percent) of total reported releases and transfers in North America.

- Texas facilities reported the largest total releases and transfers: 247.7 million kg, over 8 percent of all releases and transfers reported in North America in 2001. Texas ranked first for total on-site releases and second for total releases; the state also ranked second for other transfers for further management, with almost one-quarter of its releases and transfers (57.5 million kg or 23 percent) being transfers to energy recovery.
- Ohio facilities reported the second-largest releases and transfers, 205.0 million kg. Ohio ranked first in total releases and second in transfers to recycling.
- Facilities in Michigan had the third-largest releases and transfers, 197.0 million kg. Michigan ranked first in other transfers for further waste management, due in part to one facility, the Petro-Chem Processing Group/Solvent Distillers Group facility in Detroit, Michigan, which transferred over 50 million kg to energy recovery.
- Ontario facilities had the fourth-largest releases and transfers, 171.9 million kg. Ontario ranked first in transfers to recycling.
- A total of nine jurisdictions accounted for half of all releases and transfers in 2001. In addition to the four top ranked, they included Pennsylvania, Indiana, Illinois, North Carolina and Alabama.
- Five jurisdictions reported less than 500,000 kg in 2001: Prince Edward Island, Virgin Islands, Alaska, Guam, and the District of Columbia.

### Table 4–2. Total Reported Amounts of Releases and Transfers in North America, by State and Province, 2001

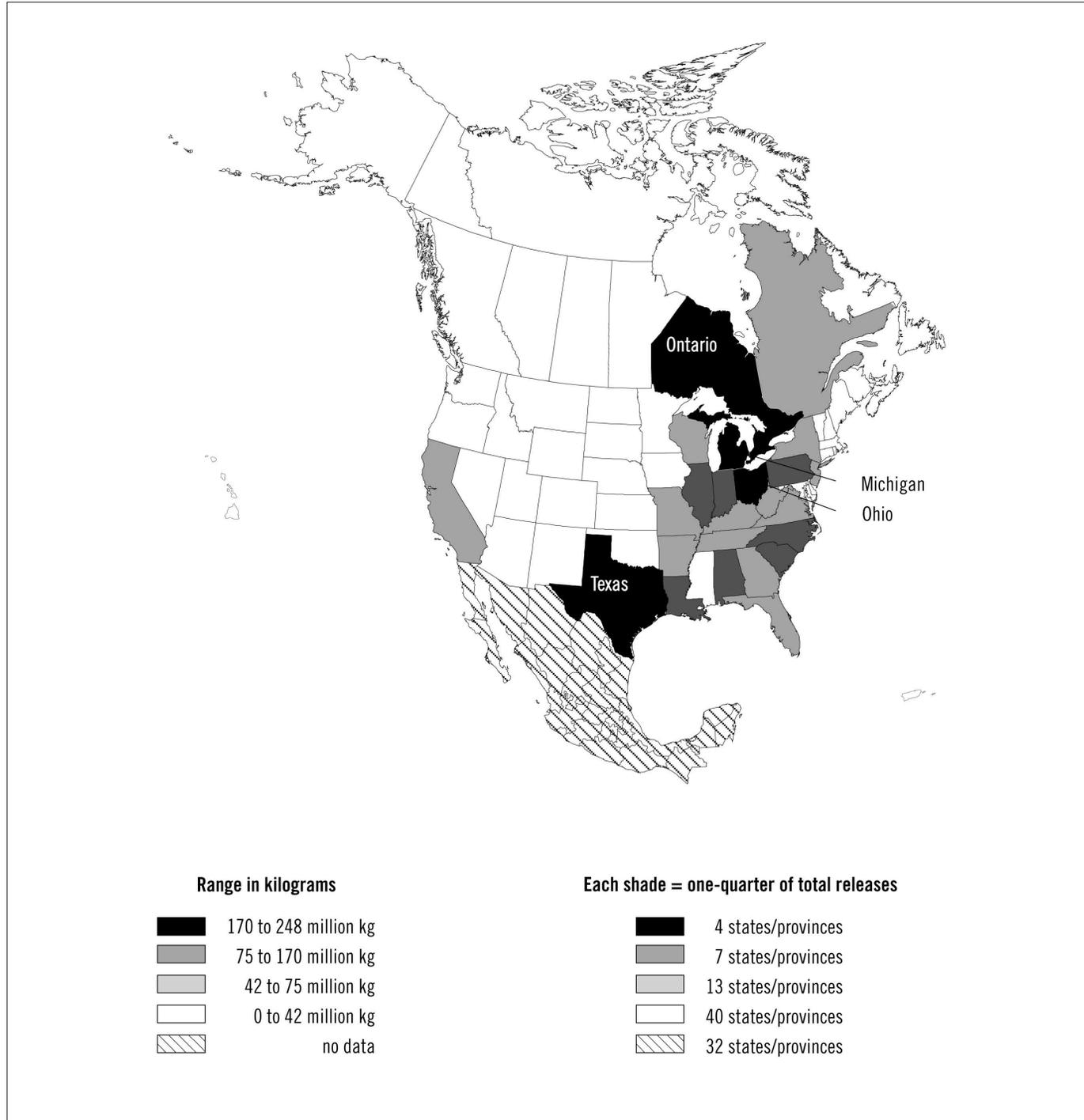
State/Province	Number of Facilities	Releases On- and Off-site				Off-site Transfers for Further Management				Total Reported Amounts of Releases and Transfers		Population	Land Area sq km	2001 Gross Domestic Product**	
		Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site		Total Transfers to Recycling		Total Other Transfers for Further Management*		kg	Rank				
				kg	Rank	kg	Rank	kg	Rank						
Alabama	445	47,694,437	7,085,831	54,780,268	8	17,407,657	15	16,400,552	13	88,588,477	9	4,468,912	131,432	121,490	27
Alaska	10	181,410	13	181,423	61	15,878	59	2,838	59	200,139	62	633,630	1,477,155	28,581	50
Alberta	159	13,016,215	2,170,141	15,186,356	31	3,696,438	40	2,729,321	36	21,612,115	37	3,059,100	661,194	97,692	31
Arizona	192	25,404,632	280,092	25,684,723	20	7,767,908	31	1,088,410	40	34,541,041	28	5,306,966	294,310	160,687	24
Arkansas	329	11,051,463	7,916,612	18,968,075	25	24,201,727	12	21,282,364	8	64,452,166	17	2,694,698	134,864	67,913	38
British Columbia	115	10,946,195	898,882	11,845,077	34	993,975	47	571,093	44	13,410,146	42	4,101,600	947,806	84,483	35
California	1,123	15,961,834	3,103,365	19,065,199	24	24,645,328	11	23,117,227	5	66,827,755	15	34,600,463	403,939	1,359,265	1
Colorado	156	3,379,527	647,795	4,027,321	48	9,788,397	26	2,948,832	35	16,764,551	40	4,430,989	268,637	173,772	22
Connecticut	281	2,373,392	1,541,336	3,914,728	50	14,182,723	18	6,241,883	25	24,339,334	34	3,434,602	12,548	166,165	23
Delaware	59	3,308,452	1,681,746	4,990,198	43	1,884,333	42	1,861,641	37	8,736,172	44	796,599	5,063	40,509	46
District of Columbia	4	18,919	5	18,924	64	4,275	60	0	--	23,199	64	573,822	158	64,459	40
Florida	506	48,953,681	1,588,969	50,542,649	10	5,652,319	34	5,466,806	30	61,661,775	18	16,373,330	139,841	491,488	4
Georgia	620	44,091,081	1,298,950	45,390,031	13	10,317,107	24	9,389,458	20	65,096,596	16	8,405,677	149,999	299,874	10
Guam	2	75,551	0	75,551	63	0	--	0	--	75,551	63	154,805	544	--	--
Hawaii	15	991,065	24,847	1,015,912	56	1	62	559	61	1,016,471	57	1,227,024	16,634	43,710	44
Idaho	56	19,889,586	585,790	20,475,376	23	778,631	49	414,788	47	21,668,794	36	1,320,585	214,309	36,905	49
Illinois	1,151	45,582,081	13,759,112	59,341,193	7	41,238,789	6	19,902,249	10	120,482,231	7	12,520,227	143,975	475,541	5
Indiana	901	51,387,124	34,075,796	85,462,920	4	67,967,870	3	11,135,645	19	164,566,435	6	6,126,743	92,896	189,919	17
Iowa	368	10,721,967	4,424,908	15,146,875	32	10,577,685	22	5,734,704	28	31,459,264	29	2,931,967	144,705	90,942	33
Kansas	248	6,875,541	2,905,752	9,781,293	37	10,532,255	23	21,641,312	7	41,954,859	25	2,702,125	211,905	87,196	34
Kentucky	404	32,197,159	4,493,794	36,690,954	14	16,253,835	17	18,985,142	11	71,929,930	13	4,068,816	102,898	120,266	28
Louisiana	320	44,485,548	2,560,625	47,046,173	11	12,387,289	20	20,167,077	9	79,600,539	11	4,470,368	112,827	148,697	25
Maine	70	3,712,562	447,618	4,160,180	46	1,174,122	44	383,913	48	5,718,215	50	1,284,470	79,934	37,449	47
Manitoba	64	4,478,518	417,478	4,895,996	44	1,730,940	43	7,025,950	47	11,491,000	47	1,149,100	649,953	22,407	53
Maryland	151	18,171,088	745,985	18,917,073	26	3,827,369	39	4,821,887	32	27,566,329	32	5,386,079	25,315	195,007	16
Massachusetts	414	2,970,499	1,013,316	3,983,815	49	9,770,531	27	8,300,028	21	22,054,373	35	6,401,164	20,299	287,802	11
Michigan	793	32,193,098	20,768,105	52,961,202	9	38,982,800	7	105,071,607	1	197,015,609	3	10,006,266	147,124	320,470	9
Minnesota	410	7,040,391	2,832,769	9,873,160	36	7,811,720	30	8,192,964	23	25,877,845	33	4,984,533	206,192	188,050	18
Mississippi	272	27,341,212	813,886	28,155,099	18	8,062,800	29	3,408,701	34	39,626,600	26	2,859,735	121,498	67,125	39
Missouri	490	23,628,517	1,555,452	25,183,969	21	13,902,509	19	12,589,769	17	51,676,247	21	5,637,309	178,432	181,493	20
Montana	34	9,385,382	781,050	10,166,431	35	46,210	58	22,221	57	10,234,863	43	905,382	376,961	22,635	52
Nebraska	146	7,914,500	5,148,272	13,062,772	33	7,357,592	32	552,802	45	20,973,166	38	1,720,039	199,099	56,967	41
Nevada	50	2,238,229	1,097,851	3,336,080	51	500,450	51	37,094	56	3,873,625	53	2,097,722	284,376	79,220	36
New Brunswick	31	5,907,244	890,284	6,797,528	40	481,364	52	44,992	55	7,323,884	46	756,000	73,440	13,239	59
New Hampshire	92	1,964,252	84,547	2,048,799	53	4,628,484	35	1,103,790	39	7,781,073	45	1,259,359	23,228	47,183	43
New Jersey	466	7,101,492	9,770,619	16,872,111	30	9,941,019	25	41,647,541	3	68,460,671	14	8,511,116	19,214	365,388	8
New Mexico	48	1,304,720	569,118	1,873,838	54	1,045,131	46	247,667	49	3,166,636	54	1,830,935	314,311	55,426	42
New York	557	16,912,305	1,826,672	18,738,977	27	27,728,120	10	5,919,748	27	52,386,845	20	19,084,350	122,301	826,488	2
Newfoundland and Labrador	7	769,120	3	769,123	57	2,901	61	0	--	772,024	59	533,800	405,721	8,884	60
North Carolina	700	57,549,592	3,999,768	61,549,361	6	32,464,256	8	8,213,158	22	102,226,774	8	8,206,105	126,170	275,615	13
North Dakota	40	3,164,338	866,512	4,030,850	47	330,137	53	226,696	50	4,587,682	51	636,550	178,681	19,005	57
Nova Scotia	31	5,188,443	364,275	5,552,718	42	987,476	48	70,824	54	6,611,019	48	942,900	55,491	16,271	58
Ohio	1,443	75,628,969	26,255,327	101,884,296	1	70,174,136	2	32,929,310	4	204,987,742	2	11,389,785	106,060	373,708	7
Oklahoma	287	6,946,532	1,447,039	8,393,571	38	8,173,681	28	1,290,663	38	17,857,915	39	3,469,577	177,865	93,855	32
Ontario	1,014	54,104,601	13,274,813	67,379,414	5	90,296,154	1	14,221,353	15	171,896,921	4	11,894,900	1,068,586	286,551	12
Oregon	221	14,433,103	3,981,063	18,414,166	29	4,046,124	37	5,552,386	29	28,012,675	31	3,473,441	248,629	120,055	29
Pennsylvania	1,173	50,698,884	37,011,463	87,710,347	3	64,518,346	4	15,828,279	14	168,056,972	5	12,303,104	116,075	408,373	6
Prince Edward Island	5	228,729	95,624	324,353	59	0	--	161,434	52	485,787	60	138,900	5,659	2,247	61
Puerto Rico	124	5,662,056	452,101	6,114,156	41	5,829,954	33	22,782,347	6	34,726,458	27	3,838,361	8,875	--	--
Quebec	407	18,276,304	5,361,953	23,638,258	22	16,412,094	16	5,992,262	26	46,042,614	23	7,417,700	1,540,689	148,241	26
Rhode Island	118	279,557	112,264	391,821	58	4,501,190	36	832,890	41	5,725,901	49	1,059,659	2,706	36,398	48
Saskatchewan	31	1,083,117	114,348	1,197,465	55	518,759	50	72,882	53	1,788,506	56	1,017,100	652,334	21,502	54
South Carolina	468	25,510,449	9,033,426	34,543,875	15	32,270,835	9	18,345,594	12	85,160,305	10	4,062,125	77,981	115,204	30
South Dakota	65	2,726,865	18,790	2,745,655	52	196,684	55	185,995	51	3,128,334	55	758,324	196,555	24,251	51
Tennessee	560	42,944,328	2,893,338	45,837,665	12	23,579,374	13	5,232,169	31	74,649,208	12	5,749,398	106,752	182,515	19
Texas	1,234	88,349,607	8,045,082	96,394,690	2	57,151,029	5	94,196,363	2	247,742,082	1	21,370,983	678,305	763,874	3
Utah	141	23,878,602	3,528,857	27,407,459	19	1,068,272	45	620,470	42	29,096,200	30	2,278,712	212,799	70,409	37
Vermont	33	71,831	58,041	129,872	62	302,663	54	431,017	46	863,552	58	612,978	23,953	19,149	56
Virgin Islands	3	214,194	2,849	217,043	60	55,231	56	1,636	60	273,910	61	108,612	347	--	--
Virginia	389	26,658,130	3,307,907	29,966,037	17	12,249,012	21	12,454,067	18	54,669,116	19	7,196,750	102,551	273,070	14
Washington	228	7,443,254	684,541	8,127,795	39	3,925,014	38	3,525,293	33	15,578,102	41	5,993,390	172,431	222,950	15
West Virginia	159	30,181,971	1,713,194	31,895,166	16	3,110,922	41	7,752,456	24	42,758,544	24	1,800,975	62,381	42,368	45
Wisconsin	786	12,829,794	5,854,081	18,683,875	28	19,321,596	14	13,318,335	16	51,323,806	22	5,405,947	140,662	177,354	21
Wyoming	35	4,063,103	261,237	4,324,340	45	46,719	57	9,265	58	4,380,324	52	493,754	251,483	20,418	55
<b>Total</b>	<b>21,254</b>	<b>1,169,736,346</b>	<b>268,545,275</b>	<b>1,438,281,621</b>		<b>868,818,143</b>		<b>646,249,178</b>		<b>2,953,348,941</b>					

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.

\* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

\*\* Gross Domestic Product for Canada from <www.statcan.ca/english/Pgdb/econ15.htm> with exchange rate

Map 4-1. Largest Sources of Total Reported Amounts of Releases and Transfers in North America, 2001: States and Provinces



#### 4.2.2 Total Reported Amounts of Releases and Transfers by Industry Sector, 2001

Facilities in five manufacturing industries each reported more than 230 million kg in total releases and transfers in 2001.

- The chemical manufacturing industry reported the largest total releases and transfers (635.0 million kg, or 22 percent of total releases and transfers), primarily as other off-site transfers for further management (reporting the largest transfers to energy recovery, to treatment and to sewage) and as on-site releases (reporting the largest underground injection). The chemicals industry accounted for 12 percent of releases and transfers in NPRI and 22 percent in TRI.
- The primary metals industry reported the second-largest amount, 607.9 million kg, primarily as on- and off-site releases (reporting the largest on-site land releases) and as transfers to recycling (reporting the largest transfers of metals to recycling). This industry accounted for 21 percent of all North American releases and transfers for 2001, a percentage that also held true in NPRI and TRI individually.
- The electric utility industry reported the third-largest amount, 416.5 million kg. This industry reported the largest amount of on-site releases (reporting the largest on-site air emissions) and total on- and off-site releases. This industry's releases and transfers made up 14 percent of the North American total, 9 percent of the NPRI total, and 15 percent of the TRI total.
- Hazardous waste management and solvent recovery facilities reported the fourth-largest amount, with 274.5 million kg, primarily as on-site releases (reporting the second-largest on-site land releases) and other off-site transfers for further management (reporting the

Table 4-3. Total Reported Amounts of Releases and Transfers in North America by Industry, 2001

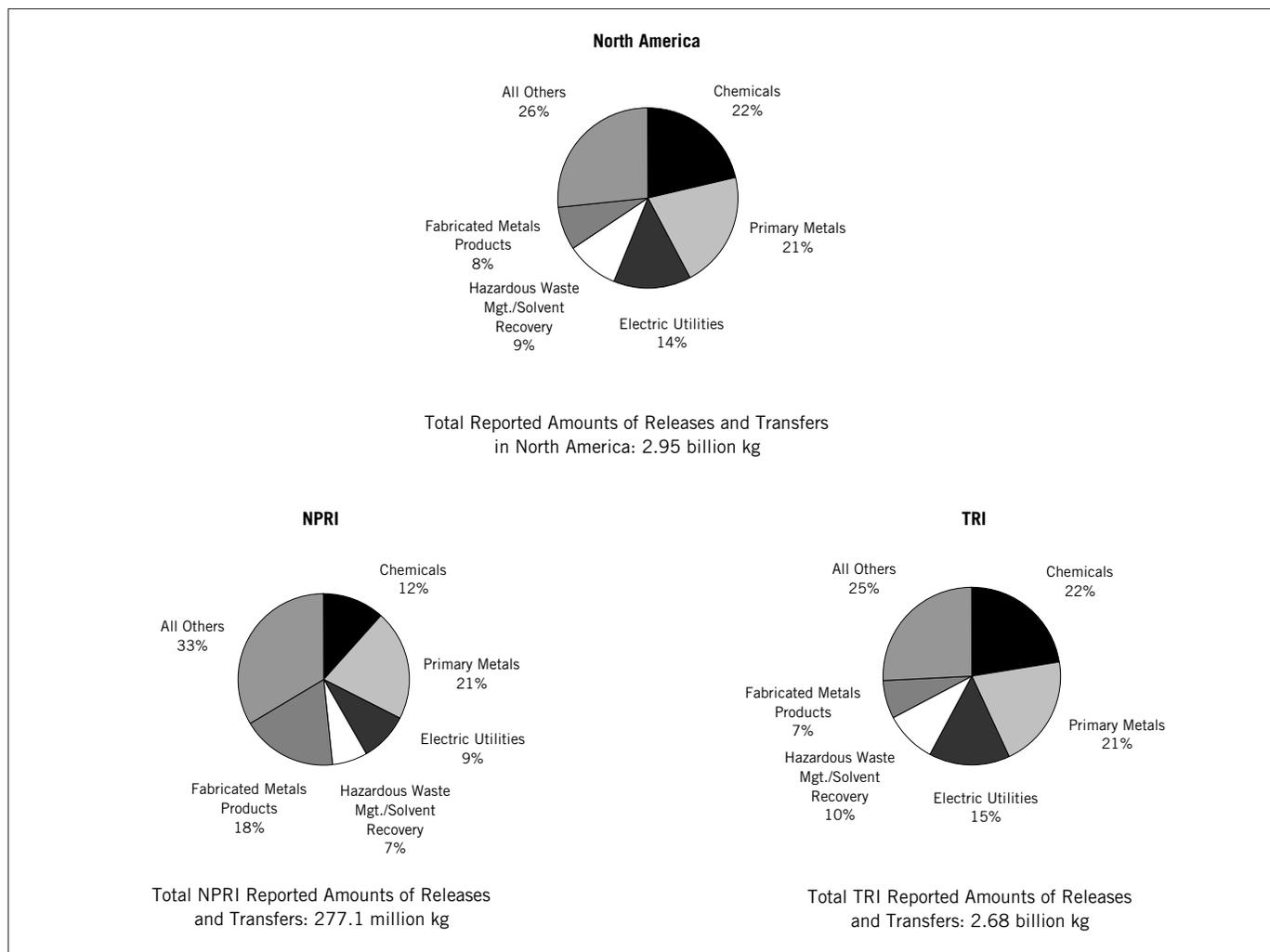
Rank	US SIC Code	Industry	Releases On- and Off-site			Off-site Transfers for Further Management		Total Reported Amounts of Releases and Transfers (kg)	NPRI as % of North American Total	TRI as % of North American Total
			Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)	Total Transfers to Recycling (kg)	Total Other Transfers for Further Management* (kg)			
1	28	Chemicals	196,955,368	33,380,472	230,335,841	72,796,365	331,866,853	634,999,059	5	95
2	33	Primary Metals	125,498,775	147,370,007	272,868,781	325,407,626	44,892,286	607,949,363	10	90
3	491/493	Electric Utilities	395,649,451	16,958,631	412,608,082	3,846,792	1,471,951	416,458,136	6	94
4	495/738	Hazardous Waste Mgt./Solvent Recovery	72,699,330	25,986,542	98,685,871	9,708,774	166,143,374	274,538,019	7	93
5	34	Fabricated Metals Products	15,933,291	10,690,419	26,623,710	191,520,110	58,707,662	232,222,244	21	79
6	--	Multiple codes 20-39**	34,073,489	6,608,019	40,681,508	64,767,158	26,042,545	131,491,210	0	100
7	26	Paper Products	103,464,105	2,919,995	106,384,100	1,057,116	22,350,572	129,729,748	21	79
8	37	Transportation Equipment	32,430,837	5,568,737	37,999,574	68,185,421	28,761,184	116,322,897	21	79
9	36	Electronic/Electrical Equipment	6,390,028	2,777,322	9,167,350	45,090,104	15,112,388	67,131,354	4	96
10	20	Food Products	48,181,459	2,489,886	50,671,345	493,351	15,633,203	66,699,113	7	93
11	30	Rubber and Plastics Products	42,260,710	4,892,309	47,153,019	7,875,146	9,646,249	62,383,546	18	82
12	35	Industrial Machinery	4,514,150	2,034,103	6,548,253	42,979,860	3,503,803	51,462,405	3	97
13	29	Petroleum and Coal Products	30,493,721	2,656,813	33,150,533	11,762,831	6,926,576	50,824,612	12	88
14	24	Lumber and Wood Products	17,904,360	366,687	18,271,047	491,193	2,333,545	20,969,931	24	76
15	32	Stone/Clay/Glass Products	14,485,973	1,410,585	15,896,558	1,523,233	2,577,922	19,969,773	13	87
16	27	Printing and Publishing	9,740,289	164,861	9,905,150	6,310,087	3,144,054	18,630,709	11	89
17	39	Misc. Manufacturing Industries	3,866,466	996,800	4,863,265	7,529,294	3,778,248	14,224,338	23	77
18	38	Measurement/Photographic Instruments	3,651,184	122,487	3,773,671	4,586,210	1,765,559	10,125,440	0	100
19	5169	Chemical Wholesalers	518,138	69,427	587,565	34,017	8,949,456	9,571,039	0.2	99.8
20	25	Furniture and Fixtures	4,372,654	156,021	4,528,675	2,239,715	1,706,270	7,895,877	24	76
21	22	Textile Mill Products	2,948,671	340,608	3,289,279	501,093	1,460,886	5,249,933	8	92
22	12	Coal Mining	2,645,748	26	2,645,774	3,619	0	2,649,393	0	100
23	31	Leather Products	345,101	558,018	903,119	87,395	51,448	1,041,963	2	98
24	21	Tobacco Products	581,253	264	581,517	0	13,561	595,077	0	100
25	23	Apparel and Other Textile Products	131,795	26,237	158,032	21,633	34,098	213,762	0.2	99.8
<b>Total</b>			<b>1,169,736,346</b>	<b>268,545,275</b>	<b>1,438,281,621</b>	<b>868,818,143</b>	<b>761,385,329</b>	<b>2,953,348,941</b>	<b>9</b>	<b>91</b>

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

\* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

\*\* Multiple SIC codes reported only in TRI.

**Figure 4–2. Percentage Contribution of Top Industry Sectors to Total Reported Amounts of Releases and Transfers, NPRI and TRI, 2001**



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

second-largest transfers to energy recovery). The sector accounted for 9 percent of total releases and transfers in North America and 10 percent of the TRI total but only 7 percent of the NPRI total.

- The fifth-ranked fabricated metals products sector reported 232.2 million kg, 21 percent of which was in NPRI. This industry represented 18 percent of the NPRI total but only 7 percent of the TRI total.

## Query Builder

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

To find out what chemicals are released and/or transferred by each industry sector using *Taking Stock Online*:

- 1 select **Chemical** report and select **All** for the number of results to be displayed.
- 2 select the **year 2001**.
- 3 select **Canada & USA** for the geographic area, select **All chemicals** for the chemical, select **one particular Industry Sector** (for example, primary metals) for the industrial sector.
- 4 check all boxes.

Then click on  **Run the query**

If you are interested in the top chemicals in a sector, click on the **down arrow** at the top of the release/transfer column you are interested in.

### 4.2.3 Facilities with the Largest Total Reported Amounts of Releases and Transfers, 2001

The 50 facilities in North America with the largest total releases and transfers reported 542.1 million kg of releases and transfers, 18 percent of the total for the matched data set in 2001.

- The 50 facilities with the largest total releases and transfers in 2001 reported 18 percent of total releases, 9 percent of off-site transfers to recycling, and 28 percent of other off-site transfers for further management. All but two were located in the US.
- Of the 50 facilities, over half (26 out of 50) reported over 75 percent of their total releases and transfers as releases on- and off-site. Another 8 of the 50 facilities reported over 75 percent of their total as transfers to recycling. The rest reported a combination of releases and transfers to recycling and other transfers for further waste management.
- The four facilities (all located in the United States) with the largest amounts all reported more than 20 million kg each of total releases and transfers.
- The hazardous waste management facility Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan, reported the largest total, with 53.8 million kg of other transfers for further management (mainly transfers to energy recovery of xylenes and toluene).
- The facility with the second-largest total, the ASARCO Ray Complex/Hayden Smelter and Concentrator, a primary metals facility in Hayden, Arizona, reported 23.6 million kg, mainly as on-site land disposal of copper and zinc and their compounds.

Table 4-4. The 50 North American Facilities with the Largest Total Reported Amounts of Releases and Transfers, 2001

Rank	Facility	City, Province/State	SIC Codes		Number of Forms	Releases On- and Off-site		
			Canada	US		Total On-site Releases (kg)	Total Off-site Releases (kg)	Total On-site and Off-site Releases Reported (kg)
1	Petro-Chem Processing Group/Solvent Distillers Group	Detroit, MI		495/738	12	727	0	727
2	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ		33	12	22,603,852	28,079	22,631,931
3	Jayhawk Fine Chemicals Corp.	Galena, KS		28	22	5,399	2,373,823	2,379,222
4	Pharmacia & Upjohn Co.	Kalamazoo, MI		28	30	292,160	26,802	318,962
5	Rineco	Benton, AR		495/738	43	2,060	51,348	53,408
6	Teris L.L.C. (dba Heat Treatment Services)	Dallas, TX		495/738	35	14,628	147,755	162,383
7	Pfizer Inc. Parke-Davis Div.	Holland, MI		28	12	1,038,678	2,686	1,041,364
8	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	15	13,300,155	0	13,300,155
9	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	12	361,030	11,952,117	12,313,147
10	U.S. Department of the Treasury Philadelphia Mint	Philadelphia, PA		34	4	0	176	176
11	Steel Dynamics Inc.	Butler, IN		33	10	22,881	11,580,723	11,603,604
12	Kennebecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	11,275,045	12,771	11,287,816
13	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	12	10,630	45	10,675
14	Marisol Inc.	Middlesex, NJ		495/738	20	6,968	80,177	87,145
15	Solutia Inc.	Cantonment, FL		28	21	10,768,870	760	10,769,630
16	Precision Kidd Steel Co.	West Aliquippa, PA		33	3	4	10,676,447	10,676,451
17	Safety-Kleen Envirosystems Co. of Puerto Rico Inc.	Manati, PR		495/738	5	5,061	24,161	29,222
18	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	9	224	5,959,468	5,959,693
19	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	9	17,261	10,505,598	10,522,859
20	Shell Norco Chemical Plant East Site	Norco, LA		28	24	307,669	0	307,669
21	Celanese Ltd. Clear Lake Plant	Pasadena, TX		28	20	255,288	256,775	512,063
22	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	9,175,987	30	9,176,017
23	Krupp Gerlach Veedersburg	Veedersburg, IN		34	1	0	0	0
24	Southeastern Chemical & Solvent Co. Inc.	Sumter, SC		495/738	5	10,130	0	10,130
25	Nucor Steel Arkansas	Blytheville, AR		33	10	5,565	251,614	257,179
26	North Star BHP Steel L.L.C.	Delta, OH		33	6	12,040	40,422	52,462
27	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	8	8,260,182	5	8,260,188
28	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	8	15,350	6,687,837	6,703,186
29	Reliant Energies Inc. Keystone Power Plant	Sheloceta, PA		491/493	11	8,171,018	0	8,171,018
30	BASF Corp.	Freeport, TX		28	28	8,025,503	7,463	8,032,967
31	Olin Corp. Zone 17 Facility	East Alton, IL		33	7	30,703	394,387	425,090
32	J & L Specialty Steel Inc.	Louisville, OH		33	6	2,940	74,039	76,978
33	Georgia Power Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	13	7,801,673	8	7,801,681
34	Ontario Power Generation Inc. Nanticoke Generating Station	Nanticoke, ON	49	491/493	13	7,467,826	0	7,467,826
35	Equistar Chemicals L.P. Victoria Facility	Victoria, TX		28	5	125,149	0	125,149
36	AK Steel Corp. Butler Works (Rte. 8 S.)	Butler, PA		33	11	4,932,676	40,368	4,973,045
37	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	16	7,225,057	23,441	7,248,498
38	Nucor Steel, Nucor Corp.	Huger, SC		33	8	11,121	7,112,156	7,123,277
39	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI		495/738	50	4,881,545	2,304,192	7,185,737
40	ASARCO Inc., Americas Mining Corp.	East Helena, MT		33	10	6,486,681	639,695	7,126,376
41	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	39	7,062,357	144	7,062,501
42	Chevron Phillips Chemical Co. L.P. Port Arthur Facility	Port Arthur, TX		28	16	171,556	2	171,558
43	USS Gary Works, U.S. Steel Corp.	Gary, IN		33	39	6,126,707	76,532	6,203,239
44	National Steel Corp. Greatlakes Ops.	Ecorse, MI		33	22	155,350	6,526,231	6,681,582
45	AK Steel Corp.	Rockport, IN		33	7	6,427,547	226,757	6,654,304
46	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	9	30,865	6,527,153	6,558,018
47	Firestone Polymers	Sulphur, LA		28	5	716,917	0	716,917
48	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	3	6,513,016	0	6,513,016
49	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	18	188,192	3,304,520	3,492,712
50	Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore, MD		491/493	15	6,325,215	3,795	6,329,009
	<b>Subtotal</b>				<b>750</b>	<b>166,647,460</b>	<b>87,920,504</b>	<b>254,567,964</b>
	<b>% of Total</b>				<b>1</b>	<b>14</b>	<b>33</b>	<b>18</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.

Table 4-4. (continued)

Rank	Off-site Transfers for Further Management		Total Reported Amounts of Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported amounts from the facility)
	Total Transfers to Recycling (kg)	Other Transfers Off-site for Further Management* (kg)		
1	39,797	53,805,473	53,845,997	Xylenes, Toluene, Naphthalene, Methyl ethyl ketone, n-Hexane (transfers to energy recovery)
2	938,379	0	23,570,310	Copper and compounds, Zinc and compounds (land)
3	0	19,373,973	21,753,195	Nitric acid and nitrate compounds (transfers to sewage)
4	2	19,953,554	20,272,518	Methanol, Toluene (transfers to energy recovery), Dichloromethane (transfers to treatment)
5	0	17,301,198	17,354,606	Xylenes, Toluene, Methyl ethyl ketone, Methanol (transfers to energy recovery)
6	0	16,434,785	16,597,168	Xylenes, Toluene, Methyl ethyl ketone (transfers to energy recovery)
7	2,126,101	12,585,601	15,753,067	Methanol (transfers to energy recovery), Toluene (transfers to energy recovery, recycling)
8	0	0	13,300,155	Zinc and compounds (land)
9	0	0	12,313,147	Zinc and compounds (transfers of metals to disposal)
10	11,760,884	0	11,761,060	Copper and compounds (transfers to recycling)
11	0	0	11,603,604	Zinc and compounds (transfers of metals to disposal)
12	0	0	11,287,816	Copper and compounds, Zinc and compounds (land)
13	0	11,200,380	11,211,056	Cyclohexane, Xylenes, Toluene, Methanol (transfers to energy recovery)
14	0	10,818,593	10,905,738	Toluene, Methanol, Xylenes, Methyl ethyl ketone (transfers to energy recovery)
15	42,122	14,873	10,826,626	Nitric acid and nitrate compounds (UU)
16	8,465	0	10,684,916	Manganese and compounds (transfers of metals to disposal)
17	265,073	10,317,523	10,611,818	Dichloromethane (transfers to energy recovery, transfers to treatment), Acetonitrile, Methanol (transfers to energy recovery)
18	0	4,567,617	10,527,310	Methyl isobutyl ketone (transfers to disposal), N-Methyl-2-pyrrolidone (transfers to energy recovery)
19	0	0	10,522,859	Zinc and compounds (transfers of metals to disposal)
20	261,807	9,417,346	9,986,823	Propylene, Ethylene (transfers to treatment)
21	0	8,900,905	9,412,969	Diethyl sulfate, Acrylic acid (transfers to energy recovery), Ethylene glycol (transfers to sewage)
22	0	0	9,176,017	Hydrochloric acid (air)
23	8,803,682	0	8,803,682	Manganese and compounds (transfers to recycling)
24	0	8,488,036	8,498,166	Methyl ethyl ketone, Toluene (transfers to energy recovery)
25	8,203,552	0	8,460,731	Zinc and compounds (transfers to recycling)
26	8,263,961	0	8,316,423	Zinc and compounds (transfers to recycling)
27	0	0	8,260,188	Zinc and compounds (land)
28	1,483,747	0	8,186,934	Zinc and compounds (transfers of metals to disposal)
29	113	0	8,171,131	Hydrochloric acid (air)
30	64,308	24,224	8,121,500	Nitric acid and nitrate compounds (water)
31	7,628,736	0	8,053,825	Copper and compounds (transfers to recycling)
32	7,573,404	238,710	7,889,092	Chromium and compounds, Nickel and compounds (transfers to recycling)
33	0	0	7,801,681	Hydrochloric acid (air)
34	288,022	0	7,755,848	Hydrochloric acid (air)
35	0	7,547,877	7,673,025	Ethylene (transfers to energy recovery)
36	2,560,055	2	7,533,103	Nitric acid and nitrate compounds (water), Zinc and compounds (transfers to recycling)
37	0	758	7,249,256	Nitric acid and nitrate compounds, Hydrogen fluoride, Manganese and compounds (UU)
38	99,052	0	7,222,328	Zinc and compounds (transfers of metals to disposal)
39	26,651	0	7,212,388	Nickel and compounds, Selenium and compounds, Arsenic and compounds (land, transfers of metals to disposal)
40	0	0	7,126,376	Zinc and compounds, Copper and compounds (land)
41	0	880	7,063,382	Asbestos (land)
42	6,366,898	423,519	6,961,976	Naphthalene, Styrene (transfers to recycling), Benzene (transfers to recycling, treatment)
43	526,457	459	6,730,155	Zinc and compounds, Manganese and compounds (land)
44	4,495	16,461	6,702,538	Zinc and compounds (transfers of metals to disposal)
45	0	0	6,654,304	Nitric acid and nitrate compounds (water)
46	59,579	0	6,617,597	Zinc and compounds (transfers of metals to disposal)
47	4,861,171	942,251	6,520,340	1,3-Butadiene (transfers to recycling)
48	0	0	6,513,016	Chlorine (air)
49	2,852,520	24,956	6,370,188	Zinc and compounds (transfers to recycling, transfers of metals to disposal)
50	0	0	6,329,009	Hydrochloric acid (air)
	<b>75,109,035</b>	<b>212,399,957</b>	<b>542,076,956</b>	
	<b>9</b>	<b>28</b>	<b>18</b>	
	<b>868,818,143</b>	<b>761,385,329</b>	<b>2,953,348,941</b>	

\* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.  
UU=underground injection.

- The facilities with the third- and fourth-largest amounts were chemical manufacturers with over 20.0 million kg each. The Jayhawk Fine Chemicals Corp. facility in Galena, Kansas, reported mainly transfers of nitrate compounds to sewage, and the Pharmacia and Upjohn Co. facility in Kalamazoo, Michigan, reported mainly transfers off-site to energy recovery of methanol and toluene.

#### 4.2.4 Chemicals with Largest Releases and Transfers, 2001

Of the 204 chemicals in the matched data set for 2001, the 25 chemicals with the largest amounts of releases and transfers accounted for 2.63 billion kg, or 89 percent of all releases and transfers reported in North America in 2001.

- Copper and its compounds had the largest total releases and transfers in 2001, with 387.7 million kg of releases and transfers, accounting for over 13 percent of all North American releases and transfers. Copper and its compounds ranked first in off-site transfers to recycling.
- Zinc and its compounds ranked second in total releases and transfers in 2001, with 382.5 million kg, accounting for almost 13 percent of all North American releases and transfers. Zinc and its compounds ranked first in off-site releases.
- Hydrochloric acid ranked third in 2001. Only air emissions of hydrochloric acid are included in the matched database. Hydrochloric acid had the largest on-site releases, with 282.4 million kg.
- Methanol, with the fourth-largest releases and transfers in 2001, had the largest other off-site transfers for further management due to 70.2 million kg of transfers to energy recovery, 34.9 million kg of transfers to sewage, and 20.2 million kg of transfers to treatment. Methanol had the largest transfers for each of these types of transfers.

Table 4–5. The 25 Chemicals with the Largest Total Reported Amounts of Releases and Transfers in North America, 2001

CAS Number	Chemical	Number of Forms	Releases On- and Off-site						
			Total On-site Releases		Total Off-site Releases*		Total Reported Releases On- and Off-site		
			kg	Rank	kg	Rank	kg	Rank	
--	m	Copper (and its compounds)	4,680	36,604,816	8	13,615,160	4	50,219,975	7
--	m	Zinc (and its compounds)	3,697	79,091,173	4	128,460,350	1	207,551,522	2
7647-01-0		Hydrochloric acid	1,365	282,407,660	1	0	175	282,407,660	1
67-56-1		Methanol	2,369	100,640,767	3	1,709,236	15	102,350,002	5
--		Nitric acid and nitrate compounds	3,733	119,435,050	2	11,319,963	6	130,755,013	3
--	m	Manganese (and its compounds)	3,578	59,318,683	6	45,607,754	2	104,926,437	4
108-88-3	p	Toluene	2,791	37,677,852	7	1,301,771	17	38,979,622	8
--		Xylenes	2,845	27,867,946	10	1,413,272	16	29,281,217	10
--	m,c,p,t	Chromium (and its compounds)	3,726	13,050,044	16	14,961,709	3	28,011,753	11
--	m,c,p,t	Nickel (and its compounds)	3,552	10,756,045	19	11,437,334	5	22,193,379	14
7664-93-9		Sulfuric acid	975	73,531,087	5	0	176	73,531,087	6
78-93-3		Methyl ethyl ketone	1,761	18,104,429	13	787,019	22	18,891,447	16
107-21-1		Ethylene glycol	1,492	3,180,387	43	1,121,712	18	4,302,099	35
110-54-3		n-Hexane	905	24,311,025	11	194,900	38	24,505,925	12
7664-39-3	t	Hydrogen fluoride	986	35,841,628	9	316,217	32	36,157,844	9
75-09-2	c,p,t	Dichloromethane	557	11,550,227	17	164,681	41	11,714,909	18
100-42-5	c	Styrene	1,605	23,046,200	12	907,438	19	23,953,638	13
108-10-1		Methyl isobutyl ketone	859	5,274,373	28	5,443,362	7	10,717,735	21
--	m	Vanadium (and its compounds)	539	17,474,768	14	4,546,415	8	22,021,183	15
74-85-1		Ethylene	305	13,163,458	15	54	169	13,163,512	17
71-36-3		n-Butyl alcohol	1,000	9,019,925	20	589,559	25	9,609,484	22
7429-90-5	m	Aluminum (fume or dust)	330	4,343,209	31	3,640,827	9	7,984,036	26
75-05-8		Acetonitrile	142	7,242,566	24	12,933	80	7,255,499	27
50-00-0	c,p	Formaldehyde	797	11,225,568	18	370,218	31	11,595,786	19
100-41-4	c	Ethylbenzene	1,156	3,856,662	34	217,380	36	4,074,043	37
		<b>Subtotal</b>	<b>45,745</b>	<b>1,028,015,548</b>		<b>248,139,262</b>		<b>1,276,154,811</b>	
		<b>% of Total</b>	<b>69</b>	<b>88</b>		<b>92</b>		<b>89</b>	
		<b>Total</b>	<b>66,581</b>	<b>1,169,736,346</b>		<b>268,545,275</b>		<b>1,438,281,621</b>	

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

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical (chemicals linked to cancer, birth defects or other reproductive harm).

t = CEPA Toxic chemical.

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Table 4-5. (continued)

Off-site Transfers for Further Management				Total Reported Amounts of Releases and Transfers		NPRI as % of North American Total	TRI as % of North American Total
Total Transfers to Recycling		Total Other Transfers for Further Management		kg	Rank		
kg	Rank	kg	Rank	kg	Rank		
337,437,018	1	NA	--	387,656,994	1	8	92
174,937,229	2	NA	--	382,488,751	2	15	85
NA	--	NA	--	282,407,660	3	6	94
14,332,330	9	125,304,179	1	241,986,511	4	11	89
1,389,453	27	98,818,219	2	230,962,685	5	6	94
68,417,081	3	NA	--	173,343,518	6	12	88
18,389,597	7	81,098,429	3	138,467,649	7	9	91
17,375,040	8	73,696,205	4	120,352,462	8	12	88
65,057,255	4	NA	--	93,069,008	9	16	84
52,801,571	5	NA	--	74,994,951	10	8	92
NA	--	NA	--	73,531,087	11	10	90
8,385,466	11	36,358,443	5	63,635,356	12	14	86
34,565,739	6	20,099,218	6	58,967,057	13	3	97
3,422,063	18	14,419,039	8	42,347,027	14	8	92
114,264	51	1,019,513	45	37,291,621	15	9	91
5,622,711	12	16,724,893	7	34,062,513	16	6	94
1,105,129	32	6,109,787	19	31,168,555	17	6	94
4,817,532	14	11,323,304	10	26,858,571	18	6	94
2,803,398	20	NA	--	24,824,581	19	9	91
200	127	10,932,824	12	24,096,537	20	10	90
1,099,833	33	10,048,248	13	20,757,566	21	8	92
12,466,038	10	NA	--	20,450,074	22	17	83
1,342,908	29	11,356,826	9	19,955,233	23	0.03	99.97
69,876	59	3,780,580	24	15,446,243	24	13	87
2,494,017	21	8,293,832	14	14,861,892	25	8	92
<b>828,445,749</b>		<b>529,383,541</b>		<b>2,633,984,101</b>		<b>10</b>	<b>90</b>
<b>95</b>		<b>82</b>		<b>89</b>			
<b>868,818,143</b>		<b>646,249,178</b>		<b>2,953,348,941</b>		<b>9</b>	<b>91</b>

NA: Transfers of metals and metal compounds reported as transferred to energy recovery, treatment or sewage are included as transfers of metals to disposal (off-site releases). Only air emissions of hydrochloric acid and sulfuric acid are included in the matched database.

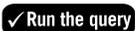
## Query Builder

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

To get releases and transfers for all of the chemicals in the matched data set using *Taking Stock Online*:

- 1 select **Chemical** report and select **All** for the number of results to be displayed.
- 2 select the **year 2001**.
- 3 select **Canada & USA** for the geographic area, select **All chemicals** for the chemical, select **All industries** for the industrial sector.

- 4 check all boxes.

Then click on  **Run the query**

#### 4.2.5 Average Releases and Transfers per Facility, NPRI and TRI

- Average releases and transfers were about 8 percent higher for NPRI (148,683 kg per facility) than for TRI (138,020 kg per facility). The ratio of NPRI to TRI average kilograms per facility for total releases and transfers was 1.1 in 2001.
- The NPRI to TRI ratio of per-facility average for total reported releases on- and off-site as well as on-site releases was also 1.1, primarily due to the higher average air releases of NPRI facilities and transfers to disposal of substances other than metals.
- Average reported off-site releases were about the same for NPRI and TRI (a ratio of 1.0).
- Average off-site transfers to recycling were higher for NPRI than for TRI. The ratio of NPRI to TRI average kilograms per facility for transfers to recycling was 1.6 in 2001, primarily due to recycling of metals.
- For all three types of other off-site transfers for further management—energy recovery, treatment, and sewage—per-facility averages were considerably smaller for NPRI than for TRI. The ratio of NPRI to TRI average kilograms per facility for these other transfers was 0.4 in 2001.

Table 4–6. Average Kilograms per Facility of Releases and Transfers in North America, NPRI and TRI, 2001

	NPRI*		TRI		Ratio of Average per Facility (NPRI/TRI)
	Number	Forms/Facility	Number	Forms/Facility	
Total Facilities	1,864		19,390		
Total Forms	6,687	3.6	66,597	3.4	
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg/facility</b>	<b>kg</b>	<b>kg/facility</b>	
<b>On-site Releases</b>	<b>113,998,488</b>	<b>61,158</b>	<b>1,055,737,858</b>	<b>54,448</b>	<b>1.1</b>
Air	87,665,608	47,031	667,836,068	34,442	1.4
Surface Water	6,903,656	3,704	94,850,488	4,892	0.8
Underground Injection	2,631,460	1,412	76,205,021	3,930	0.4
Land	16,687,855	8,953	216,846,281	11,183	0.8
<b>Off-site Releases</b>	<b>23,587,802</b>	<b>12,654</b>	<b>244,957,473</b>	<b>12,633</b>	<b>1.0</b>
Transfers to Disposal (except metals)	5,004,734	2,685	33,614,449	1,734	1.5
Transfers of Metals**	18,583,068	9,969	211,343,025	10,900	0.9
<b>Total Reported Releases On- and Off-site</b>	<b>137,586,289</b>	<b>73,812</b>	<b>1,300,695,332</b>	<b>67,081</b>	<b>1.1</b>
<b>Off-site Transfers to Recycling</b>	<b>115,120,102</b>	<b>61,760</b>	<b>753,698,041</b>	<b>38,870</b>	<b>1.6</b>
Transfers to Recycling of Metals	102,198,492	54,828	621,257,251	32,040	1.7
Transfers to Recycling (except metals)	12,921,610	6,932	132,440,790	6,830	1.0
<b>Other Off-site Transfers for Further Management</b>	<b>24,439,574</b>	<b>13,111</b>	<b>621,809,604</b>	<b>32,069</b>	<b>0.4</b>
Energy Recovery (except metals)	8,002,099	4,293	365,670,556	18,859	0.2
Treatment (except metals)	9,192,257	4,931	113,161,185	5,836	0.8
Sewage (except metals)	7,245,218	3,887	142,977,862	7,374	0.5
<b>Total Reported Amounts of Releases and Transfers</b>	<b>277,145,965</b>	<b>148,683</b>	<b>2,676,202,977</b>	<b>138,020</b>	<b>1.1</b>

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

**Releases On-site and Off-site, 2001**



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## Key Findings

- In 2001, North American facilities released 1.40 billion kg of matched chemicals on- and off-site, based on the matched set of data reported to the US TRI and the Canadian NPRI. On-site releases are releases to air, water, land, or underground injection wells at the site of the facility. Off-site releases include all transfers to disposal and transfers of metals to sewage, treatment, and energy recovery.
- On-site releases accounted for 84 percent of total releases in North America in 2001, and off-site releases, for 16 percent. Over half (54 percent) of total releases were on-site air emissions. On-site land releases made up 17 percent. Transfers of metals to disposal, sewage, treatment, or energy recovery accounted for 14 percent.
- The pattern of releases differed between NPRI and TRI. While on-site air emissions made up 53 percent of total releases in TRI, they accounted for 66 percent of total releases in NPRI. On the other hand, TRI had proportionately larger on-site land releases (17 percent versus 13 percent for NPRI) and transfers of metals (mainly off-site land disposal) (14 percent versus 11 percent for NPRI).
- More than one-quarter of all releases originated in four states—Ohio, Texas, Pennsylvania, and Indiana. Ohio had the largest releases, with 98.4 million kg, and Texas, the second-largest, with 95.8 million kg. Pennsylvania was third, with 87.3 million kg, and Indiana was fourth, with 83.4 million kg. Ontario, the Canadian province with the largest releases, ranked fifth, with 64.4 million kg.
- Ohio (with 132.4 million kg), Texas (with 95.8 million kg) and Pennsylvania (with 80.6 million kg) had the largest “loadings” of total releases within their states. Indiana came next, with 75.6 million kg, and then Ontario, with 64.2 million kg. Releases within a state or province include on-site releases plus off-site releases transferred to sites within the state or province.
- Electric utilities reported the largest total releases of any matched industry sector in North America, with 412.1 million kg. The primary metals sector accounted for the second-largest total releases, with 243.7 million kg, and the chemicals sector was third, with 229.5 million kg.
- The 50 facilities with the largest reported releases in 2001 accounted for 25 percent of total reported releases in North America. They included 16 electric utilities and 16 primary metals facilities.
- The 25 chemicals with the largest total reported releases on- and off-site accounted for 89 percent of the North American total. The top three chemicals, ranked by amount of total releases, were hydrochloric acid (with the largest on-site air releases), the metal zinc and its compounds (with largest on-site land releases and off-site transfers to disposal), and nitric acid and nitrate compounds (with the largest on-site surface water discharges).

## 5.1 Introduction

This chapter examines reporting of releases on- and off-site of 204 chemicals from industrial facilities in North America in 2001. On-site releases—to air, water, land, or underground injection wells—occur at the facility. Off-site releases represent transfers to other locations for disposal and transfers of metals to disposal, sewage, treatment, and energy recovery facilities. As explained in **Chapter 2**, the analysis covers the common set of industries and chemicals for which reports must be filed in the United States and Canada (the matched data set). Mexican data are not available for the 2001 reporting year.

The chapter begins with a summary of 2001 releases for North America and for the Canadian NPRI and the US TRI separately. The data are next broken down by state and province, by industry sector and by chemical. Information is also presented for the 50 facilities with the largest total reported releases.

## 5.2 Releases On- and Off-site in North America, 2001

The term **on-site releases** refers to releases to air, water, underground injection, and land at the site of the facility. **Off-site releases** refers to transfers to disposal (except metals) and transfers of metals off the facility site to disposal, sewage, treatment, or energy recovery facilities. **Total reported releases on- and off-site** refers to the sum of these two groups.

Some facilities report transfers to disposal that are in turn reported by other NPRI or TRI facilities as on-site releases. For example, a facility may transfer waste to a hazardous waste treatment facility, where it is landfilled on-site (reported as on-site land releases). Total releases in this chapter are adjusted so that the material is included only once. The amount called **total releases on- and off-site adjusted** or simply **total releases** omits the transfers but includes the on-site releases for amounts that are reported by two facilities. (See **Chapter 2** for a further explanation of the categories used in this report.)

- In 2001, 21,254 North American facilities in industries covered by both the NPRI and the TRI filed 73,284 reports on the substances that are common to both PRTRs. Facilities reporting to Canada's NPRI represented 9 percent of all North American facilities and forms in the matched data set, while US TRI facilities and forms accounted for 91 percent.
- Total releases in North America were 1.40 billion kg in 2001 for the matched data set. Most of the North American reporting occurs in the United States, with its larger industrial base. TRI facilities reported 91 percent of the North American releases.
- On-site releases were 1.17 billion kg, or 84 percent of total releases in North America. Off-site releases, adjusted to take into account transfers to other facilities that reported them as on-site releases, were 228.7 million kg, 16 percent of total releases.

Table 5–1. Summary of Releases On- and Off-site in North America, NPRI and TRI, 2001

	North America Number	NPRI* Number	TRI Number	NPRI as % of North American Total	TRI as % of North American Total
Total Facilities	21,254	1,864	19,390	9	91
Total Forms	73,284	6,687	66,597	9	91
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>		
<b>On-site Releases</b>	<b>1,169,736,346</b>	<b>113,998,488</b>	<b>1,055,737,858</b>	<b>10</b>	<b>90</b>
Air	755,501,676	87,665,608	667,836,068	12	88
Surface Water	101,754,144	6,903,656	94,850,488	7	93
Underground Injection	78,836,481	2,631,460	76,205,021	3	97
Land	233,534,136	16,687,855	216,846,281	7	93
<b>Off-site Releases</b>	<b>268,545,275</b>	<b>23,587,802</b>	<b>244,957,473</b>	<b>9</b>	<b>91</b>
Transfers to Disposal (except metals)	38,619,183	5,004,734	33,614,449	13	87
Transfers of Metals**	229,926,092	18,583,068	211,343,025	8	92
<b>Total Reported Releases On- and Off-site</b>	<b>1,438,281,621</b>	<b>137,586,289</b>	<b>1,300,695,332</b>	<b>10</b>	<b>90</b>
Off-site Releases Omitted for Adjustment Analysis***	39,808,385	5,080,841	34,727,544	13	87
<b>Total Releases On- and Off-site (adjusted)****</b>	<b>1,398,473,236</b>	<b>132,505,448</b>	<b>1,265,967,788</b>	<b>9</b>	<b>91</b>

Note: Canada and US data only. Mexico data not available for 2001. Data include 204 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.

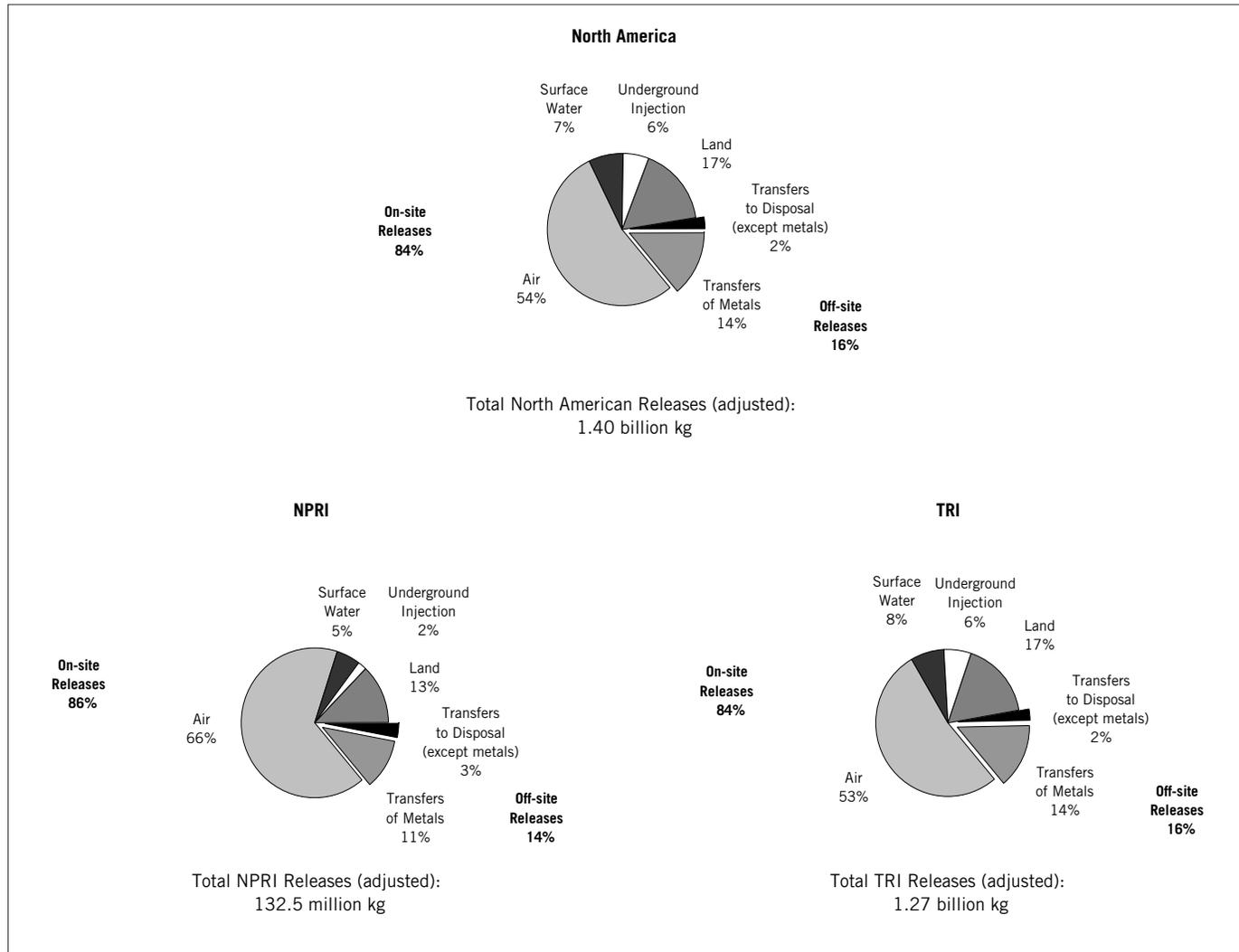
\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

\*\*\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

**Figure 5–1. Percentage of Releases On-site and Off-site in North America by Type, NPRI and TRI, 2001**



Note: Canada and US data only. Mexico data not available for 2001. Off-site releases and total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

- For both NPRI and TRI, on-site air releases accounted for over half of total releases—66 percent of the NPRI total releases, and 53 percent of the TRI total.
- Off-site releases made up 14 percent of NPRI total releases, and 16 percent of the TRI total.
- TRI facilities reported proportionately larger on-site releases to surface waters (8 percent for TRI and 5 percent for NPRI) and on-site underground injection (6 percent for TRI and 2 percent for NPRI).

## 5.2.1 Releases On- and Off-site, by State and Province, 2001

More than one-quarter of all North American releases originated in four states.

- Ohio reported the largest releases, with 98.4 million kg, or 7 percent of the North American total. Ohio reported the second-largest on-site air emissions (behind North Carolina), with several electric generating facilities contributing significantly to its total on-site air emissions. Ohio had the second-largest on-site releases and the largest off-site transfers to disposal (except metals).
- Texas reported the second-largest total releases, 95.8 million kg (almost 7 percent of the North American total). Texas also had the largest releases on-site to underground injection (27.6 million kg, over one-third of the total in this category) and to surface waters (11.4 million kg, 11 percent of the total in this category), resulting in the largest total on-site releases (88.3 million kg).
- Pennsylvania reported the third-largest total releases (87.3 million kg or 6 percent of the North American total), including the largest total off-site transfers of metals and total off-site releases.
- Indiana reported the fourth-largest total releases (83.4 million kg or almost 6 percent of the North American total) and the second-largest total off-site releases.
- Ontario, the Canadian province with the largest releases, ranked fifth in North America, with 64.4 million kg and had the third-largest air releases and second-largest off-site transfers of substances other than metals off-site to disposal in North America.

Table 5–2. Releases On- and Off-site in North America, by State and Province, 2001

State/Province	Number of Facilities	On-site Releases				Total On-site Releases	
		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	kg	Rank
Alabama	445	32,055,435	2,006,074	9,983	13,622,946	47,694,437	8
Alaska	10	160,684	19,259	3	1,465	181,410	61
Alberta	159	8,027,384	750,747	2,618,817	1,611,582	13,016,215	28
Arizona	192	1,677,981	380	0	23,726,270	25,404,632	19
Arkansas	329	7,127,836	1,298,335	719,380	1,905,911	11,051,463	30
British Columbia	115	8,422,984	1,928,868	0	584,078	10,946,195	31
California	1,123	5,519,720	2,125,902	6,647	8,309,565	15,961,834	26
Colorado	156	1,308,568	1,647,172	0	423,786	3,379,527	46
Connecticut	281	2,021,705	351,183	0	503	2,373,392	51
Delaware	59	2,771,802	255,068	0	281,582	3,308,452	47
District of Columbia	4	18,473	298	0	148	18,919	64
Florida	506	34,967,590	648,269	10,624,802	2,713,020	48,953,681	7
Georgia	620	37,206,973	3,660,050	0	3,224,058	44,091,081	11
Guam	2	75,551	0	0	0	75,551	62
Hawaii	15	978,008	13,053	3	0	991,065	56
Idaho	56	1,000,926	2,626,413	0	16,262,247	19,889,586	22
Illinois	1,151	24,679,080	3,605,771	148	17,297,082	45,582,081	9
Indiana	901	33,079,220	8,492,854	112,608	9,702,443	51,387,124	5
Iowa	368	8,554,214	1,364,796	0	802,958	10,721,967	32
Kansas	248	4,941,749	503,896	238,877	1,191,019	6,875,541	39
Kentucky	404	25,199,214	789,779	24,531	6,183,635	32,197,159	13
Louisiana	320	20,035,160	4,760,073	14,759,153	4,931,163	44,485,548	10
Maine	70	1,638,173	1,782,245	0	292,143	3,712,562	45
Manitoba	64	3,285,637	100,263	0	1,089,089	4,478,518	43
Maryland	151	15,332,648	1,714,916	24,722	1,098,801	18,171,088	24
Massachusetts	414	2,887,813	32,749	0	49,397	2,970,499	49
Michigan	793	24,130,378	388,359	1,119,799	6,554,562	32,193,098	14
Minnesota	410	5,227,231	685,891	0	1,127,269	7,040,391	37
Mississippi	272	13,784,416	5,691,335	4,911,614	2,953,848	27,341,212	16
Missouri	490	13,186,055	555,017	0	9,887,444	23,628,517	21
Montana	34	1,641,073	15,183	0	7,729,126	9,385,382	33
Nebraska	146	3,102,977	4,239,390	0	572,133	7,914,500	34
Nevada	50	835,064	6,578	0	1,396,587	2,238,229	52
New Brunswick	31	4,769,390	766,582	0	370,705	5,907,244	40
New Hampshire	92	1,956,768	4,366	0	3,118	1,964,252	53
New Jersey	466	5,487,325	1,531,081	3	83,083	7,101,492	36
New Mexico	48	407,607	2,739	3,579	890,795	1,304,720	54
New York	557	12,013,788	2,961,917	0	1,936,601	16,912,305	25
Newfoundland and Labrador	7	748,824	10,557	0	9,739	769,120	57
North Carolina	700	50,066,939	4,261,107	0	3,221,546	57,549,592	3
North Dakota	40	1,740,764	31,743	0	1,391,831	3,164,338	48
Nova Scotia	31	4,367,968	59,884	0	760,391	5,188,443	42
Ohio	1,443	45,889,914	3,702,555	13,338,569	12,697,932	75,628,969	2
Oklahoma	287	4,757,047	1,044,249	1,935	1,143,301	6,946,532	38
Ontario	1,014	45,480,752	1,758,225	0	6,793,650	54,104,601	4
Oregon	221	4,974,839	1,298,899	0	8,159,365	14,433,103	27
Pennsylvania	1,173	38,726,682	8,367,445	0	3,604,758	50,698,884	6
Prince Edward Island	5	18,978	208,546	0	1,205	228,729	59
Puerto Rico	124	5,643,971	15,820	0	2,265	5,662,056	41
Quebec	407	11,565,633	1,296,780	632	5,399,877	18,276,304	23
Rhode Island	118	276,456	2,939	0	162	279,557	58
Saskatchewan	31	978,058	23,204	12,011	67,538	1,083,117	55
South Carolina	468	22,852,720	1,139,020	0	1,518,709	25,510,449	18
South Dakota	65	699,461	990,463	0	1,036,941	2,726,865	50
Tennessee	560	31,634,010	1,070,800	2	10,239,516	42,944,328	12
Texas	1,234	42,656,276	11,415,011	27,630,199	6,648,122	88,349,607	1
Utah	141	8,332,181	536,318	0	15,010,102	23,878,602	20
Vermont	33	39,461	32,254	0	116	71,831	63
Virgin Islands	3	171,866	39,049	0	3,279	214,194	60
Virginia	389	21,764,358	3,096,371	2	1,797,399	26,658,130	17
Washington	228	5,531,632	903,026	0	1,008,596	7,443,254	35
West Virginia	159	26,109,457	1,339,803	5	2,732,707	30,181,971	15
Wisconsin	786	10,451,604	1,782,795	0	595,395	12,829,794	29
Wyoming	35	505,223	432	2,678,458	878,990	4,063,103	44
<b>Total</b>	<b>21,254</b>	<b>755,501,676</b>	<b>101,754,144</b>	<b>78,836,481</b>	<b>233,534,136</b>	<b>1,169,736,346</b>	

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.

Table 5-2. (continued)

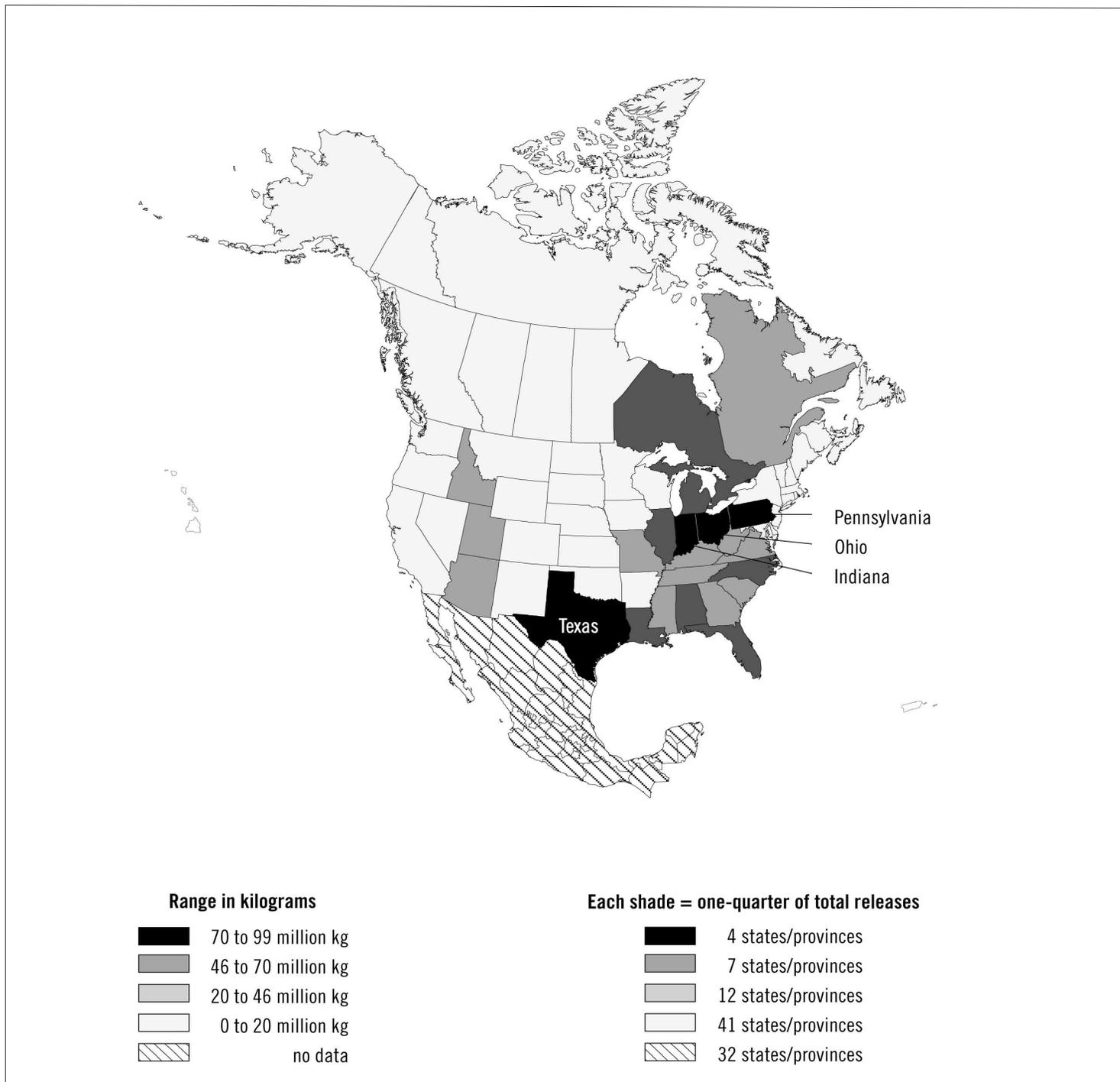
Off-site Releases				Total Releases						2001		2001 Gross Domestic Product***	
Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases		Total Reported Releases On- and Off-site		Adjustment Component* (kg)	Total Releases (adjusted)**		Population	Land Area (sq km)	US\$ millions	Rank	
		kg	Rank	kg	Rank		kg	Rank					
3,230,903	3,854,928	7,085,831	11	54,780,268	8	1,942,921	52,837,347	8	4,468,912	131,432	121,490	27	
6	6	13	61	181,423	61	1	181,421	61	633,630	1,477,155	28,581	50	
658,579	1,511,562	2,170,141	26	15,186,356	31	241,743	14,944,613	30	3,059,100	661,194	97,692	31	
97,286	182,806	280,092	51	25,684,723	20	87,788	25,596,935	19	5,306,966	294,310	160,687	24	
120,144	7,796,468	7,916,612	10	18,968,075	25	2,731,873	16,236,202	29	2,694,698	134,864	67,913	38	
78,520	820,362	898,882	37	11,845,077	34	14	11,845,063	33	4,101,600	947,806	84,483	35	
1,550,703	1,552,662	3,103,365	21	19,065,199	24	789,722	18,275,477	26	34,600,463	403,939	1,359,265	1	
13,836	633,959	647,795	44	4,027,321	48	192,763	3,834,558	49	4,430,989	268,637	173,772	22	
159,397	1,381,939	1,541,336	32	3,914,728	50	201,173	3,713,555	50	3,434,602	12,548	166,165	23	
739	1,681,007	1,681,746	29	4,990,198	43	536	4,989,662	43	796,599	5,063	40,509	46	
0	5	5	62	18,924	64	0	18,924	64	573,822	158	64,459	40	
476,320	1,112,649	1,588,969	30	50,542,649	10	57,126	50,485,524	10	16,373,330	139,841	491,488	4	
235,725	1,063,225	1,298,950	34	45,390,031	13	315,175	45,074,856	13	8,405,677	149,999	299,874	10	
0	0	0	--	75,551	63	0	75,551	63	154,805	544	--	--	
693	24,154	24,847	58	1,015,912	56	115	1,015,796	56	1,227,024	16,634	43,710	44	
499,145	86,644	585,790	45	20,475,376	23	10,554	20,464,822	23	1,320,585	214,309	36,905	49	
1,460,489	12,298,623	13,759,112	5	59,341,193	7	4,275,124	55,066,069	7	12,520,227	143,975	475,541	5	
682,307	33,393,488	34,075,796	2	85,462,920	4	2,025,474	83,437,446	4	6,126,743	92,896	189,919	17	
305,125	4,119,783	4,424,908	16	15,146,875	32	2,991,730	12,155,145	32	2,931,967	144,705	90,942	33	
2,440,918	464,834	2,905,752	22	9,781,293	37	85,041	9,696,252	36	2,702,125	211,905	87,196	34	
1,662,839	2,830,955	4,493,794	15	36,690,954	14	118,457	36,572,497	14	4,068,816	102,898	120,266	28	
1,037,640	1,522,985	2,560,625	25	47,046,173	11	170,702	46,875,471	11	4,470,368	112,827	148,697	25	
17,648	429,971	447,618	48	4,160,180	46	12,063	4,148,117	45	1,284,470	79,934	37,449	47	
4,051	413,427	417,478	49	4,895,996	44	74,416	4,821,580	44	1,149,100	649,953	22,407	53	
41,693	704,292	745,985	42	18,917,073	26	4,131	18,912,942	24	5,386,079	25,315	195,007	16	
96,841	916,475	1,013,316	36	3,983,815	49	37,647	3,946,168	48	6,401,164	20,299	287,802	11	
1,195,072	19,573,032	20,768,105	4	52,961,202	9	207,115	52,754,087	9	10,006,266	147,124	320,470	9	
188,761	2,644,009	2,832,769	24	9,873,160	36	60,357	9,812,803	35	4,984,535	206,192	188,050	18	
88,806	725,080	813,886	40	28,155,099	18	23,583	28,131,516	18	2,859,733	121,498	67,125	39	
140,110	1,415,342	1,555,452	31	25,183,969	21	28,221	25,155,748	20	5,637,309	178,432	181,493	20	
2,322	778,727	781,050	41	10,166,431	35	54,570	10,111,861	34	905,382	376,961	22,635	52	
518,531	4,629,741	5,148,272	14	13,062,772	33	4,080,813	8,981,959	37	1,720,039	199,099	56,967	41	
4,492	1,093,359	1,097,851	35	3,336,080	51	1,968	3,334,112	51	2,097,722	284,376	79,220	36	
89,328	800,956	890,284	38	6,797,528	40	101,791	6,695,738	40	756,000	73,440	13,239	59	
16,645	67,902	84,547	56	2,048,799	53	3,635	2,045,164	53	1,259,359	23,228	47,183	43	
335,123	9,435,496	9,770,619	7	16,872,111	30	64,984	16,807,127	28	8,511,116	19,214	365,388	8	
3,688	565,430	569,118	46	1,873,838	54	333,589	1,540,250	54	1,830,935	314,311	55,426	42	
154,682	1,671,989	1,826,672	27	18,738,977	27	49,713	18,689,264	25	19,084,350	122,301	826,488	2	
0	3	3	63	769,123	57	0	769,123	57	533,800	405,721	8,884	60	
1,389,247	2,610,521	3,999,768	17	61,549,361	6	248,183	61,301,177	6	8,206,105	126,170	275,615	13	
220	866,292	866,512	39	4,030,850	47	61,589	3,969,261	47	636,550	178,681	19,005	57	
219,829	144,446	364,275	50	5,552,718	42	801	5,551,917	42	942,900	55,491	16,271	58	
8,299,084	17,956,243	26,255,327	3	101,884,296	1	3,477,578	98,406,718	1	11,389,785	106,060	373,708	7	
160,084	1,286,955	1,447,039	33	8,393,571	38	34,321	8,359,251	38	3,469,577	177,865	93,855	32	
3,431,985	9,842,828	13,274,813	6	67,379,414	5	3,008,390	64,371,024	5	11,894,900	1,068,586	286,551	12	
46,895	3,934,169	3,981,063	18	18,414,166	29	3,492,606	14,921,560	31	3,473,441	248,629	120,055	29	
1,282,494	35,728,968	37,011,463	1	87,710,347	3	405,677	87,304,671	3	12,303,104	116,075	408,373	6	
0	95,624	95,624	55	324,353	59	0	324,353	59	138,900	5,659	2,247	61	
211,469	240,632	452,101	47	6,114,156	41	1,544	6,112,613	41	3,838,361	8,875	--	--	
443,005	4,918,948	5,361,953	13	23,638,258	22	1,651,141	21,987,117	22	7,417,700	1,540,689	148,241	26	
46,760	65,504	112,264	54	391,821	58	245	391,576	58	1,059,659	2,706	36,939	48	
79,437	34,911	114,348	53	1,197,465	55	2,545	1,194,920	55	1,017,100	652,334	21,502	54	
118,104	8,915,322	9,033,426	8	34,543,875	15	1,101,779	33,442,096	15	4,062,125	77,981	115,204	30	
254	18,536	18,790	59	2,745,655	52	113	2,745,542	52	758,324	196,555	24,251	51	
564,249	2,329,089	2,893,338	23	45,837,665	12	152,956	45,684,709	12	5,749,398	106,752	182,515	19	
3,056,332	4,988,751	8,045,082	9	96,394,690	2	615,212	95,779,477	2	21,370,983	678,305	763,874	3	
32,160	3,496,697	3,528,857	19	27,407,459	19	3,206,921	24,200,538	21	2,278,712	212,799	70,409	37	
38,889	19,151	58,041	57	129,872	62	0	129,872	62	612,978	23,953	19,149	56	
132	2,717	2,849	60	217,043	60	117	216,926	60	108,612	347	--	--	
416,950	2,890,957	3,307,907	20	29,966,037	17	18,333	29,947,704	17	7,196,750	102,551	273,070	14	
78,663	605,878	684,541	43	8,127,795	39	84,552	8,043,243	39	5,993,390	172,431	222,950	15	
258,461	1,454,733	1,713,194	28	31,895,166	16	36,113	31,859,053	16	1,800,975	62,381	42,368	45	
834,896	5,019,185	5,854,081	12	18,683,875	28	650,046	18,033,829	27	5,405,947	140,662	177,354	21	
478	260,760	261,237	52	4,324,340	45	180,993	4,143,347	46	493,754	251,483	20,418	55	
<b>38,619,183</b>	<b>229,926,092</b>	<b>268,545,275</b>		<b>1,438,281,621</b>		<b>39,808,385</b>	<b>1,398,473,236</b>						

\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

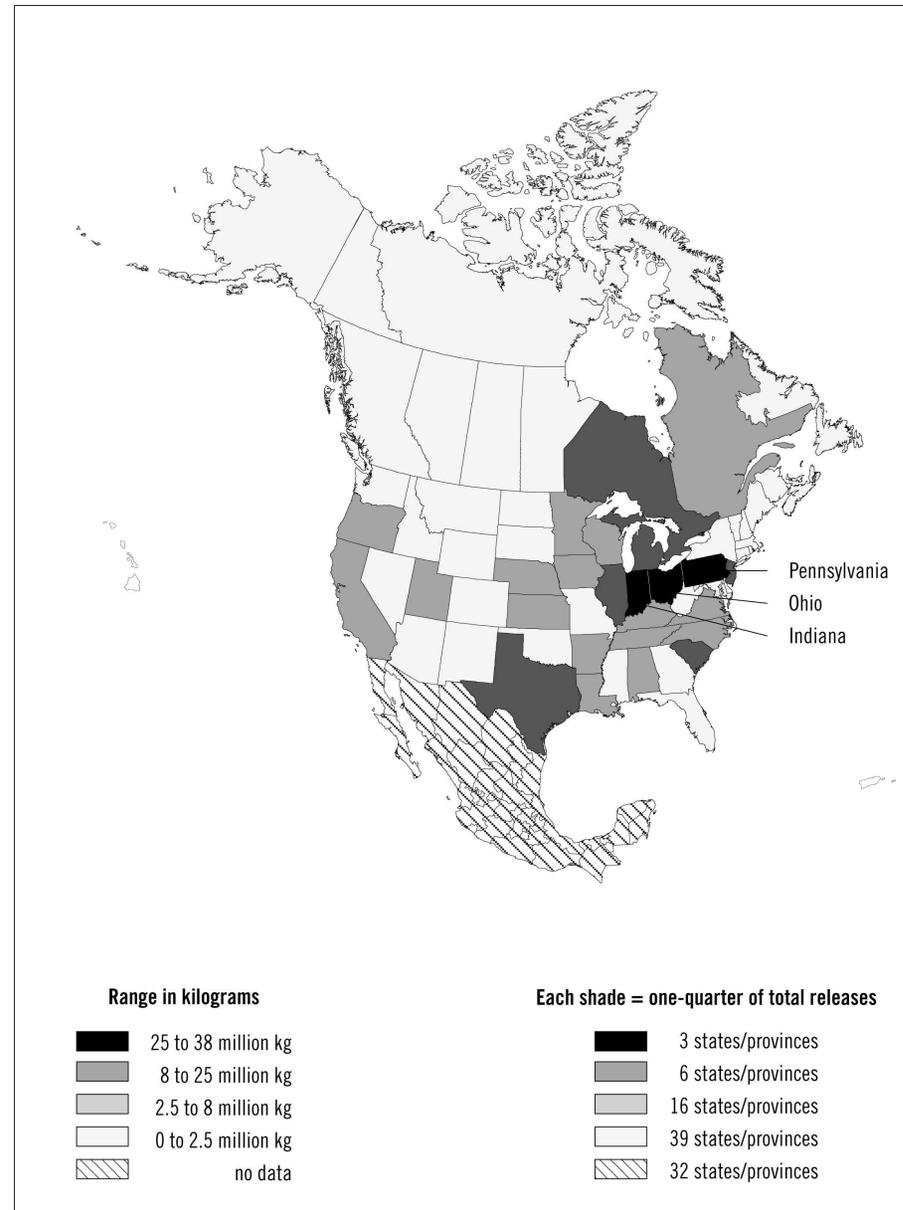
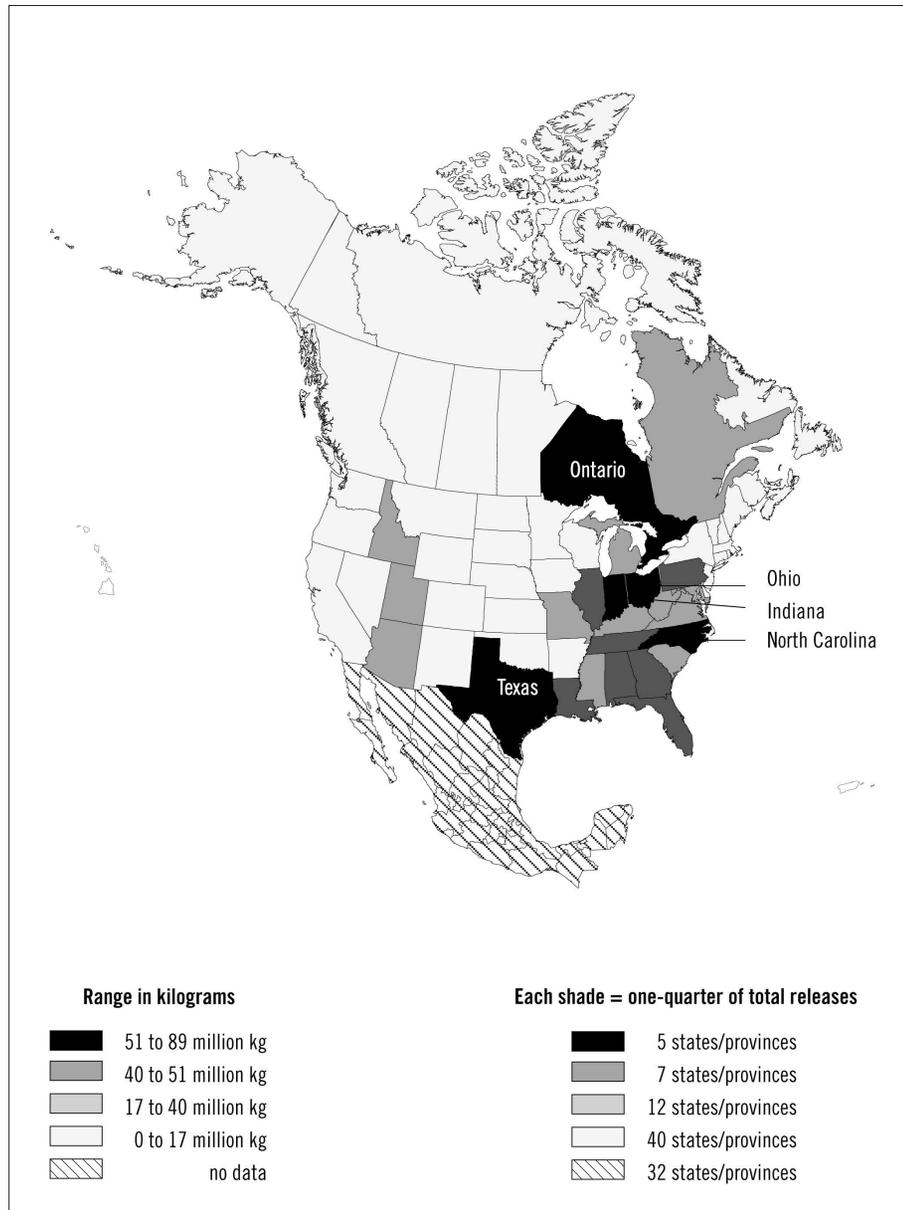
\*\*\* Gross Domestic Product for Canada from <www.statcan.ca/english/Pgdb/econ15.htm> with exchange rate of US\$0.6456 per Canadian dollar, and for the United States from <www.bea.gov/bea/newsrelarchive/2003/gsp0503.htm>. Both sites were accessed 10 September 2003.

Map 5-1. Largest Sources of Total Releases On-site and Off-site (adjusted) in North America, 2001: States and Provinces



**Map 5-2. Largest Sources of On-site Releases in North America, 2001:  
States and Provinces**

**Map 5-3. States and Provinces in North America Sending Largest Amounts  
of Off-site Releases (Off-site Transfers to Disposal), 2001**



### “Loadings”—Total Releases within a State or Province

Total releases within a state or province include: (1) on-site releases at facilities located within the jurisdiction, (2) off-site releases transferred within the state or province, and (3) off-site releases transferred by facilities located outside the jurisdiction to sites within the state or province. Not included in this total are transfers from facilities in the jurisdiction sent off-site for disposal (off-site releases) to locations outside the state or province. This analysis aims to give an estimate of the total “loading” of releases within the borders of each state/province.

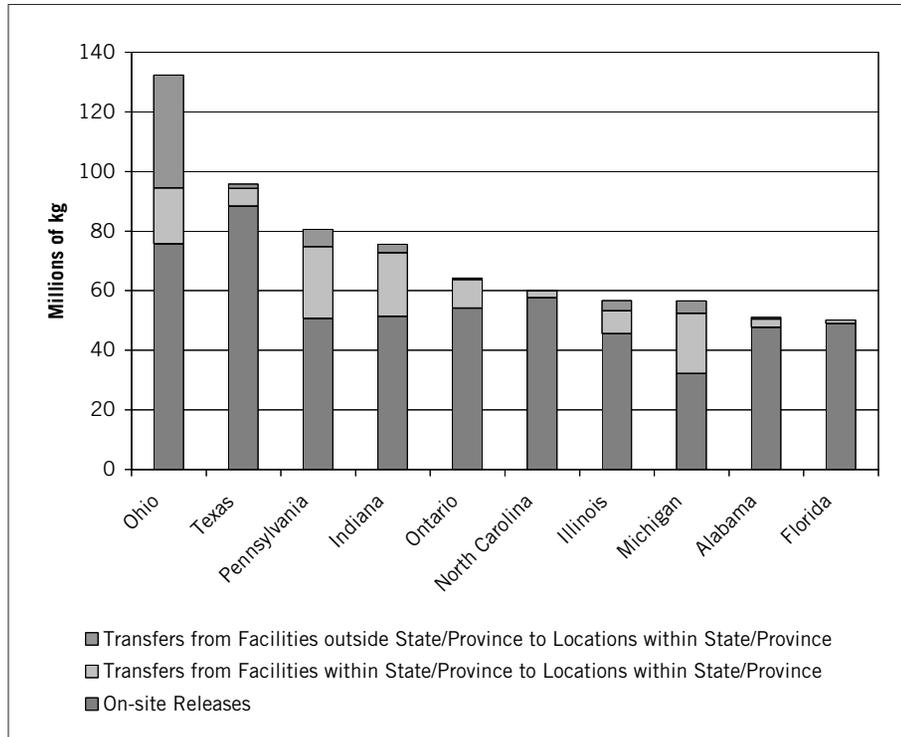
- Ohio had the largest total releases within a state, with 132.4 million kg. Ohio also received the largest transfers of metals from facilities outside the state to sites within the state (36.3 million kg).
- Texas had the second-largest releases within a state, with 95.8 million kg, and the largest on-site releases (88.3 million kg).
- Pennsylvania, third-ranked for releases within a state, with 80.6 million kg, had the largest transfers from facilities to in-state locations—22.9 million kg of metals transfers and over one million kg of transfers of substances other than metals off-site to disposal.
- Indiana ranked fourth, with 75.6 million kg, due to transfers of metals within the state.
- Ontario, the Canadian province with the largest releases within a province, ranked fifth in North America, with 64.2 million kg, largely due to on-site releases.

Table 5–3. Total Releases (adjusted) within State/Province, 2001

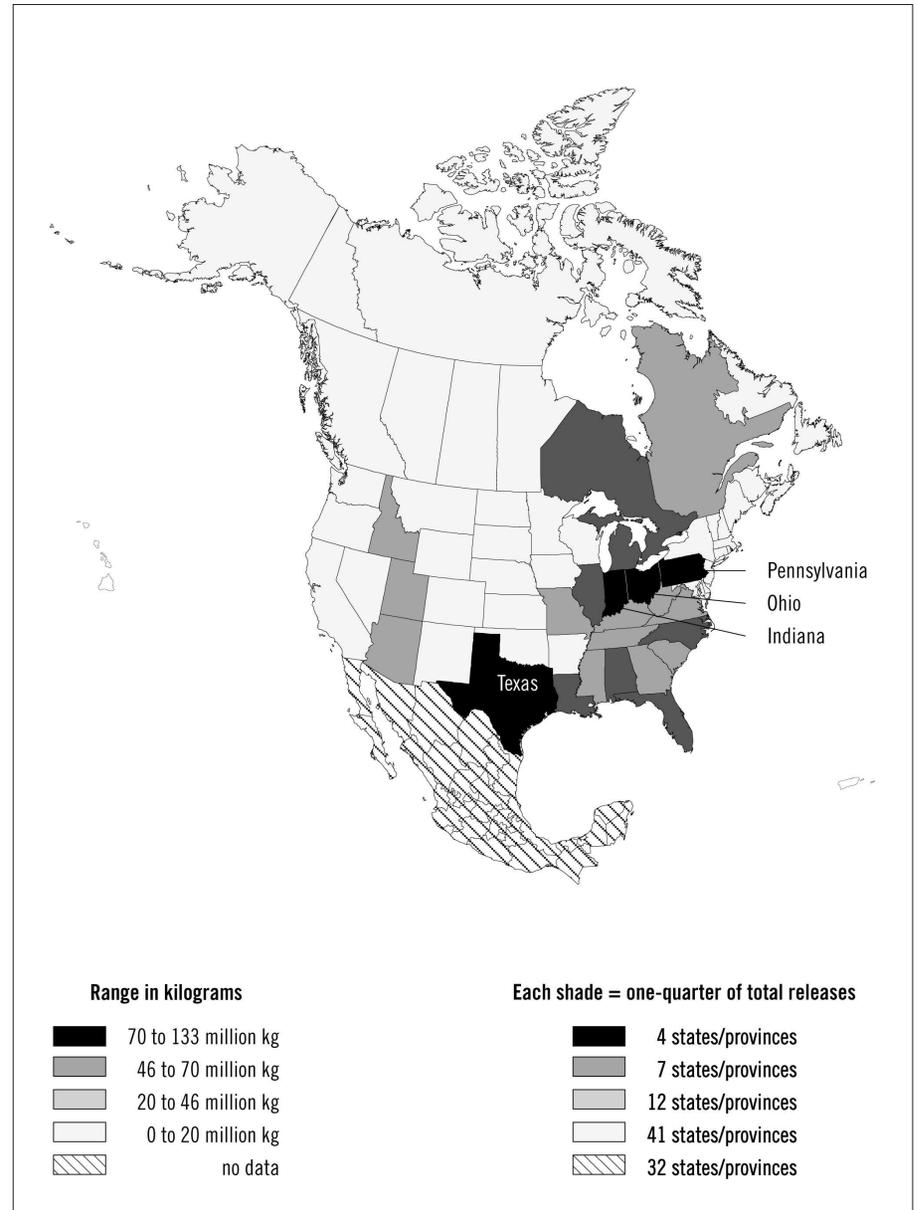
State/Province	Total On-site Releases		Off-site Releases (adjusted)*						Total Releases (adjusted) within State/Province*	
			Transfers from Facilities within State/Province to Locations within State/Province		Transfers from Facilities outside State/Province to Locations within State/Province					
	kg	Rank	Transfers Off-site to Disposal (except metals) (kg)	Transfers of Metals (kg)	Transfers Off-site to Disposal (except metals) (kg)	Transfers of Metals (kg)	kg	Rank		
Alabama	47,694,437	8	1,549,473	1,171,698	176,805	415,963	51,008,376	9		
Alaska	181,410	61	0	0	5,947	0	187,357	61		
Alberta	13,016,215	28	628,286	1,300,113	9,432	165,223	15,119,268	28		
Arizona	25,404,632	19	29,148	103,460	413,639	50,729	26,001,608	19		
Arkansas	11,051,463	30	28,818	314,450	129,380	328,773	11,852,884	31		
British Columbia	10,946,195	31	78,023	646,499	16	103,332	11,774,065	32		
California	15,961,834	26	894,837	390,442	4,003	4,976	17,256,092	27		
Colorado	3,379,527	46	11,315	388,033	1,466	651	3,780,992	48		
Connecticut	2,373,392	51	21,035	105,730	3,046	28,536	2,531,739	52		
Delaware	3,308,452	47	249	1,048,137	3,371	5,836	4,366,044	44		
District of Columbia	18,919	64	0	0	0	0	18,919	64		
Florida	48,953,681	7	439,944	750,515	1,111	42,103	50,187,353	10		
Georgia	44,091,081	11	73,333	520,076	69,210	252,549	45,006,249	12		
Guam	75,551	62	0	0	0	0	75,551	63		
Hawaii	991,065	56	437	24,128	0	0	1,015,629	56		
Idaho	19,889,586	22	498,692	2,224	86	673,547	21,064,135	23		
Illinois	45,582,081	9	1,232,091	6,391,348	181,766	3,245,323	56,632,610	7		
Indiana	51,387,124	5	536,345	20,773,844	1,615,795	1,243,706	75,556,814	4		
Iowa	10,721,967	32	151,156	464,531	1,473	14,846	11,353,973	33		
Kansas	6,875,541	39	58,972	275,759	28,122	100,859	7,339,254	39		
Kentucky	32,197,159	13	179,644	802,686	81,369	398,158	33,659,016	14		
Louisiana	44,485,548	10	719,339	1,126,369	639,841	870,207	47,841,304	11		
Maine	3,712,562	45	6,638	369,906	113	4,222,945	45	45		
Manitoba	4,478,518	43	3,900	328,953	57,379	17,378	4,886,128	43		
Maryland	18,171,088	24	11,958	522,284	15,307	116,292	18,836,929	25		
Massachusetts	2,970,499	49	57,680	443,577	86,303	112,823	3,670,882	49		
Michigan	32,193,098	14	1,102,972	19,045,113	289,750	3,950,638	56,581,571	8		
Minnesota	7,040,391	37	170,909	404,536	0	41,374	7,657,210	38		
Mississippi	27,341,212	16	54,671	416,656	6,726	69,874	27,889,139	17		
Missouri	23,628,517	21	102,838	872,995	23,640	98,593	24,726,583	20		
Montana	9,385,382	33	123	35,685	0	0	9,421,190	35		
Nebraska	7,914,500	34	369,549	226,766	1,695	137,687	8,650,197	36		
Nevada	2,238,229	52	1,924	1,087,358	23,615	165,759	3,516,886	50		
New Brunswick	5,907,244	40	63,598	625,184	0	91	6,596,117	40		
New Hampshire	1,964,252	53	134	32,109	9,637	217,247	2,223,378	53		
New Jersey	7,101,492	36	116,276	6,907,658	171,497	98,390	14,395,313	30		
New Mexico	1,304,720	54	1,270	231,427	8	14,346	1,551,771	54		
New York	16,912,305	25	115,354	1,143,071	120,243	198,217	18,489,190	26		
Newfoundland and Labrador	769,120	57	0	3	0	0	769,123	57		
North Carolina	57,549,592	3	1,180,080	1,223,149	46,411	123,176	60,122,408	6		
North Dakota	3,164,338	48	0	801,559	2	0	3,965,899	47		
Nova Scotia	5,188,443	42	219,829	86,986	0	1,222	5,496,479	42		
Ohio	75,628,969	2	6,843,367	12,025,244	1,515,730	36,349,712	132,363,023	1		
Oklahoma	6,946,532	38	17,970	458,950	2,156,472	355,823	9,935,746	34		
Ontario	54,104,601	4	2,244,244	7,349,911	294,472	239,329	64,232,557	5		
Oregon	14,433,103	27	39,876	190,135	20,285	90,793	14,774,192	29		
Pennsylvania	50,698,884	6	1,090,452	22,916,825	116,689	5,775,403	80,598,253	3		
Prince Edward Island	228,729	59	0	50,624	0	0	279,353	59		
Puerto Rico	5,662,056	41	46,548	239,666	0	0	5,948,270	41		
Quebec	18,276,304	23	318,756	3,252,167	191,490	692,338	22,731,055	22		
Rhode Island	279,557	58	2,094	17,445	17,316	21,148	337,561	58		
Saskatchewan	1,083,117	55	21,062	6,166	0	0	1,110,345	55		
South Carolina	25,510,449	18	63,841	1,103,893	124,496	627,782	27,430,460	18		
South Dakota	2,726,865	50	254	17,820	0	233	2,745,172	51		
Tennessee	42,944,328	12	324,344	1,510,214	50,439	95,741	44,925,065	13		
Texas	88,349,607	1	2,302,270	3,609,448	720,416	826,031	95,807,773	2		
Utah	23,878,602	20	32,160	93,998	46,364	190,119	24,241,243	21		
Vermont	71,831	63	22,903	3,010	114	3,994	101,852	62		
Virgin Islands	214,194	60	0	0	0	0	214,194	60		
Virginia	26,658,130	17	215,212	2,576,446	52,056	64,112	29,565,956	16		
Washington	7,443,254	35	56,529	486,154	629	45,130	8,031,696	37		
West Virginia	30,181,971	15	36,421	1,212,258	155,080	208,750	31,794,480	15		
Wisconsin	12,829,794	29	822,222	4,009,446	89,418	1,570,622	19,321,502	24		
Wyoming	4,063,103	44	0	77,294	0	0	4,140,397	46		
<b>Total</b>	<b>1,169,736,346</b>		<b>25,211,364</b>	<b>132,612,126</b>	<b>9,769,668</b>	<b>60,599,211</b>	<b>1,397,928,715</b>			

\* Off-site releases are omitted (adjusted) if the amount of off-site release is also reported as an on-site release by another facility within the state/province.

**Figure 5–2. States and Provinces with Largest Total Releases (adjusted) within the State/Province, 2001**



**Map 5–4. States and Provinces in North America with Largest Total Releases within the State/Province, 2001**



Note: Off-site releases (transfers to disposal or transfers of metals except to recycling) are omitted (adjusted) if the amount of off-site release is also reported as an on-site release by another facility within the state/province.

## 5.2.2 Releases On- and Off-site, by Industry, 2001

Among industry sectors, electric utilities reported the largest total on- and off-site releases in 2001. Ranking next were the primary metals, chemical manufacturing, paper products, and hazardous waste management and solvent recovery facilities. These five sectors accounted for 77 percent of total releases in 2001.

- Electric utilities reported 412.1 million kg of total releases on- and off-site, the largest amount of any industry. Releases from electric utilities represented 29 percent of the North American total and 45 percent of all North American on-site air emissions in 2001.
- Primary metals facilities reported 243.7 million kg in total releases, 17 percent of the North American total. This included 78.5 million kg (34 percent) of on-site land releases, the most of any industry. Primary metals facilities also reported the most metals released off-site—143.1 million kg, or 62 percent of the total for all industry sectors.
- The chemical manufacturing sector reported 225.4 million kg of total releases in 2001, 16 percent of the North American total. This sector had by far the largest amount of underground injection, 67.8 million kg, or 86 percent of the total for the category.

Table 5–4. Releases On- and Off-site in North America, by Industry, 2001

US SIC Code	Industry	On-site Releases				Total On-site Releases (kg)
		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
491/493	Electric Utilities	341,361,643	1,125,272	0	53,162,498	395,649,451
33	Primary Metals	26,361,526	20,391,206	217,792	78,513,998	125,498,775
28	Chemicals	83,944,984	25,016,906	67,779,691	20,162,679	196,955,368
26	Paper Products	85,510,242	10,639,550	632	7,312,627	103,464,105
7389/4953	Hazardous Waste Mgt./Solvent Recovery	449,721	8,996	10,132,615	62,106,468	72,699,330
20	Food Products	19,505,841	26,030,261	23,938	2,620,648	48,181,459
30	Rubber and Plastics Products	41,854,914	27,008	0	376,648	42,260,710
--	Multiple codes 20–39*	24,633,052	7,269,744	118	2,170,575	34,073,489
37	Transportation Equipment	32,000,877	87,766	340	334,570	32,430,837
29	Petroleum and Coal Products	21,583,965	7,936,678	621,785	346,760	30,493,721
34	Fabricated Metals Products	14,877,245	788,483	0	257,310	15,933,291
24	Lumber and Wood Products	17,726,393	6,828	0	167,816	17,904,360
32	Stone/Clay/Glass Products	12,458,756	70,761	24,861	1,929,831	14,485,973
27	Printing and Publishing	9,738,955	136	0	349	9,740,289
36	Electronic/Electrical Equipment	4,762,969	1,326,325	0	299,985	6,390,028
35	Industrial Machinery	3,394,995	7,385	0	1,109,824	4,514,150
39	Misc. Manufacturing Industries	3,822,310	16,496	0	23,185	3,866,466
25	Furniture and Fixtures	4,368,932	37	0	2	4,372,654
38	Measurement/Photographic Instruments	3,018,726	626,965	0	5,493	3,651,184
22	Textile Mill Products	2,770,862	70,726	0	106,938	2,948,671
12	Coal Mining	79,995	9,389	34,705	2,521,659	2,645,748
31	Leather Products	285,271	56,040	0	3,785	345,101
5169	Chemical Wholesalers	517,226	414	2	487	518,138
21	Tobacco Products	340,481	240,772	0	0	581,253
23	Apparel and Other Textile Products	131,793	2	0	0	131,795
<b>Total</b>		<b>755,501,676</b>	<b>101,754,144</b>	<b>78,836,481</b>	<b>233,534,136</b>	<b>1,169,736,346</b>

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

\* Multiple SIC codes reported only in TRI.

Table 5-4. (continued)

Off-site Releases			Total Releases				
Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Reported Releases		Adjustment Component* (kg)	Total Releases (adjusted)**	
			On- and Off-site kg	Rank		kg	Rank
353,670	16,604,961	16,958,631	412,608,082	1	471,979	412,136,102	1
4,220,367	143,149,640	147,370,007	272,868,781	2	29,197,775	243,671,006	2
13,331,786	20,048,686	33,380,472	230,335,841	3	4,933,003	225,402,838	3
578,699	2,341,296	2,919,995	106,384,100	4	302	106,383,798	4
9,938,249	16,048,293	25,986,542	98,685,871	5	2,565,178	96,120,693	5
2,262,299	227,587	2,489,886	50,671,345	6	1,793	50,669,552	6
1,381,646	3,510,663	4,892,309	47,153,019	7	6,775	47,146,244	7
1,018,849	5,589,170	6,608,019	40,681,508	8	502,577	40,178,931	8
802,483	4,766,254	5,568,737	37,999,574	9	197,644	37,801,930	9
1,612,570	1,044,243	2,656,813	33,150,533	10	350,169	32,800,364	10
1,575,926	9,114,493	10,690,419	26,623,710	11	1,053,252	25,570,458	11
106,712	259,976	366,687	18,271,047	12	21,094	18,249,954	12
180,488	1,230,097	1,410,585	15,896,558	13	191,634	15,704,923	13
107,039	57,823	164,861	9,905,150	14	849	9,904,301	14
273,342	2,503,980	2,777,322	9,167,350	15	201,749	8,965,601	15
60,785	1,973,318	2,034,103	6,548,253	16	50,156	6,498,097	16
517,797	479,003	996,800	4,863,265	17	23,814	4,839,451	17
78,012	78,009	156,021	4,528,675	18	34,485	4,494,190	18
19,718	102,769	122,487	3,773,671	19	2,044	3,771,627	19
125,114	215,494	340,608	3,289,279	20	319	3,288,961	20
0	26	26	2,645,774	21	0	2,645,774	21
3,019	554,999	558,018	903,119	22	0	903,119	22
51,980	17,447	69,427	587,565	23	1,795	585,771	23
205	59	264	581,517	24	0	581,517	24
18,430	7,807	26,237	158,032	25	0	158,032	25
<b>38,619,183</b>	<b>229,926,092</b>	<b>268,545,275</b>	<b>1,438,281,621</b>		<b>39,808,385</b>	<b>1,398,473,236</b>	

\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

- For all of the top three industries—electric utilities, primary metals, and chemicals—TRI facilities accounted for at least 92 percent of total releases.
- For the paper products industry, NPRI facilities accounted for 26 percent of total releases from this sector and TRI facilities, for 74 percent, much lower than the TRI average of 90 percent for all sectors.
- Other NPRI industry sectors that accounted for more than one-quarter of total North American releases for the sector were lumber and wood products, and furniture and fixtures.

## Query Builder

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

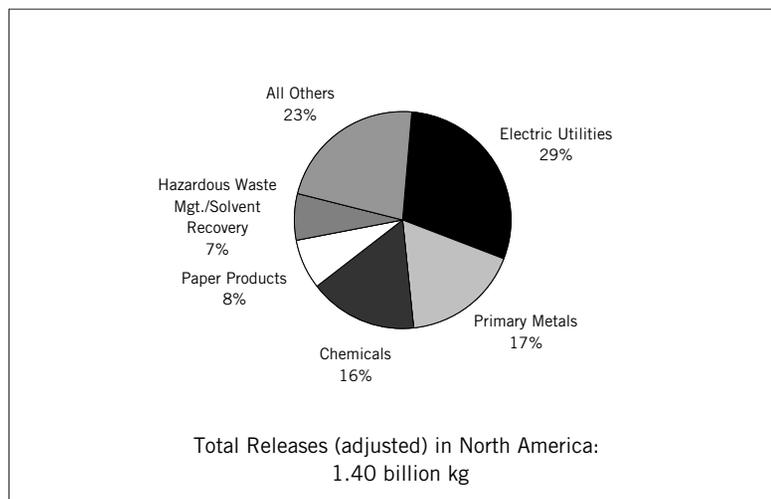
To find the chemicals with the largest releases on- and off-site for the electric utility sector using *Taking Stock Online*:

- 1 select **Chemical** report.
- 2 select the **year 2001**.
- 3 select **Canada & USA** for the geographic area, select **All chemicals** for the chemical, select **Electric Utilities** for the industrial sector.
- 4 select **Total releases (on- and off-site)**.

Then click on  **Run the query**

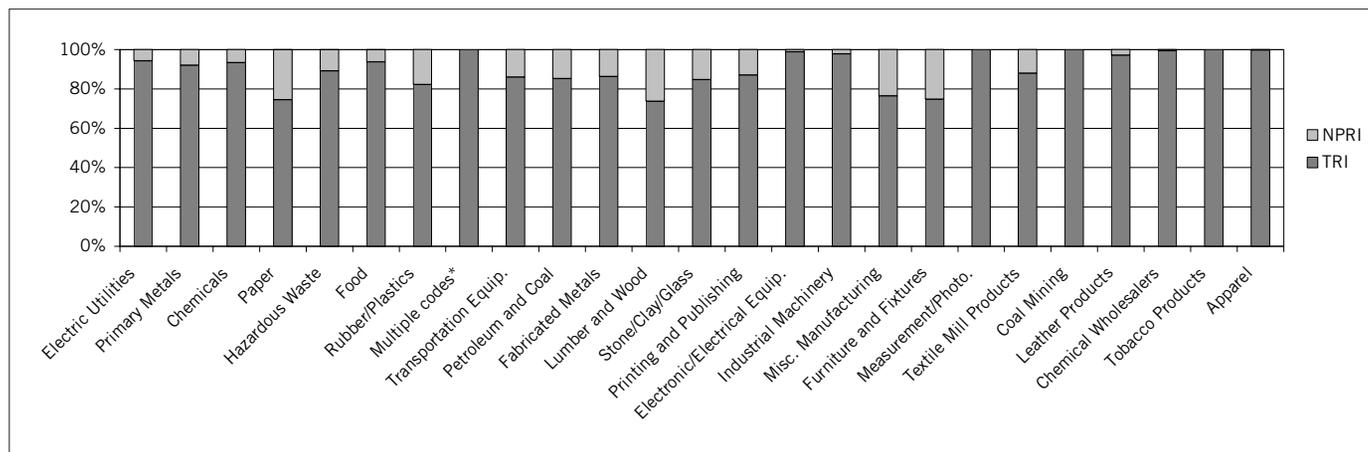
Once you have the report, go to the column titled "Total releases (on- and off-site)" and click on the **down arrow** to sort the list in descending order.

**Figure 5-3. Contribution of Top Industry Sectors to Total Releases (adjusted) in North America, 2001**



Note: Canada and US data only. Mexico data not available for 2001. Total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

**Figure 5-4. NPRI and TRI as Percentage of North American Total Releases (adjusted), by Industry, 2001 (Ordered by Total North American Releases)**



Note: Canada and US data only. Mexico data not available for 2001. Total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.  
\* Multiple SIC codes reported only in TRI.

Table 5–5. Average Releases per Facility, NPRI and TRI, 2001

	NPRI*		TRI		Ratio of Average per Facility (NPRI/TRI)
	Number	Forms/Facility	Number	Forms/Facility	
Total Facilities	1,864		19,390		
Total Forms	6,687	3.6	66,597	3.4	
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg/facility</b>	<b>kg</b>	<b>kg/facility</b>	
<b>On-site Releases</b>	<b>113,998,488</b>	<b>61,158</b>	<b>1,055,737,858</b>	<b>54,448</b>	<b>1.1</b>
Air	87,665,608	47,031	667,836,068	34,442	1.4
Surface Water	6,903,656	3,704	94,850,488	4,892	0.8
Underground Injection	2,631,460	1,412	76,205,021	3,930	0.4
Land	16,687,855	8,953	216,846,281	11,183	0.8
<b>Off-site Releases</b>	<b>23,587,802</b>	<b>12,654</b>	<b>244,957,473</b>	<b>12,633</b>	<b>1.0</b>
Transfers to Disposal (except metals)	5,004,734	2,685	33,614,449	1,734	1.5
Transfers of Metals**	18,583,068	9,969	211,343,025	10,900	0.9
<b>Total Reported Releases On- and Off-site</b>	<b>137,586,289</b>	<b>73,812</b>	<b>1,300,695,332</b>	<b>67,081</b>	<b>1.1</b>
Off-site Releases Omitted for Adjustment Analysis***	5,080,841	2,726	34,727,544	1,791	
<b>Total Releases On- and Off-site (adjusted)****</b>	<b>132,505,448</b>	<b>71,087</b>	<b>1,265,967,788</b>	<b>65,290</b>	<b>1.1</b>

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

\*\*\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

### 5.2.3 Releases On- and Off-site, by Facility, 2001

#### Average Releases per Facility, NPRI and TRI

- Average on-site releases were more than 10 percent higher for NPRI (61,158 kg per facility) than for TRI (54,448 kg per facility). Among on-site releases, the NPRI per-facility average for air releases was higher by more than one-third. The NPRI averages for surface water releases, underground injections, and land releases were lower than in TRI.
- Average reported off-site releases were about the same for NPRI and TRI although the ratio of NPRI to TRI per-facility averages was 1.5 for transfers of substances other than metals and 0.9 for transfers of metals.
- Average total on- and off-site releases were 71,087 kg per facility for NPRI and 65,290 kg per facility for TRI—a ratio of 1.1.

## Facilities with Largest Total Reported Releases

Fifty facilities in North America, representing only 0.2 percent of all reporting facilities, accounted for 1 percent of forms submitted and 25 percent of total reported releases on- and off-site in 2001.

- The 50 facilities with the largest total releases in North America reported 357.6 million kg in 2001. They accounted for 45 percent of all on-site land releases and 61 percent of all on-site underground injection.
- The electric utility industry, the sector with the largest total releases in North America for 2001, had 16 of the 50 facilities with the largest total releases. Fifteen of the 16 plants were in the United States, and one was in Ontario. Hydrochloric acid was the main chemical released. (Only air emissions of this chemical are included in the matched data set.)
- The primary metals industry, the sector with the second-largest total releases, also had 16 facilities among the top 50 facilities, including six in the top 10. The facility with the largest total releases was the ASARCO Ray Complex/Hayden Smelter and Concentrator in Hayden, Arizona, a primary metals facility that reported large on-site land releases of copper, arsenic, zinc and their compounds. Most of the primary metals facilities within the top 50 facilities reported zinc and its compounds as the main substance released.
- The third-ranked industry sector, chemical manufacturing, had 10 facilities in the top 50.

### Table 5-6. The 50 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	On-site Releases				Total On-site Releases (kg)
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
1	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ		33	12	72,664	0	0	22,531,188	22,603,852
2	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	15	3,644	0	0	13,296,512	13,300,155
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	12	360,567	463	0	0	361,030
4	Steel Dynamics Inc.	Butler, IN		33	10	22,152	728	0	0	22,881
5	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	42,651	3,697	0	11,228,696	11,275,045
6	Solutia Inc.	Canonment, FL		28	21	215,483	346	10,553,041	0	10,768,870
7	Precision Kidd Steel Co.	West Aliquippa, PA		33	3	0	4	0	0	4
8	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	9	17,146	115	0	0	17,261
9	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	8,714,345	2,812	0	458,830	9,175,987
10	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	8	1,015	0	0	8,259,166	8,260,182
11	Reliant Energies Inc. Keystone Power Plant	Shelocta, PA		491/493	11	7,857,450	6,143	0	307,425	8,171,018
12	BASF Corp.	Freeport, TX		28	28	116,805	7,094,730	813,968	0	8,025,503
13	Georgia Power Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	13	7,451,833	6,221	0	343,619	7,801,673
14	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON		49 491/493	13	6,932,888	10,172	0	524,766	7,467,826
15	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	16	0	0	7,225,057	0	7,225,057
16	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI		495/738	50	7,954	0	0	4,873,591	4,881,545
17	ASARCO Inc., Americas Mining Corp.	East Helena, MT		33	10	3,939	75	0	6,482,668	6,486,681
18	Nucor Steel, Nucor Corp.	Huger, SC		33	8	11,058	63	0	0	11,121
19	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	39	1,050	0	0	7,061,307	7,062,357
20	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	8	15,334	15	0	0	15,350
21	National Steel Corp. Greatlakes Ops.	Ecorse, MI		33	22	91,967	63,384	0	0	155,350
22	AK Steel Corp.	Rockport, IN		33	7	862	6,426,685	0	0	6,427,547
23	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	9	30,184	682	0	0	30,865
24	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	3	6,509,751	0	0	3,265	6,513,016
25	Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore, MD		491/493	15	6,323,603	1,611	0	0	6,325,215
26	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	34	3,039	0	0	6,250,819	6,253,857
27	Madison Inds. Inc.	Old Bridge, NJ		28	2	227	0	0	0	227
28	BP Chemicals Inc., BP America Inc.	Lima, OH		28	32	95,498	0	6,113,499	0	6,208,997
29	USS Gary Works, U.S. Steel Corp.	Gary, IN		33	39	294,583	1,391,957	0	4,440,167	6,126,707
30	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	9	216	0	0	8	224
31	Duke Power Belews Creek Steam Station, Duke Energy Corp.	Belews Creek, NC		491/493	12	5,590,732	1,048	0	288,187	5,879,967
32	Doe Run Co.Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	9	15,717	156	0	5,782,133	5,798,006
33	Duke Energy Marshall Steam Station	Terrell, NC		491/493	12	5,124,769	2,763	0	460,534	5,588,066
34	Du Pont Delisle Plant	Pass Christian, MS		28	15	374,964	299	4,910,228	296,301	5,581,793
35	American Electric Power John E. Amos Plant	Winfield, WV		491/493	13	4,689,699	1,330	0	168,420	4,859,449
36	Florida Power Crystal River Energy Complex, Progress Energy	Crystal River, FL		491/493	16	5,118,701	8,526	0	68,869	5,196,097
37	Gulf Power Co. Plant Crist, Southern Co.	Pensacola, FL		491/493	12	5,143,406	810	0	41,865	5,186,081
38	Solutia Chocolate Bayou	Alvin, TX		28	24	93,527	1,451	5,040,412	4,535	5,139,925
39	Detroit Edison Monroe Power Plant, DTE Energy Co.	Monroe, MI		491/493	14	4,592,450	7,845	0	385,561	4,985,856
40	J. M. Stuart Station, Dayton Power & Light Co.	Manchester, OH		491/493	13	4,173,408	4,401	0	806,988	4,984,798
41	AK Steel Corp. Butler Works (Rte. 8 S.)	Butler, PA		33	11	46,168	3,810,587	0	1,075,922	4,932,676
42	BP Chemicals Green Lake Facility, BP America Inc.	Port Lavaca, TX		28	20	29,962	301	4,793,664	0	4,823,927
43	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	9	819	0	0	4,719,968	4,720,787
44	Monsanto Luling, Pharmacia Corp.	Luling, LA		28	13	57,525	131,841	4,530,295	1,234	4,720,894
45	American Electric Power Mitchell Plant	Moundsville, WV		491/493	14	4,156,590	3,652	0	358,586	4,518,828
46	U.S. TVA Johnsonville Fossil Plant	New Johnsonville, TN		491/493	14	4,066,367	10,938	0	377,668	4,454,973
47	Tampa Electric Co. Gannon Station, TECO Energy Inc.	Tampa, FL		491/493	12	4,451,420	2,634	0	36	4,454,089
48	Du Pont Victoria Plant	Victoria, TX		28	33	195,203	238,225	4,002,555	3,961	4,439,944
49	Du Pont Johnsonville Plant	New Johnsonville, TN		28	15	27,827	9,395	0	4,404,423	4,441,645
50	Alabama Power Co. Greene County Steam Plant, Southern Co.	Forkland, AL		491/493	12	4,183,065	3,226	0	206,680	4,392,972
	<b>Subtotal</b>				<b>782</b>	<b>97,330,225</b>	<b>19,249,333</b>	<b>47,982,718</b>	<b>105,513,898</b>	<b>270,076,175</b>
	<b>% of Total</b>				<b>1</b>	<b>13</b>	<b>19</b>	<b>61</b>	<b>45</b>	<b>23</b>
	<b>Total</b>				<b>73,284</b>	<b>755,501,676</b>	<b>101,754,144</b>	<b>78,836,481</b>	<b>233,534,136</b>	<b>1,169,736,346</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.

Table 5-6. (continued)

Rank	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Reported Releases		Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported releases from the facility)
				On- and Off-site (kg)		
1	0	28,079	28,079	22,631,931		Copper and compounds, Zinc and compounds (land)
2	0	0	0	13,300,155		Zinc and compounds (land)
3	0	11,952,117	11,952,117	12,313,147		Zinc and compounds (transfers of metals)
4	0	11,580,723	11,580,723	11,603,604		Zinc and compounds (transfers of metals)
5	0	12,771	12,771	11,287,816		Copper and compounds, Zinc and compounds (land)
6	751	8	760	10,769,630		Nitric acid and nitrate compounds (UU)
7	0	10,676,447	10,676,447	10,676,451		Manganese and compounds (transfers of metals)
8	0	10,505,598	10,505,598	10,522,859		Zinc and compounds (transfers of metals)
9	0	30	30	9,176,017		Hydrochloric acid (air)
10	0	5	5	8,260,188		Zinc and compounds (land)
11	0	0	0	8,171,018		Hydrochloric acid (air)
12	3,820	3,644	7,463	8,032,967		Nitric acid and nitrate compounds (water)
13	0	8	8	7,801,681		Hydrochloric acid (air)
14	0	0	0	7,467,826		Hydrochloric acid (air)
15	23,168	273	23,441	7,248,498		Nitric acid and nitrate compounds, Hydrogen fluoride, Manganese and compounds (UU)
16	184,490	2,119,702	2,304,192	7,185,737		Nickel and compounds, Selenium and compounds, Arsenic and compounds (land, transfers of metals)
17	0	639,695	639,695	7,126,376		Zinc and compounds, Copper and compounds (land)
18	0	7,112,156	7,112,156	7,123,277		Zinc and compounds (transfers of metals)
19	0	144	144	7,062,501		Asbestos (land)
20	6,394	6,681,443	6,687,837	6,703,186		Zinc and compounds (transfers of metals)
21	107	6,526,125	6,526,231	6,681,582		Zinc and compounds (transfers of metals)
22	0	226,757	226,757	6,654,304		Nitric acid and nitrate compounds (water)
23	0	6,527,153	6,527,153	6,558,018		Zinc and compounds (transfers of metals)
24	0	0	0	6,513,016		Chlorine (air)
25	100	3,695	3,795	6,329,009		Hydrochloric acid (air)
26	0	288	288	6,254,146		Aluminum oxide, Asbestos, Copper and compounds, Zinc and compounds, Aluminum (land)
27	0	6,221,583	6,221,583	6,221,810		Zinc and compounds (transfers of metals)
28	454	562	1,016	6,210,013		Acetonitrile, Acrylonitrile (UU)
29	1,477	75,055	76,532	6,203,239		Zinc and compounds, Manganese and compounds (land), Nitric acid and nitrate compounds (water)
30	5,959,468	0	5,959,468	5,959,693		Methyl isobutyl ketone (transfers to disposal)
31	0	0	0	5,879,967		Hydrochloric acid (air)
32	0	2,182	2,182	5,800,188		Zinc and compounds (land)
33	0	0	0	5,588,066		Hydrochloric acid (air)
34	0	12	12	5,581,805		Manganese and compounds (UU)
35	0	351,610	351,610	5,211,059		Hydrochloric acid (air)
36	0	17	17	5,196,114		Hydrochloric acid (air)
37	0	0	0	5,186,081		Hydrochloric acid (air)
38	0	0	0	5,139,925		Acrylonitrile, Acrylic acid, Acrylamide (UU)
39	0	0	0	4,985,856		Hydrochloric acid (air)
40	0	0	0	4,984,798		Hydrochloric acid, Sulfuric acid (air)
41	870	39,499	40,368	4,973,045		Nitric acid and nitrate compounds (water)
42	0	4,192	4,192	4,828,119		Acetonitrile, Acrylamide, Cyanide and compounds (UU)
43	0	4,331	4,331	4,725,118		Zinc and compounds, Manganese and compounds (land)
44	0	0	0	4,720,894		Formaldehyde, Formic acid (UU)
45	0	89	89	4,518,917		Hydrochloric acid (air)
46	680	1,190	1,870	4,456,843		Hydrochloric acid (air)
47	0	1,915	1,915	4,456,004		Hydrochloric acid (air)
48	617	1,498	2,115	4,442,059		Nitric acid and nitrate compounds (UU)
49	0	0	0	4,441,645		Manganese and compounds, Vanadium (land)
50	0	0	0	4,392,972		Hydrochloric acid (air)
	<b>6,182,395</b>	<b>81,300,598</b>	<b>87,482,994</b>	<b>357,559,169</b>		
	<b>16</b>	<b>35</b>	<b>33</b>	<b>25</b>		
	<b>38,619,183</b>	<b>229,926,092</b>	<b>268,545,275</b>	<b>1,438,281,621</b>		

UU=underground injection.

- The fourth-ranked industry sector, hazardous waste management and solvent recovery, had eight facilities in the top 50, including the facility with the second-largest total releases, US Ecology Idaho Inc. in Grand View, Idaho, reporting mainly on-site land releases of zinc and its compounds. Hazardous waste disposal/solvent recovery facilities are disposal sites that receive wastes from manufacturing and other facilities. They may also treat or consolidate wastes and transfer them to other disposal sites.

## 5.2.4 Chemicals with Largest Releases On- and Off-site, 2001

Of the 204 chemicals in the matched data set for 2001, the 25 chemicals with the largest amounts of total releases on- and off-site accounted for 1.25 billion kg, or 89 percent of all releases reported in North America in 2001. Total releases are adjusted to omit off-site releases that are reported as on-site releases by other NPRI or TRI facilities.

- Hydrochloric acid had the largest releases on- and off-site in North America: 282.4 million kg, or 20 percent of total releases of all chemicals. (Only air releases of this chemical are included in the matched data set.)
- Zinc and its compounds ranked second for total releases (adjusted), with 182.7 million kg (13 percent of the total), mainly in the form of on-site land releases and off-site transfers of metals.
- Nitric acid and nitrate compounds had the third-largest total releases (127.6 million kg). This group ranked first for reported surface water discharges, underground injection, and transfers of substances other than metals off-site to disposal.

Table 5–7. The 25 Chemicals with the Largest Total Releases On- and Off-site in North America, 2001

CAS Number	Chemical	Number of Forms	On-site Releases				Total On-site Releases	
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	kg	Rank
7647-01-0	Hydrochloric acid	1,529	282,407,660	0	0	0	282,407,660	1
-- m	Zinc (and its compounds)	4,134	4,141,916	712,534	275,488	73,956,434	79,091,173	4
--	Nitric acid and nitrate compounds	3,960	1,085,093	91,690,223	22,912,496	3,746,108	119,435,050	2
67-56-1	Methanol	2,732	90,336,714	2,228,524	7,483,663	584,359	100,640,767	3
-- m	Manganese (and its compounds)	4,032	1,364,295	3,865,113	5,161,737	48,920,468	59,318,683	6
7664-93-9	Sulfuric acid	1,146	73,531,087	0	0	0	73,531,087	5
-- m	Copper (and its compounds)	5,064	1,340,585	221,504	104,480	34,935,249	36,604,816	8
108-88-3	Toluene	3,103	37,428,079	34,393	145,893	61,323	37,677,852	7
7664-39-3	Hydrogen fluoride	1,034	33,720,905	9,773	1,995,465	115,485	35,841,628	9
--	Xylenes	3,150	27,692,289	9,543	60,992	93,039	27,867,946	10
-- m,c,p,t	Chromium (and its compounds)	4,095	497,350	102,019	998,851	11,450,007	13,050,044	16
110-54-3	n-Hexane	994	24,265,682	3,500	31,593	4,815	24,311,025	11
100-42-5	Styrene	1,711	22,791,087	1,336	178,685	72,550	23,046,200	12
-- m	Vanadium (and its compounds)	587	1,083,072	291,615	408,664	15,691,313	17,474,768	14
-- m,c,p,t	Nickel (and its compounds)	3,793	1,001,125	139,283	332,717	9,281,212	10,756,045	19
78-93-3	Methyl ethyl ketone	1,946	17,162,448	21,642	857,254	56,310	18,104,429	13
74-85-1	Ethylene	344	13,159,787	632	3,030	2	13,163,458	15
75-09-2	c,p,t Dichloromethane	630	11,417,649	2,217	99,316	28,810	11,550,227	17
50-00-0	c,p Formaldehyde	937	6,490,420	180,975	4,483,225	68,578	11,225,568	18
1332-21-4	c,p,t Asbestos (friable)	112	761	2	0	8,748,383	8,749,147	21
108-10-1	Methyl isobutyl ketone	948	5,211,246	8,975	23,676	27,387	5,274,373	28
71-36-3	n-Butyl alcohol	1,107	8,618,226	18,161	378,496	965	9,019,925	20
75-15-0	p Carbon disulfide	123	8,206,054	13,886	7,594	1,643	8,229,177	22
7782-50-5	Chlorine	1,210	7,865,983	94,713	77,008	44,007	8,082,261	23
-- m,c,p,t	Arsenic (and its compounds)	664	269,513	67,193	29,802	5,891,793	6,258,372	27
	<b>Subtotal</b>	<b>49,085</b>	<b>681,089,025</b>	<b>99,717,756</b>	<b>46,050,126</b>	<b>213,780,239</b>	<b>1,040,711,681</b>	
	<b>% of Total</b>	<b>67</b>	<b>90</b>	<b>98</b>	<b>58</b>	<b>92</b>	<b>89</b>	
	<b>Total</b>	<b>73,284</b>	<b>755,501,676</b>	<b>101,754,144</b>	<b>78,836,481</b>	<b>233,534,136</b>	<b>1,169,736,346</b>	

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

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

Table 5-7. (continued)

Off-site Releases				Total Releases					
Disposal (except metals) (kg)	Transfers of Metals* (kg)	Total Off-site Releases		Total Reported Releases On- and Off-site		Adjustment Component** (kg)	Total Releases (adjusted)***		
		kg	Rank	kg	Rank		kg	Rank	
0	0	0	--	282,407,660	1	0	282,407,660	1	
0	128,460,350	128,460,350	1	207,551,522	2	24,817,043	182,734,480	2	
11,319,963	0	11,319,963	6	130,755,013	3	3,175,665	127,579,348	3	
1,709,236	0	1,709,236	15	102,350,002	5	381,583	101,968,420	4	
0	45,607,754	45,607,754	2	104,926,437	4	4,901,630	100,024,807	5	
0	0	0	--	73,531,087	6	0	73,531,087	6	
0	13,615,160	13,615,160	4	50,219,975	7	1,370,212	48,849,763	7	
1,301,771	0	1,301,771	17	38,979,622	8	46,102	38,933,520	8	
316,217	0	316,217	32	36,157,844	9	252,985	35,904,859	9	
1,413,272	0	1,413,272	16	29,281,217	10	7,476	29,273,741	10	
0	14,961,709	14,961,709	3	28,011,753	11	1,698,081	26,313,672	11	
194,900	0	194,900	38	24,505,925	12	24	24,505,901	12	
907,438	0	907,438	19	23,953,638	13	442	23,953,196	13	
0	4,546,415	4,546,415	8	22,021,183	15	211,262	21,809,920	14	
0	11,437,334	11,437,334	5	22,193,379	14	971,028	21,222,352	15	
787,019	0	787,019	22	18,891,447	16	17,363	18,874,084	16	
54	0	54	169	13,163,512	17	0	13,163,512	17	
164,681	0	164,681	41	11,714,909	18	759	11,714,150	18	
370,218	0	370,218	31	11,595,786	19	25,853	11,569,934	19	
2,563,789	0	2,563,789	11	11,312,936	20	33,736	11,279,200	20	
5,443,362	0	5,443,362	7	10,717,735	21	6,959	10,710,777	21	
589,559	0	589,559	25	9,609,484	22	484	9,609,001	22	
2,007	0	2,007	117	8,231,184	23	0	8,231,184	23	
20,572	0	20,572	71	8,102,834	25	39	8,102,794	24	
0	1,887,103	1,887,103	13	8,145,475	24	291,098	7,854,376	25	
<b>27,104,056</b>	<b>220,515,824</b>	<b>247,619,881</b>		<b>1,288,331,561</b>		<b>38,209,824</b>	<b>1,250,121,738</b>		
<b>70</b>	<b>96</b>	<b>92</b>		<b>90</b>		<b>96</b>	<b>89</b>		
<b>38,619,183</b>	<b>229,926,092</b>	<b>268,545,275</b>		<b>1,438,281,621</b>		<b>39,808,385</b>	<b>1,398,473,236</b>		

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

\*\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.



**Total Reported Amounts of Releases and Transfers,  
1998-2001**



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## Key Findings

- Total North American releases and transfers declined from 3.15 billion kg in 1998 to 2.82 billion kg in 2001. This was a reduction of 10 percent. Total releases decreased by 16 percent, transfers to recycling decreased by 2 percent, and other off-site transfers for further management decreased by 8 percent.
- Total amounts of releases and transfers as reported to NPRI decreased by 7 percent and TRI decreased by 11 percent. However, the pattern of releases and transfers from 1998 to 2001 differed for NPRI and TRI. On-site releases in NPRI increased by 5 percent while those in TRI decreased by 21 percent. Off-site releases in NPRI decreased by 52 percent while those in TRI increased by 16 percent. Transfers to recycling increased by 5 percent in NPRI and decreased by 3 percent in TRI. Other transfers for further management decreased by 16 percent in NPRI and decreased by 7 percent in TRI.
- The jurisdictions with the highest total releases and transfers in 2001 were the state of Texas, with a decrease of 8 percent; Ohio, with a decrease of 27 percent; and Michigan, with a decrease of 15 percent. The province of Ontario, with the fourth-highest total releases and transfers in 2001, decreased by 12 percent.
- The industry sectors with the largest total releases and transfers were the primary metals sector, with an 11-percent decrease; chemical manufacturing, with an 8-percent decrease; and electric utilities, with a 9-percent decrease. Three industries, food, industrial machinery, and printing and publishing, had increases of 10 percent from 1998 to 2001.
- NPRI had an increase of 22 percent in the number of facilities reporting, compared to a decrease of 7 percent in the number of TRI facilities. The increase in the number of facilities as well as a few facilities reporting large increases changed the pattern of trends for NPRI facilities. The decrease in facilities reporting had little effect on the pattern for TRI.
- Newly reporting facilities had a significant effect on NPRI reporting. NPRI reported overall increases in on-site air releases, on-site land releases, and transfers to recycling, but for the group of facilities that reported in both years, these release categories decreased. On the other hand, other off-site transfers for further management decreased overall but increased for the group of facilities reporting in both years.
- While overall releases and transfers in NPRI and TRI are dominated by a few facilities reporting the largest amounts, most facilities reported smaller amounts (defined as total releases and transfers of less than 100,000 kg in 1998). Among facilities reporting in both 1998 and 2001, total releases and transfers from facilities reporting smaller amounts increased by 29 percent. Indeed, these facilities reported net increases in most types of releases and transfers in both NPRI and TRI. Only TRI air releases and underground injection showed decreases for this group of facilities.

## 6.1 Introduction

This chapter examines changes in reported amounts of North American releases and transfers from 1998 to 2001, including on- and off-site releases, transfers to recycling, and other transfers for further management. It analyzes data for industries and chemicals that reported in both the United States and Canada (the matched data set) for the years 1998 and 2001. Data for manufacturing sectors as well as electrical utilities, hazardous waste management facilities, chemical wholesalers and coal mining are included. Comparable Mexican data are not available for these years. The chapter analyzes the effect on the data of newly reporting facilities (facilities that reported in 2001 but not in 1998) as well as those facilities that have stopped reporting. This chapter also takes a special look at the group of facilities that reported relatively smaller amounts, i.e., less than 100,000 kg of total releases and transfers in 1998, as compared to those that reported larger amounts.

The information in this chapter is based on the 155 chemicals that were consistently reported from 1998 to 2001. This chapter does not include the new chemicals added to NPRI for the 1999 and 2000 reporting years because data for these chemicals are not available for 1998. Nor does it include mercury and its compounds because the threshold for that chemical was lowered for both NPRI and TRI beginning with the 2000 reporting year. Lead and its compounds are not included because TRI lowered the threshold for reporting for the 2001 reporting year (NPRI lowered the threshold for the 2002 reporting year). The 2001 data presented in this chapter are, therefore, a subset of the 2001 data presented in **Chapters 4** and **5**.

Further details of facilities' reporting and their changes can be found by using the "query builder" function on the *Taking Stock Online* web site <[www.ccc.org/takingstock](http://www.ccc.org/takingstock)>.

## 6.2 1998–2001 Total Reported Amounts of Releases and Transfers in North America

Total reported amounts of releases and transfers include the following categories: **on-site releases** (releases to air, water, underground injection, and land at the site of the facility), **off-site releases** (transfers to disposal (except metals) and transfers of metals off the facility site to disposal, sewage, treatment, or energy recovery), **transfers to recycling**, and **other transfers for further management** (transfers to energy recovery, treatment, and sewage, not including such transfers of metals). The term **total reported amounts of releases and transfers** refers to the sum of these four groups.

In addition, some facilities report transfers to disposal that are in turn reported by other NPRI or TRI facilities as on-site releases. **Total releases (adjusted)** are total releases on- and off-site adjusted so that the chemical amounts are included only once. (See **Chapter 2** for a further explanation of the categories used in this report.) Note that **total reported amounts of releases and transfers** includes total releases before the adjustment in order to focus on how the total amounts reported by facilities are managed.

- Total reported amounts of releases and transfers declined from 3.15 billion kg to 2.82 billion kg, or 10 percent, from 1998 to 2001.
- North American on-site releases decreased by 19 percent, mainly due to decreased emissions to air of almost 158 million kg (18 percent). Releases to land (mainly landfills) decreased by over 74 million kg (26 percent), releases to underground injection decreased by almost 15 million kg (17 percent) and releases to water decreased by almost 14 million kg (12 percent).

Table 6–1. Summary of Total Reported Amounts of Releases and Transfers in North America, 1998–2001

	North America				Change 1998–2001	
	1998 Number	1999 Number	2000 Number	2001 Number	Number	%
Total Facilities	21,661	21,406	21,373	20,575	-1,086	-5
Total Forms	70,253	69,801	69,786	66,877	-3,376	-5
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases</b>	<b>1,362,784,356</b>	<b>1,358,337,191</b>	<b>1,303,346,339</b>	<b>1,102,018,524</b>	<b>-260,765,832</b>	<b>-19</b>
Air	871,475,649	862,039,332	818,847,165	713,698,171	-157,777,478	-18
Surface Water	113,869,577	122,083,324	121,738,287	100,274,642	-13,594,936	-12
Underground Injection	85,531,809	80,316,524	88,622,806	70,618,145	-14,913,664	-17
Land	291,787,056	293,776,885	274,030,696	217,325,148	-74,461,908	-26
<b>Off-site Releases</b>	<b>253,724,148</b>	<b>253,707,729</b>	<b>254,896,986</b>	<b>261,930,110</b>	<b>8,205,961</b>	<b>3</b>
Transfers to Disposal (except metals)	32,904,060	39,292,817	37,305,517	36,662,657	3,758,597	11
Transfers of Metals**	220,820,088	214,414,912	217,591,469	225,267,453	4,447,365	2
<b>Total Reported Releases On- and Off-site</b>	<b>1,616,508,505</b>	<b>1,612,044,920</b>	<b>1,558,243,325</b>	<b>1,363,948,634</b>	<b>-252,559,871</b>	<b>-16</b>
Transfers Omitted for Adjustment Analysis***	49,151,191	48,016,074	52,694,178	39,557,609	-9,593,581	--
<b>Total Releases On- and Off-site (adjusted)***</b>	<b>1,567,357,314</b>	<b>1,564,028,845</b>	<b>1,505,549,147</b>	<b>1,324,391,025</b>	<b>-242,966,289</b>	<b>-16</b>
<b>Off-site Transfers to Recycling</b>	<b>876,947,600</b>	<b>920,336,418</b>	<b>930,014,016</b>	<b>857,546,571</b>	<b>-19,401,029</b>	<b>-2</b>
Transfers to Recycling of Metals	735,583,678	776,045,833	794,880,562	720,564,270	-15,019,408	-2
Transfers to Recycling (except metals)	141,363,922	144,290,585	135,133,454	136,982,301	-4,381,621	-3
<b>Other Off-site Transfers for Further Management</b>	<b>652,391,933</b>	<b>582,994,650</b>	<b>594,639,632</b>	<b>602,921,241</b>	<b>-49,470,692</b>	<b>-8</b>
Energy Recovery (except metals)	385,357,007	328,497,141	335,422,671	342,074,479	-43,282,528	-11
Treatment (except metals)	130,343,846	119,824,314	115,306,096	114,942,292	-15,401,554	-12
Sewage (except metals)	136,691,080	134,673,194	143,910,865	145,904,470	9,213,390	7
<b>Total Reported Amounts of Releases and Transfers****</b>	<b>3,145,848,038</b>	<b>3,115,375,988</b>	<b>3,082,896,973</b>	<b>2,824,416,446</b>	<b>-321,431,591</b>	<b>-10</b>

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.

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Transfers omitted are those off-site releases also reported as on-site releases by another NPRI or TRI facility.

\*\*\*\* Sum of total reported releases on- and off-site, off-site transfers to recycling and other off-site transfers for further management.

Table 6–1. (continued)

NPRI*				TRI							
1998	1999	2000	2001	Change 1998–2001		1998	1999	2000	2001	Change 1998–2001	
Number	Number	Number	Number	Number	%	Number	Number	Number	Number	Number	%
1,489	1,598	1,672	1,823	334	22	20,172	19,808	19,701	18,752	-1,420	-7
4,914	5,335	5,682	6,171	1,257	26	65,339	64,466	64,104	60,706	-4,633	-7
kg	kg	kg	kg	kg	%	kg	kg	kg	kg	kg	%
<b>103,653,170</b>	<b>118,344,604</b>	<b>114,010,556</b>	<b>108,690,702</b>	<b>5,037,532</b>	<b>5</b>	<b>1,259,131,186</b>	<b>1,239,992,587</b>	<b>1,189,335,783</b>	<b>993,327,822</b>	<b>-265,803,364</b>	<b>-21</b>
81,070,314	83,837,949	87,446,003	83,185,865	2,115,551	3	790,405,335	778,201,383	731,401,162	630,512,306	-159,893,028	-20
4,744,190	6,389,685	6,554,663	6,874,623	2,130,433	45	109,125,387	115,693,639	115,183,624	93,400,019	-15,725,369	-14
3,700,389	3,272,461	3,569,261	2,611,456	-1,088,933	-29	81,831,420	77,044,063	85,053,545	68,006,689	-13,824,731	-17
14,018,011	24,723,383	16,333,244	15,916,339	1,898,328	14	277,769,045	269,053,502	257,697,452	201,408,809	-76,360,236	-27
<b>48,169,096</b>	<b>41,615,237</b>	<b>30,335,848</b>	<b>23,261,712</b>	<b>-24,907,384</b>	<b>-52</b>	<b>205,555,052</b>	<b>212,092,492</b>	<b>224,561,138</b>	<b>238,668,398</b>	<b>33,113,345</b>	<b>16</b>
9,282,614	9,443,254	5,880,120	4,958,166	-4,324,448	-47	23,621,446	29,849,563	31,425,397	31,704,491	8,083,045	34
38,886,482	32,171,983	24,455,728	18,303,546	-20,582,936	-53	181,933,606	182,242,929	193,135,741	206,963,907	25,030,301	14
<b>151,822,266</b>	<b>159,959,841</b>	<b>144,346,404</b>	<b>131,952,414</b>	<b>-19,869,852</b>	<b>-13</b>	<b>1,464,686,239</b>	<b>1,452,085,079</b>	<b>1,413,896,921</b>	<b>1,231,996,220</b>	<b>-232,690,019</b>	<b>-16</b>
1,219,511	1,554,593	10,875,924	5,079,877	3,860,366	--	47,931,680	46,461,481	41,818,254	34,477,732	-13,453,948	--
<b>150,602,755</b>	<b>158,405,248</b>	<b>133,470,480</b>	<b>126,872,537</b>	<b>-23,730,218</b>	<b>-16</b>	<b>1,416,754,559</b>	<b>1,405,623,597</b>	<b>1,372,078,666</b>	<b>1,197,518,488</b>	<b>-219,236,071</b>	<b>-15</b>
<b>108,978,897</b>	<b>96,024,556</b>	<b>111,122,780</b>	<b>114,197,632</b>	<b>5,218,735</b>	<b>5</b>	<b>767,968,703</b>	<b>824,311,862</b>	<b>818,891,236</b>	<b>743,348,939</b>	<b>-24,619,764</b>	<b>-3</b>
94,161,810	81,280,372	95,661,205	101,293,367	7,131,557	8	641,421,868	694,765,461	699,219,357	619,270,903	-22,150,965	-3
14,817,087	14,744,184	15,461,575	12,904,265	-1,912,822	-13	126,546,835	129,546,401	119,671,879	124,078,036	-2,468,799	-2
<b>28,112,703</b>	<b>30,202,826</b>	<b>33,267,907</b>	<b>23,753,320</b>	<b>-4,359,383</b>	<b>-16</b>	<b>624,279,230</b>	<b>552,791,824</b>	<b>561,371,725</b>	<b>579,167,921</b>	<b>-45,111,309</b>	<b>-7</b>
12,023,812	14,069,929	15,578,153	7,844,410	-4,179,402	-35	373,333,195	314,427,212	319,844,518	334,230,069	-39,103,126	-10
10,726,089	10,748,952	10,601,105	8,798,418	-1,927,671	-18	119,617,757	109,075,362	104,704,991	106,143,874	-13,473,883	-11
5,362,802	5,383,945	7,088,649	7,110,492	1,747,690	33	131,328,278	129,289,249	136,822,216	138,793,978	7,465,700	6
<b>288,913,866</b>	<b>286,187,223</b>	<b>288,737,091</b>	<b>269,903,366</b>	<b>-19,010,500</b>	<b>-7</b>	<b>2,856,934,172</b>	<b>2,829,188,765</b>	<b>2,794,159,882</b>	<b>2,554,513,080</b>	<b>-302,421,091</b>	<b>-11</b>

- However, on-site releases in NPRI and TRI showed opposite trends from 1998 to 2001. On-site releases in NPRI rose by 5 percent, with the largest changes being an increase in surface water discharges of 2.13 million kg (45 percent) and in air emissions of 2.12 million kg (3 percent). All categories of on-site releases (air, water, land and underground injection) decreased in TRI.
- Off-site releases (transfers to disposal) in North America rose 3 percent from 1998 to 2001. Again, NPRI and TRI showed opposite trends. TRI off-site releases rose by 16 percent, or 33.1 million kg. NPRI off-site releases, however, decreased by 52 percent, or 24.9 million kg.
- Transfers to recycling decreased by 2 percent in North America. NPRI transfers to recycling increased by 5 percent, and TRI recycling decreased by 3 percent.
- Within other transfers for further management, which fell 8 percent overall, transfers to energy recovery declined by 11 percent, transfers to treatment declined by 12 percent, but transfers to sewage rose by 7 percent. Transfers to sewage increased for both NPRI (33 percent) and TRI (6 percent).

## 6.2.1 1998–2001 Total Reported Amounts of Releases and Transfers by State and Province

- Texas reported the highest North American total releases and transfers in 2001, but the amount fell by 8 percent, from 249.9 million kg to 230.4 million kg. It had ranked second for total releases and transfers in 1998, behind Ohio.
- Ohio had the second-highest total releases and transfers in 2001 and the highest in 1998. Its reported amount fell by 27 percent, from 270.9 million kg to 198.7 million kg.
- Michigan had the third-highest total releases and transfers in both 1998 and 2001, with a decrease of 15 percent.
- Ontario ranked fourth in both 1998 and 2001, with decreases in total releases and transfers of 12 percent.
- Ohio reported the highest total reported releases on- and off-site in both 1998 and 2001, despite a 28-percent decrease over the time period. Texas ranked second in this category in both 1998 and 2001, despite a 21-percent decrease.
- Ontario had the highest transfers to recycling in both 1998 and 2001, with a 9-percent increase. Ohio ranked second in this category in both 1998 and 2001, despite an 8-percent decrease.
- Michigan had the highest other transfers for further management in both 1998 and 2001, despite a 15-percent decrease. Texas ranked second in this category in both 1998 and 2001, with a 5-percent increase.

### Table 6–2. Change in Total Reported Amounts of Releases and Transfers in North America, by State and Province, 1998–2001

State/Province	Facilities					Total Releases On- and Off-site				
	1998		2001		Change 1998–2001 (%)	1998		2001		Change 1998–2001 (%)
	Number	Rank	Number	Rank		kg	Rank	kg	Rank	
Alabama	481	17	439	18	-9	56,180,805	8	52,617,244	8	-6
Alaska	10	59	10	59	0	258,033	60	173,216	61	-33
Alberta	126	40	155	34	23	18,126,870	30	14,231,173	31	-21
Arizona	182	33	184	33	1	25,393,780	22	25,331,498	20	-0.2
Arkansas	353	25	320	25	-9	19,028,707	28	17,275,449	29	-9
British Columbia	79	43	108	42	37	6,809,717	42	11,791,885	34	73
California	1,191	4	1,071	5	-10	18,588,513	29	17,645,570	28	-5
Colorado	155	35	148	36	-5	3,467,783	51	3,717,771	47	7
Connecticut	288	28	270	28	-6	4,127,891	48	3,145,393	51	-24
Delaware	62	46	58	47	-6	6,316,116	44	4,740,117	43	-25
District of Columbia	2	63	4	62	100	30,048	64	18,924	64	-37
Florida	497	16	487	14	-2	52,863,119	10	46,839,647	10	-11
Georgia	654	11	602	11	-8	48,225,571	14	43,608,916	11	-10
Guam	2	64	2	64	0	66,813	63	68,951	63	3
Hawaii	16	58	15	58	-6	815,224	55	1,000,508	56	23
Idaho	52	47	55	48	6	21,087,257	26	20,000,919	23	-5
Illinois	1,177	5	1,109	4	-6	68,968,166	6	54,706,915	7	-21
Indiana	956	6	871	7	-9	77,771,357	5	81,004,092	4	4
Iowa	374	23	346	24	-7	16,973,036	31	13,094,874	32	-23
Kansas	247	31	237	30	-4	13,741,981	33	8,773,152	36	-36
Kentucky	421	21	384	22	-9	39,155,533	16	32,665,464	15	-17
Louisiana	308	26	314	26	2	51,816,769	13	42,055,540	13	-19
Maine	70	44	68	44	-3	3,700,802	50	4,134,618	46	12
Manitoba	48	49	62	45	29	4,462,307	47	4,499,555	44	1
Maryland	168	34	145	37	-14	15,934,984	32	18,570,546	24	17
Massachusetts	436	19	393	21	-10	4,550,562	46	3,649,555	48	-20
Michigan	838	7	769	9	-8	52,275,868	11	51,874,535	9	-1
Minnesota	435	20	397	20	-9	7,966,303	40	8,512,801	37	7
Mississippi	280	29	264	29	-6	29,511,282	19	26,027,002	19	-12
Missouri	532	15	475	15	-11	28,448,750	20	23,608,678	21	-17
Montana	27	55	30	55	11	21,715,309	25	10,010,499	35	-54
Nebraska	144	38	139	38	-3	11,354,783	38	12,359,063	33	9
Nevada	47	50	45	50	-4	2,982,615	52	3,259,187	50	9
New Brunswick	29	52	30	54	3	7,967,063	39	6,469,473	40	-19
New Hampshire	101	42	87	43	-14	2,940,708	53	2,021,398	53	-31
New Jersey	536	14	451	17	-16	11,484,852	37	16,464,332	30	43
New Mexico	52	48	47	49	-10	12,415,201	36	1,550,230	54	-88
New York	609	12	544	13	-11	24,384,031	23	18,290,905	27	-25
Newfoundland and Labrador	7	60	7	60	0	457,911	58	637,922	57	39
North Carolina	737	10	686	10	-7	61,224,522	7	59,516,525	6	-3
North Dakota	33	51	38	51	15	3,758,499	49	3,609,008	49	-4
Nova Scotia	27	56	31	53	15	4,623,585	45	5,159,063	42	12
Ohio	1,507	1	1,409	1	-7	136,442,568	1	98,427,566	1	-28
Oklahoma	290	27	279	27	-4	12,937,333	35	8,071,315	38	-38
Ontario	793	9	995	6	25	88,349,859	4	65,107,143	5	-26
Oregon	238	32	217	32	-9	23,710,662	24	18,305,579	26	-23
Pennsylvania	1,253	2	1,143	3	-9	93,233,411	3	85,739,056	3	-8
Prince Edward Island	3	61	5	61	67	207,653	62	277,503	59	34
Puerto Rico	145	37	117	40	-19	7,460,313	41	5,976,957	41	-20
Quebec	354	24	401	19	13	20,033,449	27	22,749,475	22	14
Rhode Island	117	41	114	41	-3	693,202	57	375,303	58	-46
Saskatchewan	23	57	29	56	26	783,852	56	1,029,222	55	31
South Carolina	472	18	456	16	-3	32,532,586	17	33,625,975	14	3
South Dakota	64	45	60	46	-6	1,521,335	54	2,455,487	52	61
Tennessee	590	13	546	12	-7	54,061,337	9	42,230,045	12	-22
Texas	1,200	3	1,188	2	-1	110,803,978	2	87,825,991	2	-21
Utah	133	39	134	39	1	51,919,684	12	27,171,835	18	-48
Vermont	29	53	32	52	10	209,536	61	128,438	62	-39
Virgin Islands	3	62	3	63	0	441,045	59	190,835	60	-57
Virginia	414	22	374	23	-10	30,721,859	18	28,401,147	17	-8
Washington	255	30	223	31	-13	13,596,561	34	7,833,640	39	-42
West Virginia	154	36	154	35	0	42,374,939	15	30,807,685	16	-27
Wisconsin	806	8	772	8	-4	26,147,595	21	18,338,166	25	-30
Wyoming	29	54	27	57	-7	6,352,718	43	4,148,156	45	-35
<b>Total</b>	<b>21,661</b>		<b>20,575</b>		<b>-5</b>	<b>1,616,508,505</b>		<b>1,363,948,634</b>		<b>-16</b>

Note: Canada and US data only. Mexico data not available for 1998–2001. 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. Transfers are from facilities located in the state/province.

Table 6-2. (continued)

Total Transfers to Recycling					Total Other Transfers for Further Management					Total Reported Amounts of Releases and Transfers				
1998		2001		Change 1998-2001	1998		2001		Change 1998-2001	1998		2001		Change 1998-2001
kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
19,358,226	15	17,407,572	15	-10	23,861,894	6	11,168,480	18	-53	99,400,925	8	81,193,296	10	-18
12,301	60	15,878	59	29	2,312	60	2,450	59	6	272,646	62	191,545	62	-30
3,054,462	38	3,671,127	40	20	1,472,305	38	2,625,959	35	78	22,653,637	35	20,528,259	37	-9
18,380,236	18	7,620,566	29	-59	1,422,488	39	956,411	40	-33	45,196,503	24	33,908,474	28	-25
17,557,996	19	24,197,856	11	38	7,270,510	22	20,657,615	8	184	43,857,213	25	62,130,920	17	42
474,424	49	993,874	46	109	504,971	44	555,163	44	10	7,789,112	47	13,340,922	42	71
20,274,527	12	23,602,360	12	16	20,082,936	9	20,966,798	7	4	58,945,976	19	62,214,729	16	6
7,658,377	31	9,481,512	27	24	2,327,126	35	2,226,718	36	-4	13,453,286	42	15,426,002	40	15
8,685,823	30	13,954,331	18	61	4,817,938	29	5,816,924	25	21	17,631,652	41	22,916,648	34	30
2,392,278	42	1,882,730	42	-21	1,767,969	37	1,436,540	37	-19	10,476,363	44	8,059,387	44	-23
3,311	61	4,275	60	29	0	--	0	--	--	33,358	64	23,199	64	-30
5,580,867	35	5,205,548	34	-7	5,715,279	27	5,246,624	30	-8	64,159,266	17	57,291,820	18	-11
15,545,680	21	10,311,859	24	-34	7,679,126	21	8,301,696	20	8	71,450,377	13	62,222,472	15	-13
0	--	0	--	--	0	--	0	--	--	66,813	63	68,951	63	3
45,360	58	0	--	-100	1,635	61	553	61	-66	862,219	57	1,001,061	57	16
587,961	48	778,631	49	32	392,202	46	387,146	47	-1	22,067,420	38	21,166,696	36	-4
31,982,772	8	41,033,735	6	28	23,383,588	7	19,301,460	9	-17	124,334,527	7	115,042,110	7	-7
64,857,634	3	67,611,258	3	4	41,525,390	4	10,725,902	19	-74	184,154,381	5	159,341,253	6	-13
10,923,899	25	10,563,727	22	-3	6,308,373	25	5,718,115	27	-9	34,205,309	29	29,376,716	29	-14
12,354,371	23	10,529,940	23	-15	2,096,130	36	21,437,819	6	923	28,192,483	30	40,740,911	25	45
20,189,894	14	16,241,736	17	-20	11,929,683	15	18,391,516	10	54	71,275,110	14	67,298,716	13	-6
19,307,179	16	11,951,492	21	-38	13,494,352	14	16,864,210	12	25	84,618,300	11	70,871,242	11	-16
957,327	47	1,174,119	44	23	358,245	47	371,274	48	4	5,016,375	52	5,680,010	50	13
2,550,646	41	1,728,049	43	-32	352,057	48	558,999	43	59	7,365,010	48	6,786,603	46	-8
1,961,472	43	3,677,076	39	87	4,185,302	32	4,808,937	32	15	22,081,759	37	27,056,558	32	23
12,023,276	24	9,582,074	26	-20	8,493,077	19	7,960,370	21	-6	25,066,916	32	21,191,999	35	-15
54,317,738	6	37,731,632	7	-31	114,604,763	1	97,806,154	1	-15	221,198,369	3	187,412,320	3	-15
9,311,940	27	7,593,248	30	-18	5,463,589	28	6,875,904	24	26	22,741,832	34	22,981,953	33	1
6,378,290	32	7,421,532	31	16	4,562,110	30	3,394,928	34	-26	40,451,682	27	36,843,462	26	-9
17,373,812	20	13,882,762	19	-20	10,238,652	17	12,383,437	16	21	56,061,214	20	49,874,877	22	-11
22,549	59	46,196	58	105	28,557	57	21,992	57	-23	21,766,415	39	10,078,688	43	-54
10,654,748	26	7,357,580	32	-31	413,713	45	520,426	45	26	22,423,244	36	20,237,069	38	-10
1,082,759	46	500,450	50	-54	31,589	56	37,094	56	17	4,096,962	54	3,796,732	53	-7
218,303	55	140,265	55	-36	56,269	55	44,992	55	-20	8,241,635	46	6,654,730	47	-19
5,724,926	34	4,624,811	35	-19	1,380,388	40	1,071,605	39	-22	10,046,023	45	7,717,815	45	-23
13,109,010	22	9,804,982	25	-25	36,876,428	5	36,992,795	3	0	61,470,291	18	63,262,109	14	3
56,513	57	848,759	48	1,402	319,438	49	235,471	49	-26	12,791,152	43	2,634,460	55	-79
35,290,952	7	27,556,995	10	-22	8,773,689	18	5,592,237	28	-36	68,448,672	15	51,440,137	20	-25
0	--	2,901	61	--	0	--	0	--	--	457,911	60	640,823	59	40
27,794,327	9	32,418,061	8	17	8,264,001	20	7,872,165	22	-5	97,282,850	9	99,806,752	8	3
311,260	52	330,137	52	6	258,747	51	226,156	50	-13	4,328,507	53	4,165,301	52	-4
1,449,746	44	971,322	47	-33	301,459	50	70,824	53	-77	6,374,790	51	6,201,209	48	-3
75,265,870	2	69,559,242	2	-8	59,189,759	3	30,735,680	4	-48	270,898,197	1	198,722,488	2	-27
9,221,098	28	8,171,208	28	-11	2,447,579	34	1,243,607	38	-49	24,606,010	33	17,486,130	39	-29
82,532,585	1	89,951,719	1	9	20,819,038	8	13,976,590	14	-33	191,701,482	4	169,035,452	4	-12
4,780,067	37	3,902,149	37	-18	6,368,383	24	5,420,801	29	-15	34,859,112	28	27,628,529	31	-21
55,432,577	5	64,422,321	4	16	16,824,244	11	14,932,378	13	-11	165,490,233	6	165,093,755	5	-0
0	--	0	--	--	71,041	54	139,434	52	96	278,694	61	416,937	60	50
6,310,768	33	5,823,118	33	-8	14,049,832	13	22,370,311	5	59	27,820,913	31	34,170,386	27	23
18,397,929	17	16,395,011	16	-11	4,533,008	31	5,726,778	26	26	42,964,386	26	44,871,264	23	4
5,036,577	36	4,501,099	36	-11	856,697	41	816,727	41	-5	6,586,476	50	5,693,129	49	-14
300,802	53	343,364	51	14	2,555	59	54,581	54	2,036	1,087,209	56	1,427,167	56	31
20,254,454	13	31,556,011	9	56	18,665,514	10	18,181,952	11	-3	71,452,553	12	83,363,938	9	17
314,644	51	196,682	54	-37	642,503	43	183,168	51	-71	2,478,482	55	2,835,336	54	14
24,251,191	10	23,408,371	13	-3	7,082,812	23	4,971,569	31	-30	85,395,340	10	70,609,986	12	-17
55,500,185	4	55,162,653	5	-1	83,552,055	2	87,384,549	2	5	249,856,218	2	230,373,192	1	-8
1,148,061	45	1,068,263	45	-7	653,923	42	567,346	42	-13	53,721,668	21	28,807,444	30	-46
234,344	54	280,124	53	20	158,880	52	389,082	46	145	602,760	59	797,643	58	32
75,073	56	50,996	56	-32	154,971	53	1,636	60	-99	671,090	58	243,468	61	-64
9,214,636	29	12,052,004	20	31	10,686,695	16	12,038,336	17	13	50,623,190	23	52,491,487	19	4
2,755,297	40	3,827,362	38	39	3,108,491	33	3,492,703	33	12	19,460,348	40	15,153,705	41	-22
2,819,208	39	3,092,421	41	10	6,175,512	26	7,504,600	23	22	51,369,660	22	41,404,706	24	-19
22,810,661	11	19,282,781	14	-15	15,325,353	12	13,146,291	15	-14	64,283,609	16	50,767,238	21	-21
474,398	50	46,712	57	-90	4,805	58	9,263	58	93	6,831,922	49	4,204,130	51	-38
<b>876,947,600</b>		<b>857,546,571</b>		<b>-2</b>	<b>652,391,933</b>		<b>602,921,241</b>		<b>-8</b>	<b>3,145,848,038</b>		<b>2,824,416,446</b>		<b>-10</b>

## 6.2.2 1998–2001 Total Reported Amounts of Releases and Transfers by Industry

Data comparing 1998 to 2001 include all industry sectors in the matched data set, but only those chemicals reported consistently during that period.

- Primary metals recorded a decrease of 11 percent between 1998 and 2001, primarily as a reduction in total releases. Primary metals facilities in NPRI reported a reduction of 20 percent, while those in TRI reported a drop of 10 percent.
- The chemical manufacturing sector showed a decrease of 8 percent, primarily in total releases. Transfers for further management increased for the chemical manufacturing sector from 1998 to 2001. Overall, TRI chemical manufacturers' total releases and transfers decreased by 7 percent, while in NPRI they decreased by 11 percent.
- Electric utilities reported a decrease of 9 percent, primarily as total releases. The decrease came from TRI facilities, which reported an overall decrease of 10 percent. NPRI electric utilities reported an overall increase of 12 percent from 1998 to 2001.
- Hazardous waste facilities reported a decrease of 23 percent in total releases and transfers, primarily as total releases. This included a reduction of 21 percent from TRI facilities and of 47 percent from NPRI facilities. Transfers to recycling from this sector increased by 8 percent.
- Releases and transfers from the fabricated metals industry fell by 4 percent, mainly as total releases. Its transfers to recycling also fell, by 2 percent, while other transfers for further management increased by 11 percent. This industry ranked second in NPRI and had a 9-percent decrease from 1998 to 2001. TRI fabricated metals facilities ranked fifth in TRI and reported a 3-percent decrease.

**Table 6–3. Change in Total Reported Amounts of Releases and Transfers in North America, by Industry, 1998–2001 (Ordered by Total Releases and Transfers, 2001)**

US SIC Code	Industry	Total Releases On- and Off-site						Total Transfers to Recycling					
		1998		2001		Change 1998–2001 (%)	1998		2001		Change 1998–2001 (%)		
		kg	Rank	kg	Rank		kg	Rank	kg	Rank			
33	Primary Metals	331,788,957	2	270,546,982	2	-18	338,972,660	1	324,634,763	1	-4		
28	Chemicals	265,344,258	3	208,294,082	3	-22	72,303,778	3	68,124,655	3	-6		
491/493	Electric Utilities	436,450,486	1	396,651,456	1	-9	1,847,088	15	2,897,810	14	57		
7389/4953	Hazardous Waste Mgt./Solvent Recovery	128,351,037	4	98,030,632	5	-24	8,665,382	10	9,355,205	9	8		
34	Fabricated Metals Products	33,326,470	10	26,059,649	11	-22	195,163,350	2	191,490,515	2	-2		
26	Paper Products	119,287,169	5	105,871,319	4	-11	1,406,242	16	840,522	17	-40		
--	Multiple codes 20–39*	48,939,574	7	37,627,970	7	-23	64,900,113	4	63,423,130	5	-2		
37	Transportation Equipment	47,649,845	8	36,748,546	8	-23	61,997,774	5	67,974,566	4	10		
36	Electronic/Electrical Equipment	11,192,242	14	7,642,160	15	-32	53,974,294	6	43,942,186	6	-19		
30	Rubber and Plastics Products	51,914,236	6	42,146,651	6	-19	8,176,357	11	7,764,676	10	-5		
20	Food Products	30,487,751	11	35,607,425	9	17	1,250,079	18	487,668	19	-61		
35	Industrial Machinery	8,354,286	17	5,714,866	16	-32	33,367,028	7	42,174,632	7	26		
29	Petroleum and Coal Products	33,523,222	9	30,354,091	10	-9	8,905,024	9	11,329,586	8	27		
24	Lumber and Wood Products	16,756,440	12	17,960,876	12	7	498,307	21	491,191	18	-1		
32	Stone/Clay/Glass Products	13,945,122	13	15,548,189	13	11	1,399,596	17	1,523,130	16	9		
27	Printing and Publishing	11,174,996	15	9,858,314	14	-12	3,540,902	14	6,310,087	12	78		
39	Misc. Manufacturing Industries	5,027,281	19	4,422,529	18	-12	9,170,519	8	7,520,127	11	-18		
5169	Chemical Wholesalers	561,544	24	466,668	24	-17	1,141,645	19	34,002	22	-97		
38	Measurement/Photographic Instruments	4,372,649	20	3,020,291	20	-31	5,090,644	12	4,436,159	13	-13		
25	Furniture and Fixtures	8,397,334	16	4,480,933	17	-47	4,285,259	13	2,235,058	15	-48		
22	Textile Mill Products	5,244,092	18	3,065,178	19	-42	719,786	20	444,256	20	-38		
12	Coal Mining	2,139,707	21	2,320,154	21	8	19,834	23	3,619	24	-82		
31	Leather Products	1,484,268	22	824,335	22	-44	147,673	22	87,395	21	-41		
21	Tobacco Products	621,352	23	581,390	23	-6	0	25	0	25	--		
23	Apparel and Other Textile Products	174,185	25	103,948	25	-40	4,266	24	21,633	23	407		
<b>Total</b>		<b>1,616,508,505</b>		<b>1,363,948,634</b>		<b>-16</b>	<b>876,947,600</b>		<b>857,546,571</b>		<b>-2</b>		

Note: Canada and US data only. Mexico data not available for 1998–2001.

\* Multiple SIC codes reported only in TRI.

**Figure 6–1. Change in NPRI Total Reported Amounts of Releases and Transfers for Industries with Largest Total Amount, 1998–2001**

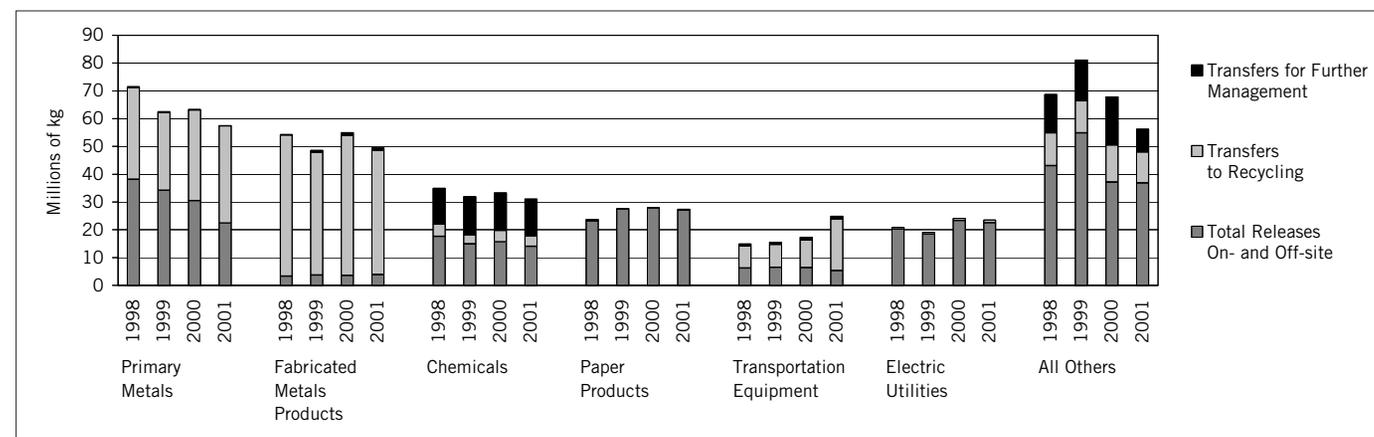
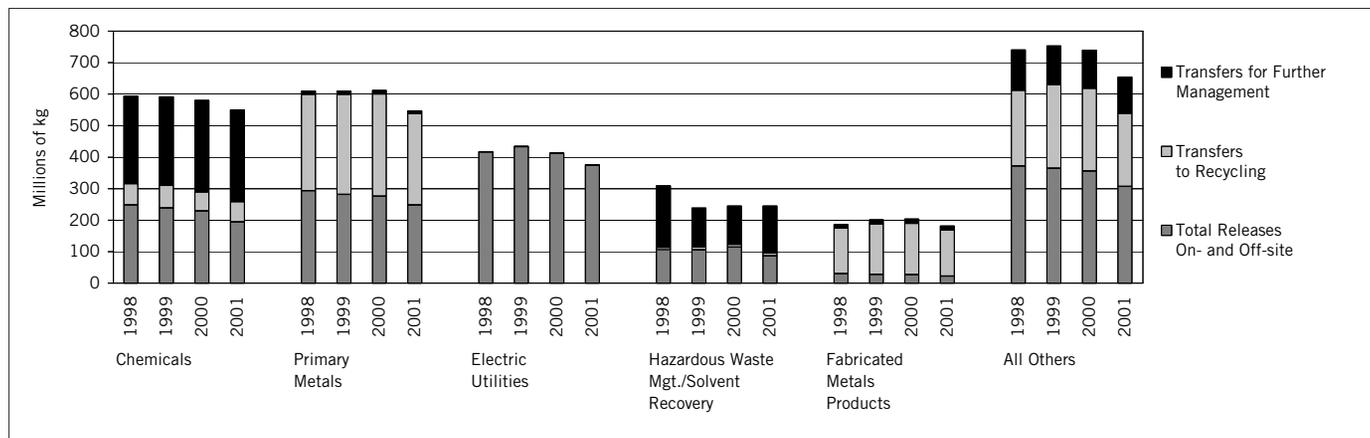


Table 6–3. (continued)

US SIC Code	Industry	Total Other Transfers for Further Management					Total Reported Amounts of Releases and Transfers				
		1998		2001		Change 1998–2001 (%)	1998		2001		Change 1998–2001 (%)
		kg	Rank	kg	Rank		kg	Rank	kg	Rank	
33	Primary Metals	10,423,975	10	9,353,246	9	-10	681,185,591	1	604,534,991	1	-11
28	Chemicals	291,404,156	1	305,162,781	1	5	629,052,192	2	581,581,518	2	-8
491/493	Electric Utilities	20,476	23	3,255	24	-84	438,318,050	3	399,552,522	3	-9
7389/4953	Hazardous Waste Mgt./Solvent Recovery	206,968,833	2	156,418,911	2	-24	343,985,253	4	263,804,747	4	-23
34	Fabricated Metals Products	12,444,906	6	13,812,198	6	11	240,934,726	5	231,362,362	5	-4
26	Paper Products	24,324,812	3	22,131,290	4	-9	145,018,224	6	128,843,131	6	-11
--	Multiple codes 20–39*	23,406,375	4	24,845,323	3	6	137,246,062	7	125,896,422	7	-8
37	Transportation Equipment	11,093,860	9	9,766,405	8	-12	120,741,479	8	114,489,518	8	-5
36	Electronic/Electrical Equipment	12,257,590	7	11,613,899	7	-5	77,424,125	9	63,198,246	9	-18
30	Rubber and Plastics Products	6,502,352	12	5,357,639	12	-18	66,592,944	10	55,268,966	10	-17
20	Food Products	15,109,841	5	15,474,379	5	2	46,847,670	12	51,569,472	11	10
35	Industrial Machinery	3,268,748	14	1,695,072	16	-48	44,990,062	13	49,584,570	12	10
29	Petroleum and Coal Products	6,974,272	11	5,715,460	11	-18	49,402,518	11	47,399,137	13	-4
24	Lumber and Wood Products	1,258,908	20	2,206,524	15	75	18,513,656	15	20,658,592	14	12
32	Stone/Clay/Glass Products	4,014,341	13	2,430,158	13	-39	19,359,058	14	19,501,477	15	1
27	Printing and Publishing	2,084,537	18	2,387,900	14	15	16,800,435	16	18,556,302	16	10
39	Misc. Manufacturing Industries	2,481,361	15	1,615,640	18	-35	16,679,162	17	13,558,295	17	-19
5169	Chemical Wholesalers	12,188,410	8	8,784,709	10	-28	13,891,599	19	9,285,380	18	-33
38	Measurement/Photographic Instruments	2,468,800	16	1,661,211	17	-33	11,932,094	20	9,117,661	19	-24
25	Furniture and Fixtures	2,314,939	17	1,109,161	20	-52	14,997,532	18	7,825,152	20	-48
22	Textile Mill Products	1,304,443	19	1,297,892	19	-1	7,268,321	21	4,807,326	21	-34
12	Coal Mining	0	25	0	25	--	2,159,541	22	2,323,773	22	8
31	Leather Products	31,816	22	36,056	21	13	1,663,757	23	947,787	23	-43
21	Tobacco Products	5,189	24	13,561	23	161	626,541	24	594,951	24	-5
23	Apparel and Other Textile Products	38,994	21	28,570	22	-27	217,445	25	154,150	25	-29
<b>Total</b>		<b>652,391,933</b>		<b>602,921,241</b>		<b>-8</b>	<b>3,145,848,038</b>		<b>2,824,416,446</b>		<b>-10</b>

Note: Canada and US data only. Mexico data not available for 1998–2001.  
\* Multiple SIC codes reported only in TRI.

Figure 6–2. Change in TRI Total Reported Amounts of Releases and Transfers for Industries with Largest Total Amount, 1998–2001



## Query Builder

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

To find the industries with the largest decrease in a specific chemical, such as zinc and its compounds using *Taking Stock Online*:

- 1 select **Industry** report.
- 2 select the **years 1998 and 2001**.
- 3 select **Canada & USA** for the geographic area, select **Zinc (and its compounds)** for the chemical, select **All industries** for the industrial sector.
- 4 select **Total releases and transfers**.

Then click on **Run the query**

Once you have the report, go to the column titled “Change from 1998–2001” and click on the **up arrow** to get the 10 industry sectors 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 industry sectors with the largest increase.

### 6.2.3 Chemicals with Largest Change in Total Reported Amounts of Releases and Transfers, 1998–2001

The 1998–2001 matched data set includes 155 chemicals reported by both NPRI and TRI facilities. It does not include those chemicals added to NPRI for 1999 and 2000 or chemicals whose reporting definition has changed such as mercury and lead and their compounds.

- Zinc and its compounds had the largest reduction in total reported amounts of releases and transfers between 1998 and 2001 (a 36.4-million-kg decrease). The decrease occurred mainly in on-site land releases. Both off-site releases (transfers to disposal) and transfers to recycling increased. Hazardous waste management facilities reported an overall reduction of 29.2 million kg.
- Xylenes had the second-largest reduction, of 28.4 million kg. Most types of releases and transfers decreased for xylenes from 1998 to 2001, including reductions of 12.3 million kg in on-site air emissions, 7.2 million kg in transfers to energy recovery, and 3.6 million kg in transfers to recycling. Chemical manufacturers reported an overall decrease of 8.9 million kg in xylenes, mainly as transfers to energy recovery and to recycling, and the transportation equipment sector reported decreases of 5.7 million kg, mainly in air emissions.
- The largest increases in total releases and transfers were for propylene (a 3.9-million-kg increase), primarily as transfers to treatment, which increased by 5.1 million kg. One facility, Shell Norco Plant East Site in Norco, Louisiana, reported an increase of 4.9 million kg in transfers to treatment of propylene. On-site air emissions of propylene decreased by 1.3 million kg from 1998 to 2001.
- Acrylonitrile, a designated carcinogen, had the second-largest increase (2.2 million kg) in total releases and transfers from 1998 to 2001, mainly as on-site underground injection releases, which

Table 6–4. The 10 Chemicals with the Largest Decrease in Total Reported Amounts of Releases and Transfers, 1998–2001

Rank	CAS Number	Chemical	Total Reported Amounts of Releases and Transfers			
			1998 (kg)	2001 (kg)	Change 1998–2001	
					kg	%
1	--	m Zinc (and its compounds)	418,938,133	382,488,751	-36,449,382	-9
2	--	Xylenes	148,731,968	120,352,462	-28,379,506	-19
3	7664-93-9	Sulfuric acid	100,127,745	73,531,087	-26,596,658	-27
4	--	m Copper (and its compounds)	411,518,668	387,656,994	-23,861,674	-6
5	108-88-3	p Toluene	161,072,324	138,467,649	-22,604,676	-14
6	7782-50-5	Chlorine	28,617,888	8,378,129	-20,239,759	-71
7	--	m,c,p,t Chromium (and its compounds)	111,609,532	93,069,008	-18,540,525	-17
8	78-93-3	Methyl ethyl ketone	79,360,340	63,635,356	-15,724,983	-20
9	75-15-0	p Carbon disulfide	20,008,831	8,326,496	-11,682,335	-58
10	75-09-2	c,p,t Dichloromethane	42,824,420	34,062,513	-8,761,908	-20

Note: Canada and US data only. Mexico data not available for 1998–2001.

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

Table 6–5. The 10 Chemicals with the Largest Increase in Total Reported Amounts of Releases and Transfers, 1998–2001

Rank	CAS Number	Chemical	Total Reported Amounts of Releases and Transfers			
			1998 (kg)	2001 (kg)	Change 1998–2001	
					kg	%
1	115-07-1	Propylene	9,652,295	13,579,045	3,926,750	41
2	107-13-1	c,p,t Acrylonitrile	3,476,304	5,697,019	2,220,715	64
3	--	m Selenium (and its compounds)	2,033,303	4,235,543	2,202,240	108
4	75-01-4	c,p,t Vinyl chloride	1,101,461	2,989,283	1,887,823	171
5	74-85-1	Ethylene	22,938,831	24,096,537	1,157,706	5
6	80-05-7	4,4'-Isopropylidenediphenol	803,162	1,708,516	905,355	113
7	1634-04-4	Methyl tert-butyl ether	3,858,238	4,470,829	612,591	16
8	606-20-2	c,p 2,6-Dinitrotoluene	409	592,999	592,590	144,863
9	7429-90-5	m Aluminum (fume or dust)	19,863,328	20,450,074	586,746	3
10	25321-14-6	p Dinitrotoluene (mixed isomers)	294,000	840,329	546,329	186

Note: Canada and US data only. Mexico data not available for 1998–2001.

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

**Table 6–6. The 10 Chemicals with the Largest Decrease in Total Releases On- and Off-site, 1998–2001**

Rank	CAS Number	Chemical	Total Releases On- and Off-site			
			1998 (kg)	2001 (kg)	Change 1998–2001	
					kg	%
1	--	m Zinc (and its compounds)	250,032,804	207,551,522	-42,481,281	-17
2	7664-93-9	Sulfuric acid	100,127,745	73,531,087	-26,596,658	-27
3	7782-50-5	Chlorine	28,030,322	8,102,834	-19,927,489	-71
4	--	Nitric acid and nitrate compounds	149,464,026	130,755,013	-18,709,013	-13
5	67-56-1	Methanol	119,715,874	102,350,002	-17,365,871	-15
6	--	m,c,p,t Chromium (and its compounds)	45,355,710	28,011,753	-17,343,957	-38
7	--	Xylenes	44,057,081	29,281,217	-14,775,864	-34
8	108-88-3	p Toluene	53,523,202	38,979,622	-14,543,580	-27
9	75-15-0	p Carbon disulfide	19,780,847	8,231,184	-11,549,663	-58
10	75-09-2	c,p,t Dichloromethane	21,017,804	11,714,909	-9,302,895	-44

Note: Canada and US data only. Mexico data not available for 1998–2001.

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

**Table 6–7. The 10 Chemicals with the Largest Increase in Total Releases On- and Off-site, 1998–2001**

Rank	CAS Number	Chemical	Total Releases On- and Off-site			
			1998 (kg)	2001 (kg)	Change 1998–2001	
					kg	%
1	108-10-1	Methyl isobutyl ketone	7,805,444	10,717,735	2,912,292	37
2	107-13-1	c,p,t Acrylonitrile	2,348,378	5,214,135	2,865,757	122
3	--	m Selenium (and its compounds)	1,850,520	4,048,090	2,197,570	119
4	606-20-2	c,p 2,6-Dinitrotoluene	242	591,629	591,387	244,196
5	--	m,c,p,t Cadmium (and its compounds)	4,645,579	5,197,415	551,836	12
6	75-07-0	c,p,t Acetaldehyde	6,333,786	6,879,733	545,947	9
7	79-06-1	c,p Acrylamide	2,887,781	3,430,731	542,950	19
8	121-14-2	c,p 2,4-Dinitrotoluene	6,359	315,770	309,410	4,866
9	7429-90-5	m Aluminum (fume or dust)	7,723,219	7,984,036	260,817	3
10	74-90-8	Hydrogen cyanide	937,808	1,178,063	240,255	26

Note: Canada and US data only. Mexico data not available for 1998–2001.

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

increased by 2.8 million kg. One facility, BP Chemicals Inc. in Lima, Ohio, reported an increase of 1.9 million kg in underground injection of acrylonitrile from 1998 to 2001.

- Zinc and its compounds also had the largest reduction in total releases on- and off-site between 1998 and 2001 (a 42.5-million-kg decrease). On-site land releases of zinc and its compounds decreased by 45.3 million kg. Hazardous waste management facilities reported an overall reduction of 28.4 million kg.
- Sulfuric acid had the second-largest reduction, of 26.6 million kg. (Only on-site air releases of sulfuric acid are included in the matched data set.) Electric utilities reported an overall decrease of 23.5 million kg in on-site air emissions of sulfuric acid from 1998 to 2001.
- The largest increase in total releases was for methyl isobutyl ketone (a 2.91-million-kg increase), mainly as transfers to disposal. However, on-site air releases decreased by 2.2 million kg. Hazardous waste management/solvent recovery facilities reported an increase of 5.2 million kg of transfers to disposal.
- Acrylonitrile had the second-largest increase, of 2.87 million kg, mainly as underground injection. One facility, BP Chemicals Inc. in Lima, Ohio, reported an increase of 1.9 million kg in underground injection of acrylonitrile from 1998 to 2001.

### 6.2.4 Facilities with Largest Change in Total Releases On- and Off-site, NPRI and TRI, 1998–2001

- Among NPRI facilities, the largest decreases in total releases were reported by two hazardous waste management facilities, both owned by Philip Services and located in Hamilton, Ontario. Philip's Yard 3 facility reported 8.2 million kg in 1998, mainly as transfers to disposal of zinc and its compounds, and only 20,000 kg in 2001. Philip's Parkdale Avenue facility did not report to NPRI in 2001 after reporting almost 6.8 million kg in 1998.
- Five of the 10 NPRI facilities with the largest decreases were primary metals facilities, including smelters and steel mills, all located in Ontario. They included Co-Steel Lasco in Whitby, Dofasco Inc. in Hamilton, Inco Limited in Copper Cliff, Ivaco Rolling Mills L.P. in L'Orignal, and Zalev Brothers Co. in Windsor.

Table 6–8. The NPRI Facilities with the Largest Change in Total Releases On- and Off-site, 1998–2001

North American Rank	NPRI Rank	Facility	City, Province	SIC Codes	
				Canada	US
<b>Largest Decrease</b>					
8	1	Philip Services Inc., Yard 3 Facility	Hamilton, ON	77	495/738
9	2	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738
12	3	Co-Steel Lasco	Whitby, ON	29	33
21	4	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33
23	5	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33
26	6	Browning Ferris Industries, BFI Calgary Landfill District #236	Calgary, AB	99	495/738
44	7	Ivaco Rolling Mills Limited Partnership	L'Orignal, ON	29	33
46	8	Bowater Maritimes Inc., Dalhousie Mill, Bowater Pulp and Paper/OJI Paper Co./Mitsui & Co.	Dalhousie, NB	27	26
62	9	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28
75	10	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	29	33
<b>Largest Increase</b>					
8	1	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	495/738
12	2	Stablex Canada Inc.	Blainville, QC	77	495/738
17	3	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493
50	4	Norske Skog Canada Limited, Crofton Division	Crofton, BC	27	26
53	5	Nova Scotia Power Inc., Trenton Generating Station, Emera Inc.	Trenton, NS	41	491/493
59	6	St Marys Cement Company, St Marys Cement Plant	St Marys, ON	35	32
74	7	Norske Skog Canada Limited, Powell River Division	Powell River, BC	27	26
80	8	Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat, BC	27	26
87	9	Stelco McMaster Ltée, Stelco Inc.	Contrecoeur, QC	29	33
92	10	Howe Sound Pulp and Paper Limited Partnership, OJI Paper Canada/Canadian Forest Products	Port Mellon, BC	27	26

Table 6–8. (continued)

NPRI Rank	Forms		Total Releases On- and Off-site			Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
	1998	2001	1998	2001	Change	
	Number	Number	(kg)	(kg)	(kg)	
<b>Largest Decrease</b>						
1	7	1	8,177,763	20,000	-8,157,763	Zinc and compounds (transfers of metals)
2	16	*	6,786,722	*	-6,786,722	Zinc/Manganese and compounds (transfers of metals), Xylenes, Toluene, Methyl ethyl ketone (transfers to disposal)
3	5	5	6,469,735	869,286	-5,600,449	Zinc and compounds (transfers of metals)
4	16	16	6,567,403	3,492,598	-3,074,805	Zinc and compounds (transfers of metals)
5	7	12	4,577,346	1,552,220	-3,025,126	Chromium and compounds (land), Sulfuric acid (air)
6	1	*	2,802,160	*	-2,802,160	Asbestos (land)
7	6	6	1,737,560	24,698	-1,712,862	Zinc/Manganese/Chromium/Copper/Nickel and compounds, Aluminum (transfers of metals)
8	2	1	1,698,700	4,227	-1,694,473	Sulfuric acid (air)
9	11	11	3,632,874	2,184,385	-1,448,489	Methanol (UU)
10	7	6	1,207,259	110	-1,207,149	Zinc/Copper and compounds (transfers of metals)
<b>Largest Increase</b>						
1	15	14	99,402	4,066,490	3,967,088	Zinc and compounds, Aluminum oxide (land)
2	*	6	*	3,323,700	3,323,700	Zinc/Selenium and compounds (land)
3	11	11	5,101,160	7,338,828	2,237,668	Hydrochloric acid (air)
4	3	8	9,000	1,043,969	1,034,969	Hydrochloric acid, Methanol (air), Nitric acid and nitrate compounds (water)
5	1	6	156,000	1,127,800	971,800	Hydrochloric acid (air)
6	*	4	*	893,960	893,960	Zinc/Manganese and compounds (land)
7	4	9	471,260	1,191,048	719,788	Hydrochloric acid (air), Nitric acid and nitrate compounds (water)
8	3	6	15,540	682,710	667,170	Methanol (air)
9	4	4	1,668,582	2,283,539	614,957	Zinc and compounds (transfers of metals)
10	5	6	259,460	834,255	574,795	Hydrochloric acid (air), Manganese and compounds (land, water)

\* Facility did not report matched chemicals in year indicated.  
UU=underground injection.

- Two other NPRI hazardous waste management facilities reported the largest increases in total releases, each reporting increases of more than 3 million kg. Both the Safety-Kleen Lambton facility, located in Corunna, Ontario, and the Stalex Canada facility in Blainville, Quebec, reported mainly increases in on-site land disposal of metals.
- The facility with the third-largest increase was an electric utility located in Ontario (Ontario Power Generation Inc. in Nanticoke), with increases of 2.2 million kg, mainly of air emissions of hydrochloric acid. (Only on-site air releases of hydrochloric acid are included in the matched data set.) The fifth-ranked facility was also an electric utility, Nova Scotia Power Inc., Trenton Generating Station in Trenton, Nova Scotia.
- Four of the 10 facilities with the largest increase in releases were in the paper products industry and were located in British Columbia. They included two Norske Skog Canada facilities—one in Crofton and another in Powell River—the Eurocan Pulp and Paper Company, West Fraser Mills, in Kitimat, and the Howe Sound Pulp and Paper facility in Port Mellon. Their increases included hydrochloric acid and methanol air releases and nitric acid and nitrate compounds water releases. These NPRI paper facilities explained their increases as due to increases in production levels and/or a change in the method of estimation during the time period. A handbook developed by the National Council of the Paper Industry for Air and Stream Improvement (NCASI) was cited as the source for improved estimation methods that resulted in increased estimates and/or numbers of chemicals reported.

- The TRI facility with the largest decrease in total releases was the primary metals facility Magnesium Corp. of America located in Rowley, Utah. This facility reported a decrease of 19.7 million kg, from 26.2 million kg in 1998 to 6.5 million kg in 2001, mainly in chlorine air releases.
- Four other primary metals facilities were among the 10 facilities with the largest decreases, including the third-largest, the ASARCO Inc. plant in East Helena, Montana, which had a decrease of 11.4 million kg.
- The facility with the second-largest decrease was the hazardous waste facility EnviroSAFE Services of Ohio in Oregon, Ohio, reporting a decrease of 16.5 million kg, mainly in on-site land disposal of zinc and its compounds.

**Table 6–9. The TRI Facilities with the Largest Change in Total Releases On- and Off-site, 1998–2001**

North American Rank	TRI Rank	Facility	City, State	SIC Codes	
				Canada	US
<b>Largest Decrease</b>					
	1	1 Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33
	2	2 EnviroSAFE Services of Ohio Inc., ETDS Inc.	Oregon, OH	495/738	
	3	3 ASARCO Inc., Americas Mining Corp.	East Helena, MT		33
	4	4 Phelps Dodge Hildago Inc.	Playas, NM		33
	5	5 AK Steel Corp. Butler Works (Rte. 8 S.)	Butler, PA		33
	8	6 Elementis Chromium L.P.	Corpus Christi, TX		28
	9	7 Lenzing Fibers Corp.	Lowland, TN		28
	11	8 Du Pont Victoria Plant	Victoria, TX		28
	12	9 Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC		28
	13	10 Northwestern Steel & Wire Co.	Sterling, IL		33
<b>Largest Increase</b>					
	1	1 Precision Kidd Steel Co.	West Aliquippa, PA		33
	2	2 Steel Dynamics Inc.	Butler, IN		33
	3	3 AK Steel Corp.	Rockport, IN		33
	4	4 Onyx Environmental Services L.L.C.	West Carrollton, OH	495/738	
	5	5 Madison Inds. Inc.	Old Bridge, NJ		28
	6	6 Wayne Disposal Inc., EQ Holding Co.	Belleville, MI	495/738	
	7	7 Nucor Steel, Nucor Corp.	Huger, SC		33
	9	8 Reliant Energies Inc. Keystone Power Plant	Sheloceta, PA	491/493	
	10	9 Gibbons Creek Steam Electric Station	Carlos, TX	491/493	
	11	10 Solutia Chocolate Bayou	Alvin, TX		28

Table 6–9. (continued)

TRI Rank	Forms		Total Releases On- and Off-site			Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
	1998	2001	1998	2001	Change	
	Number	Number	(kg)	(kg)	(kg)	
<b>Largest Decrease</b>						
5	3		26,163,746	6,513,016	-19,650,730	Chlorine (air)
9	7		21,225,504	4,718,748	-16,506,756	Zinc and compounds (land)
9	9		18,503,489	7,122,935	-11,380,554	Zinc and compounds (land)
15	*		9,717,004	*	-9,717,004	Zinc/Copper and compounds (land)
12	10		14,337,268	4,973,036	-9,364,231	Nitric acid and nitrate compounds (water)
2	1		7,268,732	502,919	-6,765,814	Chromium and compounds (land)
5	8		8,042,501	1,391,384	-6,651,117	Carbon disulfide (air)
28	27		9,713,640	4,407,051	-5,306,589	Nitric acid and nitrate compounds (UU)
1	1		4,543,951	262,336	-4,281,615	Chromium and compounds (land)
5	5		5,653,155	1,523,104	-4,130,051	Zinc/Manganese and compounds (land)
<b>Largest Increase</b>						
1	2	2	3,004	10,676,451	10,673,448	Manganese and compounds (transfers of metals)
2	2	9	4,554,503	11,577,702	7,023,199	Zinc and compounds (transfers of metals)
3	*	6	*	6,064,735	6,064,735	Nitric acid and nitrate compounds (water)
4	8	8	28,669	5,958,097	5,929,428	Methyl isobutyl ketone, Xylenes, Methyl ethyl ketone, Dichloromethane, n-Butyl alcohol, Toluene, Ethylbenzene, Methanol (transfers to disposal)
5	2	2	579,417	6,221,810	5,642,392	Zinc and compounds (transfers of metals)
6	22	46	2,002,118	7,150,976	5,148,859	Nickel and compounds, Selenium and compounds, Arsenic and compounds (land, transfers of metals)
7	5	6	2,242,382	7,119,707	4,877,325	Zinc and compounds (transfers of metals)
8	9	9	4,160,966	8,028,848	3,867,882	Hydrochloric acid (air)
9	4	5	114,015	3,790,044	3,676,029	Hydrochloric acid (air)
10	16	21	1,438,471	5,021,991	3,583,520	Acrylic acid, Acrylamide, Acrylonitrile (UU)

\* Facility did not report matched chemicals in year indicated.  
UU=underground injection.

- Among TRI facilities, the largest increase in total releases was reported by a primary metals facility located in West Aliquippa, Pennsylvania. The Precision Kidd Steel Co. reported an increase of 10.7 million kg, mainly in transfers to disposal of the metal manganese and its compounds.
- Three other primary metals facilities were among those with the largest increases in releases, including the second largest, Steel Dynamics Inc. in Butler, Indiana, with an increase of 7.0 million kg.
- Two of the 10 facilities with the largest increase were hazardous waste management facilities. Two were electric utilities and two were chemical manufacturers.

### 6.3 Facilities Reporting in Both Years Compared to Facilities Reporting in One Year Only, NPRI and TRI

In this section, the effects of the change in the number of facilities from 1998 to 2001 are analyzed. During this span, NPRI saw an increase of 22 percent in the number of facilities reporting, while the number of TRI facilities dropped by 7 percent (see **Table 6–1**). These changes in the number of facilities are part of the overall increase or decrease in amounts reported.

Facilities may start or stop reporting for various reasons, including changes in levels of business activity that put them above or below reporting thresholds, changes in operations that alter the chemicals they use, the adoption of pollution prevention or control activities that put them below reporting thresholds, or simply complying with the program. Data from newly reporting facilities, therefore, is difficult to interpret, as it can represent actual changes in releases and transfers, or represent chemical releases and transfers that have been ongoing, but are only now being reported. This analysis describes the effect of changes in the number of facilities from 1998 to 2001, mainly facilities that started reporting in NPRI and stopped reporting in TRI. In this section, the changes in releases and transfers are shown for two groups:

- facilities reporting only in one of the two years 1998 and 2001 (which includes the newly reporting facilities that reported in 2001 but not in 1998 and facilities that have dropped out, reporting in 1998 but not 2001), and
- facilities that reported in both 1998 and 2001.

Also, 20 facilities (two in NPRI and 18 in TRI) reported large increases (less than 100,000 kg in 1998 and 1 million kg or more of total releases and transfers in 2001). These facilities are also separated so they do not dominate the analysis.

**Table 6–10. Change in Releases and Transfers, NPRI, for Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1998 and 2001**

	Reported in One Year Only		Facilities with Large Increase***			Facilities Reporting in Both Years (without Facilities with Large Increase)			
	1998 Number	2001 Number	1998 Number	2001 Number	Change 1998–2001 Number	1998 Number	2001 Number	Change 1998–2001 Number	%
Facilities	186	520	2	2	0	1,301	1,301	0	0
Forms	375	1,268	18	22	4	4,521	4,881	360	8
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>			<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases*</b>	<b>6,526,315</b>	<b>10,613,804</b>	<b>108,402</b>	<b>5,100,416</b>	<b>4,992,014</b>	<b>97,018,453</b>	<b>92,976,482</b>	<b>-4,041,971</b>	<b>-4</b>
Air	2,875,689	6,154,939	9,120	718,949	709,829	78,185,505	76,311,977	-1,873,528	-2
Surface Water	400,271	347,947	0	314,700	314,700	4,343,919	6,211,976	1,868,057	43
Underground Injection	0	330	0	0	0	3,700,389	2,611,126	-1,089,263	-29
Land	3,238,127	4,080,121	99,282	4,066,767	3,967,485	10,680,602	7,769,451	-2,911,151	-27
<b>Off-site Releases</b>	<b>7,757,516</b>	<b>989,555</b>	<b>0</b>	<b>10,043</b>	<b>10,043</b>	<b>40,411,580</b>	<b>22,262,114</b>	<b>-18,149,466</b>	<b>-45</b>
Transfers to Disposal (except metals)	3,623,387	130,070	0	0	0	5,659,227	4,828,096	-831,131	-15
Transfers of Metals**	4,134,129	859,485	0	10,043	10,043	34,752,353	17,434,018	-17,318,335	-50
<b>Total Reported Releases On- and Off-site</b>	<b>14,283,831</b>	<b>11,603,359</b>	<b>108,402</b>	<b>5,110,459</b>	<b>5,002,057</b>	<b>137,430,033</b>	<b>115,238,596</b>	<b>-22,191,437</b>	<b>-16</b>
<b>Off-site Transfers to Recycling</b>	<b>6,382,611</b>	<b>24,945,482</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>102,596,286</b>	<b>89,252,150</b>	<b>-13,344,136</b>	<b>-13</b>
Transfers to Recycling of Metals	5,518,824	24,638,004	0	0	0	88,642,986	76,655,363	-11,987,623	-14
Transfers to Recycling (except metals)	863,787	307,478	0	0	0	13,953,300	12,596,787	-1,356,513	-10
<b>Other Off-site Transfers for Further Management</b>	<b>7,079,037</b>	<b>1,450,660</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21,033,666</b>	<b>22,302,660</b>	<b>1,268,994</b>	<b>6</b>
Energy Recovery (except metals)	6,678,948	313,107	0	0	0	5,344,864	7,531,303	2,186,439	41
Treatment (except metals)	396,648	585,612	0	0	0	10,329,441	8,212,806	-2,116,635	-20
Sewage (except metals)	3,441	551,941	0	0	0	5,359,361	6,558,551	1,199,190	22
<b>Total Reported Amounts of Releases and Transfers</b>	<b>27,745,479</b>	<b>37,999,501</b>	<b>108,402</b>	<b>5,110,459</b>	<b>5,002,057</b>	<b>261,059,985</b>	<b>226,793,406</b>	<b>-34,266,579</b>	<b>-13</b>

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Two facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2001.

#### 6.3.1 NPRI Facilities

- In NPRI, there were 520 newly reporting facilities, which reported 38.0 million kg of releases and transfers in 2001. Many of these newly reporting facilities were located in Ontario (307 facilities) and Quebec (91 facilities). The fabricated metals and chemical industries had the largest numbers of newly reporting facilities. According to Environment Canada, this increase in the number of newly reporting industries is the result of

a number of factors, including ongoing compliance promotion, increased awareness on the need to report stemming from consultations on criteria air contaminants, industrial association outreach, and overlap with Ontario's new monitoring regulations.

- NPRI facilities reporting in both years reported an overall decrease in on-site releases of 4 percent, compared to a 5 percent increase for all NPRI facilities (see **Table 6–1**). In particular, on-site

air releases decreased by 2 percent for NPRI facilities reporting in both years while air releases increased by 3 percent for all NPRI facilities. Similarly, on-site land releases decreased by 27 percent for NPRI facilities reporting in both years but increased by 14 percent for all NPRI facilities.

- NPRI facilities reporting in both years reported an overall decrease of 13 percent in transfers to recycling while all NPRI facilities reported an increase of

**Table 6–11. Change in Releases and Transfers, TRI, for Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1998 and 2001**

	Reported in One Year Only		Facilities with Large Increase**			Facilities Reporting in Both Years (without Facilities with Large Increase in Reporting)			
	1998	2001	1998	2001	Change 1998–2001	1998	2001	Change 1998–2001	
	Number	Number	Number	Number	Number	Number	Number	Number	%
Facilities	4,038	2,618	18	18	0	16,116	16,116	0	0
Forms	8,051	4,931	79	118	39	57,209	55,657	-1,552	-3
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>Total On-site Releases</b>	<b>51,638,543</b>	<b>21,837,420</b>	<b>162,263</b>	<b>415,034</b>	<b>252,772</b>	<b>1,207,330,381</b>	<b>971,075,368</b>	<b>-236,255,013</b>	<b>-20</b>
Air	35,034,688	11,325,122	161,591	413,209	251,618	755,209,056	618,773,976	-136,435,081	-18
Surface Water	1,799,411	8,241,958	654	625	-28	107,325,323	85,157,435	-22,167,888	-21
Underground Injection	1,487,476	20,075	0	0	0	80,343,944	67,986,613	-12,357,330	-15
Land	13,316,969	2,250,264	18	1,200	1,182	264,452,058	199,157,344	-65,294,714	-25
<b>Off-site Releases</b>	<b>13,651,018</b>	<b>5,444,155</b>	<b>285,410</b>	<b>16,408,193</b>	<b>16,122,782</b>	<b>191,618,624</b>	<b>216,816,050</b>	<b>25,197,426</b>	<b>13</b>
Transfers to Disposal (except metals)	3,746,702	919,361	24,444	4,413	-20,032	19,850,300	30,780,718	10,930,418	55
Transfers of Metals*	9,904,316	4,524,794	260,966	16,403,780	16,142,814	171,768,324	186,035,333	14,267,009	8
<b>Total Reported Releases On- and Off-site</b>	<b>65,289,561</b>	<b>27,281,574</b>	<b>447,673</b>	<b>16,823,227</b>	<b>16,375,554</b>	<b>1,398,949,005</b>	<b>1,187,891,419</b>	<b>-211,057,586</b>	<b>-15</b>
<b>Off-site Transfers to Recycling</b>	<b>62,865,890</b>	<b>51,242,446</b>	<b>164,343</b>	<b>24,079,868</b>	<b>23,915,525</b>	<b>704,938,470</b>	<b>668,026,625</b>	<b>-36,911,845</b>	<b>-5</b>
Transfers to Recycling of Metals	55,744,247	39,987,792	114,747	23,984,218	23,869,470	585,562,873	555,298,893	-30,263,980	-5
Transfers to Recycling (except metals)	7,121,643	11,254,654	49,595	95,650	46,054	119,375,597	112,727,732	-6,647,865	-6
<b>Other Off-site Transfers for Further Management</b>	<b>53,153,317</b>	<b>20,825,267</b>	<b>98,845</b>	<b>7,646,118</b>	<b>7,547,273</b>	<b>571,027,069</b>	<b>550,696,536</b>	<b>-20,330,532</b>	<b>-4</b>
Energy Recovery (except metals)	39,903,031	8,487,637	27,949	1,233,432	1,205,483	333,402,215	324,509,001	-8,893,214	-3
Treatment (except metals)	3,916,821	6,723,934	69,105	5,032,479	4,963,374	115,631,831	94,387,461	-21,244,371	-18
Sewage (except metals)	9,333,465	5,613,696	1,791	1,380,207	1,378,416	121,993,022	131,800,075	9,807,053	8
<b>Total Reported Amounts of Releases and Transfers</b>	<b>181,308,767</b>	<b>99,349,287</b>	<b>710,861</b>	<b>48,549,213</b>	<b>47,838,352</b>	<b>2,674,914,544</b>	<b>2,406,614,580</b>	<b>-268,299,963</b>	<b>-10</b>

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\* Eighteen facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2001.

5 percent. The opposite was true for other off-site transfers for further management. NPRI facilities reporting in both years had an increase of 6 percent while all NPRI facilities had a decrease of 16 percent.

- NPRI facilities reporting in 2001 and not in 1998 (the newly reporting facilities) reported 38.0 million kg of total releases and transfers in 2001. This was over 10 million kg more than facilities that stopped reporting (reported in 1998 and

not in 2001). These newly reporting facilities offset the decrease that would have otherwise been seen in on-site releases, particularly air emissions, and in off-site transfers to recycling of metals due to facilities no longer reporting. The facilities that stopped reporting had more off-site releases and other off-site transfers for further management, however.

- The two NPRI facilities reporting large increases reported increases in on-site releases primarily, with an increase of

4.0 million kg in on-site land releases, almost 710,000 kg in on-site air releases, and 315,000 kg in on-site surface water discharges.

- Therefore, newly reporting facilities and those that stopped reporting had a significant effect on the changes in NPRI releases and transfers from 1998 to 2001. This effect was most pronounced in a few categories: air and land releases, recycling and other off site transfers for further management.

### 6.3.2 TRI Facilities

- The overall pattern of trends from 1998 to 2001 was the same for TRI facilities reporting in both 1998 and 2001 as it was for all TRI facilities (see Table 6–1), although the actual percentages differed somewhat.
- The 99.3 million kg of releases and transfers from newly reporting TRI facilities reporting did not offset the decreases of 181.3 million kg from the facilities that stopped reporting.
- Except for surface water discharges, newly reporting TRI facilities did not report more on-site releases than those that stopped reporting. Thus, while the overall decrease in TRI surface water discharges was 14 percent, it was 21 percent for those TRI facilities that reported in both 1998 and 2001.
- There were also 18 TRI facilities that reported large increases from 1998 to 2001, totaling 47.8 million kg in releases and transfers. These increases were primarily off-site releases (transfers of metals to disposal) and off-site transfers to recycling.
- Much of the reporting by facilities with large increases in reporting from 1998 to 2001 was as off-site transfers of metals to disposal (an increase of 16.1 million kg). This was partially offset by facilities that stopped reporting (9.9 million kg of off-site transfers of metals to disposal in 1998 only). Therefore, although the facilities that reported both years recorded an 8 percent increase in transfers of metals to disposal, the result for all TRI facilities was a 14 percent increase.
- The same pattern held for off-site transfers of metals to recycling. The TRI facilities with large increases reported an increase of 24.0 million kg. While this was partially offset by the net decrease of 15.8 million kg among facilities reporting only in one year, the result for all these facilities (large increasers and facilities reporting only in one year) was an overall increase of 8.1 million kg. Therefore, although the facilities that reported both years recorded a 5-percent

decrease in transfers of metals to recycling, the result for all TRI facilities was a decrease of only 3 percent.

- Much of the decrease in off-site transfers for energy recovery by TRI facilities can be attributed to facilities that stopped reporting. These facilities reported 39.9 million kg in 1998. The total decrease from 1998 and 2001 for all TRI facilities in the matched database was 39.1 million kg.

### 6.3.3 Average Releases and Transfers per Facility, Facilities Reporting in Both Years, NPRI and TRI, 1998–2001

- For facilities reporting in both 1998 and 2001, NPRI average total releases and transfers and average total releases per facility were 1.2 times those of TRI for both 1998 and 2001.
- While average on-site air releases and surface water discharges decreased for both NPRI and TRI from 1998 to 2001, the decrease was greater for TRI facilities. Therefore, the NPRI/TRI ratio for on-site air releases and water discharges increased from 1998 to 2001. It increased from 1.3 to 1.5 for air releases and from 0.5 to 0.9 for water discharges.
- Average off-site releases per facility decreased substantially in NPRI while they increased for TRI. The NPRI/TRI ratio for off-site releases fell from 2.6 in 1998 to 1.3 in 2001. Two NPRI facilities accounted for much of this change, a Philip Services facility in Hamilton, Ontario, and the Co-Steel Lasco facility in Whitby, Ontario. From 1998 to 2001 these two facilities reported a decrease in off-site releases (of metals to disposal) of 13.4 million kg. Without these two facilities, the NPRI/TRI ratio for off-site releases would have been 1.7 in 1998 and 1.3 in 2001.

**Table 6–12. Average Total Releases and Transfers per Facility, NPRI and TRI, 1998 and 2001, for Facilities Reporting in Both Years**

	NPRI		TRI		Ratio of Average per Facility (NPRI/TRI)	
	1998	2001	1998	2001	1998	2001
	(kg/facility)	(kg/facility)	(kg/facility)	(kg/facility)		
<b>On-site Releases</b>	<b>74,572</b>	<b>71,465</b>	<b>74,915</b>	<b>60,255</b>	<b>1.0</b>	<b>1.2</b>
Air	60,096	58,656	46,861	38,395	1.3	1.5
Surface Water	3,339	4,775	6,660	5,284	0.5	0.9
Underground Injection	2,844	2,007	4,985	4,219	0.6	0.5
Land	8,210	5,972	16,409	12,358	0.5	0.5
<b>Off-site Releases</b>	<b>31,062</b>	<b>17,112</b>	<b>11,890</b>	<b>13,453</b>	<b>2.6</b>	<b>1.3</b>
Transfers to Disposal (except metals)	4,350	3,711	1,232	1,910	3.5	1.9
Transfers of Metals	26,712	13,400	10,658	11,544	2.5	1.2
<b>Total Reported Releases On- and Off-site</b>	<b>105,634</b>	<b>88,577</b>	<b>86,805</b>	<b>73,709</b>	<b>1.2</b>	<b>1.2</b>
<b>Off-site Transfers to Recycling</b>	<b>78,860</b>	<b>68,603</b>	<b>43,742</b>	<b>41,451</b>	<b>1.8</b>	<b>1.7</b>
Transfers to Recycling of Metals	68,135	58,920	36,334	34,456	1.9	1.7
Transfers to Recycling (except metals)	10,725	9,682	7,407	6,995	1.4	1.4
<b>Other Off-site Transfers for Further Management</b>	<b>16,167</b>	<b>17,143</b>	<b>35,432</b>	<b>34,171</b>	<b>0.5</b>	<b>0.5</b>
Energy Recovery (except metals)	4,108	5,789	20,688	20,136	0.2	0.3
Treatment (except metals)	7,940	6,313	7,175	5,857	1.1	1.1
Sewage (except metals)	4,119	5,041	7,570	8,178	0.5	0.6
<b>Total Reported Amounts of Releases and Transfers</b>	<b>200,661</b>	<b>174,322</b>	<b>165,979</b>	<b>149,331</b>	<b>1.2</b>	<b>1.2</b>

**Table 6–13. Summary of Total Reported Amounts of Releases and Transfers in North America, by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1998, 1998–2001**

	Facilities Reporting Both Years and less than 100,000 kg in 1998				Facilities Reporting Both Years and 100,000 kg or more in 1998				Total For Facilities Reporting in Both Years***			
	1998		2001		Change 1998–2001		1998		2001		Change 1998–2001	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	13,953	13,953	0	0	3,464	3,464	0	0	17,417	17,417	0	0
Total Forms	37,129	36,816	-313	-1	24,601	23,722	-879	-4	61,730	60,538	-1,192	-2
<b>Releases On- and Off-site</b>		kg	kg	%		kg	kg	%	kg	kg	kg	%
<b>On-site Releases*</b>	<b>101,027,353</b>	<b>106,419,309</b>	<b>5,391,957</b>	<b>5</b>	<b>1,203,321,481</b>	<b>957,632,541</b>	<b>-245,688,941</b>	<b>-20</b>	<b>1,304,348,834</b>	<b>1,064,051,850</b>	<b>-240,296,984</b>	<b>-18</b>
Air	92,205,592	90,900,192	-1,305,400	-1	741,188,969	604,185,760	-137,003,209	-18	833,394,561	695,085,953	-138,308,609	-17
Surface Water	4,772,638	8,881,694	4,109,056	86	106,896,604	82,487,717	-24,408,886	-23	111,669,242	91,369,411	-20,299,831	-18
Underground Injection	191,599	185,052	-6,547	-3	83,852,734	70,412,687	-13,440,046	-16	84,044,333	70,597,739	-13,446,593	-16
Land	3,785,428	6,402,930	2,617,501	69	271,347,232	200,523,865	-70,823,366	-26	275,132,660	206,926,795	-68,205,865	-25
<b>Off-site Releases</b>	<b>23,877,964</b>	<b>31,392,557</b>	<b>7,514,593</b>	<b>31</b>	<b>208,152,240</b>	<b>207,685,607</b>	<b>-466,633</b>	<b>-0.2</b>	<b>232,030,204</b>	<b>239,078,164</b>	<b>7,047,960</b>	<b>3</b>
Transfers to Disposal (except metals)	4,875,747	7,672,278	2,796,531	57	20,633,780	27,936,536	7,302,756	35	25,509,527	35,608,814	10,099,287	40
Transfers of Metals**	19,002,217	23,720,279	4,718,062	25	187,518,460	179,749,071	-7,769,389	-4	206,520,677	203,469,351	-3,051,326	-1
<b>Total Reported Releases On- and Off-site</b>	<b>124,905,317</b>	<b>137,811,867</b>	<b>12,906,550</b>	<b>10</b>	<b>1,411,473,721</b>	<b>1,165,318,148</b>	<b>-246,155,573</b>	<b>-17</b>	<b>1,536,379,038</b>	<b>1,303,130,015</b>	<b>-233,249,023</b>	<b>-15</b>
<b>Off-site Transfers to Recycling</b>	<b>68,964,848</b>	<b>108,124,702</b>	<b>39,159,854</b>	<b>57</b>	<b>738,569,907</b>	<b>649,154,073</b>	<b>-89,415,835</b>	<b>-12</b>	<b>807,534,756</b>	<b>757,278,775</b>	<b>-50,255,981</b>	<b>-6</b>
Transfers to Recycling of Metals	56,737,714	90,837,428	34,099,714	60	617,468,145	541,116,828	-76,351,317	-12	674,205,859	631,954,256	-42,251,603	-6
Transfers to Recycling (except metals)	12,227,134	17,287,275	5,060,140	41	121,101,762	108,037,245	-13,064,518	-11	133,328,897	125,324,519	-8,004,378	-6
<b>Other Off-site Transfers for Further Management</b>	<b>45,562,903</b>	<b>63,745,310</b>	<b>18,182,407</b>	<b>40</b>	<b>546,497,832</b>	<b>509,253,887</b>	<b>-37,243,945</b>	<b>-7</b>	<b>592,060,735</b>	<b>572,999,196</b>	<b>-19,061,538</b>	<b>-3</b>
Energy Recovery (except metals)	19,687,846	27,534,834	7,846,988	40	319,059,233	304,505,470	-14,553,763	-5	338,747,079	332,040,304	-6,706,775	-2
Treatment (except metals)	10,287,512	13,374,111	3,086,599	30	115,673,760	89,226,155	-26,447,605	-23	125,961,272	102,600,267	-23,361,006	-19
Sewage (except metals)	15,587,545	22,836,365	7,248,820	47	111,764,839	115,522,262	3,757,423	3	127,352,383	138,358,626	11,006,243	9
<b>Total Reported Amounts of Releases and Transfers</b>	<b>239,433,068</b>	<b>309,681,879</b>	<b>70,248,810</b>	<b>29</b>	<b>2,696,541,460</b>	<b>2,323,726,108</b>	<b>-372,815,353</b>	<b>-14</b>	<b>2,935,974,529</b>	<b>2,633,407,986</b>	<b>-302,566,542</b>	<b>-10</b>

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.

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Does not include 20 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2001.

- Average off-site transfers to recycling remained higher for NPRI, with the NPRI/TRI ratio 1.8 in 1998 and 1.7 in 2001.
- The average of other transfers for further management per facility increased for NPRI and decreased for TRI even though the NPRI/TRI ratio was the same at 0.5 in 1998 and in 2001.

#### 6.4 Facilities Reporting Smaller Amounts (Total Releases and Transfers less than 100,000 kg in 1998)

The overall quantities reported to NPRI and TRI are dominated by facilities reporting the largest releases and transfers. While this is an important group, it is a relatively small number of facilities. This section analyzes the changes in releases and transfers for the majority of facilities that report to NPRI and TRI. This majority reports smaller amounts, and so tends to be overshadowed by the fewer facilities that report larger amounts.

This section divides and compares reporting by two separate groups:

- facilities reporting total releases and transfers of less than 100,000 kg in 1998 (called smaller reporters) and
- facilities reporting releases and transfers of 100,000 kg or more in 1998 (called larger reporters).

This section includes reporting only by facilities that reported in both 1998 and 2001 and, in order to see underlying patterns, the analysis does not include 20 facilities with large increases (those that reported less than 100,000 kg in 1998 and 1 million kg or more in 2001).

These two groups differ in many ways. The smaller reporters made up 80 percent of the total number of facilities, and yet contributed only about 12 percent of the total releases and transfers in 2001. The larger reporters made up only 20 percent of the total number of facilities reporting and yet contributed 88 percent of the total releases and transfers in 2001. Facilities in this latter group are not necessarily large in terms of size or number

of employees, but they are large in terms of the amount of releases and transfers.

- Looking at trends in these two groups, the group of smaller reporters had an overall increase of 29 percent in total releases and transfers from 1998 to 2001, compared to a decrease of 14 percent by the larger reporters.
- Smaller reporters had increases in most categories of releases and transfers, including a 10-percent increase in total releases. Only two media showed decreases, on-site air decreased by 1 percent and underground injection by 3 percent. Total on-site releases increased by 5 percent and off-site releases increased by 31 percent.

#### 6.4.1 NPRI Facilities Reporting Smaller Amounts (Total Releases and Transfers less than 100,000 kg in 1998)

The pattern of substantial increases by the group of smaller reporters and decreases by the group of larger reporters was also present in NPRI.

- The group of smaller reporters in NPRI showed an overall increase of 75 percent in total releases and transfers, compared to a decrease of 19 percent for the group of larger reporters in NPRI.
- This pattern of increases by the group of smaller reporters and decreases by the group of larger reporters held for most major categories of releases and transfers. The exceptions were that NPRI larger reporters also reported increases in surface water discharges (of 40 percent) and in other off-site transfers for further management (of 3 percent, including a 39-percent increase in transfers to energy recovery and a 17-percent increase in transfers to sewage).
- NPRI smaller reporters showed an increase of 65 percent in on-site releases, compared to a decrease of 10 percent reported by larger reporters. For off-site releases, smaller reporters had an increase of 35 percent compared to a 49-percent decrease for larger reporters.

**Table 6–14. Summary of Total Reported Amounts of Releases and Transfers in NPRI, by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1998, 1998–2001**

	Facilities Reporting Both Years and less than 100,000 kg in 1998***				Facilities Reporting Both Years and 100,000 kg or more in 1998			
	1998	2001	Change 1998–2001		1998	2001	Change 1998–2001	
	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	923	923	0	0	378	378	0	0
Total Forms	2,332	2,585	253	11	2,189	2,296	107	5
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases*</b>	<b>8,013,434</b>	<b>13,250,290</b>	<b>5,236,856</b>	<b>65</b>	<b>89,005,019</b>	<b>79,726,192</b>	<b>-9,278,827</b>	<b>-10</b>
Air	7,233,509	11,859,270	4,625,761	64	70,951,996	64,452,707	-6,499,289	-9
Surface Water	456,665	773,236	316,571	69	3,887,254	5,438,740	1,551,486	40
Underground Injection	5,450	9,054	3,604	66	3,694,939	2,602,072	-1,092,867	-30
Land	245,715	559,288	313,573	128	10,434,887	7,210,163	-3,224,724	-31
<b>Off-site Releases</b>	<b>1,920,401</b>	<b>2,596,711</b>	<b>676,310</b>	<b>35</b>	<b>38,491,179</b>	<b>19,665,403</b>	<b>-18,825,776</b>	<b>-49</b>
Transfers to Disposal (except metals)	316,286	521,176	204,890	65	5,342,941	4,306,920	-1,036,021	-19
Transfers of Metals**	1,604,115	2,075,535	471,420	29	33,148,238	15,358,483	-17,789,755	-54
<b>Total Reported Releases On- and Off-site</b>	<b>9,933,835</b>	<b>15,847,001</b>	<b>5,913,166</b>	<b>60</b>	<b>127,496,198</b>	<b>99,391,595</b>	<b>-28,104,603</b>	<b>-22</b>
<b>Off-site Transfers to Recycling</b>	<b>5,276,408</b>	<b>11,533,053</b>	<b>6,256,645</b>	<b>119</b>	<b>97,319,878</b>	<b>77,719,097</b>	<b>-19,600,781</b>	<b>-20</b>
Transfers to Recycling of Metals	3,946,280	9,705,448	5,759,168	146	84,696,706	66,949,915	-17,746,791	-21
Transfers to Recycling (except metals)	1,330,128	1,827,605	497,477	37	12,623,172	10,769,182	-1,853,990	-15
<b>Other Off-site Transfers for Further Management</b>	<b>2,059,812</b>	<b>2,783,658</b>	<b>723,846</b>	<b>35</b>	<b>18,973,854</b>	<b>19,519,002</b>	<b>545,148</b>	<b>3</b>
Energy Recovery (except metals)	347,323	606,001	258,678	74	4,997,541	6,925,302	1,927,761	39
Treatment (except metals)	1,323,599	1,437,281	113,682	9	9,005,842	6,775,525	-2,230,317	-25
Sewage (except metals)	388,890	740,376	351,486	90	4,970,471	5,818,175	847,704	17
<b>Total Reported Amounts of Releases and Transfers</b>	<b>17,270,055</b>	<b>30,163,712</b>	<b>12,893,657</b>	<b>75</b>	<b>243,789,930</b>	<b>196,629,694</b>	<b>-47,160,236</b>	<b>-19</b>

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.

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Does not include 2 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2001.

**Table 6–15. Summary of Total Reported Amounts of Releases and Transfers in TRI, by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1998, 1998–2001**

	Facilities Reporting Both Years and less than 100,000 kg in 1998**				Facilities Reporting Both Years and 100,000 kg or more in 1998			
	1998	2001	Change 1998–2001		1998	2001	Change 1998–2001	
	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	13,030	13,030	0	0	3,086	3,086	0	0
Total Forms	34,797	34,231	-566	-2	22,412	21,426	-986	-4
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases</b>	<b>93,013,919</b>	<b>93,169,019</b>	<b>155,101</b>	<b>0.2</b>	<b>1,114,316,462</b>	<b>877,906,349</b>	<b>-236,410,114</b>	<b>-21</b>
Air	84,972,083	79,040,922	-5,931,161	-7	670,236,973	539,733,053	-130,503,920	-19
Surface Water	4,315,973	8,108,458	3,792,485	88	103,009,350	77,048,977	-25,960,372	-25
Underground Injection	186,149	175,998	-10,151	-5	80,157,795	67,810,615	-12,347,179	-15
Land	3,539,713	5,843,642	2,303,928	65	260,912,345	193,313,702	-67,598,642	-26
<b>Off-site Releases</b>	<b>21,957,563</b>	<b>28,795,846</b>	<b>6,838,283</b>	<b>31</b>	<b>169,661,061</b>	<b>188,020,204</b>	<b>18,359,143</b>	<b>11</b>
Transfers to Disposal (except metals)	4,559,461	7,151,102	2,591,641	57	15,290,839	23,629,616	8,338,777	55
Transfers of Metals*	17,398,102	21,644,744	4,246,642	24	154,370,222	164,390,588	10,020,366	6
<b>Total Reported Releases On- and Off-site</b>	<b>114,971,482</b>	<b>121,964,866</b>	<b>6,993,384</b>	<b>6</b>	<b>1,283,977,523</b>	<b>1,065,926,553</b>	<b>-218,050,970</b>	<b>-17</b>
<b>Off-site Transfers to Recycling</b>	<b>63,688,440</b>	<b>96,591,649</b>	<b>32,903,209</b>	<b>52</b>	<b>641,250,029</b>	<b>571,434,976</b>	<b>-69,815,054</b>	<b>-11</b>
Transfers to Recycling of Metals	52,791,434	81,131,980	28,340,546	54	532,771,439	474,166,913	-58,604,526	-11
Transfers to Recycling (except metals)	10,897,006	15,459,670	4,562,663	42	108,478,590	97,268,063	-11,210,528	-10
<b>Other Off-site Transfers for Further Management</b>	<b>43,503,091</b>	<b>60,961,652</b>	<b>17,458,561</b>	<b>40</b>	<b>527,523,978</b>	<b>489,734,885</b>	<b>-37,789,093</b>	<b>-7</b>
Energy Recovery (except metals)	19,340,523	26,928,833	7,588,310	39	314,061,692	297,580,168	-16,481,524	-5
Treatment (except metals)	8,963,913	11,936,830	2,972,917	33	106,667,918	82,450,630	-24,217,288	-23
Sewage (except metals)	15,198,655	22,095,989	6,897,334	45	106,794,368	109,704,087	2,909,719	3
<b>Total Reported Amounts of Releases and Transfers</b>	<b>222,163,013</b>	<b>279,518,167</b>	<b>57,355,153</b>	<b>26</b>	<b>2,452,751,530</b>	<b>2,127,096,414</b>	<b>-325,655,117</b>	<b>-13</b>

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.

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\* Does not include 18 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2001.

- NPRI smaller reporters also showed an increase of over 100 percent for off-site transfers to recycling while larger reporters showed a decrease of 20 percent.

#### 6.4.2 TRI Facilities Reporting Smaller Amounts (Total Releases and Transfers less than 100,000 kg in 1998)

The pattern of substantial increases by the group of smaller reporters and decreases by the group of larger reporters was also present in TRI.

- The group of smaller reporters in TRI showed an overall increase of 26 percent in total releases and transfers, compared to a decrease of 13 percent for the group of larger reporters in TRI.
- This pattern of increases by smaller reporters compared to decreases by other facilities held for most categories of releases and transfers. The exceptions were on-site air releases and underground injection, where smaller reporters did report decreases but the decreases were less than those for the larger reporters, and off-site releases, where smaller reporters had greater increases than larger reporters.
- While TRI small reporters showed a slight increase (less than 0.5 percent) in on-site releases, compared to a decrease of 21 percent by larger reporters, on-site air releases decreased for both groups. TRI facilities with smaller amounts reported a decrease of 7 percent compared to a decrease of 19 percent for TRI facilities with larger amounts. Similarly for underground injection, there was a decrease of 5 percent reported by smaller reporters and a decrease of 15 percent by larger reporters.
- For off-site releases, both groups reported increases. TRI smaller reporters had an increase of 31 percent compared to an 11-percent increase for larger reporters.
- Off-site transfers to recycling increased by 52 percent for TRI smaller reporters

and decreased by 11 percent for larger reporters.

- Other off-site transfers for further management increased by 40 percent among TRI smaller reporters and decreased by 7 percent for larger reporters.

### 6.4.3 Releases On- and Off-site by Industry for Facilities Reporting Smaller Amounts

While overall total releases on- and off-site for the group of facilities reporting less than 100,000 kg in 1998 increased by 10 percent from 1998 to 2001, there were notable differences between NPRI and TRI industry sectors.

- For the NPRI group of smaller reporters, the paper products sector had the largest total releases in 2001, and they reported almost triple the amount of releases in 1998. Some facilities in the paper industry in NPRI indicated that they changed their method of estimating releases, resulting in increased estimates. For TRI, the paper facilities in the group of smaller reporters was ranked thirteenth and reported an overall decrease of 15 percent. (Generally, TRI paper facilities had made a similar change in their method of estimation during the 1994 reporting year.)
- For the NPRI smaller reporters, the paper products industry also reported the largest increase in total releases, with an increase of 182 percent. For TRI smaller reporters, the food industry reported the largest increase, with total releases rising by 136 percent.
- For TRI smaller reporters, the rubber and plastics industry reported the largest total releases in 1998 and the second-largest in 2001, with a 2-percent decrease from 1998 to 2001. For NPRI smaller reporters, the rubber and plastics industry reported the second-largest amounts of releases in 2001 after ranking third in 1998 and an overall increase of 49 percent.

**Table 6–16. Change in Total Releases On- and Off-site by Facilities Reporting less than 100,000 kg, NPRI and TRI, by Industry, 1998–2001**

US SIC Code	Industry	NPRI Total Releases On- and Off-site						TRI Total Releases On- and Off-site					
		1998		2001		Change 1998–2001		1998		2001		Change 1998–2001	
		kg	Rank	kg	Rank	kg	(%)	kg	Rank	kg	Rank	kg	%
12	Coal Mining	0	--	0	--	0	--	117,083	24	193,711	23	76,627	65
20	Food Products	174,393	13	213,066	13	38,673	22	3,885,194	10	9,173,633	6	5,288,439	136
21	Tobacco Products	0	--	0	--	0	--	59,884	25	68,917	25	9,033	15
22	Textile Mill Products	42,539	17	27,209	18	-15,330	-36	1,490,283	17	1,492,667	17	2,383	0
23	Apparel and Other Textile Products	0	--	0	--	0	--	158,268	23	90,191	24	-68,077	-43
24	Lumber and Wood Products	791,331	6	1,588,684	4	797,353	101	6,271,035	9	6,456,676	10	185,641	3
25	Furniture and Fixtures	212,809	12	326,116	10	113,307	53	3,583,098	11	2,456,026	15	-1,127,071	-31
26	Paper Products	1,479,324	1	4,173,815	1	2,694,491	182	3,238,231	13	2,747,001	13	-491,230	-15
27	Printing and Publishing	275,066	10	290,991	11	15,925	6	772,383	19	510,120	20	-262,263	-34
28	Chemicals	1,454,581	2	1,905,816	3	451,235	31	13,977,349	3	15,513,561	1	1,536,212	11
29	Petroleum and Coal Products	115,463	15	122,109	15	6,646	6	2,576,893	15	3,392,511	11	815,619	32
30	Rubber and Plastics Products	1,326,685	3	1,973,399	2	646,714	49	14,591,440	1	14,299,834	2	-291,606	-2
31	Leather Products	9,000	20	6,683	19	-2,317	-26	834,675	18	705,508	18	-129,167	-15
32	Stone/Clay/Glass Products	653,366	8	1,050,476	6	397,110	61	6,528,653	7	7,319,056	8	790,403	12
33	Primary Metals	950,591	4	1,438,724	5	488,133	51	8,900,511	5	10,806,109	4	1,905,598	21
34	Fabricated Metals Products	675,100	7	833,123	8	158,023	23	14,461,747	2	12,628,625	3	-1,833,122	-13
35	Industrial Machinery	142,467	14	100,992	16	-41,475	-29	3,407,398	12	2,673,607	14	-733,791	-22
36	Electronic/Electrical Equipment	64,405	16	62,572	17	-1,833	-3	3,198,588	14	3,287,037	12	88,449	3
37	Transportation Equipment	837,990	5	856,724	7	18,734	2	10,637,874	4	10,034,825	5	-603,049	-6
38	Measurement/Photographic Instruments	0	--	0	--	0	--	487,112	20	395,970	22	-91,142	-19
39	Misc. Manufacturing Industries	467,794	9	502,359	9	34,565	7	1,943,255	16	1,564,652	16	-378,602	-19
491/493	Electric Utilities	226,014	11	248,893	12	22,879	10	6,747,204	6	8,420,887	7	1,673,683	25
495/738	Hazardous Waste Mgt./Solvent Recovery	17,970	18	123,957	14	105,987	590	348,610	22	628,312	19	279,703	80
5169	Chemical Wholesalers	16,947	19	1,293	20	-15,654	-92	379,591	21	400,102	21	20,512	5
--	Multiple codes 20–39*	--	--	--	--	--	--	6,375,124	8	6,705,328	9	330,204	5
<b>Total</b>		<b>9,916,888</b>		<b>15,845,708</b>		<b>5,928,820</b>	<b>60</b>	<b>114,971,482</b>		<b>121,964,866</b>		<b>6,993,384</b>	<b>6</b>

\* Multiple SIC codes reported in TRI only.

**Table 6–17. Summary of Total Releases On- and Off-site, by NPRI Paper Products (US SIC code 26) Facilities Reporting less than 100,000 kg in 1998, 1998–2001**

	1998	2001	Change 1998–2001	
	Number	Number	Number	%
Total Facilities	54	54	0	--
Total Forms	111	160	49	44
	kg	kg	kg	%
<b>On-site Releases*</b>	<b>1,319,496</b>	<b>3,942,483</b>	<b>2,622,987</b>	<b>199</b>
Air	1,047,709	3,056,910	2,009,201	192
Surface Water	153,929	521,911	367,982	239
Underground Injection	0	632	632	
Land	116,555	363,030	246,475	211
<b>Off-site Releases</b>	<b>159,828</b>	<b>231,332</b>	<b>71,504</b>	<b>45</b>
Transfers to Disposal (except metals)	9,286	12,792	3,506	38
Transfers of Metals**	150,542	218,540	67,998	45
<b>Total Reported Releases On- and Off-site</b>	<b>1,479,324</b>	<b>4,173,815</b>	<b>2,694,491</b>	<b>182</b>

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

**Table 6–18. Total Releases On- and Off-site for NPRI Paper Products (US SIC code 26) Facilities Reporting less than 100,000 kg in 1998, by Province, 1998–2001**

Province	Number of Facilities	Total Releases On- and Off-site		
		1998 (kg)	2001 (kg)	Change 1998–2001 (kg)
British Columbia	4	103,458	1,298,759	1,195,301
Quebec	22	648,753	1,040,341	391,588
Ontario	14	246,018	594,247	348,229
New Brunswick	3	100,162	475,643	375,481
Alberta	4	121,205	331,138	209,933
Nova Scotia	3	143,031	319,991	176,960
Newfoundland and Labrador	3	84,797	82,692	-2,105
Saskatchewan	1	31,900	31,004	-896
<b>Total</b>	<b>54</b>	<b>1,479,324</b>	<b>4,173,815</b>	<b>2,694,491</b>

**NPRI Releases On- and Off-site, Paper Products Industry**

For the group of facilities reporting less than 100,000 kg in 1998 in NPRI, the paper products industry reported the largest total releases on- and off-site and had the largest increase from 1998 to 2001.

- The NPRI paper products facilities that reported less than 100,000 kg in 1998 increased their total releases by 182 percent from 1.5 million kg to 4.2 million kg.
- A large proportion of these increases in total releases came from paper products facilities in British Columbia. The four facilities in this group in British Columbia reported an increase of 1.2 million kg.
- Of the 2.7-million-kg increase in total releases, 2.0 million were on-site air releases. Five NPRI facilities reporting less than 100,000 kg in 1998 each reported increases of more than 140,000 kg in on-site air releases from 1998 to 2001, mostly as methanol releases. They accounted for increases totaling 1.4 million kg. The third-ranked facility started up in 1998 (AV Cell Inc.). The others explained their increases as due to increases in production levels and a change in the method of estimation during the time period. A handbook developed by the National Council of the Paper Industry for Air and Stream Improvement (NCASI) was cited as the source for improved estimation methods that resulted in increased estimates and/or numbers of chemicals reported.

**Table 6–19. NPRI Paper Products (US SIC code 26) Facilities Reporting less than 100,000 kg in 1998 with Largest Increase in Air Releases, 1998–2001**

Rank	Facility	City, Province	On-site Air Releases							Chemicals with Largest Increase at the Facility
			Forms		Change					
			1998 Number	2001 Number	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	1998–2001 (kg)	
1	Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat, BC	3	6	0	100	31,125	659,162	659,162	Methanol, Hydrochloric acid
2	Western Pulp Limited Partnership, Doman Industries	Squamish, BC	3	7	4,100	333,022	325,687	239,539	235,439	Methanol, Hydrochloric acid
3	AV Cell Inc., Tembec/Grasim Industries/Thai Rayon LP/P.T. Indo Bharat Co. Ltd.	Atholville, NB	3	4	35,151	61,897	196,482	229,818	194,667	Methanol, Chlorine
4	Alberta Pacific Forest Industries Inc.	Boyle, AB	3	7	99,258	116,070	126,987	241,580	142,322	Methanol, Sulfuric acid
5	Kimberly-Clark Inc.	New Glasgow, NS	4	8	71,395	61,420	157,280	215,410	144,015	Methanol, Acetaldehyde

### TRI Releases On- and Off-site, Food Products Industry

For the group of facilities reporting less than 100,000 kg in 1998 in TRI, the food products industry reported the largest overall increase from 1998 to 2001.

- The group of TRI food products facilities that reported smaller amounts had the largest overall increase of all TRI industry sectors, with an increase of 5.3 million kg, from 3.9 million kg to 9.2 million kg, or 136 percent. The increase was primarily as on-site surface water discharges, which showed an increase of 2.7 million kg, or 153 percent.
- Five TRI facilities reporting less than 100,000 kg in 1998 each reported increases of more than 315,000 kg in on-site surface water discharges from 1998 to 2001, mostly as releases of nitric acid and nitrate compounds. They accounted for total increases of 2.1 million kg.
- TRI food products industry facilities with the largest releases in 2001 among this group of smaller reporters were concentrated in six states in the Midwest, the South and California. These six states were home to one-quarter of the facilities in this group but over one-third of total releases in 1998 and over half of the releases in 2001.

**Table 6–20. Summary of Total Releases On- and Off-site, by TRI Food Products (US SIC code 20) Facilities Reporting less than 100,000 kg in 1998, 1998–2001**

	1998	2001	Change 1998–2001	
	Number	Number	Number	%
Total Facilities	871	871	0	--
Total Forms	1,688	1,782	94	6
	kg	kg	kg	%
<b>On-site Releases</b>	<b>3,487,985</b>	<b>7,481,668</b>	<b>3,993,684</b>	<b>114</b>
Air	868,112	1,258,036	389,924	45
Surface Water	1,777,055	4,496,069	2,719,014	153
Underground Injection	5	13,842	13,838	305,123
Land	842,813	1,713,720	870,907	103
<b>Off-site Releases</b>	<b>397,210</b>	<b>1,691,965</b>	<b>1,294,755</b>	<b>326</b>
Transfers to Disposal (except metals)	351,088	1,622,733	1,271,645	362
Transfers of Metals*	46,121	69,231	23,110	50
<b>Total Reported Releases On- and Off-site</b>	<b>3,885,194</b>	<b>9,173,633</b>	<b>5,288,439</b>	<b>136</b>

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

**Table 6–21. Total Releases On- and Off-site, by TRI Food Products (US SIC code 20) Facilities Reporting less than 100,000 kg in 1998, States with Largest Total Releases in 2001, 1998–2001**

State	Number of Facilities	Total Releases On- and Off-site			
		1998 (kg)	2001 (kg)	Change 1998–2001	
				kg	%
California	63	328,180	1,182,495	854,315	260
Mississippi	15	129,025	789,142	660,117	512
Wisconsin	77	629,049	785,583	156,534	25
Idaho	11	75,567	746,447	670,879	888
North Carolina	32	166,699	672,695	505,996	304
Arkansas	30	35,260	594,592	559,332	1,586
<b>Subtotal</b>	<b>228</b>	<b>1,363,780</b>	<b>4,770,953</b>	<b>3,407,173</b>	<b>250</b>
<b>% of Total</b>	<b>26</b>	<b>35</b>	<b>52</b>		
<b>Total</b>	<b>871</b>	<b>3,885,194</b>	<b>9,173,633</b>	<b>5,288,439</b>	<b>136</b>

**Table 6–22. TRI Food Products (US SIC code 20) Facilities Reporting less than 100,000 kg in 1998 with Largest Increase in Water Releases, 1998–2001**

Rank	Facility	City, State	On-site Water Releases							Chemicals with Largest Increase at the Facility
			Forms		Change					
			1998 Number	2001 Number	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	1998–2001 (kg)	
1	Choctaw Maid Farms Carthage Plant	Carthage, MS	1	2	0	374,487	0	589,529	589,529	Nitric acid and nitrate compounds
2	Wayne Farms L.L.C. Danville, Contigroup Cos.	Danville, AR	5	5	5,904	5,908	5,865	548,029	542,126	Nitric acid and nitrate compounds
3	Conagra Poultry Co., Conagra Foods Inc.	Farmerville, LA	1	2	0	163,696	271,766	339,135	339,135	Nitric acid and nitrate compounds
4	Conagra Poultry Co., Conagra Foods Inc.	Enterprise, AL	2	2	93,038	619,174	508,364	431,003	337,965	Nitric acid and nitrate compounds
5	Pilgrim's Pride Corp. Mt. Pleasant Complex	Mount Pleasant, TX	1	2	45	331,814	317,460	317,914	317,868	Nitric acid and nitrate compounds

**Table 6–23. Summary of Total Releases On- and Off-site, by NPRI Lumber and Wood Products (US SIC code 24) Facilities Reporting less than 100,000 kg in 1998, 1998–2001**

	1998	2001	Change 1998–2001	
	Number	Number	Number	%
Total Facilities	62	62	0	--
Total Forms	175	193	18	10
	kg	kg	kg	%
<b>On-site Releases*</b>	<b>763,180</b>	<b>1,549,676</b>	<b>786,496</b>	<b>103</b>
Air	759,770	1,544,525	784,755	103
Surface Water	331	30	-301	-91
Underground Injection	0	0	0	--
Land	0	4,209	4,209	--
<b>Off-site Releases</b>	<b>28,151</b>	<b>39,008</b>	<b>10,857</b>	<b>39</b>
Transfers to Disposal (except metals)	14,938	23,479	8,541	57
Transfers of Metals**	13,213	15,529	2,316	18
<b>Total Reported Releases On- and Off-site</b>	<b>791,331</b>	<b>1,588,684</b>	<b>797,353</b>	<b>101</b>

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

**Table 6–25. NPRI Lumber and Wood Products (US SIC code 24) Facilities Reporting less than 100,000 kg in 1998 with Largest Increase in Air Releases, 1998–2001**

Rank	Facility	City, Province	On-site Air Releases							Change 1998–2001 (kg)	Chemicals with Largest Increase at the Facility
			Forms								
			1998	2001	1998	1999	2000	2001			
1	Uniboard Canada Inc., MDF La Baie Inc., Uniboard Canada/Sodexpan	La Baie, QC	3	5	69,200	145,370	147,100	330,642	261,442	Methanol	
2	Weyerhaeuser Co. Ltd., Miramichi OSB	Miramichi, NB	14	3	13,166	132,704	130,658	167,860	154,694	Formaldehyde, Acetaldehyde	
3	Temple Pembroke Inc., Temple Inland Forest Products Corp.	Pembroke, ON	1	3	40,162	112,806	137,110	190,037	149,875	Methanol	
4	Louisiana-Pacific Canada Ltd., LP Dawson Creek OSB	Dawson Creek, BC	2	3	82,277	103,207	103,520	186,357	104,080	Acetaldehyde, Methanol	
5	Norbord Industries Inc., Val d'Or Division, Nexfor Inc.	Val d'Or, QC	2	3	37,337	39,569	72,895	124,681	87,344	Methanol	

**Table 6–24. Total Releases On- and Off-site for NPRI Lumber and Wood Products (US SIC code 24) Facilities Reporting less than 100,000 kg in 1998, by Province, 1998–2001**

Province	Number of Facilities	Total Releases On- and Off-site		
		1998 (kg)	2001 (kg)	Change 1998–2001 (kg)
Quebec	14	256,836	545,910	289,074
Ontario	21	268,078	460,794	192,716
New Brunswick	3	26,881	250,799	223,918
British Columbia	10	117,705	202,722	85,017
Alberta	7	121,145	124,840	3,695
Nova Scotia	2	76	2,732	2,656
Manitoba	2	0	657	657
Saskatchewan	2	610	230	-380
Newfoundland and Labrador	1	0	0	0
<b>Total</b>	<b>62</b>	<b>791,331</b>	<b>1,588,684</b>	<b>797,353</b>

**NPRI Releases On- and Off-site, Lumber and Wood Products Industry**

For the group of facilities reporting less than 100,000 kg in 1998 in NPRI, the lumber and wood products industry reported the second-largest overall increase from 1998 to 2001.

- The NPRI lumber and wood products facilities that reported less than 100,000 kg in 1998 increased their total releases by 101 percent from 791,000 kg to 1.6 million kg. The increase was primarily as on-site air releases, which showed an increase of almost 785,000 kg.
- These increases were primarily at lumber and wood products facilities in Quebec and New Brunswick. The 14 facilities in this group in Quebec reported an increase of 289,000 kg and the three in New Brunswick reported an increase of 224,000 kg.
- Five NPRI facilities reporting less than 100,000 kg in 1998 each reported increases of more than 87,000 kg in on-site air releases from 1998 to 2001. The Uniboard Canada facility in La Baie, Quebec, reported the largest increase of over 261,400 kg, mainly due to increases in air emissions of methanol. A change in the method of estimation to the use of NCASI emission factors was cited as the reason for the increased estimates of emissions of methanol and acetaldehyde. This change was also cited by the Louisiana-Pacific Canada facility in Dawson Creek, British Columbia, which had an increase of 104,100 kg mainly as acetaldehyde and methanol.
- The Weyerhaeuser facility in Miramichi, New Brunswick, reported an increase in air emissions of almost 154,700 kg, primarily of formaldehyde and acetaldehyde. The reasons cited for the increased formaldehyde emissions were a change to the use of actual test data as the basis for the report.
- The Temple Pembroke facility in Pembroke, Ontario, had an increase of almost 150,000 kg, mainly as air emissions of methanol, and cited the reason

for the increase as due to a change in their method of estimation from the use of engineering estimates to the use of test data.

### TRI Releases On- and Off-site, Primary Metals Industry

For the group of facilities reporting less than 100,000 kg in 1998 in TRI, the primary metals industry reported the second-largest overall increase in total releases on- and off-site from 1998 to 2001.

- The TRI primary metals facilities that reported less than 100,000 kg in 1998 increased their total releases by 1.9 million kg, from 8.9 million kg to 10.8 million kg, or 21 percent. The increase was primarily as off-site transfers of metals to disposal, which showed an increase of 1.9 million kg, or 53 percent.
- TRI primary metals facilities among the smaller reporters were concentrated in nine states, which accounted for one-half of the facilities in this group and about one-half of total releases in 1998 but over 60 percent of the releases in 2001.
- Five TRI facilities reporting less than 100,000 kg in 1998 each reported increases of more than 161,000 kg in off-site transfers of metals to disposal from 1998 to 2001. Together the five facilities reported a total of more than 2.0 million kg in increases in transfers of metals to disposal.
- The facility with the largest increase was Griffin Pipe Products located in New Jersey. It reported almost 890,000 kg of off-site transfers to disposal of zinc compounds in 2001 after reporting no releases or transfers of this metal in 1998.
- The facility with the second-largest increase was Neenah Foundry located in Wisconsin. It reported an increase of almost 542,000 kg from 1998 to 2001, which was attributed to increases in production as well as to lower transfers to recycling over this period. The other three facilities also reported increases in production, of more than 10 percent, from 1998 to 2001.

**Table 6–26. Summary of Total Releases On- and Off-site, by TRI Primary Metals (US SIC code 33) Facilities Reporting less than 100,000 kg in 1998, 1998–2001**

	1998	2001	Change 1998–2001	
	Number	Number	Number	%
Total Facilities	1,135	1,131	-4	-0.4
Total Forms	2,903	2,878	-25	-1
	kg	kg	kg	%
<b>On-site Releases</b>	<b>4,913,207</b>	<b>4,594,924</b>	<b>-318,283</b>	<b>-6</b>
Air	4,183,597	3,374,344	-809,253	-19
Surface Water	140,080	415,959	275,879	197
Underground Injection	7.3	6.8	-0.5	-6
Land	589,523	804,614	215,091	36
<b>Off-site Releases</b>	<b>3,987,304</b>	<b>6,211,185</b>	<b>2,223,882</b>	<b>56</b>
Transfers to Disposal (except metals)	387,982	713,218	325,236	84
Transfers of Metals*	3,599,322	5,497,968	1,898,646	53
<b>Total Reported Releases On- and Off-site</b>	<b>8,900,511</b>	<b>10,806,109</b>	<b>1,905,598</b>	<b>21</b>

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

**Table 6–28. TRI Primary Metals (US SIC code 33) Facilities Reporting less than 100,000 kg in 1998 with Largest Increase in Disposal of Metals, 1998–2001**

Rank	Facility	City, State	Off-site Transfers of Metals to Disposal							Chemicals with Largest Increase at the Facility
			Forms		Change					
			1998	2001	1998	1999	2000	2001	1998–2001	
			Number	Number	(kg)	(kg)	(kg)	(kg)	(kg)	
1	Griffin Pipe Prods. Co., Amsted Inds. Inc.	Florence, NJ	1	2	0	16,633	25,922	889,921	889,921	Zinc and compounds
2	Neenah Fndy. Co., NFC Castings Inc.	Neenah, WI	4	5	36,853	83,405	357,563	578,568	541,715	Manganese and compounds
3	Ellwood Quality Steels Co.	New Castle, PA	5	6	22,798	118,797	320,729	312,781	289,983	Aluminum, Zinc and compounds
4	McConway & Torley Corp., Trinity Inds. Inc.	Pittsburgh, PA	3	4	27	131,529	107,034	175,228	175,201	Manganese/Chromium and compounds
5	Doe Run Co. Recycling Facility, Renco Group Inc.	Boss, MO	3	4	96,076	634,675	1,232,115	257,241	161,165	Antimony and compounds

**Table 6–27. Total Releases On- and Off-site, by TRI Primary Metals (US SIC code 33) Facilities Reporting less than 100,000 kg in 1998, States with Largest Total Releases in 2001, 1998–2001**

State	Number of Facilities	Total Releases On- and Off-site			
		1998	2001	Change 1998–2001	
		(kg)	(kg)	kg	%
Pennsylvania	125	742,891	1,295,570	552,679	74
Wisconsin	52	551,477	1,105,170	553,693	100
New Jersey	34	171,809	987,145	815,336	475
Ohio	124	930,299	634,682	-295,617	-32
Indiana	69	488,224	599,366	111,142	23
Missouri	32	317,170	540,825	223,655	71
Michigan	69	377,215	529,083	151,868	40
Kentucky	24	360,347	501,967	141,620	39
Alabama	33	431,044	466,698	35,654	8
<b>Subtotal</b>	<b>562</b>	<b>4,370,476</b>	<b>6,660,506</b>	<b>2,290,030</b>	<b>52</b>
<b>% of Total</b>	<b>50</b>	<b>49</b>	<b>62</b>	<b>62</b>	
<b>Total</b>	<b>1,131</b>	<b>8,900,511</b>	<b>10,806,109</b>	<b>1,905,598</b>	<b>21</b>

**Releases and Transfers, 1995–2001**



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## Key Findings

- Releases and transfers from manufacturing facilities in North America decreased 14 percent from 1995 to 2001.
- Total releases on- and off-site decreased by 20 percent from 1995 to 2001. These releases represent on-site releases to air, water, land, or underground injection wells; and off-site releases, including off-site transfers to disposal and transfers of metals, to treatment, sewage, and disposal.
- NPRI manufacturing facilities reported a decrease of 15 percent in on-site releases and 27 percent in off-site releases. Total releases and transfers decreased by 13 percent from 1995 to 2001.
- While TRI manufacturing facilities reported a 33-percent reduction in on-site releases, TRI off-site releases increased by 59 percent. Total releases and transfers decreased by 14 percent from 1995 to 2001.
- Manufacturing facilities in the state of Texas had the largest releases and transfers in both 1995 and 2001, despite a 26-percent reduction in total releases and transfers. The state of Pennsylvania ranked second for total releases and transfers in 2001, up from fourth in 1995 with an increase of 2 percent in total releases. The state of Indiana ranked third for total releases and transfers in 2001, up from tenth, with an increase of 30 percent. It also ranked second for total releases. The province of Ontario ranked second in 1995 and fourth in 2001 for both total releases and transfers and total releases, with a 21-percent reduction in total releases and transfers.
- The manufacturing industries with the largest total releases and transfers in North America in 2001—chemicals, primary metals, and paper products—were the same as in 1995. Chemicals, ranking first, reported an 18-percent decrease from 1995 to 2001. Primary metals, ranking second, reported a 2-percent increase, and paper products, ranking third, had a 19-percent decrease.
- NPRI showed an increase of 42 percent in the number of facilities reporting, compared to a decrease of 10 percent for TRI. The overall trends for the group of facilities reporting in both 1995 and 2001 were similar to the trends for all facilities, despite the change in the number of facilities reporting.
- Overall releases and transfers are dominated by a small subset of facilities reporting the largest amounts. Most manufacturing facilities reported smaller amounts of total releases and transfers (defined as less than 100,000 kg in 1995). Total releases and transfers from this group of smaller reporters increased by 19 percent compared to an overall decrease of 25 percent for the group of manufacturing facilities reporting larger amounts (100,000 kg or more in 1995). Indeed, the group of smaller reporters reported net increases in all types of releases and transfers with one exception. Only TRI air releases showed a decrease (of 18 percent) for the group of facilities reporting smaller amounts.

## 7.1 Introduction

This chapter examines changes in amounts of releases and transfers for further management between 1995 and 2001 from manufacturing industries. It analyzes data for industries and chemicals that reported in both the United States and Canada (the 1995 matched data set) for the years 1995 through 2001. Comparable Mexican data are not available for the 1995–2001 reporting years.

The data in this chapter include reporting on 155 chemicals from the manufacturing sectors (US SIC codes 20–39) and data for on-site releases and transfers to disposal, treatment, and sewage. This chapter does not include the TRI industries that began reporting only in 1998 (electric utilities, hazardous waste management/solvent recovery facilities, chemical wholesalers and coal mines). Nor do they include transfers to recycling and energy recovery, since required reporting of these data to NPRI began with the 1998 reporting year. Similarly, the new chemicals added to the NPRI list for 1999 and 2001 are excluded, as is mercury and its compounds since the reporting threshold was changed for the 2001 reporting year in both NPRI and TRI. Lead and its compounds are also excluded because TRI lowered the threshold for reporting for the 2001 reporting year (NPRI lowered the threshold for lead and its compounds for the 2002 reporting year). The 1995 and 2001 data presented in this chapter are thus a subset of the 1998 and 2001 data presented in **Chapters 4, 5, and 6**.

## 7.2 1995–2001 Total Releases and Transfers from Manufacturing Industries in North America

The total amounts reported to the PRTR systems in Canada and the United States include releases on- and off-site, as well as off-site transfers for further management. On-site releases—to air, surface water, underground injection wells, and land—occur at the reporting facility site. Off-site releases consist of off-site transfers to disposal, including all transfers of metals to disposal, treatment, or sewage. Transfers of metals are included in the off-site releases category because metals in waste streams sent to treatment or sewage units are not destroyed and are ultimately released or disposed of. Transfers off-site for further management include transfers to treatment or sewage treatment plants of all chemicals in the matched data set that are not metals or their compounds.

- The number of facilities reporting in North America declined each year and was 7 percent lower in 2001 than in 1995. The number of forms for North America decreased by 5 percent from 1995 to 2001.
- Total releases and transfers in North America decreased 14 percent from 1995 to 2001. After increasing from 1996 to 1997, total releases and transfers declined over the rest of the period, including a 10-percent decrease from 2000 to 2001.
- In North America, releases on- and off-site, which account for most of the total releases and transfers, fell in every year except from 1996 to 1997; the reduction from 1995 to 2001 was 20 percent. On-site releases declined steadily over the period, for a 31-percent reduction from 1995 to 2001.
- Off-site releases increased by 46 percent from 1995 to 2001 in North America. Amounts increased for all years except between 1997 and 1998.

Table 7–1. Summary of Total Releases and Transfers in North America, 1995–2001

	North America							Change 1995–2001	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	2000 Number	2001 Number	Number	%
Total Facilities	20,572	20,400	20,355	20,346	20,099	20,015	19,217	-1,355	-7
Total Forms	61,943	60,956	61,349	61,479	61,233	61,347	58,595	-3,348	-5
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>%</b>						
<b>On-site Releases*</b>	<b>929,303,924</b>	<b>903,614,949</b>	<b>866,451,574</b>	<b>842,230,089</b>	<b>812,576,287</b>	<b>772,508,694</b>	<b>643,770,881</b>	<b>-285,533,043</b>	<b>-31</b>
Air	614,967,162	577,046,387	525,428,904	495,835,379	468,905,897	443,634,963	372,318,272	-242,648,890	-39
Surface Water	94,221,073	90,939,951	100,448,987	111,437,578	120,661,996	120,383,364	99,242,302	5,021,230	5
Underground Injection	94,617,598	83,663,987	80,537,509	75,847,457	70,709,795	73,833,654	60,610,718	-34,006,879	-36
Land	125,367,835	151,843,465	159,913,454	158,990,609	152,183,236	134,555,940	111,498,604	-13,869,231	-11
<b>Off-site Releases</b>	<b>153,056,369</b>	<b>167,763,507</b>	<b>298,500,646</b>	<b>206,775,641</b>	<b>210,565,248</b>	<b>220,819,552</b>	<b>222,708,843</b>	<b>69,652,474</b>	<b>46</b>
Transfers to Disposal (except metals)	21,592,031	17,199,967	23,312,430	23,813,128	28,882,195	31,208,896	26,348,915	4,756,884	22
Transfers of Metals**	131,464,338	150,563,541	275,188,216	182,962,513	181,683,054	189,610,657	196,359,928	64,895,589	49
<b>Total Releases On- and Off-site</b>	<b>1,082,360,293</b>	<b>1,071,378,456</b>	<b>1,164,952,221</b>	<b>1,049,005,730</b>	<b>1,023,141,535</b>	<b>993,328,247</b>	<b>866,479,724</b>	<b>-215,880,569</b>	<b>-20</b>
<b>Off-site Transfers for Further Management</b>	<b>209,603,110</b>	<b>211,891,657</b>	<b>235,175,803</b>	<b>239,313,246</b>	<b>231,601,519</b>	<b>239,880,538</b>	<b>243,371,988</b>	<b>33,768,878</b>	<b>16</b>
Treatment (except metals)	88,132,946	85,047,065	100,230,594	103,180,314	98,206,064	97,297,279	99,068,911	10,935,965	12
Sewage (except metals)	121,470,164	126,844,592	134,945,209	136,132,932	133,395,455	142,583,259	144,303,077	22,832,913	19
<b>Total Releases and Transfers***</b>	<b>1,291,963,402</b>	<b>1,283,270,113</b>	<b>1,400,128,023</b>	<b>1,288,318,976</b>	<b>1,254,743,055</b>	<b>1,233,208,785</b>	<b>1,109,851,712</b>	<b>-182,111,691</b>	<b>-14</b>

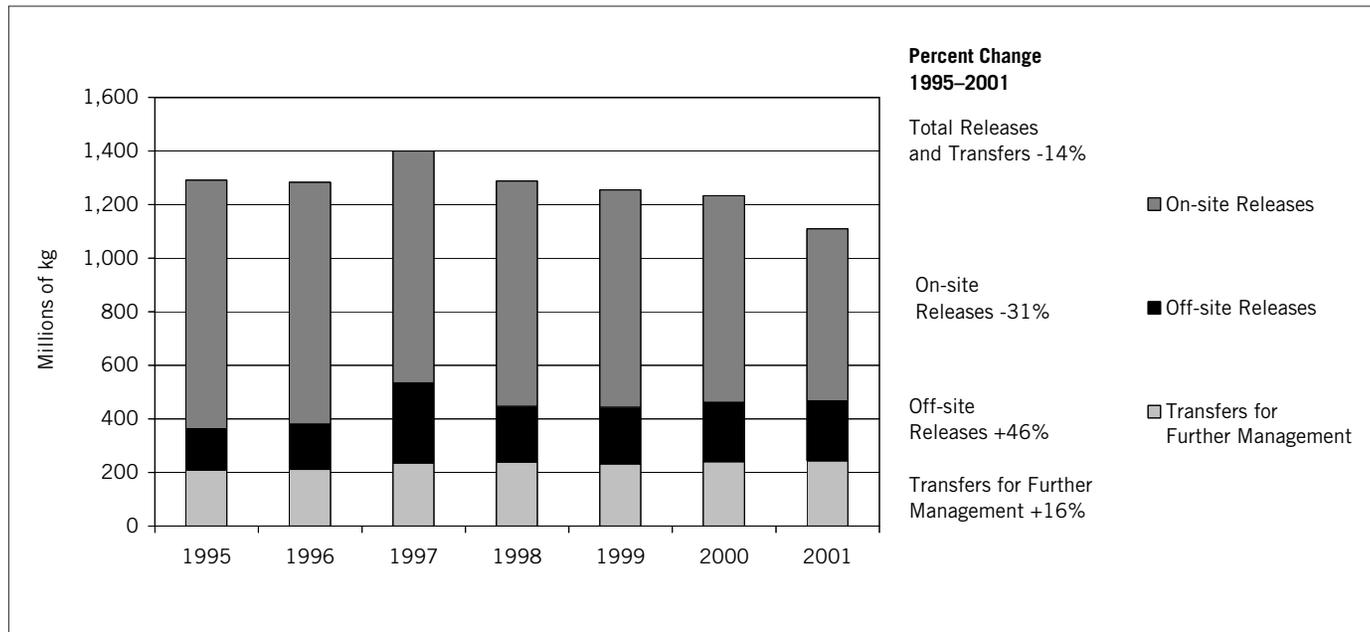
Note: Canada and US data only. Mexico data not available for 1995–2001. Data include 155 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, 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.

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to treatment, sewage and disposal.

\*\*\* Sum of releases on- and off-site and off-site transfers for further management.

Figure 7–1. Total Releases and Transfers in North America, 1995–2001



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

- Transfers for further management also increased from 1995 to 2001 in North America. With the exception of 1998 to 1999, they rose in all years, including the latest, for an increase of 16 percent from 1995 to 2001.

- The number of NPRI facilities reporting increased in every year, for an overall increase of 42 percent for the period. Despite this large increase in the number of facilities reporting, total NPRI releases and transfers were 13 percent lower in 2001 than in 1995.
- On-site releases decreased by 15 percent. Amounts decreased in all years except for the 1998 to 1999 period, including a 6-percent decrease from 2000 to 2001.
- Off-site releases decreased by 27 percent. Amounts rose for the first two years, but have decreased since 1997, including a 24-percent decrease from 2000 to 2001.
- Transfers for further management increased by 36 percent, including a 73-percent increase in transfers to sewage of chemicals excluding metals.

Table 7–2. NPRI Total Releases and Transfers, 1995–2001

	NPRI								Change 1995–2001	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	2000 Number	2001 Number	Number	%	
Total Facilities	1,231	1,288	1,374	1,413	1,520	1,588	1,742	511	42	
Total Forms	3,875	4,029	4,346	4,465	4,908	5,244	5,779	1,904	49	
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>%</b>								
<b>On-site Releases*</b>	<b>94,086,332</b>	<b>87,192,621</b>	<b>86,105,138</b>	<b>81,884,733</b>	<b>86,716,257</b>	<b>85,214,966</b>	<b>80,208,304</b>	<b>-13,878,028</b>	<b>-15</b>	
Air	71,205,399	68,178,441	67,812,641	63,969,043	68,618,719	68,037,498	64,418,209	-6,787,190	-10	
Surface Water	10,251,355	5,655,429	5,285,623	4,718,595	6,359,943	6,527,521	6,848,999	-3,402,356	-33	
Underground Injection	3,556,887	4,846,504	4,197,617	3,700,389	3,272,461	3,569,261	2,611,456	-945,431	-27	
Land	8,942,435	8,391,088	8,686,537	9,377,640	8,349,771	6,979,913	6,228,656	-2,713,779	-30	
<b>Off-site Releases</b>	<b>23,634,565</b>	<b>24,828,355</b>	<b>30,837,990</b>	<b>26,761,648</b>	<b>25,278,586</b>	<b>22,841,684</b>	<b>17,276,111</b>	<b>-6,358,454</b>	<b>-27</b>	
Transfers to Disposal (except metals)	3,768,158	1,800,796	1,824,909	2,111,621	2,283,483	2,578,478	2,398,315	-1,369,843	-36	
Transfers of Metals**	19,866,407	23,027,559	29,013,081	24,650,027	22,995,103	20,263,206	14,877,796	-4,988,611	-25	
<b>Total Releases On- and Off-site</b>	<b>117,720,897</b>	<b>112,020,976</b>	<b>116,943,128</b>	<b>108,646,381</b>	<b>111,994,843</b>	<b>108,056,650</b>	<b>97,484,415</b>	<b>-20,236,482</b>	<b>-17</b>	
<b>Off-site Transfers for Further Management</b>	<b>10,099,154</b>	<b>12,600,593</b>	<b>13,721,496</b>	<b>13,501,861</b>	<b>13,507,722</b>	<b>15,091,743</b>	<b>13,735,800</b>	<b>3,636,646</b>	<b>36</b>	
Treatment (except metals)	5,988,535	7,700,639	8,453,387	8,140,259	8,123,777	8,003,510	6,626,688	638,153	11	
Sewage (except metals)	4,110,619	4,899,954	5,268,109	5,361,602	5,383,945	7,088,233	7,109,112	2,998,493	73	
<b>Total Releases and Transfers***</b>	<b>127,820,051</b>	<b>124,621,569</b>	<b>130,664,624</b>	<b>122,148,242</b>	<b>125,502,565</b>	<b>123,148,393</b>	<b>111,220,215</b>	<b>-16,599,836</b>	<b>-13</b>	

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

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to treatment, sewage and disposal.

\*\*\* Sum of releases on- and off-site and off-site transfers for further management.

Table 7–3. TRI Total Releases and Transfers, 1995–2001

	TRI								Change 1995–2001	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	2000 Number	2001 Number	Number	%	
Total Facilities	19,341	19,112	18,981	18,933	18,579	18,427	17,475	-1,866	-10	
Total Forms	58,068	56,927	57,003	57,014	56,325	56,103	52,816	-5,252	-9	
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>	
<b>On-site Releases</b>	<b>835,217,592</b>	<b>816,422,328</b>	<b>780,346,436</b>	<b>760,345,356</b>	<b>725,860,030</b>	<b>687,293,728</b>	<b>563,562,577</b>	<b>-271,655,015</b>	<b>-33</b>	
Air	543,761,763	508,867,946	457,616,263	431,866,336	400,287,178	375,597,465	307,900,063	-235,861,700	-43	
Surface Water	83,969,718	85,284,522	95,163,364	106,718,983	114,302,053	113,855,843	92,393,303	8,423,586	10	
Underground Injection	91,060,711	78,817,483	76,339,892	72,147,068	67,437,334	70,264,393	57,999,262	-33,061,448	-36	
Land	116,425,400	143,452,377	151,226,917	149,612,969	143,833,465	127,576,027	105,269,948	-11,155,452	-10	
<b>Off-site Releases</b>	<b>129,421,804</b>	<b>142,935,152</b>	<b>267,662,656</b>	<b>180,013,993</b>	<b>185,286,662</b>	<b>197,977,868</b>	<b>205,432,732</b>	<b>76,010,928</b>	<b>59</b>	
Transfers to Disposal (except metals)	17,823,873	15,399,171	21,487,521	21,701,507	26,598,712	28,630,418	23,950,600	6,126,727	34	
Transfers of Metals*	111,597,931	127,535,982	246,175,135	158,312,486	158,687,951	169,347,451	181,482,132	69,884,200	63	
<b>Total Releases On- and Off-site</b>	<b>964,639,396</b>	<b>959,357,480</b>	<b>1,048,009,093</b>	<b>940,359,349</b>	<b>911,146,692</b>	<b>885,271,597</b>	<b>768,995,309</b>	<b>-195,644,087</b>	<b>-20</b>	
<b>Off-site Transfers for Further Management</b>	<b>199,503,956</b>	<b>199,291,064</b>	<b>221,454,307</b>	<b>225,811,385</b>	<b>218,093,797</b>	<b>224,788,795</b>	<b>229,636,188</b>	<b>30,132,232</b>	<b>15</b>	
Treatment (except metals)	82,144,411	77,346,426	91,777,207	95,040,055	90,082,287	89,293,769	92,442,223	10,297,812	13	
Sewage (except metals)	117,359,545	121,944,638	129,677,100	130,771,330	128,011,510	135,495,026	137,193,965	19,834,420	17	
<b>Total Releases and Transfers**</b>	<b>1,164,143,351</b>	<b>1,158,648,544</b>	<b>1,269,463,399</b>	<b>1,166,170,734</b>	<b>1,129,240,490</b>	<b>1,110,060,392</b>	<b>998,631,497</b>	<b>-165,511,855</b>	<b>-14</b>	

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

\* Includes transfers of metals and metal compounds to treatment, sewage and disposal.

\*\* Sum of releases on- and off-site and off-site transfers for further management.

- Total releases and transfers in TRI were 14 percent lower in 2001 than in 1995, and the numbers of facilities reporting and forms filed also decreased.
- On-site releases declined by 33 percent, including a drop in on-site air releases of 43 percent. On-site releases amounts decreased in all years, including an 18-percent decrease from 2000 to 2001.
- In TRI, both off-site releases and off-site transfers for further management increased. Off-site releases rose by 59 percent, and transfers for further management increased by 15 percent.
- Off-site releases increased in every year except from 1997 to 1998, including a 4-percent increase from 2000 to 2001. Transfers for further management have varied up and down from year to year and increased by 2 percent from 2000 to 2001.

## 7.2.1 1995–2001 Total Releases and Transfers by State and Province

Releases are on-site releases to air, water, underground injection, and land, plus off-site transfers to disposal and all transfers of metals. Transfers for further management are off-site transfers sent for treatment, including to sewage treatment plants, of all substances except metals. Transfers may be sent to nearby locations, out of the province or state, or out of the country. This analysis presents the data according to the originating states and provinces. Analysis based on the destination states and provinces is presented in **Chapter 8**.

- Manufacturing facilities in Texas reported the largest total releases and transfers in North America in both 1995 and 2001, but the amount declined by 26 percent. Texas also had the largest total releases and total transfers for further management in both years, with a decrease of 35 percent in total releases but an increase of 4 percent in transfers for further management.
- Pennsylvania reported the second-largest North American releases and transfers in 2001, with little change from 1995, when the state ranked fourth. Pennsylvania ranked fifth in total releases in 1995 and third in 2001, with the amount rising by 2 percent. The state's total transfers for further management fell by 15 percent from 1995 to 2001.
- Indiana reported the third-largest total releases and transfers in North America in 2001, rising from tenth in 1995, with a 30 percent increase. The increase in total releases for this state from 1995 to 2001 was 31 percent, and in other transfers for further management it was 25 percent.

Table 7–4. Change in Total Releases and Transfers in North America, by State and Province, 1995–2001

State/Province	Total Releases On- and Off-site					Total Off-site Transfers for Further Management				
	1995		2001		Change 1995–2001 %	1995		2001		Change 1995–2001 (%)
	kg	Rank	kg	Rank		kg	Rank	kg	Rank	
Alabama	47,314,910	6	32,295,393	8	-32	3,980,778	18	5,753,080	15	45
Alaska	1,008,727	56	116,034	61	-88	14	60	1,769	59	12,903
Alberta	15,337,229	26	10,597,638	27	-31	694,544	37	1,646,798	33	137
Arizona	16,741,317	24	23,787,736	13	42	931,808	35	859,531	37	-8
Arkansas	12,505,152	29	16,479,380	21	32	876,273	36	1,009,879	36	15
British Columbia	8,611,491	35	11,284,906	25	31	31,328	52	135,091	51	331
California	12,634,074	28	9,542,693	31	-24	10,101,020	5	10,298,464	7	2
Colorado	1,618,840	50	2,537,220	45	57	671,271	38	1,013,720	35	51
Connecticut	4,668,721	42	1,943,673	47	-58	3,081,163	24	4,720,607	18	53
Delaware	3,263,187	47	2,931,059	44	-10	1,398,042	33	599,789	38	-57
District of Columbia	116	63	451	63	290	0	--	0	--	--
Florida	19,287,287	20	21,312,924	16	11	3,654,583	22	4,133,224	22	13
Georgia	22,469,169	16	19,580,438	17	-13	2,214,766	29	3,521,753	27	59
Hawaii	220,458	61	107,917	62	-51	3,327	55	553	60	-83
Idaho	5,652,856	39	6,765,518	34	20	167,446	49	366,285	41	119
Illinois	42,983,330	8	35,382,397	7	-18	7,224,215	7	6,323,219	11	-12
Indiana	42,216,820	9	55,155,053	2	31	3,938,659	20	4,909,679	16	25
Iowa	11,726,447	30	10,520,722	28	-10	4,370,721	16	3,882,081	24	-11
Kansas	9,382,553	33	7,508,424	33	-20	1,207,211	34	19,571,710	2	1,521
Kentucky	15,774,412	25	13,900,394	23	-12	2,760,539	26	4,519,415	21	64
Louisiana	53,584,942	4	38,074,612	6	-29	2,304,042	27	13,916,428	4	504
Maine	4,526,299	43	4,121,900	41	-9	338,093	41	303,368	45	-10
Manitoba	1,637,076	49	4,310,273	40	163	205,419	46	190,299	49	-7
Maryland	5,569,762	40	4,875,893	39	-12	2,247,651	28	3,906,855	23	74
Massachusetts	3,719,737	46	1,635,557	48	-56	5,398,832	13	6,022,616	13	12
Michigan	41,341,263	10	27,857,502	10	-33	11,393,145	4	11,092,515	6	-3
Minnesota	8,244,456	36	6,460,324	37	-22	3,986,863	17	6,130,569	12	54
Mississippi	25,996,710	13	21,654,485	15	-17	1,860,394	31	1,640,854	34	-12
Missouri	22,078,197	17	18,949,127	20	-14	5,761,580	12	4,741,998	17	-18
Montana	17,561,134	23	8,476,621	32	-52	12,961	53	4,968	57	-62
Nebraska	5,390,537	41	10,110,333	29	88	164,643	50	305,749	43	86
Nevada	1,530,670	52	1,321,006	50	-14	652	59	15,795	56	2,322
New Brunswick	5,675,586	38	3,505,267	42	-38	1,010	56	44,992	55	4,355
New Hampshire	1,144,040	54	524,010	54	-54	259,110	42	339,727	42	31
New Jersey	7,684,413	37	13,238,240	24	72	19,788,004	2	14,603,162	3	-26
New Mexico	18,241,027	21	264,338	57	-99	184,288	48	218,006	47	18
New York	17,927,391	22	9,666,647	30	-46	4,984,961	14	3,779,042	26	-24
Newfoundland and Labrador	223,123	60	292,722	56	31	0	--	0	--	--
North Carolina	32,112,497	12	21,916,660	14	-32	6,215,015	10	2,626,706	30	-58
North Dakota	662,929	57	1,000,938	51	51	250,574	44	208,278	48	-17
Nova Scotia	1,601,946	51	711,463	53	-56	6,261	54	57,228	53	814
Ohio	55,712,145	3	41,950,297	5	-25	12,097,950	3	11,484,675	5	-5
Oklahoma	8,884,833	34	6,475,578	36	-27	252,655	43	389,245	40	54
Ontario	62,564,894	2	46,319,582	4	-26	6,977,242	8	8,297,881	9	19
Oregon	11,424,621	31	11,179,226	26	-2	4,665,527	15	4,600,194	19	-1
Pennsylvania	53,108,026	5	54,297,078	3	2	8,836,291	6	7,499,858	10	-15
Prince Edward Island	10,220	62	211,704	58	1,971	0	--	139,434	50	--
Puerto Rico	3,783,443	45	2,136,600	46	-44	3,533,466	23	4,533,380	20	28
Quebec	21,042,325	18	19,331,516	18	-8	2,182,585	30	3,169,496	28	45
Rhode Island	1,319,773	53	375,070	55	-72	400,647	40	238,805	46	-40
Saskatchewan	1,017,007	55	919,344	52	-10	765	57	54,581	54	7,035
South Carolina	23,822,842	15	24,803,078	11	4	3,976,062	19	3,855,167	25	-3
South Dakota	1,768,997	48	1,370,113	49	-23	201,910	47	107,511	52	-47
Tennessee	46,128,294	7	28,996,117	9	-37	3,905,740	21	2,007,598	32	-49
Texas	114,465,660	1	74,620,549	1	-35	32,093,888	1	33,448,436	1	4
Utah	34,611,460	11	23,895,073	12	-31	405,649	39	540,174	39	33
Vermont	311,908	59	128,438	60	-59	206,545	45	303,668	44	47
Virgin Islands	568,232	58	190,806	59	-66	68,098	51	323	61	-100
Virginia	24,631,668	14	19,056,395	19	-23	6,511,302	9	8,662,249	8	33
Washington	10,537,788	32	6,598,870	35	-37	1,424,806	32	2,091,160	31	47
West Virginia	13,023,649	27	5,417,655	38	-58	3,073,628	25	2,645,014	29	-14
Wisconsin	19,693,901	19	14,465,468	22	-27	6,116,383	11	5,884,787	14	-4
Wyoming	4,057,777	44	3,023,281	43	-25	764	58	2,553	58	234
<b>Total</b>	<b>1,082,360,293</b>		<b>866,479,724</b>			<b>209,603,110</b>		<b>243,371,988</b>		

Note: Canada and US data only. Mexico data not available for 1995–2001. 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. Transfers are from facilities located in the state/province.

Table 7-4. (continued)

State/Province	Total Releases and Transfers				Change 1995–2001 (%)
	1995		2001		
	kg	Rank	kg	Rank	
Alabama	51,295,688	7	38,048,473	9	-26
Alaska	1,008,740	56	117,804	61	-88
Alberta	16,031,773	31	12,244,436	31	-24
Arizona	17,673,125	26	24,647,267	16	39
Arkansas	13,381,425	32	17,489,258	26	31
British Columbia	8,642,819	38	11,419,997	32	32
California	22,735,094	23	19,841,157	24	-13
Colorado	2,290,111	48	3,550,940	45	55
Connecticut	7,749,884	40	6,664,280	42	-14
Delaware	4,661,229	46	3,530,848	47	-24
District of Columbia	116	63	451	63	290
Florida	22,941,870	21	25,446,147	15	11
Georgia	24,683,934	19	23,102,191	21	-6
Hawaii	223,785	60	108,470	62	-52
Idaho	5,820,302	42	7,131,804	39	23
Illinois	50,207,545	8	41,705,616	7	-17
Indiana	46,155,478	10	60,064,733	3	30
Iowa	16,097,168	29	14,402,803	28	-11
Kansas	10,589,764	35	27,080,134	14	156
Kentucky	18,534,951	24	18,419,809	25	-1
Louisiana	55,888,984	5	51,991,040	6	-7
Maine	4,864,393	45	4,425,268	44	-9
Manitoba	1,842,495	50	4,500,572	43	144
Maryland	7,817,413	39	8,782,748	34	12
Massachusetts	9,118,569	37	7,658,173	38	-16
Michigan	52,734,408	6	38,950,017	8	-26
Minnesota	12,231,319	33	12,590,893	30	3
Mississippi	27,857,104	14	23,295,338	20	-16
Missouri	27,839,777	15	23,691,125	19	-15
Montana	17,574,095	27	8,481,590	36	-52
Nebraska	5,555,180	44	10,416,082	33	88
Nevada	1,531,322	53	1,336,801	50	-13
New Brunswick	5,676,596	43	3,550,259	46	-37
New Hampshire	1,403,151	54	863,736	53	-38
New Jersey	27,472,416	17	27,841,402	12	1
New Mexico	18,425,316	25	482,344	56	-97
New York	22,912,352	22	13,445,689	29	-41
Newfoundland and Labrador	223,123	61	292,722	59	31
North Carolina	38,327,512	11	24,543,366	17	-36
North Dakota	913,503	57	1,209,216	51	32
Nova Scotia	1,608,207	52	768,691	54	-52
Ohio	67,810,095	3	53,434,971	5	-21
Oklahoma	9,137,488	36	6,864,823	40	-25
Ontario	69,542,136	2	54,617,463	4	-21
Oregon	16,090,148	30	15,779,420	27	-2
Pennsylvania	61,944,317	4	61,796,936	2	-0.2
Prince Edward Island	10,220	62	351,138	58	3,336
Puerto Rico	7,316,909	41	6,669,979	41	-9
Quebec	23,224,910	20	22,501,012	22	-3
Rhode Island	1,720,420	51	613,874	55	-64
Saskatchewan	1,017,772	55	973,925	52	-4
South Carolina	27,798,904	16	28,658,245	11	3
South Dakota	1,970,907	49	1,477,624	49	-25
Tennessee	50,034,034	9	31,003,715	10	-38
Texas	146,559,549	1	108,068,984	1	-26
Utah	35,017,109	12	24,435,247	18	-30
Vermont	518,453	59	432,106	57	-17
Virgin Islands	636,329	58	191,130	60	-70
Virginia	31,142,970	13	27,718,644	13	-11
Washington	11,962,594	34	8,690,029	35	-27
West Virginia	16,097,278	28	8,062,668	37	-50
Wisconsin	25,810,284	18	20,350,254	23	-21
Wyoming	4,058,541	47	3,025,834	48	-25
<b>Total</b>	<b>1,291,963,402</b>		<b>1,109,851,712</b>		

- Ontario reported the second-largest releases and transfers in North America in 1995 and the fourth-largest in 2001; the amount decreased by 21 percent. Ontario had the second-largest total releases in 1995 and the fourth-largest in 2001, with a decrease of 26 percent. Transfers for further management in Ontario increased by 19 percent between 1995 and 2001.

## 7.2.2 1995–2001 Total Releases and Transfers by Industry

Data comparing 1995 with 2001 include only the manufacturing sectors (US SIC codes 20–39) because they are the only sectors for which both TRI and NPRI data are available for this period. Information on releases and transfers from the other industry sectors was included in data presented in previous chapters.

- Of the 21 manufacturing industry sectors in the matched data set, 15 reported decreases in total releases and transfers from 1995 to 2001.
- In both 1995 and 2001, the chemical manufacturing sector had the largest releases and transfers in North America of any manufacturing industry. Its total, however, was 18 percent lower in 2001 than in 1995, the result of a 34-percent decline in total releases. Chemicals ranked first in total releases in 1995 but second in 2001. The industry had the largest transfers for further management in both years; the amount rose 24 percent from 1995 to 2001.
- Primary metals reported the second-highest total releases and transfers in both years. The amount was 2 percent higher in 2001 than in 1995. The industry ranked first in total releases in 2001, up from second in 1995, with a 3-percent increase. Total transfers for further management from the primary metals industry were 16 percent lower in 2001 than in 1995.
- Paper products ranked third in both years in total releases and transfers, but the reported amount fell 19 percent from 1995 to 2001. The industry's total releases fell by 20 percent, and total transfers for further management fell by 13 percent.

Table 7–5. Change in Total Releases and Transfers in North America, by Industry, 1995–2001 (Ordered by Total Releases and Transfers, 2001)

US SIC Code	Industry	Total Releases On- and Off-site					Total Off-site Transfers for Further Management				
		1995		2001		Change 1995–2001 %	1995		2001		Change 1995–2001 (%)
		kg	Rank	kg	Rank		kg	Rank	kg	Rank	
28	Chemicals	317,629,576	1	208,294,082	2	-34	118,179,555	1	146,968,434	1	24
33	Primary Metals	263,522,167	2	270,546,982	1	3	9,569,708	6	8,024,037	7	-16
26	Paper Products	131,585,076	3	105,871,319	3	-20	22,603,008	2	19,671,955	2	-13
--	Multiple codes 20–39*	61,271,971	4	37,627,970	5	-39	13,814,200	3	15,826,378	3	15
20	Food Products	22,347,345	9	35,607,425	7	59	10,968,623	4	15,392,277	4	40
30	Rubber and Plastics Products	55,627,008	5	42,146,651	4	-24	2,763,492	9	2,244,069	10	-19
37	Transportation Equipment	53,989,980	6	36,748,546	6	-32	4,239,466	8	4,850,143	8	14
34	Fabricated Metals Products	39,496,568	7	26,059,649	9	-34	7,631,676	7	9,878,010	5	29
29	Petroleum and Coal Products	28,084,479	8	30,354,091	8	8	2,104,791	10	4,563,341	9	117
24	Lumber and Wood Products	15,425,805	11	17,960,876	10	16	233,923	18	189,868	18	-19
32	Stone/Clay/Glass Products	11,952,972	14	15,548,189	11	30	1,273,548	13	1,595,007	11	25
36	Electronic/Electrical Equipment	15,139,681	12	7,642,160	13	-50	9,860,775	5	9,352,364	6	-5
27	Printing and Publishing	14,318,794	13	9,858,314	12	-31	506,677	16	963,901	14	90
35	Industrial Machinery	10,416,812	15	5,714,866	14	-45	1,762,067	12	1,087,136	12	-38
39	Misc. Manufacturing Industries	6,020,576	18	4,422,529	16	-27	856,664	15	1,036,360	13	21
25	Furniture and Fixtures	18,559,986	10	4,480,933	15	-76	368,981	17	296,293	17	-20
38	Measurement/Photographic Instruments	6,385,258	17	3,020,291	18	-53	1,893,829	11	925,673	15	-51
22	Textile Mill Products	8,050,100	16	3,065,178	17	-62	902,832	14	471,272	16	-48
31	Leather Products	1,562,527	19	824,335	19	-47	31,107	20	28,055	19	-10
21	Tobacco Products	516,488	20	581,390	20	13	102	21	666	21	555
23	Apparel and Other Textile Products	457,122	21	103,948	21	-77	38,084	19	6,748	20	-82
	<b>Total</b>	<b>1,082,360,293</b>		<b>866,479,724</b>		<b>-20</b>	<b>209,603,110</b>		<b>243,371,988</b>		<b>16</b>

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

\* Multiple SIC codes reported only in TRI.

Figure 7–2. Change in NPRI Total Releases and Transfers, by Industry with Largest Total Releases and Transfers in 2001, 1995–2001

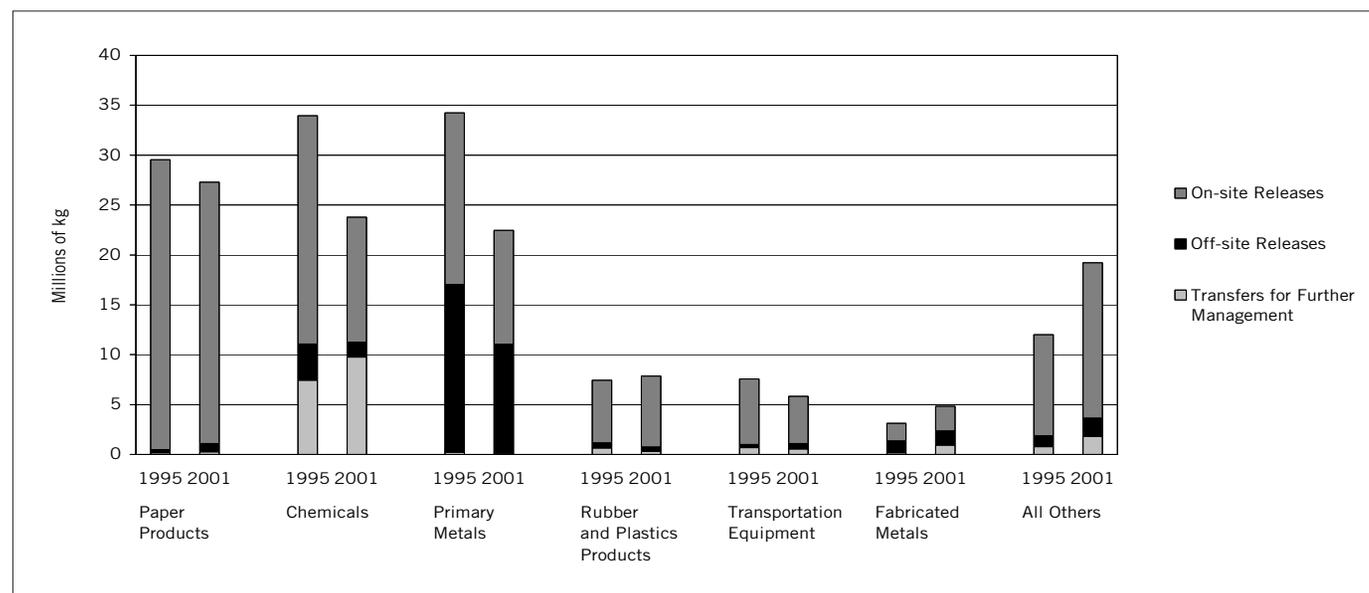
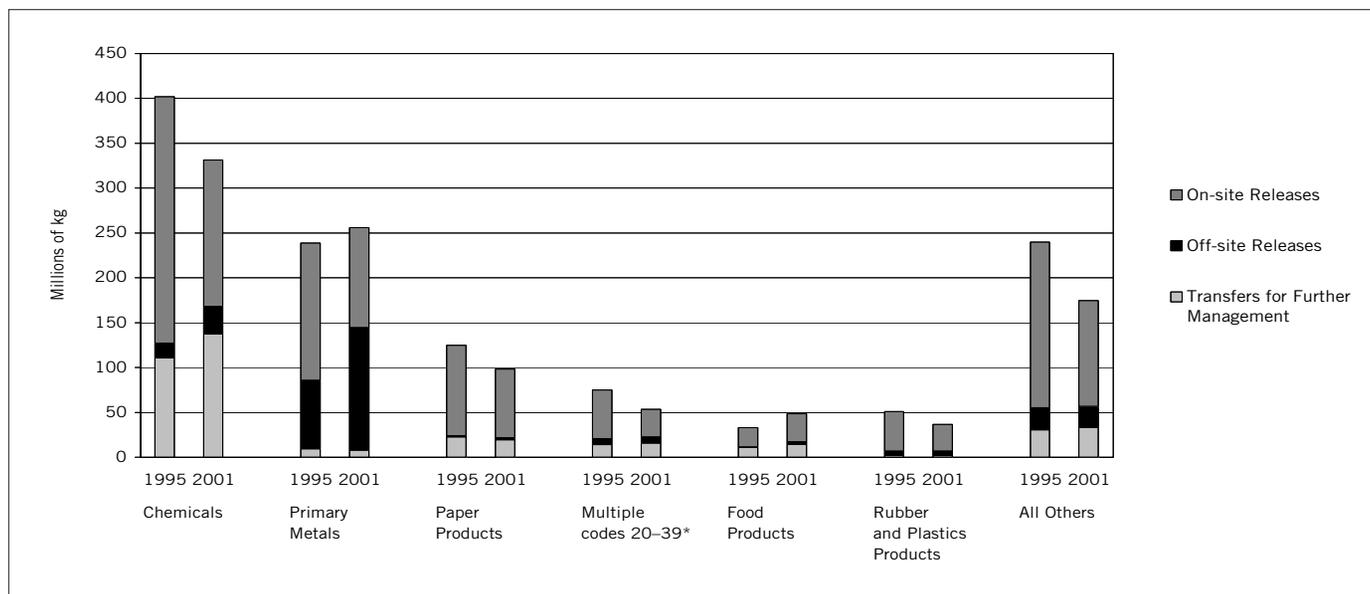


Table 7–5. (continued)

US SIC Code	Industry	Total Releases and Transfers				Change 1995–2001 (%)
		1995		2001		
		kg	Rank	kg	Rank	
28	Chemicals	435,809,131	1	355,262,517	1	-18
33	Primary Metals	273,091,876	2	278,571,019	2	2
26	Paper Products	154,188,083	3	125,543,274	3	-19
--	Multiple codes 20–39*	75,086,171	4	53,454,348	4	-29
20	Food Products	33,315,968	8	50,999,702	5	53
30	Rubber and Plastics Products	58,390,500	5	44,390,719	6	-24
37	Transportation Equipment	58,229,447	6	41,598,690	7	-29
34	Fabricated Metals Products	47,128,244	7	35,937,659	8	-24
29	Petroleum and Coal Products	30,189,271	9	34,917,432	9	16
24	Lumber and Wood Products	15,659,728	12	18,150,744	10	16
32	Stone/Clay/Glass Products	13,226,521	14	17,143,196	11	30
36	Electronic/Electrical Equipment	25,000,456	10	16,994,524	12	-32
27	Printing and Publishing	14,825,471	13	10,822,215	13	-27
35	Industrial Machinery	12,178,879	15	6,802,002	14	-44
39	Misc. Manufacturing Industries	6,877,240	18	5,458,888	15	-21
25	Furniture and Fixtures	18,928,967	11	4,777,226	16	-75
38	Measurement/Photographic Instruments	8,279,087	17	3,945,964	17	-52
22	Textile Mill Products	8,952,932	16	3,536,450	18	-60
31	Leather Products	1,593,634	19	852,390	19	-47
21	Tobacco Products	516,589	20	582,056	20	13
23	Apparel and Other Textile Products	495,206	21	110,696	21	-78
	<b>Total</b>	<b>1,291,963,402</b>		<b>1,109,851,712</b>		<b>-14</b>

Figure 7–3. Change in TRI Total Releases and Transfers, by Industry with Largest Total Releases and Transfers in 2001, 1995–2001



\* Multiple SIC codes reported only in TRI.

- Total releases and transfers in the chemical industry decreased by 30 percent in NPRI, mainly due to a drop in both on- and off-site releases. NPRI chemical industry transfers for further management increased from 1995 to 2001. Total releases and transfers in the chemical industry dropped in TRI by 18 percent, mainly due to a reduction in on-site releases. Both off-site releases and other transfers for further management increased over the same period for TRI chemical manufacturing facilities.
- The primary metals sector decreased its releases and transfers by 34 percent in NPRI but increased by 7 percent in TRI. For NPRI, on- and off-site releases as well as transfers for further management decreased from 1995 to 2001. For TRI, the primary metals sector showed substantial increases in off-site releases (of almost 80 percent), while on-site releases and transfers for further management decreased.
- The paper products sector decreased its releases and transfers by 8 percent in NPRI and 21 percent in TRI. The decreases were primarily due to reductions in on-site releases for both NPRI and TRI, while off-site releases increased.

### 7.2.3 Facilities with Largest Change in Total Releases On- and Off-site, NPRI and TRI, 1995–2001

- The largest decrease in total releases reported by an NPRI facility was the 6.7 million kg reported by the primary metals facility Co-steel Lasco in Whitby, Ontario. This facility reduced its transfers of zinc and its compounds sent for disposal. Some of this decrease was due to sending this material for recycling instead of disposal.
- Three other of the 10 facilities with the largest decreases were also primary metals facilities, all located in Ontario. Four were chemical manufacturers and two were paper products facilities.

Table 7–6. The NPRI Facilities with the Largest Change in Total Releases On- and Off-site, 1995–2001

North American Rank	NPRI Rank	Facility	City, Province	SIC Codes	
				Canada	US
<b>Largest Decrease</b>					
7	1	Co-Steel Lasco	Whitby, ON	29	33
19	2	Methanex Corporation, Medicine Hat Plant	Medicine Hat, AB	37	28
24	3	Irving Pulp & Paper Limited / Irving Tissue Company, J. D. Irving Limited	Saint John, NB	27	26
25	4	Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan, AB	37	28
27	5	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33
29	6	Nexen Chemicals Canada Limited Partnership, Nanaimo	Nanaimo, BC	37	28
30	7	Emballages Smurfit-Stone Canada Inc., Smurfit-Stone Container Corp.	La Tuque, QC	27	26
34	8	NOVA Chemicals Corporation, St. Clair River Site	Corunna, ON	37	28
40	9	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	29	33
42	10	Algoma Steel Inc	Sault Ste. Marie, ON	29	33
<b>Largest Increase</b>					
44	1	Tolko Manitoba Kraft Papers	The Pas, MB	27	26
46	2	Norske Skog Canada Limited, Crofton Division	Crofton, BC	27	26
47	3	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33
56	4	St Marys Cement Company, St Marys Cement Plant	St Marys, ON	35	32
64	5	Norske Skog Canada Limited, Powell River Division	Powell River, BC	27	26
76	6	Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat, BC	27	26
81	7	Cargill Foods	High River, AB	10	20
86	8	ITW Foils - Windsor, Illinois Tool Works	Windsor, ON	37	28
87	9	Canadian Forest Products Ltd., Northwood Pulp Mill	Prince George, BC	27	26
91	10	Stelco McMaster Ltée, Stelco Inc.	Contrecoeur, QC	29	33

Table 7–6. (continued)

NPRI Rank	Forms		Total Releases On- and Off-site			Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
	1995 Number	2001 Number	1995 (kg)	2001 (kg)	Change 1995–2001 (kg)	
<b>Largest Decrease</b>						
1	5	5	7,554,886	869,286	-6,685,600	Zinc and compounds (transfers of metals)
2	4	2	3,353,220	75,954	-3,277,266	Methanol (air)
3	4	9	3,663,623	761,830	-2,901,793	Methanol (water)
4	13	3	2,291,434	22,103	-2,269,331	Methanol (air)
5	6	12	3,594,410	1,552,220	-2,042,190	Sulfuric acid (air)
6	2	2	1,988,244	2,984	-1,985,260	Asbestos (transfers to disposal)
7	3	7	2,408,582	426,470	-1,982,112	Methanol (water)
8	9	5	2,181,830	558,150	-1,623,680	Cyclohexane (air)
9	3	*	1,487,191	*	-1,487,191	Chromium and compounds (transfers of metals)
10	16	13	1,598,360	141,898	-1,456,462	Manganese and compounds (land)
<b>Largest Increase</b>						
1	1	7	400	1,107,857	1,107,457	Methanol (air)
2	4	8	30,000	1,043,969	1,013,969	Hydrochloric acid, Methanol (air), Nitric acid and nitrate compounds (water)
3	16	16	2,480,053	3,492,598	1,012,545	Zinc and compounds (transfers of metals)
4	*	4	*	893,960	893,960	Zinc and compounds, Manganese and compounds (land)
5	4	9	371,000	1,191,048	820,048	Hydrochloric acid (air), Nitric acid and nitrate compounds (water)
6	3	6	3,500	682,710	679,210	Methanol (air)
7	*	1	*	616,426	616,426	Nitric acid and nitrate compounds (water)
8	*	5	*	547,153	547,153	Methyl ethyl ketone, Toluene, Methanol (air)
9	4	8	211,500	757,677	546,177	Methanol (air)
10	4	4	1,760,680	2,283,539	522,859	Zinc and compounds, Manganese and compounds (transfers of metals)

\* Facility did not report matched chemicals in year indicated.

- The NPRI facility with the largest increase in total releases was a paper products facility, Tolko Manitoba Kraft Papers, in The Pas, Manitoba. This facility reported an increase of 1.1 million kg, primarily of methanol releases to the air. Like many facilities in the Canadian paper products sector, Tolko used updated estimation methods developed by the National Council of the Paper Industry for Air and Stream Improvement (NCASI). The updated estimation methods result in an improved picture of releases and transfers from the paper sector in Canada.
- Four other paper products facilities, all located in British Columbia, were among the 10 facilities with the largest increases. They explained their increases as due to increases in production levels and to the updated estimation methods developed by NCASI.
- The facility with the third-largest increase was the primary metals facility Dofasco Inc., located in Hamilton, Ontario. It had an increase of more than 1 million kg, mainly as transfers of zinc and its compounds to disposal.
- Three of the facilities on the list of those with the largest increase had not reported any matched chemicals in 1995.

- The largest decrease reported by a TRI facility was by a primary metals facility located in Utah. The Magnesium Corp. of America reported a decrease of 22.7 million kg, mainly in on-site air releases of chlorine.
- Four other primary metals facilities were among the 10 facilities with the largest decreases in total releases. The other five facilities were all chemical manufacturers.

**Table 7–7. The TRI Facilities with the Largest Change in Total Releases On- and Off-site, 1995–2001**

North American Rank	TRI Rank	Facility	City, State	US SIC Code
<b>Largest Decrease</b>				
	1	1 Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	33
	2	2 Phelps Dodge Hildago Inc.	Playas, NM	33
	3	3 Acordis Cellulosic Fibers Inc., Acordis U.S. Holding Inc.	Axis, AL	28
	4	4 Lenzing Fibers Corp.	Lowland, TN	28
	5	5 ASARCO Inc., Americas Mining Corp.	East Helena, MT	33
	6	6 Cytec Inds. Inc. Fortier Plant	Westwego, LA	28
	8	7 Phelps Dodge Miami Inc.	Claypool, AZ	33
	9	8 Celanese Ltd. Clear Lake Plant	Pasadena, TX	28
	10	9 GMC Powertrain Defiance, General Motors Corp.	Defiance, OH	33
	11	10 Du Pont Victoria Plant	Victoria, TX	28
<b>Largest Increase</b>				
	1	1 ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden, AZ	33
	2	2 Steel Dynamics Inc.	Butler, IN	33
	3	3 Precision Kidd Steel Co.	West Aliquippa, PA	33
	4	4 Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT	33
	5	5 Nucor Steel, Nucor Corp.	Huger, SC	33
	6	6 Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR	33
	7	7 AK Steel Corp.	Rockport, IN	33
	8	8 Madison Inds. Inc.	Old Bridge, NJ	28
	9	9 Nucor Steel, Nucor Corp.	Crawfordsville, IN	33
	10	10 Solutia Chocolate Bayou	Alvin, TX	28

Table 7–7. (continued)

TRI Rank	Forms		Total Releases On- and Off-site			Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of change at the facility)
	1995 Number	2001 Number	1995 (kg)	2001 (kg)	Change 1995–2001 (kg)	
<b>Largest Decrease</b>						
1	5	3	29,168,744	6,513,016	-22,655,728	Chlorine (air)
2	10	*	14,149,250	*	-14,149,250	Zinc and compounds, Copper and compounds (land)
3	4	3	15,427,755	1,763,492	-13,664,263	Carbon disulfide (air)
4	5	8	10,848,231	1,391,384	-9,456,847	Carbon disulfide (air)
5	9	9	16,091,805	7,122,935	-8,968,871	Zinc and compounds (land)
6	21	23	11,718,166	3,636,107	-8,082,059	Acetonitrile, Acrylic acid (UIJ)
7	12	*	6,448,367	*	-6,448,367	Copper and compounds, Zinc and compounds (land)
8	21	16	6,211,230	501,690	-5,709,540	Ethylene glycol (UIJ)
9	15	12	6,446,644	738,909	-5,707,735	Zinc and compounds (land)
10	28	27	10,066,351	4,407,051	-5,659,300	Nitric acid and nitrate compounds (UIJ)
<b>Largest Increase</b>						
1	8	11	8,046,092	22,631,913	14,585,821	Copper and compounds (land)
2	1	9	6,117	11,577,702	11,571,585	Zinc and compounds (transfers of metals)
3	2	2	1,000	10,676,451	10,675,451	Manganese and compounds (transfers of metals)
4	13	16	2,478,460	11,262,490	8,784,029	Copper and compounds, Zinc and compounds (land)
5	*	6	*	7,119,707	7,119,707	Zinc and compounds (transfers of metals)
6	6	7	67,398	6,703,177	6,635,779	Zinc and compounds (transfers of metals)
7	*	6	*	6,064,735	6,064,735	Nitric acid and nitrate compounds (water)
8	2	2	274,717	6,221,810	5,947,093	Zinc and compounds (transfers of metals)
9	7	6	5,090,856	10,514,907	5,424,052	Zinc and compounds (transfers of metals)
10	*	21	*	5,021,991	5,021,991	Acrylonitrile, Acrylic acid, Acrylamide (UIJ)

\* Facility did not report matched chemicals in year indicated.  
UIJ=underground injection.

- The largest increase in releases reported by a TRI facility was by a primary metals facility located in Arizona. The ASARCO smelter in Hayden, Arizona, reported an increase of 14.6 million kg, mainly in on-site land disposal of the metal copper and its compounds.
- A total of eight of the 10 facilities with the largest increase from 1995 to 2001 were primary metals facilities. The other two were chemical manufacturers.
- Three of the facilities on the list of those with the largest increase had not reported any matched chemicals in 1995.

### 7.3 Changes in Releases and Transfers for Facilities Reporting in Both Years, NPRI and TRI, 1995–2001

Part of the overall increase or decrease in amounts reported may be due to facilities reporting in one year and not another. Most facilities in North America reported on matched chemicals in both 1995 and 2001, although fewer facilities overall reported in 2001 than in 1995. However, NPRI showed an increase of 42 percent in the number of facilities reporting, compared to a decrease of 10 percent for TRI (see **Table 7–1**). These changes are part of the overall increase or decrease in amounts reported.

Facilities may start and stop reporting for various reasons, including changes in levels of business activity that put them above or below reporting thresholds, changes in operations that alter the chemicals they use, the adoption of pollution prevention or control activities that put them below reporting thresholds, or simply complying with the program. Data from newly reporting facilities, therefore, is difficult to interpret, as it can represent actual changes in releases and transfers, or represent chemical releases and transfers that have been ongoing, but are only now being reported. This analysis describes the effects of changes in the number of facilities from 1995 to 2001, mainly those that started reporting in NPRI and stopped reporting in TRI. In this section, the changes in releases and transfers are shown for two groups:

- facilities reporting only in one of the two years 1995 and 2001 (which includes the newly reporting facilities that reported in 2001 but not in 1995 and facilities that have dropped out, reporting in 1995 but not 2001), and
- facilities that reported in both 1995 and 2001.

Also, 20 facilities (two in NPRI and 18 in TRI) reported large increases (reporting less than 100,000 kg in 1995 and 1 million kg or more of total releases and transfers in 2001). The facilities with large increases are separated so they do not dominate the analysis.

**Table 7–8. Change in Releases and Transfers, NPRI, for Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1995 and 2001**

	Reported in One Year Only		Facilities with Large Increase***			Facilities Reporting in Both Years (without Facilities with Large Increase)			
	1995 Number	2001 Number	1995 Number	2001 Number	Change 1995–2001 Number	1995 Number	2001 Number	Change 1995–2001 Number	%
Total Facilities	231	742	2	2	0	998	998	0	0
Total Forms	517	1,945	5	15	10	3,353	3,819	466	14
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases*</b>	<b>5,003,530</b>	<b>13,108,434</b>	<b>30,400</b>	<b>2,141,783</b>	<b>2,111,383</b>	<b>89,052,402</b>	<b>64,958,087</b>	<b>-24,094,315</b>	<b>-27</b>
Air	4,418,557	10,656,927	30,000	1,801,808	1,771,808	66,756,842	51,959,474	-14,797,368	-22
Surface Water	40,050	1,416,387	400	329,743	329,343	10,210,905	5,102,869	-5,108,036	-50
Underground Injection	0	2,540	0	0	0	3,556,887	2,608,916	-947,971	-27
Land	528,974	990,617	0	10,232	10,232	8,413,461	5,227,807	-3,185,654	-38
<b>Off-site Releases</b>	<b>2,385,044</b>	<b>1,801,327</b>	<b>0</b>	<b>10,043</b>	<b>10,043</b>	<b>21,249,521</b>	<b>15,464,741</b>	<b>-5,784,780</b>	<b>-27</b>
Transfers to Disposal (except metals)	316,222	352,720	0	0	0	3,451,936	2,045,595	-1,406,341	-41
Transfers of Metals**	2,068,822	1,448,607	0	10,043	10,043	17,797,585	13,419,146	-4,378,439	-25
<b>Total Releases On- and Off-site</b>	<b>7,388,574</b>	<b>14,909,761</b>	<b>30,400</b>	<b>2,151,826</b>	<b>2,121,426</b>	<b>110,301,923</b>	<b>80,422,828</b>	<b>-29,879,095</b>	<b>-27</b>
<b>Off-site Transfers for Further Management</b>	<b>828,052</b>	<b>2,008,706</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,271,102</b>	<b>11,727,094</b>	<b>2,455,992</b>	<b>26</b>
Treatment (except metals)	823,828	1,361,162	0	0	0	5,164,707	5,265,526	100,819	2
Sewage (except metals)	4,224	647,544	0	0	0	4,106,395	6,461,568	2,355,173	57
<b>Total Releases and Transfers</b>	<b>8,216,626</b>	<b>16,918,467</b>	<b>30,400</b>	<b>2,151,826</b>	<b>2,121,426</b>	<b>119,573,025</b>	<b>92,149,922</b>	<b>-27,423,103</b>	<b>-23</b>

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Two facilities that reported less than 100,000 kg in 1995 and more than 1,000,000 kg in 2001.

#### 7.3.1 NPRI

- In NPRI, there were 742 newly reporting facilities, which reported 16.9 million kg of releases and transfers in 2001. Many of these newly reporting facilities were located in Ontario (417 facilities) and Quebec (139 facilities). The chemical and fabricated metals industries had the largest numbers of newly reporting facilities. According to Environment Canada, this increase in the number of newly reporting industries is the result of a number of factors, including ongoing compliance promotion, increased awareness on the need to report stemming from consultations on criteria air contaminants, industrial association outreach, and overlap with Ontario's new monitoring regulations.

- Newly reporting manufacturing NPRI facilities (those reporting in 2001 and not in 1995) reported 16.9 million kg. This was more than twice the amount (8.2 million kg) reported by those manufacturing facilities that stopped reporting (reporting in 1995 and not in 2001). The newly reporting facilities offset the decrease due to facilities no longer reporting for all types of releases and transfers except transfers of metals to disposal.
- Despite causing an increase of over 40 percent in the number of facilities reporting to NPRI, the newly reporting NPRI facilities accounted for only 15 percent of total releases and transfers in 2001. The overall pattern of trends was not affected by the addition of the newly reporting facilities however, although the

actual amounts and percentage changes were somewhat larger for those facilities reporting in both years. That is, total releases and transfers decreased by 23 percent for facilities reporting in both years compared to a decrease of 13 percent for all facilities (see **Table 7–2**).

- The newly reporting NPRI facilities accounted for a somewhat higher percentage of air emissions (17 percent as compared to 15 percent for total releases and transfers). Also, the two facilities with large increases from 1995 to 2001 reported the increase primarily in air emissions. Therefore, the decrease in air emissions for facilities reporting in both years was 22 percent compared to a 10-percent decrease for all facilities.

**Table 7–9. Change in Releases and Transfers, TRI, for Facilities Reporting in One Year Compared to Facilities Reporting in Both Years, 1995 and 2001**

	Reported in One Year Only		Facilities with Large Increase**			Total for Facilities Reporting in Both Years (without Facilities with Large Increase)			
	1995 Number	2001 Number	1995 Number	2001 Number	Change 1995–2001 Number	1995 Number	2001 Number	Change 1995–2001 Number %	
Total Facilities	6,201	4,332	18	18	0	13,122	13,122	0	0
Total Forms	12,499	8,756	75	97	22	45,494	43,963	-1,531	-3
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases</b>	<b>99,548,493</b>	<b>45,610,432</b>	<b>249,735</b>	<b>5,192,393</b>	<b>4,942,659</b>	<b>735,419,364</b>	<b>512,759,752</b>	<b>-222,659,613</b>	<b>-30</b>
Air	69,189,655	23,224,258	194,606	253,994	59,388	474,377,503	284,421,812	-189,955,691	-40
Surface Water	3,448,622	15,200,078	55,012	1,507,179	1,452,167	80,466,084	75,686,046	-4,780,038	-6
Underground Injection	795,628	4,938,299	0	0	0	90,265,083	53,060,963	-37,204,120	-41
Land	26,114,589	2,247,797	117	3,431,220	3,431,104	90,310,695	99,590,931	9,280,236	10
<b>Off-site Releases</b>	<b>11,929,427</b>	<b>20,589,065</b>	<b>169,639</b>	<b>48,272,098</b>	<b>48,102,460</b>	<b>117,322,739</b>	<b>136,571,568</b>	<b>19,248,829</b>	<b>16</b>
Transfers to Disposal (except metals)	2,977,778	2,385,022	1,213	3,784,418	3,783,205	14,844,882	17,781,160	2,936,279	20
Transfers of Metals*	8,951,649	18,204,043	168,425	44,487,680	44,319,255	102,477,857	118,790,408	16,312,551	16
<b>Total Releases On- and Off-site</b>	<b>111,477,920</b>	<b>66,199,498</b>	<b>419,373</b>	<b>53,464,492</b>	<b>53,045,118</b>	<b>852,742,103</b>	<b>649,331,320</b>	<b>-203,410,783</b>	<b>-24</b>
<b>Off-site Transfers for Further Management</b>	<b>18,344,551</b>	<b>27,597,627</b>	<b>53,727</b>	<b>4,148,089</b>	<b>4,094,363</b>	<b>181,105,678</b>	<b>197,890,472</b>	<b>16,784,793</b>	<b>9</b>
Treatment (except metals)	5,443,572	15,225,410	5,442	341,371	335,929	76,695,396	76,875,441	180,045	0.2
Sewage (except metals)	12,900,978	12,372,216	48,284	3,806,718	3,758,434	104,410,282	121,015,031	16,604,749	16
<b>Total Releases and Transfers</b>	<b>129,822,470</b>	<b>93,797,124</b>	<b>473,100</b>	<b>57,612,581</b>	<b>57,139,481</b>	<b>1,033,847,781</b>	<b>847,221,792</b>	<b>-186,625,990</b>	<b>-18</b>

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\* Eighteen facilities that reported less than 100,000 kg in 1995 and more than 1,000,000 kg in 2001.

### 7.3.2 TRI

- Newly reporting manufacturing TRI facilities (those reporting in 2001 and not in 1995) released and transferred 93.8 million kg. This was less than the 129.8 million kg reported by facilities that stopped reporting (reporting in 1995 and not in 2001). However, this difference of 36.0 million kg was offset by the overall increase of 57.1 million kg reported by 18 TRI facilities that reported large increases (from less than 100,000 kg in 1995 to 1,000,000 kg or more in 2001).
- TRI manufacturing facilities reporting in both years showed a decrease of 18 percent in total releases and transfers, compared to a decrease of 14 percent for all facilities (see **Table 7–3**).
- On-site releases for TRI facilities reporting in both years decreased by 30 percent compared to 33 percent for all facilities. Surface water discharges reported by the newly reporting TRI facilities and the facilities with large increases were proportionately higher from 1995 to 2001. Thus, while surface water discharges decreased by 6 percent for facilities reporting in both years, they increased by 10 percent for all facilities. On the other hand, the newly reporting facilities reported substantially less on-site land releases than those facilities no longer reporting. Thus, although on-site land releases for facilities reporting in both years increased by 10 percent, they showed an overall decrease of 10 percent for all facilities.
- Off-site releases, particularly transfers of metals to disposal, were the largest segment of the increases as reported by the 18 TRI facilities with the largest increase. In addition, the newly reporting TRI facilities also reported higher transfers of metals to disposal than was shown by the facilities that stopped reporting. Thus, all TRI facilities showed an overall increase of 59 percent in off-site releases compared to a 16 percent increase for those facilities reporting in both years.

### 7.3.3 Average Releases and Transfers per Facility, Facilities Reporting in Both Years, NPRI and TRI, 1995–2001

- For facilities reporting in both 1995 and 2001, the average total of releases and transfers per facility decreased in both NPRI and TRI. The decrease was larger in NPRI, narrowing somewhat the difference between them. In 1995, NPRI average total releases and transfers per facility were 1.5 times those of TRI. By 2001, NPRI averages were 1.4 times those of TRI.
- Although they decreased in both countries, average on-site releases per facility decreased more in TRI so that the NPRI/TRI ratio grew from 1.6 in 1995 to 1.7 in 2001. This was due to on-site air emissions where the ratio grew from 1.9 to 2.4. For both surface water discharges and on-site land releases, the NPRI/TRI ratio declined below 1.0, indicating that the NPRI average per facility was below the TRI average per facility for facilities reporting in both years for these types of releases in 2001.
- On the other hand, average off-site releases per facility decreased substantially in NPRI, while they increased for TRI. The NPRI/TRI ratio for off-site releases fell from 2.4 in 1995 to 1.5 in 2001. On-site land releases followed a similar pattern, with the ratio falling from 1.2 in 1995 to 0.7 in 2001.
- The average for transfers for further management per facility increased for both NPRI and TRI. The NPRI/TRI ratio was 0.7 in 1995 and 0.8 in 2001.
- Therefore, for facilities reporting in both years, on average, NPRI facilities tended to release chemicals to the air more than TRI facilities and, on average, NPRI facilities tended to release chemicals to the water and land less than TRI facilities.

Table 7–10. Average Total Releases and Transfers per Facility for Facilities Reporting in Both Years, NPRI and TRI, 1995 and 2001

	NPRI		TRI		Ratio of Average per Facility (NPRI/TRI)	
	1995 (kg/facility)	2001 (kg/facility)	1995 (kg/facility)	2001 (kg/facility)	1995	2001
<b>On-site Releases</b>	<b>89,231</b>	<b>65,088</b>	<b>56,045</b>	<b>39,076</b>	<b>1.6</b>	<b>1.7</b>
Air	66,891	52,064	36,151	21,675	1.9	2.4
Surface Water	10,231	5,113	6,132	5,768	1.7	0.9
Underground Injection	3,564	2,614	6,879	4,044	0.5	0.6
Land	8,430	5,238	6,882	7,590	1.2	0.7
<b>Off-site Releases</b>	<b>21,292</b>	<b>15,496</b>	<b>8,941</b>	<b>10,408</b>	<b>2.4</b>	<b>1.5</b>
Transfers to Disposal (except metals)	3,459	2,050	1,131	1,355	3.1	1.5
Transfers of Metals	17,833	13,446	7,810	9,053	2.3	1.5
<b>Total Releases On- and Off-site</b>	<b>110,523</b>	<b>80,584</b>	<b>64,986</b>	<b>49,484</b>	<b>1.7</b>	<b>1.6</b>
<b>Off-site Transfers for Further Management</b>	<b>9,290</b>	<b>11,751</b>	<b>13,802</b>	<b>15,081</b>	<b>0.7</b>	<b>0.8</b>
Treatment (except metals)	5,175	5,276	5,845	5,859	0.9	0.9
Sewage (except metals)	4,115	6,475	7,957	9,222	0.5	0.7
<b>Total Releases and Transfers</b>	<b>119,813</b>	<b>92,335</b>	<b>78,787</b>	<b>64,565</b>	<b>1.5</b>	<b>1.4</b>

Note: Does not include 20 facilities that reported less than 100,000 kg in 1995 and more than 1,000,000 kg in 2001.

**Table 7–11. Summary of Total Reported Amounts of Releases and Transfers in North America, by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1995, 1995–2001**

	Facilities Reporting Both Years and less than 100,000 kg in 1995				Facilities Reporting Both Years and 100,000 kg or more in 1995				Total for Facilities Reporting in Both Years***			
	1995	2001	Change 1995–2001		1995	2001	Change 1995–2001		1995	2001	Change 1995–2001	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	12,465	12,465	0	0	1,655	1,655	0	0	14,120	14,120	0	0
Total Forms	35,144	34,449	-695	-2	13,703	13,333	-370	-3	48,847	47,782	-1,065	-2
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases*</b>	<b>109,499,268</b>	<b>105,030,827</b>	<b>-4,468,442</b>	<b>-4</b>	<b>714,972,498</b>	<b>472,687,012</b>	<b>-242,285,486</b>	<b>-34</b>	<b>824,471,766</b>	<b>577,717,839</b>	<b>-246,753,928</b>	<b>-30</b>
Air	102,561,823	87,966,460	-14,595,363	-14	438,572,521	248,414,826	-190,157,696	-43	541,134,345	336,381,286	-204,753,059	-38
Surface Water	3,885,788	9,846,352	5,960,563	153	86,791,200	70,942,563	-15,848,637	-18	90,676,989	80,788,915	-9,888,074	-11
Underground Injection	151,197	244,882	93,685	62	93,670,773	55,424,997	-38,245,776	-41	93,821,970	55,669,879	-38,152,091	-41
Land	2,809,023	6,927,753	4,118,730	147	95,915,133	97,890,985	1,975,852	2	98,724,156	104,818,738	6,094,582	6
<b>Off-site Releases</b>	<b>24,284,597</b>	<b>41,861,651</b>	<b>17,577,054</b>	<b>72</b>	<b>114,287,663</b>	<b>110,174,658</b>	<b>-4,113,004</b>	<b>-4</b>	<b>138,572,260</b>	<b>152,036,309</b>	<b>13,464,049</b>	<b>10</b>
Transfers to Disposal (except metals)	4,287,636	8,740,969	4,453,333	104	14,009,182	11,085,786	-2,923,396	-21	18,296,818	19,826,755	1,529,938	8
Transfers of Metals**	19,996,961	33,120,682	13,123,721	66	100,278,481	99,088,872	-1,189,609	-1	120,275,442	132,209,554	11,934,112	10
<b>Total Releases On- and Off-site</b>	<b>133,783,865</b>	<b>146,892,477</b>	<b>13,108,612</b>	<b>10</b>	<b>829,260,161</b>	<b>582,861,670</b>	<b>-246,398,490</b>	<b>-30</b>	<b>963,044,026</b>	<b>729,754,148</b>	<b>-233,289,878</b>	<b>-24</b>
<b>Off-site Transfers for Further Management</b>	<b>26,857,978</b>	<b>44,474,168</b>	<b>17,616,190</b>	<b>66</b>	<b>163,518,803</b>	<b>165,143,398</b>	<b>1,624,595</b>	<b>1</b>	<b>190,376,780</b>	<b>209,617,566</b>	<b>19,240,785</b>	<b>10</b>
Treatment (except metals)	10,992,191	19,871,213	8,879,022	81	70,867,913	62,269,754	-8,598,158	-12	81,860,103	82,140,967	280,864	0
Sewage (except metals)	15,865,787	24,602,955	8,737,168	55	92,650,890	102,873,643	10,222,754	11	108,516,677	127,476,599	18,959,922	17
<b>Total Releases and Transfers</b>	<b>160,641,843</b>	<b>191,366,646</b>	<b>30,724,803</b>	<b>19</b>	<b>992,778,963</b>	<b>748,005,068</b>	<b>-244,773,895</b>	<b>-25</b>	<b>1,153,420,806</b>	<b>939,371,714</b>	<b>-214,049,093</b>	<b>-19</b>

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

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Does not include 20 facilities that reported less than 100,000 kg in 1995 and more than 1,000,000 kg in 2001.

## 7.4 Manufacturing Facilities Reporting Smaller Amounts (Total Releases and Transfers less than 100,000 kg in 1995)

The overall quantities reported to NPRI and TRI are dominated by the facilities reporting the largest releases and transfers. While this is an important group, it is a relatively small number of facilities. This section analyzes the changes in releases and transfers for the majority of facilities that report to NPRI and TRI. This majority reports smaller amounts and so tends to be overshadowed by the fewer facilities that report larger amounts.

This section divides and compares reporting by two separate groups:

- manufacturing facilities reporting total releases and transfers of less than 100,000 kg in 1995 (called smaller reporters) and
- manufacturing facilities reporting releases and transfers of 100,000 kg or more in 1995 (called larger reporters).

This section includes reporting only by manufacturing facilities that reported in both 1995 and 2001 and, in order to see underlying patterns, the analysis does not include 20 facilities with large increases (those that reported less than 100,000 kg in 1995 and 1 million kg or more in 2001).

These two groups differ in many ways. The smaller reporters made up 88 percent of the total number of facilities, and yet contributed only about 20 percent of the total releases and transfers in 2001. The larger reporters made up only 12 percent of the total number of facilities reporting and yet contributed 80 percent of the total releases and transfers in 2001. The facilities in this latter group are not necessarily large in terms of size or number of employees, but it is large in terms of the amount of releases and transfers.

- Over 88 percent of North American facilities reporting in both years (12,465 facilities out of 14,120) reported less than 100,000 kg in 1995. They reported an overall increase of 19 percent in total releases and transfers from 1995 to 2001. This was the opposite trend to

larger reporters, who reported a decrease of 25 percent.

- The smaller reporters had increases in most categories of releases and transfers, including a 10-percent increase in total releases. Only on-site air emissions decreased, by 14 percent. As a result, total on-site releases decreased by 4 percent. However, off-site releases increased by 72 percent.
- In contrast, facilities reporting larger amounts reported decreases in all categories except for a 2-percent increase in on-site land releases and an 11-percent increase in transfers to sewage.

#### 7.4.1 NPRI Manufacturing Facilities Reporting Smaller Amounts (Total Releases and Transfers less than 100,000 kg in 1995)

The pattern of substantial increases by the group of smaller reporters and decreases by the group of larger reporters was also present in NPRI.

- NPRI manufacturing facilities reporting smaller amounts (less than 100,000 kg in 1995) increased the amount of chemicals released and transferred by 52 percent. NPRI facilities reporting larger amounts showed the opposite trend, with a decrease of 31 percent
- This pattern of overall increases by the smaller reporters and decreases by the larger reporters held for all categories of releases and transfers with one exception—NPRI facilities that reported larger amounts also reported increases in transfers to sewage (of 53 percent).
- NPRI facilities reporting smaller amounts showed an increase of 44 percent in on-site releases, compared to a decrease of 34 percent reported by facilities reporting larger amounts. For off-site releases, the smaller reporters showed an increase of 46 percent compared to a 36-percent decrease for the larger reporters.

**Table 7–12. Summary of Total Reported Amounts of Releases and Transfers in NPRI, by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1995, 1995–2001**

	Facilities Reporting Both Years and less than 100,000 kg in 1995***				Facilities Reporting Both Years and 100,000 kg or more in 1995			
	1995	2001	Change 1995–2001		1995	2001	Change 1995–2001	
	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	801	801	0	0	197	197	0	0
Total Forms	2,077	2,373	296	14	1,276	1,446	170	13
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases*</b>	<b>8,156,895</b>	<b>11,783,556</b>	<b>3,626,661</b>	<b>44</b>	<b>80,895,507</b>	<b>53,174,531</b>	<b>-27,720,976</b>	<b>-34</b>
Air	7,254,671	9,894,519	2,639,848	36	59,502,171	42,064,955	-17,437,216	-29
Surface Water	428,286	1,211,232	782,946	183	9,782,619	3,891,637	-5,890,982	-60
Underground Injection	1,336	33,884	32,548	2,436	3,555,551	2,575,032	-980,519	-28
Land	381,166	598,541	217,375	57	8,032,295	4,629,266	-3,403,029	-42
<b>Off-site Releases</b>	<b>2,295,971</b>	<b>3,352,153</b>	<b>1,056,182</b>	<b>46</b>	<b>18,953,550</b>	<b>12,112,588</b>	<b>-6,840,962</b>	<b>-36</b>
Transfers to Disposal (except metals)	460,473	688,748	228,275	50	2,991,463	1,356,847	-1,634,616	-55
Transfers of Metals**	1,835,498	2,663,405	827,907	45	15,962,087	10,755,741	-5,206,346	-33
<b>Total Releases On- and Off-site</b>	<b>10,452,866</b>	<b>15,135,709</b>	<b>4,682,843</b>	<b>45</b>	<b>99,849,057</b>	<b>65,287,119</b>	<b>-34,561,938</b>	<b>-35</b>
<b>Off-site Transfers for Further Management</b>	<b>1,487,810</b>	<b>3,061,090</b>	<b>1,573,280</b>	<b>106</b>	<b>7,783,292</b>	<b>8,666,004</b>	<b>882,712</b>	<b>11</b>
Treatment (except metals)	1,080,279	2,276,705	1,196,426	111	4,084,428	2,988,821	-1,095,607	-27
Sewage (except metals)	407,531	784,385	376,854	92	3,698,864	5,677,183	1,978,319	53
<b>Total Releases and Transfers</b>	<b>11,940,676</b>	<b>18,196,799</b>	<b>6,256,123</b>	<b>52</b>	<b>107,632,349</b>	<b>73,953,123</b>	<b>-33,679,226</b>	<b>-31</b>

Note: 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.

\* The sum of air, surface water, underground injection and land releases does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Does not include 2 facilities that reported less than 100,000 kg in 1995 and more than 1,000,000 kg in 2001.

**Table 7–13. Summary of Total Reported Amounts of Releases and Transfers in TRI, by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1995, 1995–2001**

	Facilities Reporting Both Years and less than 100,000 kg in 1995***				Facilities Reporting Both Years and 100,000 kg or more in 1995			
	1995	2001	Change 1995–2001		1995	2001	Change 1995–2001	
	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	11,664	11,664	0	0	1,458	1,458	0	0
Total Forms	33,067	32,076	-991	-3	12,427	11,887	-540	-4
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases</b>	<b>101,342,373</b>	<b>93,247,271</b>	<b>-8,095,103</b>	<b>-8</b>	<b>634,076,991</b>	<b>419,512,481</b>	<b>-214,564,510</b>	<b>-34</b>
Air	95,307,152	78,071,941	-17,235,211	-18	379,070,350	206,349,871	-172,720,480	-46
Surface Water	3,457,502	8,635,120	5,177,617	150	77,008,581	67,050,926	-9,957,655	-13
Underground Injection	149,861	210,998	61,137	41	90,115,222	52,849,965	-37,265,257	-41
Land	2,427,857	6,329,212	3,901,355	161	87,882,838	93,261,719	5,378,881	6
<b>Off-site Releases</b>	<b>21,988,626</b>	<b>38,509,498</b>	<b>16,520,872</b>	<b>75</b>	<b>95,334,113</b>	<b>98,062,070</b>	<b>2,727,958</b>	<b>3</b>
Transfers to Disposal (except metals)	3,827,163	8,052,221	4,225,058	110	11,017,719	9,728,939	-1,288,780	-12
Transfers of Metals*	18,161,463	30,457,277	12,295,814	68	84,316,394	88,333,131	4,016,737	5
<b>Total Releases On- and Off-site</b>	<b>123,330,999</b>	<b>131,756,768</b>	<b>8,425,769</b>	<b>7</b>	<b>729,411,104</b>	<b>517,574,551</b>	<b>-211,836,552</b>	<b>-29</b>
<b>Off-site Transfers for Further Management</b>	<b>25,370,168</b>	<b>41,413,078</b>	<b>16,042,910</b>	<b>63</b>	<b>155,735,511</b>	<b>156,477,394</b>	<b>741,883</b>	<b>0.5</b>
Treatment (except metals)	9,911,912	17,594,508	7,682,596	78	66,783,485	59,280,933	-7,502,551	-11
Sewage (except metals)	15,458,256	23,818,570	8,360,314	54	88,952,026	97,196,460	8,244,435	9
<b>Total Releases and Transfers</b>	<b>148,701,167</b>	<b>173,169,847</b>	<b>24,468,680</b>	<b>16</b>	<b>885,146,614</b>	<b>674,051,945</b>	<b>-211,094,669</b>	<b>-24</b>

Note: 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.

\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\* Does not include 18 facilities that reported less than 100,000 kg in 1995 and more than 1,000,000 kg in 2001.

- NPRI facilities reporting smaller amounts also showed an increase of over 100 percent for off-site transfers to treatment, while those reporting larger amounts showed a decrease of 27 percent.

#### 7.4.2 TRI Manufacturing Facilities Reporting Smaller Amounts (Total Releases and Transfers less than 100,000 kg in 1995)

The pattern of substantial increases by the group of smaller reporters and decreases by the group of larger reporters was also present for most categories of releases and transfers in TRI.

- TRI facilities reporting smaller amounts (less than 100,000 kg in 1995) increased the amount of chemicals released and transferred by 16 percent. Larger TRI reporters (those reporting 100,000 kg or more in 1995) decreased releases and transfers by 24 percent.
- This pattern held for most categories of releases and transfers. The exceptions being on-site air releases, where both groups reported decreases but those for the smaller reporters were substantially less, and off-site transfers of metals to disposal and on-site land disposal, where both groups reported increases but those for the smaller reporters were substantially more.
- TRI facilities reporting smaller amounts showed a decrease of 8 percent in on-site releases, compared to a decrease of 34 percent by facilities reporting larger amounts. This was due to decreases in on-site air releases of 18 percent versus 46 percent, respectively.
- For off-site releases, smaller reporters showed an increase of 75 percent compared to a 3-percent increase for larger reporters.
- Off-site transfers for further management increased by 63 percent for TRI facilities reporting smaller amounts, while they remained about the same (0.5 percent increase) for those reporting larger amounts.



**Off-site Transfers Within Country and Cross-Border**



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## Key Findings

- NPRI facilities transferred off-site 155.9 million kg of matched chemicals in 2001 and sent 20 percent (31.6 million kg) of the matched chemicals to US locations.
- TRI facilities transferred off-site 1.48 billion kg in 2001 and sent 2 percent (25.9 million kg) of the matched chemicals to Canadian locations and 2 percent (31.2 million kg) to Mexican locations in 2001.
- Mexico has not begun to collect mandatory data on transfers so it is not known how much was transferred to the US or Canada from Mexico.
- Of the Canadian transfers to US sites, 84 percent were for recycling. Almost 60 percent of US transfers to Canadian sites were for energy recovery, but one facility accounted for almost all of these transfers for energy recovery. US transfers to Mexican sites were mainly metals for recycling.
- A relatively small number of facilities in each country sent transfers across the US-Canada border—269 TRI facilities and 150 NPRI facilities. Three TRI facilities and nine NPRI facilities each reported one million kg or more of cross-border transfers in 2001.
- One US hazardous waste facility, Petro-Chem Processing Group/Solvent Distiller Group, in Detroit, Michigan, accounted for over half of the transfers of all US facilities to Canadian sites. It reported transferring 15.7 million kg to Canadian sites in 2001, primarily xylenes and toluene for energy recovery.
- Most cross-border transfers were received at sites in Pennsylvania and Michigan in the United States and in Ontario and Quebec in Canada.
- Cross-border transfers from Canada to the US increased by 20 percent (5.2 million kg) between 1998 and 2001. This was the opposite of the national trend of a 20-percent decrease (31.1 million kg) in total transfers within Canada.
- Cross-border transfers from the US to Canada decreased by 18 percent (5.3 million kg) between 1998 and 2001, and transfers from the US to sites in Mexico increased by 29 percent (7.0 million kg). Transfers within the US decreased by 3 percent (45.2 million kg).
- 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. These metals are put up for bid, typically on an annual or biannual basis. Facilities in the hazardous waste sector have changed their transfer sites as a result of business consolidation, price, or changes in services offered.

## 8.1 Introduction

NPRI and TRI facilities report the amounts of chemicals they transfer to off-site locations, along with the address of the off-site location. Off-site transfers represent transfers from a facility to other locations—nearby, within the state or province, or outside the country. Most transfers occur to sites within a nation's borders. However, matched chemicals can also be shipped to a North American neighbor or to another country. This chapter examines off-site transfers including those sent to sites across national boundaries in 1998 and 2001. The off-site transfers examined are transfers to recycling, energy recovery, treatment, and disposal. Off-site transfers to sewage are not included because they are sent to local sewage treatment plants.

This chapter presents:

- 2001 data for transfers to disposal, recycling, energy recovery, and treatment, based on 204 chemicals; and
- data for the time period from 1998 to 2001, based on 155 chemicals.

The information for 1998 to 2001 includes data on 155 chemicals that NPRI and TRI reported in common during that time span. It does not include the new chemicals added to NPRI since 1998, nor does it include the chemical mercury and its compounds, because the threshold for reporting mercury and its compounds was lowered for both NPRI and TRI beginning with the 2000 reporting year. Lead and its compounds are also excluded because TRI lowered the threshold for reporting for the 2001 reporting year (NPRI lowered the lead and its compounds threshold for the 2002 reporting year). No data for prior years are included because NPRI reporting did not include mandatory reporting on transfers to recycling and energy recovery until the 1998 reporting year.

As explained in **Chapter 2**, this chapter analyzes data for industries and chemicals that must be reported in both the US and Canada (the matched data set). Comparable Mexican data are not available for the 2001 reporting year and before. Also, transfers of metals, except those to recycling, are included

in one category in order to make the TRI and NPRI data comparable. TRI classifies transfers of metals in only two ways—transfers to recycling or transfers to disposal—because metals are not destroyed by treatment or burned in energy recovery.

## 8.2 2001 Off-site Transfers

Chemicals can be transferred off-site to another facility for recycling, further management (energy recovery or treatment), or disposal.

- NPRI facilities transferred off-site 155.9 million kg of matched chemicals in 2001, with 74 percent transferred to recycling.
- NPRI facilities sent 31.6 million kg of matched chemicals to US locations in 2001. This represented 20 percent of all such transfers reported by Canadian facilities. Almost 84 percent of the transfers sent to the US were transferred for recycling.
- TRI facilities transferred off-site 1.48 billion kg of matched chemicals in 2001, with 51 percent transferred to recycling and 25 percent transferred to energy recovery.
- TRI facilities sent 25.9 million kg of matched chemicals to Canadian locations. This represented 2 percent of all such transfers reported by US facilities. Almost 60 percent of transfers to Canada were for energy recovery. One hazardous waste management facility, Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan, accounted for most of these transfers, reporting 15.2 million kg of the 15.4 million kg total transfers for energy recovery for all US facilities to Canadian sites.
- TRI facilities sent 31.2 million kg to Mexican locations, almost all of it for recycling to sites in Monterrey, Nuevo León. This represented 2 percent of off-site transfers reported by US facilities in 2001.
- Mexico has not begun to collect mandatory data on transfers so it is not known how much was transferred to the US or Canada from Mexico in 2001.

**Table 8–1. Off-site Transfers Within Country and Cross-Border, 2001**

	Type of Transfer					Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers Received (kg)
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)		
<b>From Canadian Facilities</b>	<b>102,198,492</b>	<b>12,921,610</b>	<b>8,002,099</b>	<b>9,192,257</b>	<b>5,004,734</b>	<b>18,534,437</b>	<b>155,853,629</b>
Within Canada	77,998,221	10,586,699	4,877,612	8,673,744	3,982,138	18,004,030	124,122,445
To United States	24,062,194	2,334,911	3,124,487	518,513	1,022,596	530,407	31,593,108
To Mexico	0	0	0	0	0	0	0
To Other Countries	138,076	0	0	0	0	0	138,076
<b>From US Facilities</b>	<b>621,257,251</b>	<b>132,440,790</b>	<b>365,670,556</b>	<b>113,161,185</b>	<b>33,614,449</b>	<b>210,488,937</b>	<b>1,476,633,169</b>
Within United States*	583,058,294	131,613,881	350,289,688	109,635,241	33,430,723	209,286,578	1,417,314,405
To Canada	5,030,511	736,861	15,380,868	3,525,540	183,515	1,009,510	25,866,805
To Mexico	30,920,171	72,528	0	0	0	192,034	31,184,733
To Other Countries	2,248,276	17,520	0	405	210	815	2,267,227
<b>From Mexican Facilities</b>	Data not available.						

Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 2001.

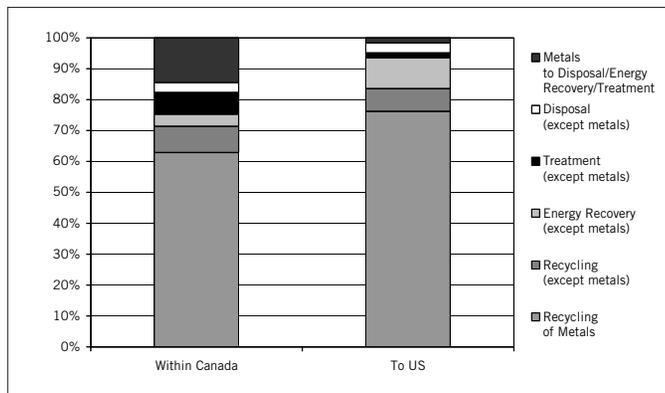
\* Includes transfers where destination is unknown.

Figure 8-1. Percentage of Transfers Sent to Sites Within and Outside Country, NPRI and TRI, 2001



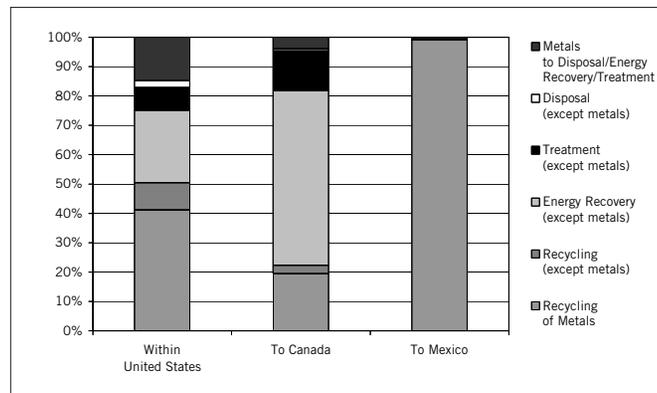
Note: Does not include transfers to sewage.

Figure 8-2. Transfers from NPRI Facilities to Sites within Canada and to US, by Type of Transfer, 2001



Note: Does not include transfers to sewage.

Figure 8-3. Transfers from TRI Facilities to Sites within US and to Canada and Mexico, by Type of Transfer, 2001



Note: Does not include transfers to sewage.

### 8.2.1 Where Off-site Transfers were Sent, 2001

- Almost 58 percent of transfers sent from NPRI facilities went to sites in Ontario. Another 16 percent went to sites in Quebec, and 20 percent went to sites in the US.
- Almost all of the metals sent for disposal were sent within Canada, with 50 percent going to Ontario, 29 percent to Quebec, and just 3 percent to US sites. On the other hand, Ontario sites received 62 percent of all transfers sent for recycling from Canadian facilities. Quebec sites received 40 percent of all transfers sent for treatment. US sites received 39 percent of all transfers for energy recovery sent from Canadian facilities.
- Almost 12 percent of transfers sent from TRI facilities went to sites in Ohio. Another 10 percent went to sites in Indiana, and 2 percent went to sites in Canada.
- However, Ohio received 26 percent of all metals sent for disposal from US facilities. Ontario received 4 percent of all transfers to energy recovery and 3 percent of transfers to treatment.
- The largest amount of transfers from Canada to the US went to the state of Pennsylvania—8.5 million kg, representing 27 percent of all transfers from Canadian facilities to US sites, almost all of it as transfers to recycling. Another 20 percent went to the state of Michigan—6.4 million kg, almost all of it also as transfers to recycling.

Table 8–2. NPRI Off-site Transfers within Canada and from Canada to Sites in Other Countries, 2001

Receiving Province/ State	Type of Transfer						Total Transfers Received (kg)	% of Total
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)		
<b>Within Canada</b>	<b>77,998,221</b>	<b>10,586,699</b>	<b>4,877,612</b>	<b>8,673,744</b>	<b>3,982,138</b>	<b>18,004,030</b>	<b>124,122,445</b>	<b>79.6</b>
Alberta	710,592	691,096	915,101	418,294	668,011	1,668,660	5,071,754	3.3
British Columbia	76,597	52,239	27,483	49,159	78,023	646,320	929,821	0.6
Manitoba	606,794	105,345	17,810	83,418	61,279	345,224	1,219,870	0.8
New Brunswick	313,559	0	0	107,652	63,598	625,275	1,110,084	0.7
Newfoundland and Labrador	28,477	0	0	0	0	3	28,480	0.02
Nova Scotia	75,156	14	0	59,781	219,829	88,183	442,963	0.3
Ontario	62,832,911	8,065,369	3,635,439	4,216,724	2,363,750	9,193,574	90,307,766	57.9
Prince Edward Island	0	0	0	0	0	50,624	50,624	0.03
Quebec	13,150,886	1,650,790	281,779	3,717,616	506,586	5,384,638	24,692,295	15.8
Saskatchewan	203,250	21,846	0	21,100	21,062	1,530	268,788	0.2
<b>To United States</b>	<b>24,062,194</b>	<b>2,334,911</b>	<b>3,124,487</b>	<b>518,513</b>	<b>1,022,596</b>	<b>530,407</b>	<b>31,593,108</b>	<b>20.3</b>
Alabama	0.03	0	0	0	0	0	0.03	0.00
Arkansas	2,000	0	0	43,350	0	683	46,033	0.03
California	1,079,134	2,230	0	0	0	0	1,081,364	0.7
Colorado	22,962	0	0	0	0	0	22,962	0.01
Connecticut	288,077	0	0	0	0	0	288,077	0.18
Idaho	3,759	0	0	0	0	0	3,759	0.002
Illinois	1,438,560	683,625	0	10,741	0	2,800	2,135,726	1.4
Indiana	315,663	0	251,885	27,185	0	0	594,733	0.4
Iowa	821,336	0	0	0	0	0	821,336	0.5
Kansas	0	0	580,393	0	0	36	580,429	0.4
Louisiana	83,543	246,105	0	0	0	70	329,718	0.2
Maryland	15,438	5,761	0	0	0	0	21,199	0.01
Michigan	5,248,154	914,175	144,268	13,840	21,374	48,372	6,390,183	4.1
Mississippi	3,370	0	0	0	0	0	3,370	0.002
Missouri	0	0	130,991	0	0	0	130,991	0.1
Nebraska	192,940	0	0	0	0	0	192,940	0.1
Nevada	540	0	0	0	0	0	540	0.00
New Jersey	766,509	0	0	0	0	31,900	798,409	0.5
New York	1,200,456	0	0	0	20,000	76,522	1,296,978	0.8
North Carolina	40,540	0	0	0	0	0	40,540	0.03
Ohio	1,869,287	5,080	1,190,908	353,733	980,880	328,029	4,727,917	3.0
Oklahoma	1,092	7,280	0	0	0	0	8,372	0.01
Pennsylvania	8,426,717	2,635	240	36,720	342	0	8,466,654	5.4
Rhode Island	925	0	0	0	0	0	925	0.00
South Carolina	0	1,000	815,988	0	0	0	816,988	0.5
Tennessee	4,659	0	0	0	0	0	4,659	0.003
Texas	2,163,031	270,020	0	0	0	0	2,433,051	1.6
Washington	73,502	0	9,814	32,944	0	41,995	158,255	0.10
West Virginia	0	197,000	0	0	0	0	197,000	0.13
<b>To Other Countries</b>	<b>138,076</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>138,076</b>	<b>0.09</b>
<b>Total</b>	<b>102,198,492</b>	<b>12,921,610</b>	<b>8,002,099</b>	<b>9,192,257</b>	<b>5,004,734</b>	<b>18,534,437</b>	<b>155,853,629</b>	<b>100</b>

Table 8–3. TRI Off-site Transfers within US and from the US to Sites in Other Countries, 2001

Receiving Country	Type of Transfer						Total Transfers Received (kg)	% of Total
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)		
<b>To Canada</b>	<b>5,030,511</b>	<b>736,861</b>	<b>15,380,868</b>	<b>3,525,540</b>	<b>183,515</b>	<b>1,009,510</b>	<b>25,866,805</b>	<b>1.8</b>
Alberta	212,063	5	0	0	0	0	212,069	0.01
British Columbia	66,883	2,371	4,646	11,749	16	103,332	188,998	0.01
Manitoba	251,155	0	0	0	0	0	251,155	0.02
Ontario	3,384,993	241,810	15,358,988	3,175,103	174,994	336,794	22,672,683	1.5
Quebec	1,115,416	492,674	17,234	338,688	8,505	569,384	2,541,900	0.2
<b>Within United States</b>	<b>582,565,707</b>	<b>131,483,180</b>	<b>349,389,282</b>	<b>109,622,665</b>	<b>33,337,494</b>	<b>208,977,732</b>	<b>1,415,376,059</b>	<b>95.9</b>
Alabama	9,396,716	2,610,927	5,009,266	1,132,004	1,793,295	2,346,163	22,288,372	1.5
Alaska	1,428	2,313	71,718	1,031	5,947	0	82,437	0.01
Arizona	7,467,137	292,480	495,771	154,773	442,854	154,189	9,007,205	0.6
Arkansas	7,126,756	413,980	30,550,677	3,432,063	159,814	666,779	42,350,068	2.9
California	16,669,268	7,134,236	3,493,691	882,641	955,173	962,627	30,097,637	2.0
Colorado	877,301	750,670	1,302,374	357,676	12,895	421,896	3,722,813	0.3
Connecticut	20,183,804	135,727	644,789	295,322	24,081	134,293	21,418,017	1.5
Delaware	22,837	2,586	0	581,908	3,619	1,053,974	1,664,924	0.1
Florida	468,695	18,486	245,365	135,678	441,054	805,408	2,114,686	0.1
Georgia	4,507,811	810,598	1,478,822	371,775	142,543	772,625	8,084,173	0.5
Guam	7,116	0	0	0	0	0	7,116	0.000
Hawaii	0	0	0	0	437	24,128	24,565	0.002
Idaho	514,087	3,544	0	2,259	498,778	12,562,461	13,581,129	0.9
Illinois	93,832,364	2,952,116	5,885,705	2,359,434	1,414,599	17,762,525	124,206,743	8.4
Indiana	65,118,742	18,708,602	31,787,688	4,008,659	2,152,973	22,024,236	143,800,899	9.7
Iowa	14,682,054	65,910	41,021	3,527	152,642	490,650	15,435,804	1.0
Kansas	2,281,610	101,063	13,665,585	470,423	87,199	380,413	16,986,293	1.2
Kentucky	3,300,205	950,202	1,645,952	3,058,000	263,246	1,207,155	10,424,759	0.7
Louisiana	2,492,625	3,750,124	5,475,804	15,996,444	2,670,951	2,323,647	32,709,595	2.2
Maine	482,248	2,080	14,111	3,813	6,751	503,633	1,012,636	0.1
Maryland	3,149,412	71,824	4,191,711	4,901,176	27,264	644,699	12,986,086	0.9
Massachusetts	5,175,534	490,247	905,081	823,341	144,210	556,412	8,094,825	0.5
Michigan	32,630,042	14,663,374	24,334,887	4,388,908	1,391,300	23,791,086	101,199,598	6.9
Minnesota	4,074,596	170,038	130,859	3,194,044	170,909	445,912	8,186,357	0.6
Mississippi	8,643,850	122,254	8,957,343	112,965	61,397	490,398	18,388,207	1.2
Missouri	18,590,567	689,102	36,182,215	934,009	126,526	975,422	57,497,842	3.9
Montana	385,207	673	0	0	123	87,317	473,321	0.03
Nebraska	3,419,559	30,998	137,688	746,183	371,244	375,322	5,080,994	0.3
Nevada	130,370	417,008	11,076	11,889	25,539	1,397,218	1,993,101	0.1
New Hampshire	681,129	0	18	0	9,771	249,356	940,273	0.1
New Jersey	10,224,844	7,490,458	10,491,740	5,848,314	302,439	7,027,356	41,385,151	2.8
New Mexico	796,284	0	4,878	496	1,278	613,636	1,416,572	0.1
New York	19,842,440	717,599	5,350,916	867,583	221,664	1,514,232	28,514,434	1.9
North Carolina	4,121,859	10,945,478	2,776,014	1,086,065	1,227,345	1,353,825	21,510,586	1.5
North Dakota	329,381	665	385	19,120	2	863,147	1,212,700	0.1
Ohio	42,987,360	13,226,467	39,503,362	13,446,856	8,889,086	54,588,025	172,641,156	11.7
Oklahoma	2,461,368	36,562	780,505	97,938	2,178,894	1,093,014	6,648,282	0.5
Oregon	3,295,276	85,312	13,296	103,274	72,714	340,299	3,910,170	0.3
Pennsylvania	91,418,988	334,369	12,291,758	3,076,523	1,206,799	28,736,469	137,064,906	9.3
Puerto Rico	716,675	2,075,893	3,802,357	1,185,577	46,662	239,711	8,066,877	0.5
Rhode Island	1,102,848	45,654	5,295	72,155	19,410	38,594	1,283,957	0.1
South Carolina	14,588,111	2,518,382	41,691,670	2,398,475	188,341	1,731,687	63,116,665	4.3
South Dakota	65,478	0	0	40	254	18,167	84,238	0.01
Tennessee	22,992,195	1,666,012	1,855,256	644,316	418,007	1,606,017	29,181,803	2.0
Texas	24,319,606	23,310,942	45,068,515	25,912,327	3,476,754	4,512,268	126,600,412	8.6
Utah	324,794	66,236	44,323	621,317	79,068	870,843	2,007,181	0.1
Vermont	6,074	0	41,071	4,789	23,017	7,004	81,955	0.01
Virginia	767,160	2,652,584	7,272,252	1,820,364	267,268	2,640,558	15,420,185	1.0
Washington	742,694	286,060	602,965	590,605	57,158	492,594	2,772,076	0.2
West Virginia	1,835,537	5,782,284	107,261	105,867	191,501	1,421,115	9,443,566	0.6
Wisconsin	13,313,435	4,881,060	1,025,646	3,360,409	912,700	5,581,934	29,075,184	2.0
Wyoming	229	0	0	8	0	77,294	77,531	0.01
<b>To Mexico</b>	<b>30,920,171</b>	<b>72,528</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>192,034</b>	<b>31,184,733</b>	<b>2.1</b>
Monterrey, Nuevo León	30,903,650	273	0	0	0	192,034	31,095,957	2.1
Other Cities	16,521	72,255	0	0	0	0	88,776	0.01
<b>To Other Countries</b>	<b>2,248,276</b>	<b>17,520</b>	<b>0</b>	<b>405</b>	<b>210</b>	<b>815</b>	<b>2,267,227</b>	<b>0.2</b>
<b>Unknown</b>	<b>492,587</b>	<b>130,702</b>	<b>900,406</b>	<b>12,576</b>	<b>93,229</b>	<b>308,846</b>	<b>1,938,346</b>	<b>0.1</b>
<b>Total</b>	<b>621,257,251</b>	<b>132,440,790</b>	<b>365,670,556</b>	<b>113,161,185</b>	<b>33,614,449</b>	<b>210,488,937</b>	<b>1,476,633,169</b>	<b>100</b>

- The largest amount of transfers from the US to Canada was sent to Ontario—22.7 million kg, representing 88 percent of all US transfers to Canada—primarily as transfers to energy recovery. Transfers to Ontario from the US included 15.7 million kg by a single TRI facility, Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan. Another 10 percent of the transfers from the US to Canada went to the province of Quebec (2.5 million kg), primarily as transfers to recycling.

## 8.2.2 Facilities Sending and Receiving Cross-Border Transfers, 2001

A relatively small number of facilities transfer listed substances in the matched data set across the Canada-US border.

- For 2001, 269 TRI facilities and 150 NPRI facilities reported transfers across the Canada-US border.
- Three TRI facilities and nine NPRI facilities reported one million kg or more of cross-border transfers in 2001.
- One TRI facility reported 15.7 million kg of transfers to Canadian sites and accounted for 61 percent of all such transfers. This facility, Petro-Chem Processing Group/Solvent Distillers Group of Detroit, Michigan, reported 15.2 million kg in transfers to energy recovery.
- The 10 facilities in each country with the largest cross-border transfers accounted for over half of such transfers of metals and their compounds destined for recycling.

Table 8-4. NPRI Facilities with Largest Transfers to the US from Canada, 2001

Rank	Facility	City, Province	SIC Code		Number of Facilities Reporting Transfers to the US
			Canada	US	
1	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	1
2	Brass Craft Canada Ltd.	St. Thomas, ON	30	34	1
3	Ivaco Rolling Mills Limited Partnership	L'Orignal, ON	29	33	1
4	Lofthouse Brass Manufacturing Limited	Burks Falls, ON	29	34	1
5	Co-Steel Lasco	Whitby, ON	29	33	1
6	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	1
7	Ball Packaging Products Canada, Inc.	Burlington, ON	30	34	1
8	Aimco Solrec Ltd.	Milton, ON	37	28	1
9	DNN Galvanizing	Windsor, ON	29	33	1
10	Maple Leaf Metal Industries Ltd.	Edmonton, AB	29	33	1
	<b>Subtotal</b>				<b>10</b>
	<b>% of Total</b>				<b>7</b>
	<b>Total</b>				<b>150</b>

Table 8-5. TRI Facilities with Largest Transfers to Canada from US, 2001

Rank	Facility	City, State	US SIC Code	Number of Facilities Reporting Transfers to Canada
2	EQ Resource Recovery Inc., EQ Holding Co.	Romulus, MI	495/738	1
3	Dow Corning Corp.	Midland, MI	Mult.	1
4	GE Co. Silicone Prods.	Waterford, NY	28	1
5	Waltec Forgings Inc.	Port Huron, MI	34	1
6	NGK Metals Corp.	Sweetwater, TN	33	1
7	Encycle Texas Inc.	Corpus Christi, TX	495/738	1
8	American Axle & Mfg. Gear Facility	Detroit, MI	37	1
9	Ford Motor Co. Livonia Transmission Plant	Livonia, MI	37	1
10	Albemarle Corp.	Tyrone, PA	28	1
	<b>Subtotal</b>			<b>10</b>
	<b>% of Total</b>			<b>4</b>
	<b>Total</b>			<b>269</b>

Table 8-4. (continued)

Rank	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
1	2,852,520	0	0	0	0	0	2,852,520	Zinc and compounds (transfers to recycling)
2	2,335,191	0	0	0	0	0	2,335,191	Copper and compounds (transfers to recycling)
3	1,837,233	0	0	0	0	0	1,837,233	Zinc and compounds (transfers to recycling)
4	1,810,000	0	0	0	0	0	1,810,000	Zinc and compounds (transfers to recycling)
5	1,581,160	0	0	0	0	0	1,581,160	Zinc and compounds (transfers to recycling)
6	51,310	0	0	0	848,880	322,914	1,223,104	Nitric acid and nitrate compounds (transfers to disposal), Chromium and compounds (transfers of metals to disposal)
7	1,217,822	0	0	0	0	0	1,217,822	Copper and compounds (transfers to recycling)
8	0	0	1,057,290	0	0	0	1,057,290	Xylenes, Toluenes (transfers to energy recovery)
9	1,000,000	0	0	0	0	0	1,000,000	Zinc and compounds (transfers to recycling)
10	954,546	0	0	0	0	0	954,546	Copper and compounds (transfers to recycling)
	<b>13,639,782</b>	<b>0</b>	<b>1,057,290</b>	<b>0</b>	<b>848,880</b>	<b>322,914</b>	<b>15,868,866</b>	
	<b>57</b>	<b>0</b>	<b>34</b>	<b>0</b>	<b>83</b>	<b>61</b>	<b>50</b>	
	<b>24,062,194</b>	<b>2,334,911</b>	<b>3,124,487</b>	<b>518,513</b>	<b>1,022,596</b>	<b>530,407</b>	<b>31,593,108</b>	

Table 8-5. (continued)

Rank	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
1	0	0	15,168,540	515,697	0	0	15,684,237	Xylenes, Toluene, Naphthalene, Methyl ethyl ketone (transfers to energy recovery)
2	0	0	56,622	1,065,243	0	0	1,121,865	Xylenes, Toluene, Methanol, Methyl ethyl ketone (transfers to treatment/energy recovery)
3	0	0	0	1,097,020	0	0	1,097,020	Xylenes, Methanol, Toluene (transfers to treatment)
4	611,329	0	0	557	0	51,247	663,133	Copper and compounds (transfers to recycling of metals)
5	543,993	0	0	0	0	0	543,993	Copper and compounds (transfers to recycling of metals)
6	498,866	0	0	0	0	0	498,866	Copper and compounds (transfers to recycling of metals)
7	355,706	0	0	0	0	0	355,706	Nickel and compounds (transfers to recycling of metals)
8	335,025	0	0	0	0	858	335,883	Manganese/Nickel and compounds (transfers to recycling of metals)
9	292,063	0	0	0	0	2	292,066	Copper and compounds (transfers to recycling of metals)
10	0	0	0	271,873	0	0	271,873	Methanol, Ethyl acrylate (transfers to treatment)
	<b>2,636,982</b>	<b>0</b>	<b>15,225,162</b>	<b>2,950,390</b>	<b>0</b>	<b>52,107</b>	<b>20,864,641</b>	
	<b>52</b>	<b>0</b>	<b>99</b>	<b>84</b>	<b>0</b>	<b>5</b>	<b>81</b>	
	<b>5,030,511</b>	<b>736,861</b>	<b>15,380,868</b>	<b>3,525,540</b>	<b>183,515</b>	<b>1,009,510</b>	<b>25,866,805</b>	

The US states of Pennsylvania and Michigan received the largest amounts of transfers from NPRI facilities.

- By far, the Pennsylvania site receiving the largest transfers from Canadian facilities was Horsehead Resource Development in Palmerton. It took in 6.3 million kg from Canadian facilities (representing 22 percent of all transfers to this site in 2001) and 22.7 million kg from US facilities. All of the transfers to this site were of metals and their compounds for recycling.
- One site in Michigan (Extruded Metals in Belding) received 3.1 million kg from Canadian facilities, which represented 28 percent of the 10.8 million kg reported transferred to this site from both Canada and the US in 2001. All of the transfers to this site were metals and their compounds for recycling.
- A second site in Michigan (Arco Alloys Corp. in Detroit) received 1.6 million kg from Canadian facilities, which represented 94 percent of all transfers to this site in 2001. All of the transfers to this site were metals and their compounds for recycling.

**Table 8–6. Sites in Pennsylvania that Received the Largest Transfers from Canada, 2001**

Rank for Transfers from Canada	Receiving Site	Location	City, State	Number of Facilities	Number of Forms
1	Horsehead Resource Development	Delaware Avenue	Palmerton, PA	3	18
2	Metal Chem (U.S. Zinc)	Washington Road	Pittsburgh, PA	2	2
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Frankfort Road	Monaca, PA	2	2
4	Cerro Metals	Route 144 South	Bellefonte, PA	1	5
5	Recmix of Pennsylvania	Plum Run Road	Canonsburg, PA	1	8
1	Horsehead Resource Development	Delaware Avenue	Palmerton, PA	22	115
2	Metal Chem (U.S. Zinc)	Washington Road	Pittsburgh, PA	14	24
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Frankfort Road	Monaca, PA	37	50
4	Cerro Metals	Route 144 South	Bellefonte, PA	13	13
5	Recmix of Pennsylvania	Plum Run Road	Canonsburg, PA	2	5

**Table 8–7. Sites in Michigan that Received the Largest Transfers from Canada, 2001**

Rank for Transfers from Canada	Receiving Site	Location	City, State	Number of Facilities	Number of Forms
1	Extruded Metals Inc.	Ashfield Street	Belding, MI	3	9
2	Arco Alloys Corp.	Trombly St.	Detroit, MI	3	3
3	Gage Products	Wanda Ave.	Ferndale, MI	3	22
4	Lafarge Corporation	Ford Avenue	Alpena, MI	3	21
5	Mueller Brass Co.	Lapeer Ave.	Port Huron, MI	2	7
1	Extruded Metals Inc.	Ashfield Street	Belding, MI	17	24
2	Arco Alloys Corp.	Trombly St.	Detroit, MI	2	2
3	Gage Products	Wanda Ave.	Ferndale, MI	34	236
4	Lafarge Corporation	Ford Avenue	Alpena, MI	0	0
5	Mueller Brass Co.	Lapeer Ave.	Port Huron, MI	25	31

Table 8-6. (continued)

Rank for Transfers from Canada	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers Received (kg)	Total North American Transfers (kg)	From Canada (%)
<b>From Canadian NPRI Facilities</b>									
1	6,270,913	0	0	0	0	0	6,270,913	29,016,802	22
2	499,682	0	0	0	0	0	499,682	4,390,124	11
3	409,330	0	0	0	0	0	409,330	5,943,227	7
4	267,995	0	0	0	0	0	267,995	8,078,221	3
5	236,958	2,635	0	0	0	0	239,593	384,461	62
<b>From US TRI Facilities</b>									
1	22,742,648	3,175	0	0	0	67	22,745,889		
2	3,890,442	0	0	0	0	0	3,890,442		
3	5,533,897	0	0	0	0	0	5,533,897		
4	7,810,226	0	0	0	0	0	7,810,226		
5	144,868	0	0	0	0	0	144,868		

Table 8-7. (continued)

Rank for Transfers from Canada	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers Received (kg)	Total North American Transfers (kg)	From Canada (%)
<b>From Canadian NPRI Facilities</b>									
1	3,061,411	0	0	0	0	0	3,061,411	10,766,743	28
2	1,622,000	0	0	0	0	0	1,622,000	1,722,196	94
3	0	845,075	0	0	0	0	845,075	7,458,646	11
4	240,849	0	144,268	0	0	0	385,117	385,117	100
5	289,901	0	0	0	0	0	289,901	7,436,018	4
<b>From US TRI Facilities</b>									
1	7,705,332	0	0	0	0	0	7,705,332		
2	100,196	0	0	0	0	0	100,196		
3	0	6,592,513	2,825	12,000	0	6,232	6,613,571		
4	0	0	0	0	0	0	0		
5	7,146,117	0	0	0	0	0	7,146,117		

The Canadian provinces of Ontario and Quebec received the largest amounts of transfers from TRI facilities.

- One site in Hamilton, Ontario, owned by Philip Services Inc., received a total of 15.7 million kg from the US and 642,000 kg from sites within Canada. US transfers, most of which were sent for energy recovery from one facility (Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan), represented 96 percent of the total transfers to this site in 2001.
- Another site in Ontario (Safety-Kleen Ltd. in Corunna, now called Clean Harbors) received 3.0 million kg from TRI facilities, which represented 33 percent of the total transfers it received in 2001 (this site also received 6.2 million kg from NPRI facilities). Most of the transfers from both TRI and NPRI facilities were of chemicals other than metals sent for treatment or of metals sent for disposal.
- One site in Quebec (Noranda Horne Smelter in Rouyn-Noranda) received almost 951,000 kg from US facilities and 4.4 million kg from Canadian facilities. Most of these transfers were of metals and their compounds for recycling.
- A second site in Quebec (Stablex Canada Inc. in Blainville) received almost 795,000 kg from US facilities, representing 17 percent of the total transfers it received in 2001. Most of the transfers were metals sent for disposal.

**Table 8–8. Sites in Ontario that Received the Largest Transfers from the US, 2001**

Rank for Transfers from US	Receiving Site	Location	City, Province	Number of Facilities	Number of Forms
1	Philip Services Inc., Parkdale Avenue Facility	Parkdale Avenue	Hamilton, ON	2	13
2	Safety-Kleen Ltd., Lambton Facility	Telfer Rd.	Corunna, ON	45	287
3	Central Machinery & Metals	Fenmar Drive	Weston, ON	2	3
4	Falconbridge Ltd. Kidd Creek Metallurgical Div.	Highway 101 East	Timmins, ON	9	23
5	Sam Adelstein & Co. Limited	Welland Ave.	St. Catharines, ON	5	15
1	Philip Services Inc., Parkdale Avenue Facility	Parkdale Avenue	Hamilton, ON	15	53
2	Safety-Kleen Ltd., Lambton Facility	Telfer Rd.	Corunna, ON	90	333
3	Central Machinery & Metals	Fenmar Drive	Weston, ON	9	18
4	Falconbridge Ltd. Kidd Creek Metallurgical Div.	Highway 101 East	Timmins, ON	9	17
5	Sam Adelstein & Co. Limited	Welland Ave.	St. Catharines, ON	1	1

**Table 8–9. Sites in Quebec that Received the Largest Transfers from the US, 2001**

Rank for Transfers from US	Receiving Site	Location	City, Province	Number of Facilities	Number of Forms
1	Noranda Inc. (Fonderie Horne)	Avenue Portelance	Rouyn-Noranda, QC	14	29
2	Stablex Canada Inc.	Boul. Industrial	Blainville, QC	60	188
3	Chemrec Inc.	Brosseau	Cowansville, QC	8	22
4	Lafarge Cement	Chemin Lafarge	Saint-Constant, QC	1	6
5	Safety-Kleen	Boulevard Ste-Marguerite	Ville Mercier, QC	8	21
1	Noranda Inc. (Fonderie Horne)	Avenue Portelance	Rouyn-Noranda, QC	10	28
2	Stablex Canada Inc.	Boul. Industrial	Blainville, QC	59	134
3	Chemrec Inc.	Brosseau	Cowansville, QC	12	40
4	Lafarge Cement	Chemin Lafarge	Saint-Constant, QC	3	6
5	Safety-Kleen	Boulevard Ste-Marguerite	Ville Mercier, QC	33	130

Table 8-8. (continued)

Rank for Transfers from US	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers Received (kg)	Total North American Transfers (kg)	From US (%)
<b>From US TRI Facilities</b>									
1	1,317	0	15,140,245	514,735	0	0	15,656,297	16,298,123	96
2	0	0	17,330	2,623,176	112,135	273,408	3,026,049	9,213,861	33
3	678,969	0	0	0	0	0	678,969	8,843,211	8
4	597,004	4,677	0	5	0	2	601,688	823,587	73
5	546,522	0	0	0	0	858	547,380	548,733	99.8
<b>From Canadian NPRI Facilities</b>									
1	1,841	378	0	128,821	506,795	3,991	641,826		
2	0	3,650	0	1,372,280	623,642	4,188,240	6,187,812		
3	8,133,970	0	0	0	0	30,272	8,164,242		
4	168,322	0	0	38,559	0	15,018	221,899		
5	1,353	0	0	0	0	0	1,353		

Table 8-9. (continued)

Rank for Transfers from US	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)	Total Transfers Received (kg)	Total North American Transfers (kg)	From US (%)
<b>From US TRI Facilities</b>									
1	899,502	0	0	0	0	51,247	950,750	5,370,818	18
2	341	0	0	271,783	8,448	514,184	794,756	4,795,544	17
3	229	491,791	0	0	0	0	492,020	1,565,872	31
4	132,154	0	0	493	0	0	132,648	162,978	81
5	0	0	0	64,577	0	229	64,806	2,666,931	2
<b>From Canadian NPRI Facilities</b>									
1	4,420,068	0	0	0	0	0	4,420,068		
2	4,823	0	0	317,075	97,280	3,581,610	4,000,788		
3	0	1,033,182	0	40,670	0	0	1,073,852		
4	14,299	0	0	0	0	16,031	30,330		
5	0	29,900	0	2,570,266	630	1,328	2,602,124		

### 8.3 1998–2001 Cross-Border Transfers

This section analyzes changes in materials sent across national borders from 1998 to 2001. It uses the data set of 155 chemicals that NPRI and TRI reported in common from 1998 to 2001 (which does not include NPRI new chemicals, lead and its compounds, or mercury and its compounds).

- Transfers from Canada to the US increased from 25.7 million kg in 1998 to 30.9 million kg in 2001, an increase of 20 percent. This increase occurred from 1998 to 2000; however, from 2000 to 2001, these transfers decreased by 7 percent.
- Although transfers from Canadian facilities to US sites increased by 20 percent, Canadian facilities decreased their transfers to other Canadian sites by 20 percent, and overall transfers, including those within Canada, decreased by 14 percent.
- Throughout this period, most of the transfers from Canada to the US were in the form of metals and their compounds to recycling.
- Transfers of the matched chemicals from US facilities to Canadian sites decreased by 18 percent, while cross-border transfers to Mexican sites increased by 29 percent. Overall transfers, including those within the US, decreased by 3 percent.
- Transfers from the US to Canada decreased from 29.8 million kg in 1998 to 24.6 million kg in 2001. The amount of transfers varied substantially from year to year during this period, with a decrease of 8.1 million kg from 1998 to 1999, a further decrease of 10.4 million kg from 1999 to 2000, and an increase of 13.3 million kg from 2000 to 2001.

Table 8–10. Total Off-site Transfers Within Country and Cross-Border, 1998–2001

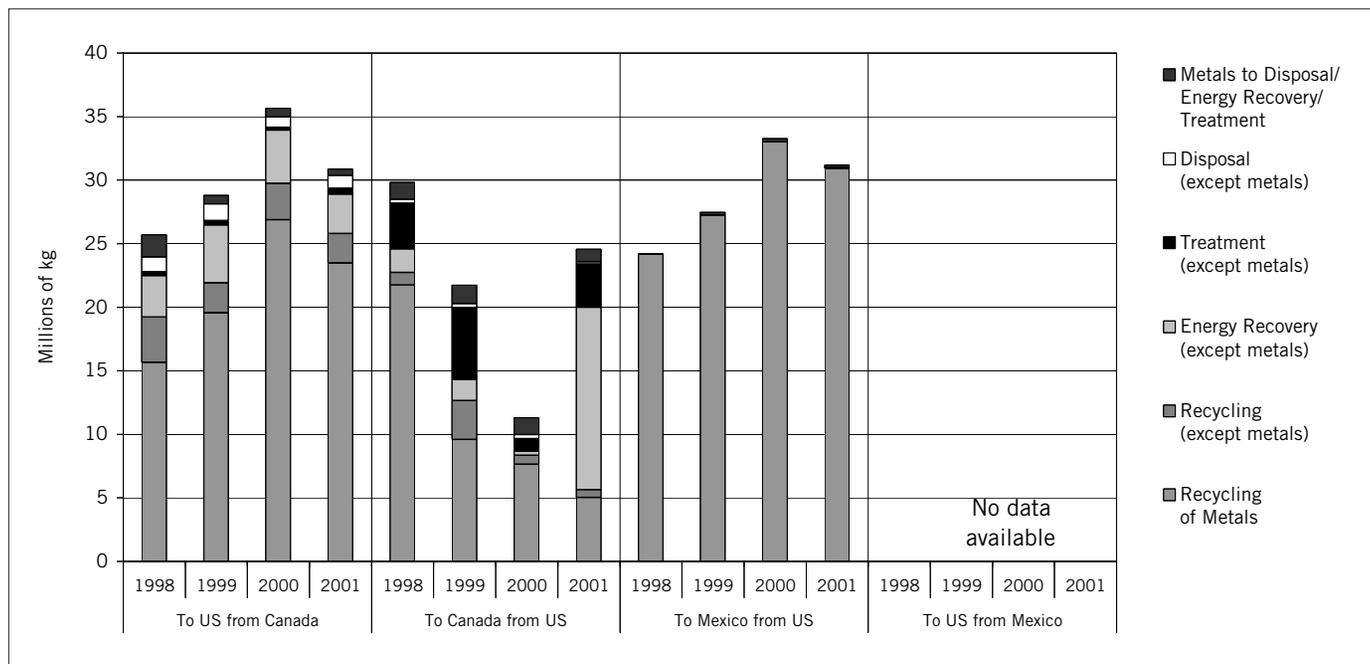
	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal							
	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	Change 2000–2001		Change 1998–2001	
					kg	%	kg	%
<b>From Canadian Facilities</b>	<b>179,842,892</b>	<b>162,394,816</b>	<b>167,601,736</b>	<b>154,053,582</b>	<b>-13,548,154</b>	<b>-8</b>	<b>-25,789,310</b>	<b>-14</b>
Within Canada*	154,108,846	133,496,809	131,672,731	123,022,684	-8,650,047	-7	-31,086,162	-20
To United States	25,695,373	28,810,974	35,642,485	30,867,246	-4,775,239	-13	5,171,873	20
To Mexico	0	0	0	0	0	--	0	--
To Other Countries	38,673	87,033	286,520	163,652	-122,868	-43	124,979	323
<b>From US Facilities</b>	<b>1,465,025,461</b>	<b>1,458,310,028</b>	<b>1,463,031,803</b>	<b>1,421,542,035</b>	<b>-41,489,768</b>	<b>-3</b>	<b>-43,483,426</b>	<b>-3</b>
Within United States*	1,408,742,632	1,406,714,826	1,414,990,882	1,363,534,847	-51,456,036	-4	-45,207,785	-3
To Canada	29,813,576	21,730,161	11,300,126	24,562,219	13,262,093	117	-5,251,357	-18
To Mexico	24,192,833	27,461,756	33,258,198	31,177,834	-2,080,364	-6	6,985,001	29
To Other Countries	2,276,420	2,403,285	3,482,597	2,267,136	-1,215,462	-35	-9,284	-0.4
<b>From Mexican Facilities</b>	Data not available.							

Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 1998–2001.

Does not include lead, mercury, vanadium and their compounds.

\* Includes transfers where destination is unknown.

Figure 8–4. Change in Off-site Transfers to/from Canada, US and Mexico, 1998–2001



Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 1998–2001. Does not include lead, mercury, vanadium and their compounds.

- Much of the variation in the amount of transfers from the US to Canada was due to a change in transfers to energy recovery, which made up 8 percent of the total in 1999 but 58 percent in 2001. One facility, Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan, accounted for most of this change, reporting an increase of 14.1 million kg of transfers to energy recovery to Canadian facilities. Transfers of metals to recycling decreased in each year from 1998 to 2001.
- Transfers by TRI facilities to sites in Mexico increased from 24.2 million kg in 1998 to 31.2 million kg in 2001, an increase of 29 percent. There was a decrease of 6 percent from 2000 to 2001 after increases in each of the two prior years.
- No data are available for transfers from Mexico to the US or to Canada for the years 1998 to 2001.

### 8.3.1 1998–2001 Cross-Border Transfers by Chemical

In both TRI and NPRI, a few chemicals accounted for most of the transfers between Canada and the US from 1998 to 2001.

- Twenty-five chemicals accounted for more than 99 percent of all cross-border transfers for both countries in 2001.
- Zinc and its compounds was the substance transferred from Canada to the US in the largest amount in 2001, having increased by 93 percent, or 5.7 million kg; however, such transfers decreased by almost 97,000 kg from 2000 to 2001 after having increased in each prior year.
- Though it had the largest cross-border transfers in 1998, copper and its compounds dropped to second in 2001, despite an increase of 15 percent, or 1.2 million kg, from 1998 to 2001. From 2000 to 2001, such transfers decreased by 2.9 million kg.
- Toluene and xylenes ranked third and fourth respectively in 2001. Transfers of toluene from Canada to the US increased by 40 percent, while those of xylenes decreased by 34 percent.

Table 8–11. NPRI Off-site Transfers to the US from Canada, by Chemical, 1998–2001 (Chemicals with Largest Transfers in 2001)

Rank	CAS Number	Chemical	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal						
			1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	Change 1998–2001 (kg) (%)		
1	--	m	Zinc (and its compounds)	6,188,771	8,045,145	12,032,658	11,935,788	5,747,017	93
2	--	m	Copper (and its compounds)	7,759,914	9,418,231	11,873,127	8,941,793	1,181,879	15
3	108-88-3	p	Toluene	1,376,703	1,869,144	2,042,849	1,932,577	555,874	40
4	1330-20-7		Xylenes	2,275,615	2,513,068	2,003,394	1,496,542	-779,073	-34
5	--	m	Manganese (and its compounds)	724,268	898,125	1,246,642	1,493,662	769,394	106
6	7697-37-2		Nitric acid and nitrate compounds	607,179	726,040	770,809	975,307	368,128	61
7	--	m,c,p,t	Nickel (and its compounds)	481,672	514,178	688,337	691,586	209,914	44
8	--	m,c,p,t	Chromium (and its compounds)	463,877	553,099	646,958	617,239	153,362	33
9	78-93-3		Methyl ethyl ketone	549,332	735,052	563,620	409,310	-140,022	-25
10	108-10-1		Methyl isobutyl ketone	411,175	630,543	464,254	323,068	-88,107	-21
11	107-21-1		Ethylene glycol	1,378,003	257,243	321,609	300,639	-1,077,364	-78
12	1313-27-5		Molybdenum trioxide	31,629	328,369	503,796	266,940	235,311	744
13	108-95-2		Phenol	748,347	154,670	138,175	259,100	-489,247	-65
14	67-56-1		Methanol	197,548	234,069	197,326	194,219	-3,329	-2
15	71-36-3		n-Butyl alcohol	77,959	171,746	191,275	170,592	92,633	119
16	100-41-4	c	Ethylbenzene	239,210	291,906	285,954	164,831	-74,379	-31
17	127-18-4	c,p,t	Tetrachloroethylene	56,420	137,305	128,367	141,176	84,756	150
18	--	m	Silver (and its compounds)	133,122	68,894	56,489	118,548	-14,574	-11
19	7429-90-5	m	Aluminum (fume or dust)	1,620,290	709,900	953,605	73,509	-1,546,781	-95
20	92-52-4		Biphenyl	0	0	22,000	69,100	69,100	--
21	--	m,c,p	Cobalt (and its compounds)	13,435	11,709	11,181	62,352	48,917	364
22	95-63-6		1,2,4-Trimethylbenzene	67,543	109,359	118,673	55,177	-12,366	-18
23	75-09-2	c,p,t	Dichloromethane	125,756	97,515	83,622	34,233	-91,523	-73
24	79-01-6	c,p,t	Trichloroethylene	40,194	96,420	57,383	27,369	-12,825	-32
25	--	m,c,p,t	Cadmium (and its compounds)	7,640	8,598	24,091	23,550	15,910	208
			<b>Subtotal</b>	<b>25,575,602</b>	<b>28,580,328</b>	<b>35,426,194</b>	<b>30,778,207</b>	<b>5,202,605</b>	<b>20</b>
			<b>% of Total</b>	<b>99.5</b>	<b>99.2</b>	<b>99.4</b>	<b>99.7</b>		
			<b>Total</b>	<b>25,695,373</b>	<b>28,810,974</b>	<b>35,642,485</b>	<b>30,867,246</b>	<b>5,171,873</b>	<b>20</b>

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

Table 8–12. TRI Off-site Transfers to Canada from the US, by Chemical, 1998–2001 (Chemicals with Largest Transfers in 2001)

Rank	CAS Number	Chemical	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal					Change 1998–2001 (%)
			1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	(kg)	
1	--	Xylenes	1,663,654	2,244,939	377,078	4,729,256	3,065,602	184
2	108-88-3	p Toluene	1,672,313	2,286,702	699,529	4,329,840	2,657,527	159
3	--	m Copper (and its compounds)	19,133,834	6,911,601	4,661,064	2,418,135	-16,715,699	-87
4	91-20-3	Naphthalene	251,756	165,937	45,880	1,798,706	1,546,950	614
5	67-56-1	Methanol	480,062	794,005	135,113	1,701,434	1,221,372	254
6	78-93-3	Methyl ethyl ketone	303,758	589,712	56,966	1,375,874	1,072,116	353
7	--	m Zinc (and its compounds)	1,408,238	1,711,536	1,517,481	1,273,922	-134,317	-10
8	108-95-2	Phenol	64,293	17,003	1,899	996,327	932,034	1,450
9	--	m,c,p,t Nickel (and its compounds)	1,224,013	1,285,119	1,316,491	954,293	-269,720	-22
10	100-41-4	c Ethylbenzene	184,401	285,375	54,216	829,708	645,307	350
11	108-10-1	Methyl isobutyl ketone	126,186	298,976	43,213	702,263	576,078	457
12	75-09-2	c,p,t Dichloromethane	521,305	531,356	223,970	656,694	135,389	26
13	71-36-3	n-Butyl alcohol	98,158	110,963	7,212	633,973	535,815	546
14	--	m Manganese (and its compounds)	450,140	464,209	579,768	558,277	108,137	24
15	--	m,c,p,t Chromium (and its compounds)	462,881	416,863	468,110	412,417	-50,463	-11
16	--	Nitric acid and nitrate compounds	198,200	130,028	219,527	339,150	140,950	71
17	--	m Antimony (and its compounds)	120,599	82,913	209,323	161,747	41,149	34
18	--	m Silver (and its compounds)	94,001	29,063	64,870	140,360	46,359	49
19	1634-04-4	Methyl tert-butyl ether	583	41,169	1,540	114,184	113,601	19,493
20	71-43-2	c,p,t Benzene	148,210	39,412	1,729	49,961	-98,249	-66
21	--	m,c,p Cobalt (and its compounds)	61,979	33,972	43,815	44,460	-17,519	-28
22	140-88-5	c,p Ethyl acrylate	2	116	10,840	44,317	44,315	1,954,300
23	--	m,c,p,t Cadmium (and its compounds)	80,442	79,864	82,897	41,851	-38,591	-48
24	1313-27-5	Molybdenum trioxide	0	20,015	26,233	35,221	35,221	--
25	7664-39-3	t Hydrogen fluoride	30,639	26,725	21,571	27,341	-3,297	-11
<b>Subtotal</b>			<b>28,779,647</b>	<b>18,597,572</b>	<b>10,870,335</b>	<b>24,369,713</b>	<b>-4,409,934</b>	<b>-15</b>
<b>% of Total</b>			<b>97</b>	<b>86</b>	<b>96</b>	<b>99</b>		
<b>Total</b>			<b>29,813,576</b>	<b>21,730,161</b>	<b>11,300,126</b>	<b>24,562,219</b>	<b>-5,251,357</b>	<b>-18</b>

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

- Xylenes and toluene were the substances with the highest transfers from the US to Canada in 2001. Transfers of both chemicals rose by over 2.5 million kg, representing increases of over 150 percent for each. The substantial increase came in the period 2000 to 2001 and was largely due to one facility, Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan.
- Although copper and its compounds was the substance transferred from the US to Canada in the largest amount in 1998, an 87-percent decrease in such transfers (16.7 million kg) dropped it to third place in 2001.

### 8.3.2 1998–2001 Cross-Border Transfers by Industry

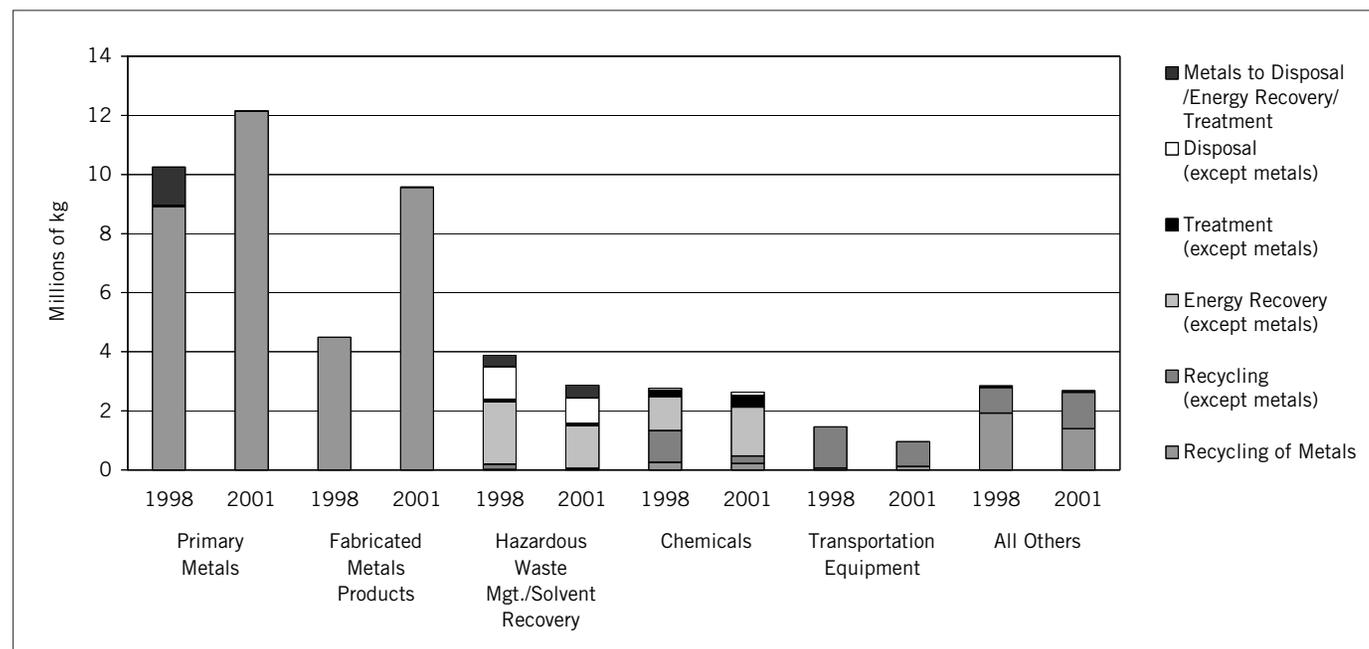
In NPRI, 15 sectors reported transfers to US sites, and in TRI, 16 industry sectors reported transfers to Canadian sites in 1998 or 2001.

- The Canadian primary metals sector, which had the largest transfers to the US in both years, increased its transfers by 1.9 million kg (19 percent) from 1998 to 2001. Almost all of the transfers were metals for recycling.
- The Canadian fabricated metals sector reported the largest increase in cross-border transfers from 1998 to 2001—5.1 million kg, or over 100 percent—although it did report a decrease from 2000 to 2001 of 1.2 million kg. Almost all of the transfers were metals for recycling.
- Canadian hazardous waste management facilities reported the largest decrease in cross-border transfers, a decline of 1.0 million kg. These facilities primarily transferred chemicals for energy recovery and disposal.

Table 8–13. NPRI Off-site Transfers to the US from Canada, by Industry, 1998–2001 (Ordered by Industry with Largest Transfers in 2001)

Rank	US SIC Code	Industry	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal					Change 1998–2001	
			1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	kg	%	
1	33	Primary Metals	10,254,259	6,548,868	13,021,429	12,152,345	1,898,086	19	
2	34	Fabricated Metals Products	4,492,271	10,912,740	10,800,566	9,575,305	5,083,034	113	
3	495/738	Hazardous Waste Mgt./Solvent Recovery	3,881,459	4,718,271	3,791,483	2,869,256	-1,012,203	-26	
4	28	Chemicals	2,762,995	2,788,987	3,009,698	2,631,906	-131,089	-5	
5	37	Transportation Equipment	1,459,822	1,585,107	2,183,969	955,627	-504,195	-35	
6	39	Misc. Manufacturing Industries	838,000	821,823	804,511	696,954	-141,046	-17	
7	27	Printing and Publishing	5,797	3,470	313,907	669,622	663,825	11,451	
8	29	Petroleum and Coal Products	922,762	241,417	300,598	367,536	-555,226	-60	
9	30	Rubber and Plastics Products	3,884	9,732	114,388	278,052	274,168	7,059	
10	491/493	Electric Utilities	260,112	210,567	162,920	243,840	-16,272	-6	
11	36	Electronic/Electrical Equipment	435,955	644,839	805,507	230,773	-205,182	-47	
12	35	Industrial Machinery	174,494	185,172	193,943	79,270	-95,224	-55	
13	20	Food Products	191,573	74,319	110,325	73,210	-118,363	-62	
14	26	Paper Products	861	26,310	21,760	41,950	41,089	4,772	
15	32	Stone/Clay/Glass Products	11,129	39,112	7,481	1,600	-9,529	-86	
16	22	Textile Mill Products	0	240	0	0	0	--	
<b>Total</b>			<b>25,695,373</b>	<b>28,810,974</b>	<b>35,642,485</b>	<b>30,867,246</b>	<b>5,171,873</b>	<b>20</b>	

Figure 8–5. NPRI Off-site Transfers to Canada from the US, Industries with Largest Transfers in 2001, 1998 and 2001



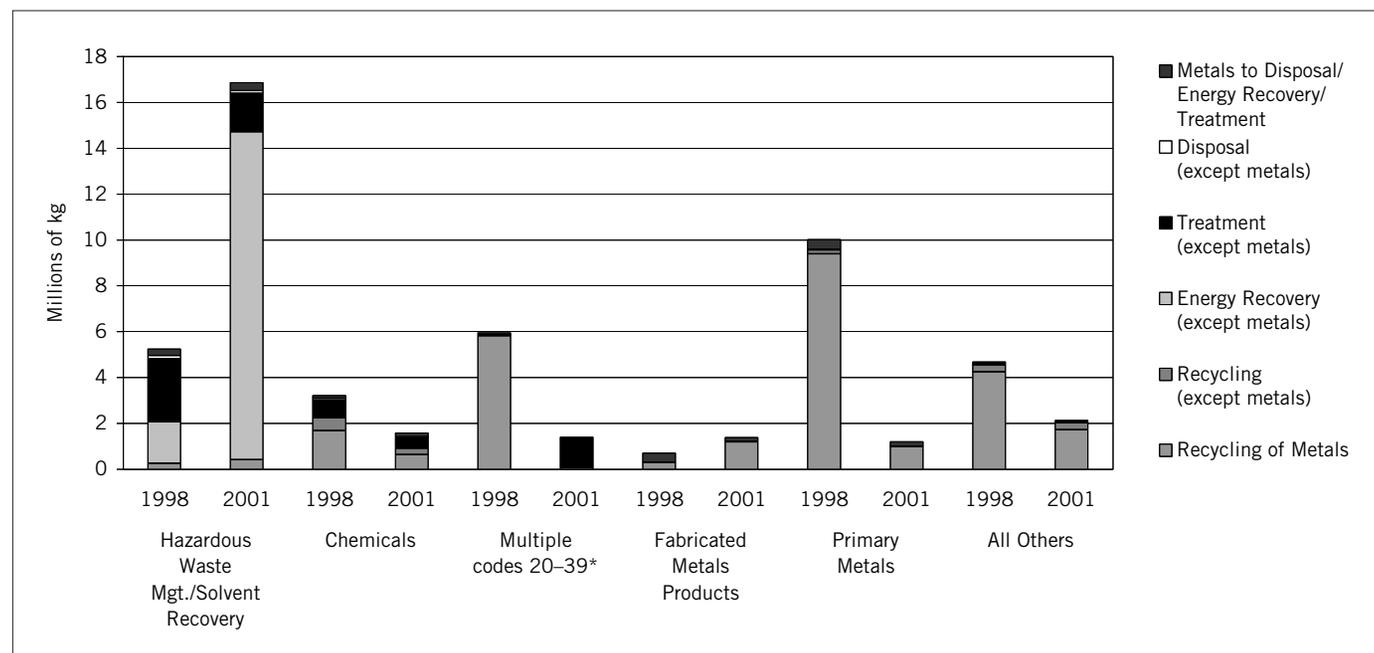
**Table 8–14. TRI Off-site Transfers to Canada from the US, by Industry, 1998–2001 (Ordered by Industry with Largest Transfers in 2001)**

Rank	US SIC Code	Industry	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal					
			1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	Change 1998–2001 (kg)	%
1	495/738	Hazardous Waste Mgt./Solvent Recovery	5,240,841	7,179,241	2,083,553	16,863,165	11,622,324	222
2	28	Chemicals	3,215,916	3,143,302	2,277,540	1,579,691	-1,636,225	-51
3	--	Multiple codes 20–39*	5,945,999	607,342	529,822	1,401,090	-4,544,909	-76
4	34	Fabricated Metals Products	701,705	780,445	1,096,405	1,383,411	681,706	97
5	33	Primary Metals	10,020,044	6,300,946	2,316,420	1,203,750	-8,816,294	-88
6	37	Transportation Equipment	3,519,791	2,639,707	1,834,522	746,292	-2,773,499	-79
7	36	Electronic/Electrical Equipment	523,880	615,804	629,259	451,586	-72,294	-14
8	38	Measurement/Photographic Instruments	199,320	112,878	181,848	280,681	81,361	41
9	32	Stone/Clay/Glass Products	35,195	39,130	32,001	262,138	226,943	645
10	26	Paper Products	283,919	99,139	204,683	240,080	-43,839	-15
11	29	Petroleum and Coal Products	22,586	42,986	38,748	57,172	34,586	153
12	30	Rubber and Plastics Products	69,331	122,481	30,690	42,386	-26,945	-39
13	35	Industrial Machinery	26,271	30,187	32,982	40,616	14,345	55
14	39	Misc. Manufacturing Industries	8,664	9,830	11,630	8,300	-364	-4
15	491/493	Electric Utilities	0	6,742	23	1,859	1,859	--
16	23	Apparel and Other Textile Products	113	0	0	0	-113	-100
<b>Total</b>			<b>29,813,576</b>	<b>21,730,161</b>	<b>11,300,126</b>	<b>24,562,219</b>	<b>-5,251,357</b>	<b>-18</b>

\* Multiple SIC codes reported only in TRI.

- US hazardous waste management facilities reported the largest transfers to Canada in 2001, with an increase of 11.6 million kg, or over 200 percent. These facilities primarily transferred chemicals for energy recovery and treatment. The increase came in transfers to energy recovery reported by one facility (Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan).
- The sector with the largest transfers from US facilities to Canadian sites in 1998, the primary metals industry, dropped to fifth, with a decrease of 8.8 million kg, or 88 percent. Almost all of the transfers from these facilities were metals for recycling.
- US chemical manufacturers had the second-largest transfers in 2001, despite reporting a decrease of 1.6 million kg, or 51 percent, since 1998. These facilities transferred chemicals mainly for recycling and treatment.

**Figure 8–6. TRI Off-site Transfers to Canada from the US, Industries with Largest Transfers in 2001, 1998 and 2001**



\* Multiple SIC codes reported only in TRI.

### 8.3.3 Sites with largest Change in Cross-Border Transfers, 1998–2001

Many of the changes noted above can be related to changes reported by a few facilities to a small number of receiving sites.

- Transfers from Canadian facilities to four sites in the US decreased by over one million kg from 1998 to 2001.
- One site, Schillberg Integrated Metals in East Hartford, Connecticut, is no longer in business. One primary metals facility, Alcatel Canada Wire in Simcoe, Ontario (which has changed its name to Nexan Magnet Wire), reported transfers to Schillberg of 2.4 million kg in 1998, primarily of copper and its compounds transferred for recycling. Nexan has changed its contract for recycling to another facility.
- Another site, Lafarge Corporation in Alpena, Michigan, ceased receiving solvent wastes for energy recovery and redirected them to another facility. One chemical manufacturer, Aimco Solrec Ltd. in Milton, Ontario, transferred over 1.4 million kg in 1999. This facility now sends its solvents to the Systech Environmental (a wholly owned subsidiary of Lafarge) site in Paulding, Ohio. One hazardous waste management facility, Philip Services in Hamilton, Ontario, transferred over 774,000 kg in 1998.

Table 8–15. NPRI Off-site Transfers to the US from Canada, Receiving Sites in the US with Largest Decrease, 1998–2001

Rank	Receiving Site in US, City, State Transferring Facility in Canada	City, Province	SIC Code		Total Transfers to Recycling/Energy Recovery/Treatment/Disposal	
			Canada	US	1998 (kg)	1999 (kg)
1	<b>Schilberg Integrated Metals, East Hartford, CT</b> Alcatel Canada Wire Alcatel Belden Canada Inc.	Simcoe, ON	33	33	2,423,000	463,600
		Montréal-Est, QC	29	33	0	0
		Cobourg, ON	29	33	0	0
2	<b>Lafarge Corporation, Alpena, MI</b> Aimco Solrec Ltd. Philip Enterprises Inc., Parkdale Avenue Facility Anachemia Ltee/Ltd Safety-Kleen Ltd. Chemrec Inc. Ontario Power Generation Inc, Nanticoke Generating Station Philip Services Corp.	Milton, ON	37	28	1,877,476	2,087,669
		Hamilton, ON	77	495/738	792,570	1,401,720
		Lachine, QC	37	28	774,400	0
		Mississauga, ON	37	28	121,743	48,065
		Cowansville, QC	99	495/738	51,993	38,669
		Nanticoke, ON	37	28	0	0
		Windsor, ON	49	491/493	136,770	139,731
3	<b>Browning-Ferris Industries - Arbor Hills Landfill, Northville, MI</b> Zalev Brothers Co., Ferrous Processing & Trading Co. Ford Motor Company Ford of Canada General Motors of Canada Limited Casco Impregnated Papers, Inc. Stackpole Limited Owens-Corning Canada Inc. Philip Services Corp.	Windsor, ON	27	26	1,491,441	262,245
		Windsor, ON	29	33	1,206,826	0
		Windsor, ON	32	35	266,740	235,160
		Oshawa, ON	32	37	13,400	0
		Cobourg, ON	32	37	3,575	0
		Cobourg, ON	35	32	861	0
		Toronto, ON	77	495/738	4	0
4	<b>Alchem Aluminum Inc., Imco Recycling Inc., Coldwater, MI</b> Ford Motor Company of Canada Limited Amcan Castings Limited Microprecision Die Casting Inc. Petro-Canada Orlick Industries Limited H.E. Vannatter Ltd. Orlick Industries Limited	Candiac, QC	32	37	35	0
		Windsor, ON	29	33	0	27,085
		Windsor, ON	29	33	1,293,654	859,738
		Hamilton, ON	29	33	1,283,000	243,300
		Burlington, ON	29	33	7,080	483,000
		Montreal, QC	29	33	1,752	129,900
		Montreal, QC	36	29	1,752	0
5	<b>Schilberg/Upstate Metals Corp., Canastota, NY</b> Noma Cable Tech Belden Canada Inc.	Stoney Creek, ON	55	37	0	0
		Wallaceburg, ON	55	37	0	0
		Hamilton, ON	55	37	1,822	3,538
		Hamilton, ON	55	37	0	0
		Stouffville, ON	33	33	886,300	940,037
		Cobourg, ON	29	33	886,300	886,300
		Cobourg, ON	29	33	0	53,737

Table 8–15. (continued)

Rank	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			Chemical with largest change (type of transfer)
	2000 (kg)	2001 (kg)	Change 1998–2001 (kg)	
1	<b>1,096,195</b>	<b>58,797</b>	<b>-2,364,203</b>	
	1,077,100	0	-2,423,000	Copper and compounds (transfers to recycling)
	0	58,797	58,797	Copper and compounds (transfers to recycling)
	19,095	0	0	Copper and compounds (transfers to recycling)
2	<b>1,261,464</b>	<b>321,696</b>	<b>-1,555,780</b>	
	857,125	0	-792,570	Xylenes (transfers to energy recovery)
	0	0	-774,400	Xylenes (transfers to energy recovery)
	48,065	48,065	-73,678	Toluene (transfers to energy recovery)
	0	0	-51,993	Methanol (transfers to energy recovery)
	131,289	0	0	Methyl ethyl ketone (transfers to treatment)
	157,775	182,551	45,781	Chromium and compounds (transfers to recycling)
67,210	91,080	91,080	Toluene (transfers to energy recovery)	
3	<b>2,500</b>	<b>17,583</b>	<b>-1,473,858</b>	
	0	0	-1,206,826	Zinc and compounds (transfers to disposal)
	0	0	-266,740	Manganese and compounds (transfers to recycling)
	0	0	-13,400	Copper and compounds (transfers to disposal)
	0	0	-3,575	Copper and compounds (transfers to disposal)
	0	0	-861	Formaldehyde (transfers to disposal)
	0	0	-4	Copper and compounds (transfers to disposal)
	0	63	28	Formaldehyde (transfers to disposal)
	2,500	17,520	17,520	Manganese and compounds (transfers to disposal)
4	<b>661,548</b>	<b>9,046</b>	<b>-1,284,608</b>	
	0	0	-1,283,000	Aluminum (fume or dust) (transfers to recycling)
	0	0	-7,080	Copper and compounds (transfers to recycling)
	0	0	-1,752	Copper and compounds (transfers to recycling)
	0	20	20	Toluene/xylenes (transfers to disposal)
	126,706	1,129	1,129	Aluminum (fume or dust) (transfers to recycling)
	0	3,200	1,378	Copper and compounds (transfers to recycling)
534,842	4,697	4,697	Aluminum (fume or dust) (transfers to recycling)	
5	<b>971,000</b>	<b>0</b>	<b>-886,300</b>	
	971,000	0	-886,300	Copper and compounds (transfers to recycling)
	0	0	0	Copper and compounds (transfers to recycling)

- Transfers from Canadian facilities to three sites in the US increased by over one million kg from 1998 to 2001.
- One site, Horsehead Resource Development in Palmerton, Pennsylvania, had three Ontario steel mills increase transfers by more than 1.5 million kg each, primarily of zinc and its compounds for recycling. These facilities have changed their practices from land disposal of the flue ash from steel furnaces at Canadian sites to recycling.
- Another site, Extruded Metals in Belding, Michigan, had three brass machinery manufacturers in Ontario sending their brass shavings to Extruded Metals, starting in 2000. This is an integrated process whereby the machinery plant gets brass from the mill, machines it and returns brass shavings to the mill for recycling. These contracts were reported set up largely due to the increased price offered by Extruded Metals.
- The Systech Environmental site in Paulding, Ohio, which is a wholly owned subsidiary of Lafarge Cement, accepts waste and blends it for use in cement kilns. Two chemical manufacturers, Aimco Solrec in Milton, Ontario, and Chemrec in Cowansville, Quebec, previously sent solvents to the Systech facility in Alpena, Michigan (see **Table 8–15**), but subsequently started sending them to the Ohio site.
- Cal Met Trading in Morgan Hill, California, saw the return of a customer, the Maple Leaf Metal Industries facility in Edmonton, Alberta, in 2001 when they offered a good price for recycling copper.

**Table 8–16. NPRI Off-site Transfers to the US from Canada, Receiving Sites in the US with Largest Increase, 1998–2001**

Rank	Receiving Site in US, City, State Transferring Facility in Canada	City, Province	SIC Code		Total Transfers to Recycling/Energy Recovery/Treatment/Disposal	
			Canada	US	1998 (kg)	1999 (kg)
1	<b>Horsehead Resource Development, Palmerton, PA</b> Dofasco Inc., Dofasco Hamilton Ivaco Rolling Mills Limited Partnership Co-Steel Lasco	Hamilton, ON L'Orignal, ON Whitby, ON	29 29 29	33 33 33	0	0
					0	0
					0	0
					0	0
2	<b>Extruded Metals Inc., Belding, MI</b> Lofthouse Brass Manufacturing Limited Brass Craft Canada Ltd. Lofthouse Brass Manufacturing Limited L&M Screw Machine Products Limited	Burks Falls, ON St. Thomas, ON Whitby, ON North York, ON	29 30 29 30	34 34 34 34	0	<b>34,936</b>
					0	0
					0	0
					0	34,936
3	<b>Systech Environmental Corporation, Lafarge Corporation, Paulding, OH</b> Aimco Solrec Ltd. Chemrec Inc. Fielding Chemical Technologies Inc.	Milton, ON Cowansville, QC Mississauga, ON	37 37 37	28 28 28	0	<b>17,991</b>
					0	17,991
					0	0
4	<b>Cal Met Trading, Morgan Hills, CA</b> Maple Leaf Metal Industries Ltd.	Edmonton, AB	29	33	0	0
					0	0
5	<b>Chemetco inc., Hartford, IL</b> Wolverine Tube (Canada) Inc Tuyaux Wolverine (Canada) inc.	Fergus, ON Montréal-Est, QC	29 29	33 33	0	0
					0	0

Table 8–16. (continued)

Rank	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			Chemical with largest change (type of transfer)
	2000 (kg)	2001 (kg)	Change 1998–2001 (kg)	
1	<b>4,869,293</b>	<b>6,270,910</b>	<b>6,270,910</b>	
	1,559,140	2,852,520	2,852,520	Zinc and compounds (transfers to recycling)
	78,670	1,837,230	1,837,230	Zinc and compounds (transfers to recycling)
	3,231,483	1,581,160	1,581,160	Zinc and compounds (transfers to recycling)
2	<b>2,669,499</b>	<b>3,061,411</b>	<b>3,061,411</b>	
	1,203,000	1,810,000	1,810,000	Copper and compounds (transfers to recycling)
	1,061,499	957,411	957,411	Copper and compounds (transfers to recycling)
	405,000	294,000	294,000	Copper and compounds (transfers to recycling)
	0	0	0	Copper and compounds (transfers to recycling)
3	<b>416,575</b>	<b>1,387,514</b>	<b>1,387,514</b>	
	414,248	1,057,290	1,057,290	Xylenes (transfers to energy recovery)
	0	330,200	330,200	Toluene (transfers to treatment)
	2,327	24	24	Toluene (transfers to energy recovery)
4	<b>0</b>	<b>954,546</b>	<b>954,546</b>	
	0	954,546	954,546	Copper and compounds (transfers to recycling)
5	<b>0</b>	<b>694,040</b>	<b>694,040</b>	
	0	377,500	377,500	Copper and compounds (transfers to recycling)
	0	316,540	316,540	Copper and compounds (transfers to recycling)

- Transfers from US facilities to three sites owned by Philip Services (two in Hamilton, Ontario, and one in Barrie, Ontario) had just about ceased in 2001.
- Transfers from US facilities to the Philip Services site located on Centennial Parkway in Hamilton, Ontario, decreased by almost 12 million kg from 1998 to 2001. Three facilities that sent more than one million kg of mainly copper and its compounds for recycling at this Philip Services facility in 1998 had ceased sending materials there by 2001.
- The Avaya facility in Omaha, Nebraska, which sent 4.5 million kg to Philip Services in 1998, had reduced its overall transfers to recycling to all facilities from 5.3 million kg in 1998 to 902,000 kg in 2001. The Philip site notified Avaya that it could not longer accept its type of material (plastic fluff from cable ends).
- The Delphi Packard Electric Systems facility in Warren, Ohio, sent 3.0 million kg in 1998 to Philip Services but had switched to other recycling facilities in the US by 2001 due to changes in its recycling contracts.
- General Cable Industries in Bonham, Texas, sent 1.5 million kg in 1998 but none after that. It had switched to other facilities in the US by 2001.
- Transfers from US facilities to the Noranda Metals facility in Rouyn-Noranda, Quebec, decreased by 6.9 million kg from 1998 to 2001. The US facility with the largest transfers, the primary metals facility Brushwellman in Elmore, Ohio, switched from this facility to one in Indiana when the Noranda contract ended. The Dow Corning facility in Carrollton, Kentucky, decreased its total releases and transfers of copper compounds by 89 percent from 1998 to 2001, including the amount sent for recycling to Noranda.

Table 8–17. TRI Off-site Transfers to Canada from the US, Receiving Sites in Canada with Largest Decrease, 1998–2001

Rank	Receiving Site in Canada, City, Province Transferring Facility in US	City, State	US SIC Code	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal				
				1998 (kg)	1999 (kg)			
1	<b>Philip Services (Centennial Parkway), Hamilton, ON</b>	Avaya Inc.	Omaha, NE	Mult.	11,787,508	2,042,179		
		Delphi Packard Electric Sys. N. River Road Facility	Warren, OH	37	4,502,581	188,693		
		General Cable Inds. Inc.	Bonham, TX	33	3,000,454	1,593,197		
		Southwire Co.	Kingman, AZ	Mult.	1,461,256	0		
		International Wire Group Omega Wire Facility	Williamstown, NY	33	753,633	0		
		General Cable Inds. L.L.C.	Sanger, CA	33	589,569	0		
		General Cable Inds.	Cass City, MI	33	510,202	0		
		Delphi Harrison Thermal Sys. Lockport	Lockport, NY	Mult.	272,529	0		
		International Wire Group Auburn Facility	Jordan, NY	33	258,503	243,084		
		International Wire Group OWI Facility	Camden, NY	Mult.	136,054	0		
		General Cable Inds. Inc.	Monticello, IL	33	107,263	0		
		General Cable Inds. Inc.	Plano, TX	33	34,511	0		
		General Cable Inds.	Taunton, MA	Mult.	16,760	0		
		All Others			8,138	17,205		
		2	<b>Noranda Inc. (Fonderie Horne), Rouyn-Noranda, QC</b>	Brushwellman Inc. Elmore Plant	Elmore, OH	33	7,878,491	2,779,604
				Dow Corning Corp.	Carrollton, KY	28	731,816	21,549
H. Kramer & Co.	Chicago, IL			33	761,234	724,505		
GE Co. Silicone Prods.	Waterford, NY			28	647,610	520,647		
Viasystems Techs. Corp. L.L.C.	Richmond, VA			36	861,752	857,799		
Revere Copper Prods. Inc.	Rome, NY			33	201,624	246,482		
21 Emi RI	Warwick, RI			495/738	93,877	0		
GE Plastics	Selkirk, NY			28	49,206	0		
Behr Specialty Metals Inc.	Rockford, IL			33	31,488	15,420		
Hadco Corp. Owego Div.	Owego, NY			36	30,509	0		
Photocircuits Corp.	Glen Cove, NY			36	24,698	0		
Erie Bronze & Aluminum	Erie, PA			33	15,823	0		
Advanced Flex Inc.	Minnetonka, MN			36	14,966	0		
Chicago Faucet Co.	Des Plaines, IL			34	10,385	3,170		
Texas Instruments Inc.	Attleboro, MA			Mult.	42,045	36,757		
Kearny Smelting & Refining Corp.	Kearny, NJ			33	6,445	0		
Brush Wellman Inc.	Shoemakersville, PA			33	6,100	3,560		
Attleboro Refining Co. Inc.	Attleboro, MA			33	5,620	0		
Eastman Kodak Co. Kodak Park	Rochester, NY			38	4,810	173,883		
All Others					196,372	77,687		
			71,426	98,145				
3	<b>Philip Services (Burlington St. East), Hamilton, ON</b>	Lawrenceburg, KY	33	2,035,342	0			
		General Cable Inds. Inc.	Manchesters, NH	33	1,675,062	0		
		General Cable Inds. Inc.	Lansing, MI	37	314,673	0		
		GM Lansing Plants 2 3 & 6 (Body)	Watkinsville, GA	33	30,385	0		
		Southwire Co.			10,544	0		
All Others			4,678	0				
4	<b>Philip Services, Barrie, ON</b>	Petro-Chem Processing Group/Solvent Distillers Group	Detroit, MI	495/738	1,480,742	37,039		
5	<b>Norsk Hydro Canada Inc., Hydro Magnesium Canada, Bécancour, QC</b>	Henderson, KY	33	1,147,392	3,256,281			
		Harlingen, TX	33	1,147,392	3,256,236			
		Cleveland, OH	33	0	0			
					0	45		

Table 8–17. (continued)

Rank	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			Chemical with largest change (type of transfer)
	2000 (kg)	2001 (kg)	Change 1998–2001 (kg)	
1	<b>1,594,845</b>	<b>13,792</b>	<b>-11,773,717</b>	
	188,693	0	-4,502,581	Copper and compounds (transfers to recycling)
	1,138,322	0	-3,000,454	Copper and compounds (transfers to recycling)
	0	0	-1,461,256	Copper and compounds (transfers to recycling)
	0	0	-753,633	Copper and compounds (transfers to recycling)
	0	0	-589,569	Copper and compounds (transfers to recycling)
	0	0	-510,202	Copper and compounds (transfers to recycling)
	0	0	-272,529	Copper and compounds (transfers to recycling)
	0	0	-258,503	Copper and compounds (transfers to recycling)
	0	0	-136,054	Copper and compounds (transfers to recycling)
	0	0	-136,054	Copper and compounds (transfers to recycling)
	0	0	-107,263	Copper and compounds (transfers to recycling)
	0	0	-34,511	Copper and compounds (transfers to recycling)
	0	0	-16,760	Copper and compounds (transfers to recycling)
	267,830	13,792	5,654	
2	<b>1,710,620</b>	<b>950,749</b>	<b>-6,927,742</b>	
	0	0	-731,816	Copper and compounds (transfers to recycling)
	616,307	32,596	-728,638	Copper and compounds (transfers to recycling)
	181,916	0	-647,610	Copper and compounds (transfers to recycling)
	513,404	513,832	-347,920	Copper and compounds (transfers to recycling)
	231,989	78,138	-123,485	Copper and compounds (transfers to recycling)
	0	0	-93,877	Copper and compounds (transfers to recycling)
	0	0	-49,206	Copper and compounds (transfers to recycling)
	0	0	-31,488	Copper and compounds (transfers to recycling)
	0	0	-30,509	Copper and compounds (transfers to recycling)
	0	0	-24,698	Copper and compounds (transfers to recycling)
	0	0	-15,823	Copper and compounds (transfers to recycling)
	0	0	-14,966	Copper and compounds (transfers to recycling)
	0	0	-10,385	Copper and compounds (transfers to recycling)
	41,610	32,948	-9,098	Copper and compounds (transfers to recycling)
	0	0	-6,445	Copper and compounds (transfers to recycling)
	0	0	-6,100	Copper/Zinc and compounds (transfers to recycling)
	0	0	-5,620	Copper and compounds (transfers to recycling)
12,742	0	-4,810	Copper and compounds (transfers to recycling)	
22,222	193,197	-3,175	Silver and compounds (transfers to recycling)	
90,430	100,038	28,612		
3	<b>0</b>	<b>0</b>	<b>-2,035,342</b>	
	0	0	-1,675,062	Copper and compounds (transfers to recycling)
	0	0	-314,673	Copper and compounds (transfers to recycling)
	0	0	-30,385	Copper and compounds (transfers to recycling)
	0	0	-10,544	Copper and compounds (transfers to recycling)
	0	0	-4,678	
4	<b>0</b>	<b>10,602</b>	<b>-1,470,140</b>	
	0	10,602	-1,470,140	Xylenes/toluene (transfers to energy recovery)
5	<b>82,653</b>	<b>175</b>	<b>-1,147,218</b>	
	77,098	154	-1,147,238	Copper/Nickel and compounds (transfers to recycling)
	5,442	0	0	Copper/Nickel and compounds (transfers to recycling)
	113	20	20	Copper and compounds (transfers to recycling)

- Transfers from US facilities to the Philip Services facility on Burlington St. East in Hamilton, Ontario, ceased in 1999.
- The US facility with the largest transfers to the Philip Services facility in Barrie, Ontario, the hazardous waste management facility Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan, switched from this facility to the Philip Services facility on Parkdale Avenue North in Hamilton, Ontario (see **Table 8–18**). The increased transfers from Petro-Chem was driven by two factors, the increased drive within Petro-Chem to use internal resources, which favored Philip as they are now owned by the same company and a shift in the type of waste that Philip could manage.

- Transfers from US facilities to one site in Canada increased by over 14 million kg from 1998 to 2001. The US facility with the largest transfers to the Philip Services facility on Parkdale Avenue North in Hamilton, Ontario, the hazardous waste management facility Petro-Chem Processing Group/Solvent Distillers Group in Detroit, Michigan, switched to this facility from the Philip Services facility in Barrie, Ontario, (see **Table 8–17**) as well as from several facilities in the US.
- Transfers to the Sam Adelstein & Company facility in St. Catharines, Ontario, from US facilities increased by 486,000 kg from 1998 to 2001. In particular, three US facilities owned by American Axle and Manufacturing increased their quantities of manganese and nickel sent for recycling in 2000. These facilities increased both the amount sent for recycling to the Ontario site and the overall amount sent for recycling to all sites during this period. These changes were a result of two factors—increased production at American Axle and modifications to their recycling contracts with Sam Adelstein.

**Table 8–18. TRI Off-site Transfers to Canada from the US, Receiving Sites in Canada with Largest Increase, 1998–2001**

Rank	Receiving Site in Canada, City, Province Transferring Facility in US	City, State	US SIC Code	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal	
				1998 (kg)	1999 (kg)
1	<b>Philip Services (Parkdale Ave. North), Hamilton, ON</b>			<b>691,059</b>	<b>1,357,162</b>
	Petro-Chem Processing Group/Solvent Distillers Group	Detroit, MI	495/738	575,208	1,349,779
	New Jersey Shell Casting Corp.	Marietta, PA	33	0	113
	Superior Brass & Aluminum Casting Co.	East Lansing, MI	33	381	268
	Cyanokem Inc.	Detroit, MI	495/738	449	0
	Revere Copper Prods. Inc.	New Bedford, MA	33	468	309
	Reed & Barton Silversmiths	Taunton, MA	39	475	0
	Printed Circuit Corp.	Woburn, MA	36	4,478	0
	Elkhart Brass Mfg. Co. Inc.	Elkhart, IN	33	7,098	0
	Rochester Plating Works Inc.	Rochester, NY	34	8,278	4,470
	Ball Brass & Aluminum Fndy.	Auburn, IN	33	28,644	2,224
	Invensus Metering Sys. Inc.	Uniontown, PA	Mult.	65,578	0
	2	<b>Sam Adelstein &amp; Company. Ltd, St. Catharines, ON</b>			<b>61,338</b>
American Axle & Mfg. Gear Facility		Detroit, MI	34	0	0
AAM Tonawanda Forge		Tonawanda, NY	34	61,224	42,177
Republic Techs. Intl. L.L.C.		Blasdell, NY	33	0	0
American Axle & Mfg. Inc. Cheektowaga		Cheektowaga, NY	37	0	0
American Axle & Mfg. Inc. Buffalo Facility	Buffalo, NY	37	113	3,197	
3	<b>Central Machinery &amp; Metals, Weston, ON</b>			<b>199,903</b>	<b>487,742</b>
	Waltec Forgings Inc.	Port Huron, MI	34	15,275	20,637
	Brazeway Inc.	Adrian, MI	33	65,712	76,541
	Moeller Land & Cattle Co.	Caneyville, KY	33	118,916	390,563
4	<b>Falconbridge Ltd. Kidd Creek Metallurgical Div., Timmins, ON</b>			<b>298,111</b>	<b>388,647</b>
	River Recycling Inds. Inc.	Cleveland, OH	32	0	0
	Photocircuits Corp.	Glen Cove, NY	36	21,032	87,453
	Duracell Inc.	Cleveland, TN	36	7,256	34,467
	Hadco Corp. Owego Div.	Owego, NY	36	35,855	59,485
	Gould Electronics Inc. Electronic Materials	Mc Connelville, OH	34	0	0
	Conbraco Inds. Inc.	Pageland, SC	34	0	0
	Webster Fndy. Co.	Franklin, NH	34	30,612	46,496
	Laird Techs.	Delaware Water Gap, PA	34	0	2,651
	Celanese Ltd. Bay City Site	Bay City, TX	28	0	0
	Cytec Inds. Inc. Fortier Plant	Westwego, LA	28	0	0
	Watts Regulator Wacasco	Spindale, NC	33	26,531	7,528
	Invensus Metering Sys. Inc.	Uniontown, PA	Mult.	29,433	19,048
	Duracell Inc.	Lancaster, SC	36	147,392	131,519
5	<b>TRI-Smith Recycling, North York, ON</b>			<b>0</b>	<b>0</b>
	Nexans Magnet Wire USA Inc.	La Grange, KY	33	0	0
	Nexans Magnet Wire USA Inc.	Mexico, MO	33	0	0

Table 8–18. (continued)

Rank	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			Chemical with largest change (type of transfer)
	2000 (kg)	2001 (kg)	Change 1998–2001 (kg)	
1	<b>0</b>	<b>14,639,384</b>	<b>13,948,326</b>	
	0	14,639,384	14,064,176	Xylenes/olefins (transfers to energy recovery)
	0	0	0	Copper and compounds (transfers to disposal)
	0	0	-381	Nickel and compounds (transfers to disposal)
	0	0	-449	Copper and compounds (transfers to disposal)
	0	0	-468	Copper and compounds (transfers to recycling)
	0	0	-475	Copper and compounds (transfers to recycling)
	0	0	-4,478	Copper and compounds (transfers to recycling)
	0	0	-7,098	Copper and compounds (transfers to disposal)
	0	0	-8,278	Zinc and compounds (transfers to recycling)
	0	0	-28,644	Copper and compounds (transfers to recycling)
	0	0	-65,578	Copper and compounds (transfers to recycling)
2	<b>414,422</b>	<b>547,380</b>	<b>486,042</b>	
	133,787	335,883	335,883	Manganese and compounds (transfers to recycling)
	112,834	140,930	79,705	Nickel and compounds (transfers to recycling)
	144,671	47,166	47,166	Manganese and compounds (transfers to recycling)
	11,338	16,327	16,327	Nickel and compounds (transfers to recycling)
	11,791	7,075	6,961	Manganese and compounds (transfers to recycling)
3	<b>131,571</b>	<b>678,969</b>	<b>479,066</b>	
	24,973	543,993	528,717	Copper and compounds (transfers to recycling)
	106,598	134,976	69,264	Zinc and compounds (transfers to recycling)
	0	0	-118,916	Zinc and compounds (transfers to recycling)
4	<b>645,502</b>	<b>601,688</b>	<b>303,577</b>	
	30,488	237,298	237,298	Zinc and compounds (transfers to recycling)
	92,555	75,590	54,559	Copper and compounds (transfers to recycling)
	77,098	42,630	35,374	Zinc and compounds (transfers to recycling)
	73,959	69,664	33,810	Copper and compounds (transfers to recycling)
	15,906	23,786	23,786	Copper and compounds (transfers to recycling)
	6,975	22,988	22,988	Copper and compounds (transfers to recycling)
	48,163	40,615	10,003	Copper/Zinc and compounds (transfers to recycling)
	8,127	678	678	Copper and compounds (transfers to recycling)
	5,980	0	0	Zinc and compounds (transfers to recycling)
	47,166	0	0	Zinc and compounds (transfers to recycling)
	140,220	0	-26,531	Copper and compounds (transfers to recycling)
	26,304	0	-29,433	Copper/Zinc and compounds (transfers to recycling)
	72,562	88,438	-58,955	Zinc and compounds (transfers to recycling)
5	<b>0</b>	<b>273,828</b>	<b>273,828</b>	
	0	143,930	143,930	Copper and compounds (transfers to recycling)
	0	129,898	129,898	Copper and compounds (transfers to recycling)



**Special Analyses: Chemicals that are Linked to Cancer/  
Birth Defects and Reproductive Harm and Air Releases**



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## Key Findings

### Chemicals Linked to Cancer/Birth Defects and Reproductive Harm

- Known or suspected carcinogens comprised 11 percent of total releases on- and off-site of all matched chemicals in 2001. Carcinogens decreased by 20 percent from 1998 to 2001, compared to 16 percent for all matched chemicals. Total releases of designated carcinogens reported by NPRI facilities decreased by 22 percent and those by TRI facilities decreased by 20 percent.
- Chemicals linked to cancer, birth defects and other reproductive harm (California Proposition 65 chemicals) accounted for 13 percent of total releases on- and off-site of all matched chemicals in 2001. These Proposition 65 chemicals decreased by 26 percent from 1998 to 2001, compared to 16 percent for all matched chemicals. Total releases reported by NPRI facilities decreased by 24 percent and those by TRI facilities decreased by 26 percent.

### Air Releases

- Emitting chemicals to the air is the most common type of release. On-site air releases accounted for 26 percent of all releases and transfers in 2001. Over 755.5 million kg of chemicals were released into the air in 2001. Most chemicals were emitted through the stack. Stack air releases were 88 percent of the total air releases and fugitive and other air releases were 12 percent.
- The states and provinces with the largest air releases in 2001 were North Carolina, Ohio and Ontario. Electric utilities reported the largest air releases in these states and province as well as in North America. The chemical released to air in the largest amount was hydrochloric acid, primarily from electric utilities.
- Texas had the largest fugitive air releases, primarily from chemical manufacturers, accounting for 15 percent of fugitive air releases in North America.
- The carcinogens released to air in the largest amounts were styrene and dichloromethane. The rubber and plastics products sector accounted for more than 70 percent of releases of these chemicals.
- On-site air releases in NPRI increased by 3 percent from 1998 to 2001. The paper products industry reported the largest air releases in NPRI in both 1998 and 2001, with an increase of 5 percent during the period. Many NPRI paper products facilities indicated a change in estimation methods and/or increased production as reasons for the increases. Also, NPRI facilities newly reporting in 2001 that did not report in 1998 contributed to the increases seen from 1998 to 2001.
- On-site air releases in TRI decreased by 20 percent from 1998 to 2001. Electric utilities reported the largest air releases of any industry sector in TRI in both 1998 and 2001. They reported a decrease of 10 percent during the period.
- Dichloromethane was the designated carcinogen with the largest decrease in air releases from 1998 to 2001. The rubber and plastics industry reported the largest air releases of dichloromethane in both NPRI and TRI. The TRI rubber and plastics sector showed a reduction of 50 percent from 1998 to 2001. The US implemented regulations aimed at reducing air releases of dichloromethane in 1998 for this and other sectors. NPRI rubber and plastics facilities reported an increase of 9 percent from 1998 to 2001, but Canadian programs to reduce air emissions of dichloromethane from some sectors were finalized in 2003.

## 9.1 Introduction

**Chapter 9** examines releases and transfers in North America for two groups of chemicals with health effects and for on-site air emissions. The two groups of chemicals of special concern are 1) known or suspected carcinogens and 2) chemicals linked to cancer, birth defects and reproductive harm (chemicals on the California Proposition 65 list of substances). The last section of this chapter takes an in-depth look at the most common method of release in the matched data set—air emissions.

As explained in **Chapter 2**, the present chapter analyzes data for industries and chemicals that must be reported in both the United States and Canada (the matched data set). Comparable Mexican data are not available for the 2001 reporting year. For two other groups of chemicals of concern that can be examined, metals and their compounds and Canadian Environmental Protection Act (CEPA) Toxics, see the *Taking Stock* web site at <[www.ccc.org/takingstock](http://www.ccc.org/takingstock)>.

## 9.2 Releases On- and Off-site of Known or Suspected Carcinogens

Chemicals can have different health effects. In this section, chemicals that are known or suspected to cause cancer are analyzed. Of the 204 chemicals in the matched data set, 58 are known or suspected carcinogens. Only one, Michler's ketone, had no reports in 2001. Lead and its compounds are not part of the matched data set due to reporting differences. A chemical is designated as a known or suspected carcinogen by the International Agency for Research on Cancer (IARC) <www.iarc.fr/> or by the US National Toxicology Program (NTP) <ntp-server.niehs.nih.gov/>. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen because they are reported as one category in the PRTRs.

### 9.2.1 Releases On- and Off-site of Carcinogens, 2001

- In 2001, 158.4 million kg of known or suspected carcinogens were released on- and off-site. This represented 11 percent of all chemicals released on- and off-site in North America in 2001.
- Chromium and its compounds were released in the largest amounts of all carcinogens, 26.3 million kg. Chromium had the largest off-site releases, with 15.0 million kg and largest on-site land releases with 11.5 million kg. While hexavalent chromium is the form of chromium listed as a carcinogen, the most common form of chromium is trivalent chromium. Under some conditions, though, trivalent chromium may be converted to hexavalent chromium. Because, for the 2001 and prior reporting years, both TRI and NPRI required reporting on the group of chromium compounds rather than the individual members of the group, it is not possible to analyze releases and transfers of only

Table 9-1. On- and Off-site Releases of Known or Suspected Carcinogens, 2001

CAS Number	Chemical	Number of Forms	Air (kg)	On-site Releases			Total On-site Releases	
				Surface Water (kg)	Underground Injection (kg)	Land (kg)	kg	Rank
--	m,p,t Chromium (and its compounds)	4,095	497,350	102,019	998,851	11,450,007	13,050,044	2
100-42-5	Styrene	1,711	22,791,087	1,336	178,685	72,550	23,046,200	1
--	m,p,t Nickel (and its compounds)	3,793	1,001,125	139,283	332,717	9,281,212	10,756,045	5
75-09-2	p,t Dichloromethane	630	11,417,649	2,217	99,316	28,810	11,550,227	3
50-00-0	p Formaldehyde	937	6,490,420	180,975	4,483,225	68,578	11,225,568	4
1332-21-4	p,t Asbestos (friable)	112	761	2	0	8,748,383	8,749,147	6
--	m,p,t Arsenic (and its compounds)	664	269,513	67,193	29,802	5,891,793	6,258,372	8
75-07-0	p,t Acetaldehyde	350	6,465,324	98,081	304,097	10,605	6,878,114	7
107-13-1	p,t Acrylonitrile	126	433,110	419	4,633,534	60,404	5,127,574	9
79-01-6	p,t Trichloroethylene	571	4,442,653	184	44,544	5,726	4,494,025	10
--	m,p,t Cadmium (and its compounds)	200	74,259	1,869	32,785	3,002,313	3,111,430	14
100-41-4	Ethylbenzene	1,278	3,540,815	3,944	299,929	8,566	3,856,662	11
71-43-2	p,t Benzene	579	3,421,853	9,292	152,960	36,883	3,622,191	12
79-06-1	p Acrylamide	90	4,736	63	3,416,617	4,098	3,425,515	13
--	m,p Cobalt (and its compounds)	759	48,049	24,060	8,954	2,063,889	2,144,967	15
108-05-4	Vinyl acetate	204	1,442,410	923	229,180	27,493	1,701,221	16
127-18-4	p,t Tetrachloroethylene	413	1,234,657	279	50,615	10,468	1,296,528	17
106-99-0	p,t 1,3-Butadiene	208	1,053,131	683	30,490	26,453	1,110,768	18
67-66-3	p Chloroform	114	676,188	10,191	66,552	4,489	757,420	19
117-81-7	p,t Di(2-ethylhexyl) phthalate	371	156,602	347	0	15,000	172,091	28
606-20-2	p 2,6-Dinitrotoluene	7	336	0	0	588,863	589,198	20
123-91-1	p 1,4-Dioxane	59	51,648	36,861	0	28,633	117,141	30
75-01-4	p,t Vinyl chloride	59	344,657	56	43,556	0	388,270	21
121-14-2	p 2,4-Dinitrotoluene	18	975	5	2	301,927	303,009	22
--	t Polychlorinated alkanes (C10 to C13)	62	217,320	2	0	0	217,322	25
75-21-8	p,t Ethylene oxide	159	243,317	2,128	0	7	245,528	23
107-06-2	p,t 1,2-Dichloroethane	98	216,749	1,086	6,592	150	224,576	24
56-23-5	p,t Carbon tetrachloride	62	131,867	39	51,647	2,689	186,242	26
75-56-9	p Propylene oxide	117	140,342	205	2,902	30,270	173,719	27
98-95-3	p Nitrobenzene	33	18,465	108	137,410	3,013	158,996	29
26471-62-5	p Toluenediisocyanate (mixed isomers)	200	106,079	0	0	8,287	114,457	31
106-89-8	p Epichlorohydrin	78	94,357	3,455	6,348	2,075	106,830	32
140-88-5	p Ethyl acrylate	113	48,862	39	0	8	49,005	34
106-46-7	p 1,4-Dichlorobenzene	29	49,708	514	4,435	2	54,759	33
584-84-9	p Toluene-2,4-diisocyanate	61	4,828	405	0	0	5,235	43
101-77-9	p 4,4'-Methylenedianiline	23	7,748	50	25,850	0	33,649	35
67-72-1	p Hexachloroethane	23	18,694	2	105	5,703	24,505	36
62-56-6	p Thiourea	24	710	134	4,989	14,188	20,021	37
120-80-9	p Catechol	133	3,477	7,796	0	1,065	12,338	38
139-13-9	p Nitrotriacetic acid	23	1,783	16	952	8,152	10,922	39
79-46-9	p 2-Nitropropane	7	7,838	105	0	0	7,943	40
64-67-5	p Diethyl sulfate	34	7,732	0	0	0	7,732	41
100-44-7	p Benzyl chloride	44	4,465	20	0	119	4,604	44
101-14-4	p 4,4'-Methylenebis(2-chloroaniline)	22	6	0	0	6,438	6,449	42
94-59-7	p Saffrole	4	197	0	0	3,547	3,744	45
563-47-3	p 3-Chloro-2-methyl-1-propene	3	3,590	0	0	0	3,590	46
77-78-1	p Dimethyl sulfate	32	3,086	0	0	0	3,087	49
612-83-9	p 3,3'-Dichlorobenzidine dihydrochloride	15	10	2	0	0	12	55
302-01-2	p Hydrazine	62	1,553	1,492	0	54	3,102	48
106-88-7	p 1,2-Butylene oxide	18	2,784	424	0	0	3,208	47
91-08-7	p Toluene-2,6-diisocyanate	26	755	28	0	0	784	50
96-45-7	p Ethylene thiourea	13	10	2	0	0	12	54
95-80-7	p 2,4-Diaminotoluene	8	432	2	0	0	434	51
7758-01-2	p Potassium bromate	3	113	0	0	0	113	52
115-28-6	p Chlorendic acid	3	24	0	0	0	24	53
96-09-3	p Styrene oxide	3	3	0	0	0	3	56
	<b>Subtotal</b>	<b>18,883</b>	<b>67,196,214</b>	<b>698,336</b>	<b>15,677,642</b>	<b>41,822,912</b>	<b>125,414,672</b>	
	<b>% of Total</b>	<b>26</b>	<b>9</b>	<b>1</b>	<b>20</b>	<b>18</b>	<b>11</b>	
	<b>Total</b>	<b>73,284</b>	<b>755,501,676</b>	<b>101,754,144</b>	<b>78,836,481</b>	<b>233,534,136</b>	<b>1,169,736,346</b>	

Note: Canada and US data only. Mexico data not available for 2001. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

m = Metal and its compounds.

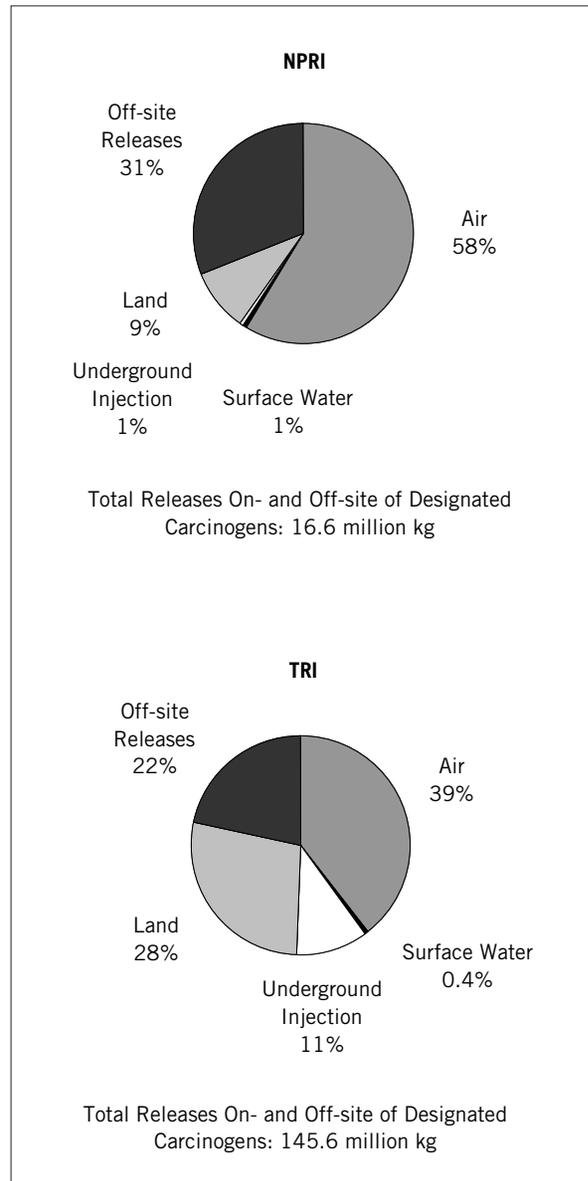
p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

Table 9-1. (continued)

Off-site Releases				Total Releases				
Disposal (except metals) (kg)	Disposal of Metals (kg)	Total Off-site Releases (kg)	Rank	Total Reported Releases On- and Off-site (kg)	Rank	Adjustment Component* (kg)	Total Releases (adjusted)** (kg)	Rank
0	14,961,709	14,961,709	1	28,011,753	1	1,698,081	26,313,672	1
907,438	0	907,438	6	23,953,638	2	442	23,953,196	2
0	11,437,334	11,437,334	2	22,193,379	3	971,028	21,222,352	3
164,681	0	164,681	12	11,714,909	4	759	11,714,150	4
370,218	0	370,218	9	11,595,786	5	25,853	11,569,934	5
2,563,789	0	2,563,789	3	11,312,936	6	33,736	11,279,200	6
0	1,887,103	1,887,103	5	8,145,475	7	291,098	7,854,376	7
1,619	0	1,619	36	6,879,733	8	0	6,879,733	8
86,561	0	86,561	14	5,214,135	9	2	5,214,133	9
74,466	0	74,466	15	4,568,490	11	344	4,568,146	10
0	2,085,985	2,085,985	4	5,197,415	10	777,265	4,420,150	11
217,380	0	217,380	11	4,074,043	12	670	4,073,372	12
105,441	0	105,441	13	3,727,632	13	3,883	3,723,749	13
5,216	0	5,216	28	3,430,731	14	2	3,430,729	14
0	792,642	792,642	7	2,937,609	15	17,490	2,920,118	15
9,595	0	9,595	25	1,710,816	16	116	1,710,700	16
32,936	0	32,936	20	1,329,463	17	704	1,328,759	17
28,422	0	28,422	21	1,139,190	18	0	1,139,190	18
12,934	0	12,934	22	770,354	19	104	770,250	19
503,113	0	503,113	8	675,204	20	2	675,202	20
2,431	0	2,431	32	591,629	21	2	591,627	21
307,826	0	307,826	10	424,967	22	2	424,965	22
454	0	454	43	388,725	23	0	388,725	23
12,761	0	12,761	23	315,770	24	2	315,767	24
40,379	0	40,379	17	257,701	25	0	257,701	25
7,934	0	7,934	27	253,462	26	0	253,462	26
10,606	0	10,606	24	235,182	27	4,046	231,136	27
1,613	0	1,613	37	187,855	28	6	187,848	28
4,658	0	4,658	29	178,377	29	0	178,377	29
9,459	0	9,459	26	168,455	30	736	167,719	30
36,401	0	36,401	19	150,859	31	2,578	148,281	31
1,450	0	1,450	38	108,280	32	181	108,098	32
36,413	0	36,413	18	85,418	33	0	85,418	33
688	0	688	42	55,447	34	0	55,447	34
41,255	0	41,255	16	46,489	35	0	46,489	35
1,126	0	1,126	39	34,775	36	0	34,775	36
3,273	0	3,273	30	27,778	37	2	27,776	37
140	0	140	49	20,161	38	0	20,161	38
417	0	417	44	12,755	39	0	12,755	39
0	0	0	--	10,922	40	0	10,922	40
708	0	708	41	8,651	41	0	8,651	41
302	0	302	45	8,034	42	0	8,034	42
2,186	0	2,186	33	6,791	43	0	6,791	43
229	0	229	47	6,678	44	0	6,678	44
1,956	0	1,956	34	5,701	45	2	5,698	45
0	0	0	--	3,590	46	0	3,590	46
229	0	229	46	3,316	47	0	3,316	47
3,265	0	3,265	31	3,277	48	0	3,277	48
118	0	118	50	3,220	49	0	3,220	49
1	0	1	53	3,209	50	0	3,209	50
1,692	0	1,692	35	2,476	51	0	2,476	51
1,026	0	1,026	40	1,038	52	0	1,038	52
227	0	227	48	661	53	0	661	53
113	0	113	51	227	54	0	227	54
2	0	2	52	26	55	0	26	55
0	0	0	--	3	56	0	3	56
<b>5,615,150</b>	<b>31,164,772</b>	<b>36,779,923</b>		<b>162,194,595</b>		<b>3,829,139</b>	<b>158,365,455</b>	
<b>15</b>	<b>14</b>	<b>14</b>		<b>11</b>		<b>10</b>	<b>11</b>	
<b>38,619,183</b>	<b>229,926,092</b>	<b>268,545,275</b>		<b>1,438,281,621</b>		<b>39,808,385</b>	<b>1,398,473,236</b>	

Figure 9-1. Releases On- and Off-site of Known or Suspected Carcinogens, NPRI and TRI, 2001



hexavalent chromium. NPRI facilities must report hexavalent chromium as a separate substance starting with the 2002 reporting year.

- Styrene was the carcinogen with the largest on-site releases, with 23.0 million kg, primarily as air releases.
- NPRI facilities reported 16.6 million kg (10 percent of the North American total) and TRI facilities reported 145.6 million kg of designated carcinogens released on- and off-site (90 percent of the total).
- Air emissions represented a higher percentage of total releases for NPRI facilities (58 percent) than for TRI facilities (39 percent). Consequently, NPRI accounted for 14 percent of all air releases of designated carcinogens, while TRI accounted for 86 percent. Similarly, NPRI accounted for 14 percent and TRI for 86 percent of off-site releases (mainly to landfills). On the other hand, TRI accounted for 96 percent and NPRI for 4 percent of on-site land releases.

\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

## 9.2.2 Facilities with the Largest Total Reported Releases On- and Off-site of Carcinogens, 2001

- The 10 NPRI facilities with the largest total reported releases of known or suspected carcinogens in the matched data set accounted for 19 percent of the 16.6 million kg reported by all NPRI facilities.
- The NPRI facility with the largest total reported releases of known or suspected carcinogens was the Philip Enterprises Inc. hazardous waste facility in Fort Erie, Ontario. This facility is a transfer site that collects and directs waste. It primarily sent chromium and its compounds for disposal at other facilities in underground injection wells (in Ohio) and off-site landfills (in Quebec and Ontario).
- The primary metals Stelco Hilton Works facility in Hamilton, Ontario, reported the second-largest total releases of designated carcinogens, mainly of asbestos and benzene. It reported that asbestos from old equipment being replaced was sent off-site for disposal. The facility reported emitting over 187,000 kg of benzene to the air.
- Another primary metals facility, the Slater Stainless Corp. in Sorel-Tracy, Quebec, reported the third-largest total releases, mainly the disposal of chromium and nickel and their compounds from old batteries. Almost 285,000 kg of these substances was sent to Stalex Canada Inc. in Blainville, Quebec. Stalex reported the fourth-largest total releases of designated carcinogens, with on-site land disposal of, primarily, chromium and cadmium and their compounds.
- The 10 TRI facilities with the largest total reported releases of known or suspected carcinogens in the matched data set accounted for 21 percent of the 145.6 million kg reported by all TRI facilities. Their releases were primarily in the form of on-site land releases and underground injection.

Table 9–2. The 10 NPRI Facilities with the Largest Total Releases of Known or Suspected Carcinogens, 2001

Rank	Facility	City, Province	SIC Codes		Number of Forms	On-site Releases			Total On-site Releases (kg)	
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)		Land (kg)
1	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	3	0	0	0	0	
2	Stelco Inc., Hilton Works	Hamilton, ON	29	33	7	187,526	684	0	189,310	
3	Slater Stainless Corp., Aciers Inoxydables Atlas	Sorel-Tracy, QC	29	33	3	25,240	280	0	25,520	
4	Stalex Canada Inc.	Blainville, QC	77	495/738	3	0	0	365,900	365,900	
5	Shell Canada Products, Sarnia Manufacturing Centre	Corunna, ON	36	29	5	51,734	32	0	51,873	
6	Carpenter Canada Co.	Woodbridge, ON	16	30	2	294,850	0	0	294,850	
7	Vitafoam Products Canada Ltd., Toronto	Downsview, ON	16	30	2	252,288	0	0	252,288	
8	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28	6	153,777	0	32,993	186,850	
9	Inco Limited, Thompson Operations	Thompson, MB	29	33	3	198,840	19,663	0	218,503	
10	Slater Stainless Corp., Atlas Specialty Steels	Welland, ON	29	33	4	1,156	58	0	1,214	
<b>Subtotal</b>					<b>38</b>	<b>1,165,411</b>	<b>20,717</b>	<b>32,993</b>	<b>366,087</b>	<b>1,586,308</b>
<b>% of Total</b>					<b>2</b>	<b>12</b>	<b>20</b>	<b>32</b>	<b>25</b>	<b>14</b>
<b>Total for NPRI Carcinogens in matched database</b>					<b>1,667</b>	<b>9,695,144</b>	<b>101,175</b>	<b>102,634</b>	<b>1,483,174</b>	<b>11,401,695</b>

Note: 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.

Table 9–3. The 10 TRI Facilities with the Largest Total Releases of Known or Suspected Carcinogens, 2001

Rank	Facility	City, State	US SIC Code	Number of Forms	On-site Releases			Total On-site Releases (kg)		
					Air (kg)	Surface Water (kg)	Underground Injection (kg)		Land (kg)	
1	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR	495/738	14	66	0	0	6,436,452	6,436,517	
2	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI	495/738	18	2,655	0	0	3,218,271	3,220,926	
3	Monsanto Luling, Pharmacia Corp.	Luling, LA	28	2	19,456	0	3,220,907	0	3,240,363	
4	Solutia Chocolate Bayou	Alvin, TX	28	6	38,390	0	2,645,850	0	2,684,240	
5	BP Chemicals Inc., BP America Inc.	Lima, OH	28	10	21,806	0	2,623,372	0	2,645,178	
6	Heritage Environmental Services L.L.C.	Indianapolis, IN	495/738	2	5	5	0	0	9	
7	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT	33	5	1,388	1,293	0	2,161,565	2,164,245	
8	Big River Zinc Corp.	Sauget, IL	33	2	362	0	0	1,035,787	1,036,149	
9	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA	495/738	12	215	0	0	1,837,228	1,837,444	
10	BP Chemicals Green Lake Facility, BP America Inc.	Port Lavaca, TX	28	5	8,374	0	1,536,517	0	1,544,891	
<b>Subtotal</b>					<b>76</b>	<b>92,717</b>	<b>1,297</b>	<b>10,026,646</b>	<b>14,689,303</b>	<b>24,809,963</b>
<b>% of Total</b>					<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>64</b>	<b>36</b>	<b>22</b>
<b>Total for TRI Carcinogens in matched database</b>					<b>17,216</b>	<b>57,501,070</b>	<b>597,161</b>	<b>15,575,008</b>	<b>40,339,738</b>	<b>114,012,977</b>

Note: 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.

Table 9–2. (continued)

Rank	Off-site Releases			Total Reported Releases	
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	On-site and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	424,810	424,810	424,810	Chromium and compounds (transfers of metals)
2	228,000	1,066	229,066	418,376	Asbestos (transfers to disposal), Benzene (air)
3	0	388,700	388,700	414,220	Chromium/Nickel and compounds (transfers of metals)
4	0	0	0	365,900	Chromium/Cadmium and compounds (land)
5	260,000	114	260,114	311,987	Asbestos (transfers to disposal)
6	0	0	0	294,850	Dichloromethane (air)
7	0	0	0	252,288	Dichloromethane (air)
8	6,800	38,945	45,745	232,595	Benzene, Acetaldehyde (air), Vinyl acetate (air, UIJ), Chromium and compounds (transfers of metals)
9	0	0	0	218,503	Nickel and compounds (air)
10	0	198,589	198,589	199,803	Chromium and compounds (transfers of metals)
	<b>494,800</b>	<b>1,052,224</b>	<b>1,547,024</b>	<b>3,133,332</b>	
	<b>26</b>	<b>32</b>	<b>30</b>	<b>19</b>	
	<b>1,891,972</b>	<b>3,270,607</b>	<b>5,162,579</b>	<b>16,564,274</b>	

UIJ = underground injection.

Table 9–3. (continued)

Rank	Off-site Releases			Total Reported Releases	
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	On-site and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	4	4	6,436,522	Asbestos (land)
2	59,846	1,482,820	1,542,666	4,763,592	Nickel/Arsenic and compounds (land, transfers of metals)
3	0	0	0	3,240,363	Formaldehyde (UIJ)
4	0	0	0	2,684,240	Acrylonitrile, Acrylamide (UIJ)
5	227	392	619	2,645,797	Acrylonitrile (UIJ)
6	0	2,472,698	2,472,698	2,472,707	Nickel/Chromium and compounds (transfers of metals)
7	0	2,018	2,018	2,166,263	Arsenic/Nickel and compounds (land)
8	0	1,036,036	1,036,036	2,072,185	Cadmium and compounds (transfers of metals, land)
9	0	169	169	1,837,613	Asbestos, Nickel and compounds (land)
10	0	38	38	1,544,929	Acrylamide (UIJ)
	<b>60,073</b>	<b>4,994,176</b>	<b>5,054,249</b>	<b>29,864,212</b>	
	<b>2</b>	<b>18</b>	<b>16</b>	<b>21</b>	
	<b>3,723,178</b>	<b>27,894,165</b>	<b>31,617,344</b>	<b>145,630,321</b>	

UIJ = underground injection.

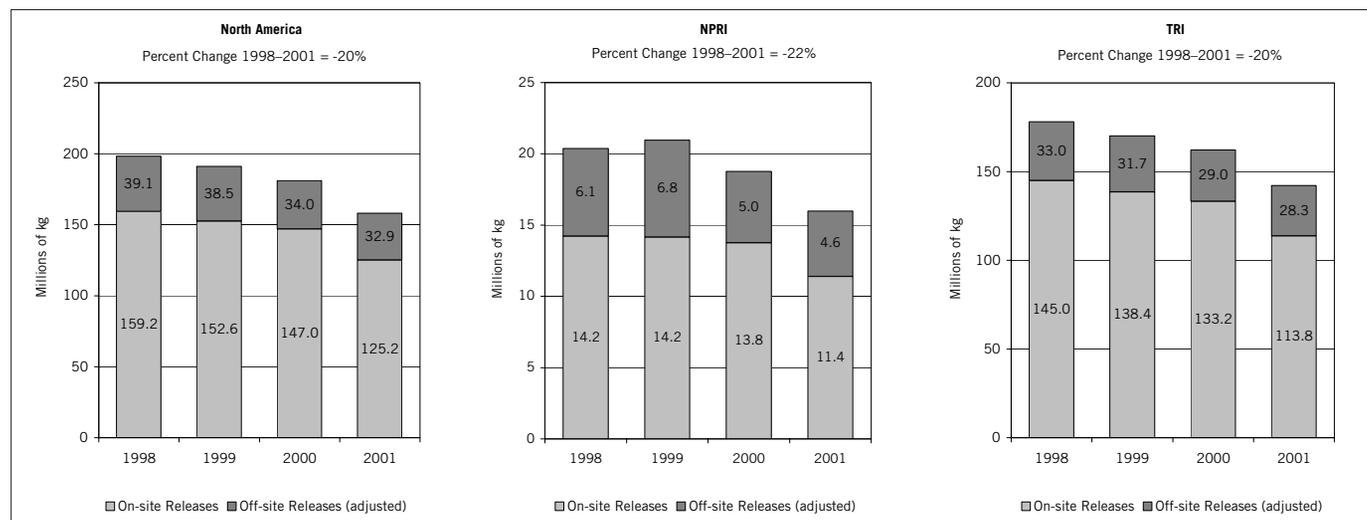
- The TRI facility with the largest total releases was the Chemical Waste Management of the Northwest Inc. hazardous waste management facility in Arlington, Oregon, reporting 6.4 million kg of on-site land disposal of asbestos.
- Wayne Disposal Inc. in Belleville, Michigan, also a hazardous waste management facility, reported 4.8 million kg of mainly of nickel and arsenic and their compounds landfilled on-site and transferred off-site for disposal.
- While there were four primary metals facilities, two hazardous waste facilities, and two rubber and plastics products facilities among the 10 NPRI facilities with the largest designated carcinogen releases, the TRI facilities included four hazardous waste management facilities and four chemical manufacturers.

### 9.2.3 Releases On- and Off-site of Carcinogens, 1998–2001

Fifty-one known or suspected carcinogens were reported from 1998 to 2001. This excludes five designated carcinogens, which were added to NPRI reporting for the 1999 reporting year (chlorendic acid, 3-chloro-2-methyl-1-propene, 3,3'-dichlorobenzidine dihydrochloride, polychlorinated alkanes (C10 to C13), and potassium bromate).

- Total releases on- and off-site of designated carcinogens decreased by 20 percent from 1998 to 2001, compared to a decrease of 16 percent for all matched chemicals.
- Total releases of designated carcinogens reported by NPRI facilities decreased by 22 percent and those by TRI facilities decreased by 20 percent.
- Chromium and its compounds had the largest reported reductions in total releases on- and off-site from 1998 to 2001 of the designated carcinogens. The reductions for chromium were 40 percent, or 17.3 million kg. Two facilities accounted for reductions of 11.0 million kg. The Elementis Chromium L.P primary metals facility in Corpus Christi, Texas, reported a reduction of 6.4 million kg in on-site land releases and the Occidental Chemical Co. in Castle Hayne, North Carolina, reported a reduction of 4.5 million kg in on-site land releases.
- Acrylonitrile led the increases with 2.9 million kg, over 100 percent. One facility, BP Chemicals Inc. in Lima, Ohio, reported an increase of 1.9 million kg in on-site underground injection from 1998 to 2001.

Figure 9–2. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1998–2001



Note: Canada and US data only. Mexico data not available for 1998–2001. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP). Off-site releases do not include those off-site releases also reported as on-site releases by another NPRI or TRI facility.

Table 9–4. Chemicals with Largest Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1998–2001

Rank	CAS Number	Chemical	Total Releases On- and Off-site (adjusted)*				Change 1998–2001	
			1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	kg	%
<b>Decreases</b>								
1	--	m,p,t Chromium (and its compounds)	43,592,212	43,368,016	31,387,695	26,313,672	-17,278,540	-40
2	75-09-2	p,t Dichloromethane	21,013,676	18,677,357	16,351,933	11,714,150	-9,299,526	-44
3	1332-21-4	p,t Asbestos (friable)	15,179,237	11,348,507	15,327,594	11,279,200	-3,900,037	-26
4	100-42-5	p Styrene	27,393,041	30,266,010	29,412,425	23,953,196	-3,439,845	-13
5	67-66-3	p Chloroform	3,182,960	2,631,575	1,719,887	770,250	-2,412,710	-76
<b>Increases</b>								
1	107-13-1	p,t Acrylonitrile	2,348,377	2,595,067	2,433,381	5,214,133	2,865,755	122
2	606-20-2	p 2,6-Dinitrotoluene	242	14,920	1,281	591,627	591,385	244,195
3	75-07-0	p,t Acetaldehyde	6,333,786	6,800,655	7,142,563	6,879,733	545,947	9
4	79-06-1	p Acrylamide	2,887,781	3,423,753	3,929,955	3,430,729	542,948	19
5	--	m,p,t Cadmium (and its compounds)	4,103,471	2,510,357	2,431,279	4,420,150	316,678	8

Note: Canada and US data only. Mexico data not available for 1998–2001. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

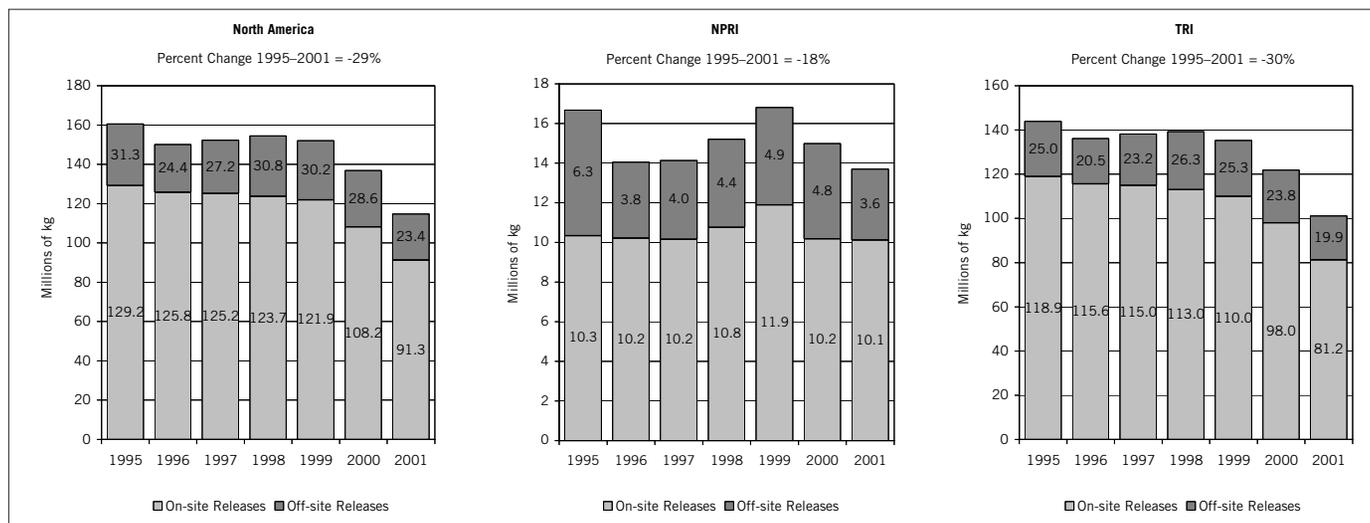
m = Metal and its compounds.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 9–3. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1995–2001



Note: Canada and US data only. Mexico data not available for 1995–2001. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

### 9.2.4 Releases On- and Off-site of Carcinogens, 1995–2001

This section reports on the same 51 known or suspected carcinogens as in the previous section but only includes the manufacturing facilities. Electric utilities, coal mining, hazardous waste and solvent recovery facilities are not included because they were not required to report to TRI before 1998.

- Total releases on- and off-site of designated carcinogens decreased by 29 percent from 1995 to 2001, compared to a decrease of 20 percent for all matched chemicals.
- Total releases of designated carcinogens reported by NPRI facilities decreased by 18 percent and those reported by TRI facilities decreased by 30 percent. Reductions for both NPRI and TRI occurred primarily in the more recent years of the time period, from 1999 to 2001.
- Dichloromethane had the largest reported reductions in total releases on- and off-site from 1995 to 2001 of the designated carcinogens, with a 60 percent reduction, or 17.1 million kg.
- Styrene led the increases with 2.6 million kg, or 12 percent. Acrylonitrile also showed an increase of over 2 million kg, an increase of 69 percent.

Table 9–5. Chemicals with Largest Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1995–2001

Rank	CAS Number	Chemical	Total Releases On- and Off-site								
			1995 (kg)	1996 (kg)	1997 (kg)	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	Change 1995–2001 (kg)	%
<b>Decreases</b>											
1	75-09-2	p,t Dichloromethane	28,559,898	26,809,611	24,279,315	20,684,038	18,337,259	16,155,798	11,469,529	-17,090,369	-60
2	--	m,p,t Chromium (and its compounds)	26,869,436	26,371,604	29,787,869	32,598,317	33,203,885	22,069,663	16,101,821	-10,767,614	-40
3	79-01-6	p,t Trichloroethylene	12,621,975	10,784,980	9,067,334	6,855,513	5,564,648	5,086,241	4,494,351	-8,127,625	-64
4	67-66-3	p Chloroform	5,120,411	4,697,084	3,639,157	3,182,365	2,574,678	1,634,551	717,136	-4,403,275	-86
5	127-18-4	p,t Tetrachloroethylene	4,547,089	3,705,117	3,313,685	2,540,074	1,787,221	1,533,829	1,179,384	-3,367,706	-74
<b>Increases</b>											
1	100-42-5	Styrene	21,258,626	21,434,134	22,825,054	27,294,642	30,171,497	29,366,565	23,908,140	2,649,514	12
2	107-13-1	p,t Acrylonitrile	3,074,265	2,236,534	2,345,124	2,347,389	2,577,911	2,422,346	5,187,988	2,113,723	69
3	--	m,p,t Cadmium (and its compounds)	1,339,614	1,034,869	1,237,372	1,837,754	985,740	1,472,866	3,083,506	1,743,892	130
4	50-00-0	p Formaldehyde	10,073,961	11,241,860	11,585,414	11,564,524	12,661,353	13,036,737	11,552,426	1,478,465	15
5	79-06-1	p Acrylamide	2,859,445	2,687,843	3,294,204	2,887,644	3,418,037	3,929,948	3,423,812	564,367	20

Note: Canada and US data only. Mexico data not available for 1995–2001. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

m = Metal and its compounds.  
p = California Proposition 65 chemical.  
t = CEPA Toxic chemical.

### 9.3 Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals)

As noted in Chapter 2, California's Safe Drinking Water and Toxic Enforcement Act of 1986 (enacted after voters' approval of Proposition 65) requires the publication of a list of chemicals that are known to the state of California to cause cancer, birth defects or other reproductive harm (found online at <[www.oehha.ca.gov/prop65/prop65\\_list/files/31403LSTA.pdf](http://www.oehha.ca.gov/prop65/prop65_list/files/31403LSTA.pdf)>). As of June 2002, the list contained almost 700 substances, of which 76 are in the matched data set. Only two, C.I. Solvent Yellow 14 and Michler's ketone, had no reports in 2001. Lead and its compounds are not part of the matched data set due to reporting differences.

#### 9.3.1 Releases and Transfers of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 2001

- In 2001, facilities released over 183 million kg of chemicals that are linked to cancer, birth defects and reproductive harm (Proposition 65 chemicals). This was 13 percent of all North American releases in 2001.
- Toluene, a developmental toxicant, was released in the largest amount, 38.9 million kg, including 37.4 million kg of on-site air releases.
- Chromium and its compounds ranked second, with 26.3 million kg of total releases, mainly as on-site land disposal and transfers off-site for disposal. While hexavalent chromium is the form of chromium listed as a carcinogen under Proposition 65, the most common form of chromium is trivalent chromium. Under some conditions, though, trivalent chromium may be converted to hexavalent chromium. Because, for the

Table 9-6. On- and Off-site Releases of California Proposition 65 Chemicals, 2001

CAS Number	Chemical	Number of Forms	On-site Releases					Total On-site Releases	
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	kg	Rank	
108-88-3	Toluene	3,103	37,428,079	34,393	145,893	61,323	37,677,852	1	
--	Chromium (and its compounds)	4,095	497,350	102,019	998,851	11,450,007	13,050,044	2	
--	Nickel (and its compounds)	3,793	1,001,125	139,283	332,717	9,281,212	10,756,045	5	
75-09-2	Dichloromethane	630	11,417,649	2,217	99,316	28,810	11,550,227	3	
50-00-0	Formaldehyde	937	6,490,420	180,975	4,483,225	68,578	11,225,568	4	
1332-21-4	Asbestos (friable)	112	761	2	0	8,748,383	8,749,147	6	
75-15-0	Carbon disulfide	123	8,206,054	13,886	7,594	1,643	8,229,177	7	
--	Arsenic (and its compounds)	664	269,513	67,193	29,802	5,891,793	6,258,372	9	
75-07-0	Acetaldehyde	350	6,465,324	98,081	304,097	10,605	6,878,114	8	
107-13-1	Acrylonitrile	126	433,110	419	4,633,534	60,404	5,127,574	10	
79-01-6	Trichloroethylene	571	4,442,653	184	44,544	5,726	4,494,025	11	
--	Cadmium (and its compounds)	200	74,259	1,869	32,785	3,002,313	3,111,430	14	
71-43-2	Benzene	579	3,421,853	9,292	152,960	36,883	3,622,191	12	
79-06-1	Acrylamide	90	4,736	63	3,416,617	4,098	3,425,515	13	
872-50-4	N-Methyl-2-pyrrolidone	485	1,888,045	4,902	923,388	28,187	2,844,703	15	
--	Cobalt (and its compounds)	759	48,049	24,060	8,954	2,063,889	2,144,967	16	
74-87-3	Chloromethane	104	1,537,040	485	76,831	5,560	1,620,112	17	
127-18-4	Tetrachloroethylene	413	1,234,657	279	50,615	10,468	1,296,528	18	
106-99-0	1,3-Butadiene	208	1,053,131	683	30,490	26,453	1,110,768	19	
67-66-3	Chloroform	114	76,188	10,191	66,552	4,489	757,420	20	
75-00-3	Chloroethane	61	729,189	468	0	2	729,660	21	
117-81-7	Di(2-ethylhexyl) phthalate	371	156,602	347	0	15,000	172,091	23	
62-53-3	Aniline	7	73,895	2,073	450,319	4,034	530,321	23	
606-20-2	2,6-Dinitrotoluene	7	336	0	0	588,863	589,198	22	
109-86-4	2-Methoxyethanol	48	397,716	14,478	0	5,117	417,324	24	
123-91-1	1,4-Dioxane	59	51,648	36,861	0	28,633	117,141	35	
75-01-4	Vinyl chloride	59	344,657	56	43,556	0	388,270	25	
74-83-9	Bromomethane	42	328,127	63	13,448	2,743	344,380	26	
121-14-2	2,4-Dinitrotoluene	18	975	5	2	301,927	303,009	27	
--	Mercury (and its compounds)	1,709	67,534	879	879	114,025	183,317	31	
75-21-8	Ethylene oxide	159	243,317	2,128	0	7	245,528	28	
107-06-2	1,2-Dichloroethane	98	216,749	1,086	6,592	150	224,576	29	
56-23-5	Carbon tetrachloride	62	131,867	39	51,647	2,689	186,242	30	
75-56-9	Propylene oxide	117	140,342	205	2,902	30,270	173,719	32	
98-95-3	Nitrobenzene	33	18,465	108	137,410	3,013	158,996	34	
26471-62-5	Toluenediisocyanate (mixed isomers)	200	106,079	0	0	8,287	114,457	36	
554-13-2	Lithium carbonate	53	4,691	2	0	32,287	36,980	44	
106-89-8	Epichlorohydrin	78	94,357	3,455	6,348	2,075	106,830	37	
140-88-5	Ethyl acrylate	113	48,862	39	0	8	49,005	41	
78-87-5	1,2-Dichloropropane	16	73,023	208	0	2,997	76,227	38	
110-80-5	2-Ethoxyethanol	39	57,279	20	0	250	57,550	39	
106-46-7	1,4-Dichlorobenzene	29	49,708	514	4,435	2	54,759	40	
79-00-5	1,1,2-Trichloroethane	31	38,857	7	0	251	39,808	42	
74-88-4	Methyl iodide	13	28,570	10	0	10,719	39,299	43	
101-77-9	4,4'-Methylenedianiline	23	7,748	50	25,850	0	33,649	45	
67-72-1	Hexachloroethane	23	18,694	2	105	5,703	24,505	46	
62-56-6	Thiourea	24	710	134	4,989	14,188	20,021	47	
91-22-5	Quinoline	21	2,358	8	11,292	3	13,661	48	
120-80-9	Catechol	133	3,477	7,796	0	1,065	12,338	49	
139-13-9	Nitrotriacetic acid	23	1,783	16	952	8,152	10,922	50	
924-42-5	N-Methylolacrylamide	35	2,527	517	0	15	3,071	61	
79-46-9	2-Nitropropane	7	7,838	105	0	0	7,943	51	
64-67-5	Diethyl sulfate	34	7,732	0	0	0	7,732	52	
100-44-7	Benzyl chloride	44	4,465	20	0	119	4,604	56	
101-14-4	4,4'-Methylenebis(2-chloroaniline)	22	6	0	0	6,438	6,449	54	
81-88-9	C.I. Food Red 15	1	0	0	0	6,450	6,450	53	
94-59-7	Safrole	4	197	0	0	3,547	3,744	57	
25321-14-6	Dinitrotoluene (mixed isomers)	12	3,542	4	1,361	7	4,913	55	
563-47-3	3-Chloro-2-methyl-1-propene	3	3,590	0	0	0	3,590	58	
77-78-1	Dimethyl sulfate	32	3,086	0	0	0	3,087	60	
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	15	10	2	0	0	12	66	
302-01-2	Hydrazine	62	1,553	1,492	0	54	3,102	59	
79-34-5	1,1,2,2-Tetrachloroethane	20	1,696	25	0	436	2,158	62	
28407-37-6	C.I. Direct Blue 218	5	0	0	0	0	0	--	
64-75-5	Tetraacycline hydrochloride	4	5	0	0	0	5	69	
96-45-7	Ethylene thiourea	13	10	2	0	0	12	67	
90-43-7	2-Phenylphenol	13	2	0	0	0	2	71	
95-80-7	2,4-Diaminotoluene	8	432	2	0	0	434	63	
120-58-1	Isosafrole	2	0	0	0	0	0	--	
7758-01-2	Potassium bromate	3	113	0	0	0	113	64	
115-28-6	Chlorendic acid	3	24	0	0	0	24	65	
86-30-6	N-Nitrosodiphenylamine	6	8	0	0	0	8	68	
96-09-3	Styrene oxide	3	3	0	0	0	3	70	
1314-20-1	Thorium dioxide	1	0	0	0	0	0	--	
	<b>Subtotal</b>	<b>21,548</b>	<b>90,064,448</b>	<b>763,704</b>	<b>16,600,853</b>	<b>41,990,352</b>	<b>149,441,019</b>		
	<b>% of Total</b>	<b>29</b>	<b>12</b>	<b>1</b>	<b>21</b>	<b>18</b>	<b>13</b>		
	<b>Total</b>	<b>73,284</b>	<b>755,501,676</b>	<b>101,754,144</b>	<b>78,836,481</b>	<b>233,534,136</b>	<b>1,169,736,346</b>		

Note: Canada and US data only. Mexico data not available for 2001. Chemicals or chemical compounds linked to cancer, birth defects or reproductive harm by California on its Proposition 65 list (<[www.oeha.org/prop65.html](http://www.oeha.org/prop65.html)>). A chemical (and its compounds) is included if the chemical or any of its compounds is on the list.

c = Known or suspected carcinogen.

m = Metal and its compounds.

t = CEPA Toxic chemical.

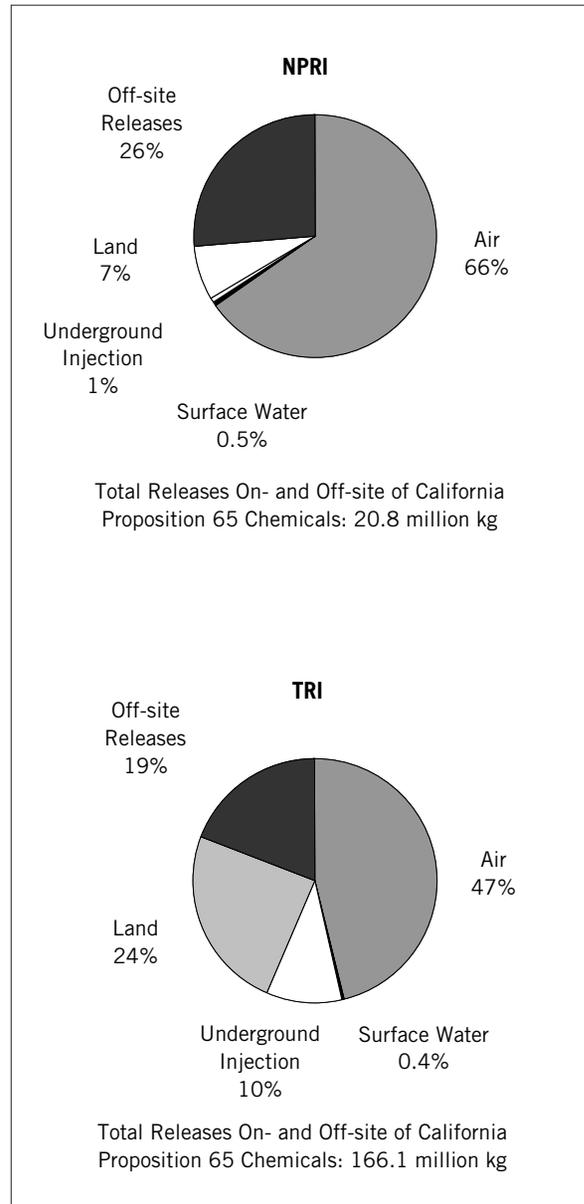
Table 9-6. (continued)

Off-site Releases				Total Reported Releases On- and Off-site		Adjustment Component*		Total Releases (adjusted)**	
Disposal (except metals) (kg)	Disposal of Metals (kg)	Total Off-site Releases (kg)	Rank	kg	Rank	(kg)	Rank	kg	Rank
1,301,771	0	1,301,771	6	38,979,622	1	46,102	38,933,520	1	
0	14,961,709	14,961,709	1	28,011,753	2	1,698,081	26,313,672	2	
0	11,437,334	11,437,334	2	22,193,379	3	971,028	21,222,352	3	
164,681	0	164,681	12	11,714,909	4	759	11,714,150	4	
370,218	0	370,218	9	11,595,786	5	25,853	11,569,934	5	
2,563,789	0	2,563,789	3	11,312,936	6	33,736	11,279,200	6	
2,007	0	2,007	42	8,231,184	7	0	8,231,184	7	
0	1,887,103	1,887,103	5	8,145,475	8	291,098	7,854,376	8	
1,619	0	1,619	44	6,879,733	9	0	6,879,733	9	
86,561	0	86,561	16	5,214,135	10	2	5,214,133	10	
74,466	0	74,466	17	4,568,490	12	344	4,568,146	11	
0	2,085,985	2,085,985	4	5,197,415	11	777,265	4,420,150	12	
105,441	0	105,441	15	3,727,632	13	3,883	3,723,749	13	
5,216	0	5,216	33	3,430,731	14	2	3,430,729	14	
236,572	0	236,572	11	3,081,276	15	0	3,081,276	15	
0	792,642	792,642	7	2,937,609	16	17,490	2,920,118	16	
3,074	0	3,074	37	1,623,185	17	0	1,623,185	17	
32,936	0	32,936	21	1,329,463	18	704	1,328,759	18	
28,422	0	28,422	23	1,139,190	19	0	1,139,190	19	
12,934	0	12,934	25	770,354	20	104	770,250	20	
22,924	0	22,924	24	752,584	21	0	752,584	21	
503,113	0	503,113	8	675,204	22	2	675,202	22	
73,756	0	73,756	18	604,078	23	726	603,352	23	
2,431	0	2,431	40	591,629	24	2	591,627	24	
29,941	0	29,941	22	447,265	25	0	447,265	25	
307,826	0	307,826	10	424,967	26	2	424,965	26	
454	0	454	56	388,725	27	0	388,725	27	
1,563	0	1,563	46	345,943	28	2	345,941	28	
12,761	0	12,761	26	315,770	29	2	315,767	29	
0	112,225	112,225	13	295,542	30	10,692	284,850	30	
7,934	0	7,934	30	253,462	31	0	253,462	31	
10,606	0	10,606	27	235,182	32	4,046	231,136	32	
1,613	0	1,613	45	187,855	33	6	187,848	33	
4,658	0	4,658	34	178,377	34	0	178,377	34	
9,459	0	9,459	28	168,455	35	736	167,719	35	
36,401	0	36,401	20	150,859	36	2,578	148,281	36	
110,459	0	110,459	14	147,439	37	0	147,439	37	
1,450	0	1,450	48	108,280	38	181	108,098	38	
36,413	0	36,413	19	85,418	39	0	85,418	39	
2,906	0	2,906	39	79,133	40	0	79,133	40	
1,532	0	1,532	47	59,082	41	0	59,082	41	
688	0	688	54	55,447	42	0	55,447	42	
8,010	0	8,010	29	47,818	43	0	47,818	43	
5,259	0	5,259	32	44,558	44	2	44,556	44	
1,126	0	1,126	50	34,775	45	0	34,775	45	
3,273	0	3,273	35	27,778	46	2	27,775	46	
140	0	140	65	20,161	47	0	20,161	47	
2,938	0	2,938	38	16,600	48	0	16,600	48	
417	0	417	58	12,755	49	0	12,755	49	
0	0	0	--	10,922	50	0	10,922	50	
5,989	0	5,989	31	9,060	51	0	9,060	51	
708	0	708	53	8,651	52	0	8,651	52	
302	0	302	60	8,034	53	0	8,034	53	
2,186	0	2,186	41	6,791	54	0	6,791	54	
229	0	229	62	6,678	55	0	6,678	55	
0	0	0	--	6,450	56	0	6,450	56	
1,956	0	1,956	43	5,701	57	2	5,698	57	
316	0	316	59	5,229	58	0	5,229	58	
0	0	0	--	3,590	59	0	3,590	59	
229	0	229	61	3,316	60	0	3,316	60	
3,265	0	3,265	36	3,277	61	0	3,277	61	
118	0	118	66	3,220	62	0	3,220	62	
427	0	427	57	2,584	63	0	2,584	63	
1,134	0	1,134	49	1,134	64	0	1,134	64	
1,088	0	1,088	51	1,093	65	0	1,093	65	
1,026	0	1,026	52	1,038	66	0	1,038	66	
685	0	685	55	687	67	0	687	67	
227	0	227	64	661	68	0	661	68	
229	0	229	63	229	69	0	229	69	
113	0	113	67	227	70	0	227	70	
2	0	2	68	26	71	0	26	71	
0	0	0	--	8	72	0	8	72	
0	0	0	--	3	73	0	3	73	
0	0	0	--	0	74	0	0	74	
<b>6,209,988</b>	<b>31,276,997</b>	<b>37,486,985</b>		<b>186,928,004</b>		<b>3,885,435</b>	<b>183,042,569</b>		
<b>16</b>	<b>14</b>	<b>30</b>		<b>13</b>		<b>10</b>	<b>13</b>		
<b>38,619,183</b>	<b>229,926,092</b>	<b>268,545,275</b>		<b>1,438,281,621</b>		<b>39,808,385</b>	<b>1,398,473,236</b>		

\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases (adjusted).

\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 9-4. Releases On- and Off-site of California Proposition 65 Chemicals, NPRI and TRI, 2001



2001 and prior reporting years, both TRI and NPRI required reporting on the group of chromium compounds rather than the individual members of the group, it is not possible to analyze releases and transfers of only hexavalent chromium. NPRI facilities must report hexavalent chromium as a separate substance starting with the 2002 reporting year.

- NPRI facilities reported 20.8 million kg (11 percent of the North American total) and TRI facilities reported 166.1 million kg of Proposition 65 chemicals released on- and off-site (89 percent of the total).

### 9.3.2 Facilities with the Largest Total Reported Releases On- and Off-site of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 2001

- The 10 NPRI facilities with the largest total reported releases of chemicals known to cause cancer, birth defects or reproductive harm (Proposition 65 chemicals) in the matched data set accounted for 19 percent of the 20.8 million kg total reported by all NPRI facilities.
- The NPRI facility with the largest total reported releases was the chemical manufacturer Bayer Inc. in Sarnia, Ontario. This facility reported 848,000 kg of Proposition 65 chemicals, mainly of chloromethane air emissions.
- The NPRI facility with the second-largest total reported releases, mainly of asbestos and benzene, was the primary metals facility Stelco Hilton Works in Hamilton, Ontario. It reported asbestos from old equipment being replaced was sent off-site for disposal. The facility reported emitting over 187,000 kg of benzene to the air.
- The 10 TRI facilities with the largest total reported releases of Proposition 65 chemicals in the matched data set accounted for 18 percent of the 166.1 million kg total reported by all TRI facilities.
- The TRI facility with the largest total releases was the Chemical Waste Management of the Northwest Inc. hazardous waste management facility in Arlington, Oregon, reporting 6.5 million kg of on-site land disposal of asbestos.
- Wayne Disposal Inc. in Belleville, Michigan, also a hazardous waste management facility, reported 4.8 million kg of mainly nickel and arsenic and their compounds, disposed of either in an on-site landfill or transferred off-site for disposal.

Table 9–7. The 10 NPRI Facilities with the Largest Total Releases of California Proposition 65 Chemicals, 2001

Rank	Facility	City, Province	SIC Codes		Number of Forms	On-site Releases				
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Bayer Inc.	Sarnia, ON	37	28	7	759,752	1	0	1,640	761,393
2	Stelco Inc., Hilton Works	Hamilton, ON	29	33	7	195,725	684	0	0	197,090
3	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	4	0	0	0	0	0
4	Slater Stainless Corp., Aciers Inoxydables Atlas	Sorel-Tracy, QC	29	33	4	25,249	280	0	0	25,529
5	Stablex Canada Inc.	Blainville, QC	77	495/738	4	0	0	0	378,877	378,877
6	Shell Canada Products, Sarnia Manufacturing Centre	Corunna, ON	36	29	6	96,820	76	0	114	97,010
7	General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa, ON	32	37	2	330,404	0	0	0	330,404
8	Canadian Technical Tape, Montreal Plant	St-Laurent, QC	27	26	1	306,131	0	0	0	306,131
9	Carpenter Canada Co.	Woodbridge, ON	16	30	2	294,850	0	0	0	294,850
10	Quebecor World Inc., Quebecor World Islington	Etobicoke, ON	28	27	1	274,626	0	0	0	274,626
<b>Subtotal</b>					<b>38</b>	<b>2,283,557</b>	<b>1,041</b>	<b>0</b>	<b>380,631</b>	<b>2,665,910</b>
<b>% of Total</b>					<b>2</b>	<b>17</b>	<b>1</b>	<b>0</b>	<b>25</b>	<b>17</b>
<b>Total for NPRI Proposition 65 Chemicals in matched database</b>					<b>1,971</b>	<b>13,580,681</b>	<b>101,695</b>	<b>118,217</b>	<b>1,502,284</b>	<b>15,324,539</b>

Note: 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.

Table 9–8. The 10 TRI Facilities with the Largest Total Releases of California Proposition 65 Chemicals, 2001

Rank	Facility	City, State	US SIC Code	Number of Forms	On-site Releases					
					Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	
1	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR	495/738	19	221	0	0	6,455,087	6,455,309	
2	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI	495/738	24	3,278	0	0	3,252,761	3,256,039	
3	Monsanto Luling, Pharmacia Corp.	Luling, LA	28	3	36,689	0	3,242,676	0	3,279,365	
4	Solutia Chocolate Bayou	Alvin, TX	28	5	38,417	0	2,645,850	0	2,684,267	
5	BP Chemicals Inc., BP America Inc.	Lima, OH	28	10	21,806	0	2,623,372	0	2,645,178	
6	Heritage Environmental Services L.L.C.	Indianapolis, IN	495/738	3	5	5	0	0	9	
7	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT	33	6	1,395	1,294	0	2,164,567	2,167,256	
8	Big River Zinc Corp.	Sauget, IL	33	3	556	0	0	1,035,896	1,036,453	
9	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA	495/738	15	627	0	0	1,849,506	1,850,132	
10	Acordis Cellulosic Fibers Inc., Acordis U.S. Holding Inc.	Axis, AL	28	1	1,672,562	757	0	0	1,673,320	
<b>Subtotal</b>					<b>89</b>	<b>1,775,557</b>	<b>2,056</b>	<b>8,511,898</b>	<b>14,757,817</b>	<b>25,047,327</b>
<b>% of Total</b>					<b>0.5</b>	<b>2</b>	<b>0.3</b>	<b>52</b>	<b>36</b>	<b>19</b>
<b>Total for TRI Proposition 65 Chemicals in matched database</b>					<b>19,577</b>	<b>76,483,766</b>	<b>662,009</b>	<b>16,482,636</b>	<b>40,488,068</b>	<b>134,116,480</b>

Note: 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.

Table 9-7. (continued)

Rank	Off-site releases			Total Reported Releases On-site and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)		
1	86,000	435	86,435	847,828	Chloromethane (air)
2	228,000	1,066	229,066	426,156	Asbestos (transfers to disposal), Benzene (air)
3	0	424,943	424,943	424,943	Chromium and compounds (transfers of metals)
4	0	388,710	388,710	414,240	Chromium/Nickel and compounds (transfers of metals)
5	0	0	0	378,877	Chromium/Cadmium and compounds (land)
6	259,986	114	260,100	357,110	Asbestos (transfers to disposal)
7	0	0	0	330,404	Toluene (air)
8	0	0	0	306,131	Toluene (air)
9	0	0	0	294,850	Dichloromethane (air)
10	0	0	0	274,626	Toluene (air)
	<b>573,986</b>	<b>815,268</b>	<b>1,389,254</b>	<b>4,055,164</b>	
	<b>26</b>	<b>25</b>	<b>25</b>	<b>19</b>	
	<b>2,218,980</b>	<b>3,286,296</b>	<b>5,505,276</b>	<b>20,829,814</b>	

Table 9-8. (continued)

Rank	Off-site Releases			Total Reported Releases On-site and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)		
1	0	4	4	6,455,313	Asbestos (land)
2	72,430	1,485,353	1,557,783	4,813,821	Nickel/Arsenic and compounds (land, transfers of metals)
3	0	0	0	3,279,365	Formaldehyde (UIJ)
4	0	0	0	2,684,267	Acrylonitrile, Acrylamide (UIJ)
5	227	392	619	2,645,797	Acrylonitrile (UIJ)
6	0	2,472,698	2,472,698	2,472,707	Nickel/Chromium and compounds (transfers of metals)
7	0	2,019	2,019	2,169,274	Arsenic/Nickel and compounds (land)
8	0	1,036,146	1,036,146	2,072,599	Cadmium and compounds (transfers of metals, land)
9	0	212	212	1,850,345	Asbestos, Nickel and compounds (land)
10	0	0	0	1,673,320	Carbon disulfide (air)
	<b>72,657</b>	<b>4,996,825</b>	<b>5,069,482</b>	<b>30,116,809</b>	
	<b>2</b>	<b>18</b>	<b>16</b>	<b>18</b>	
	<b>3,991,008</b>	<b>27,990,701</b>	<b>31,981,710</b>	<b>166,098,190</b>	

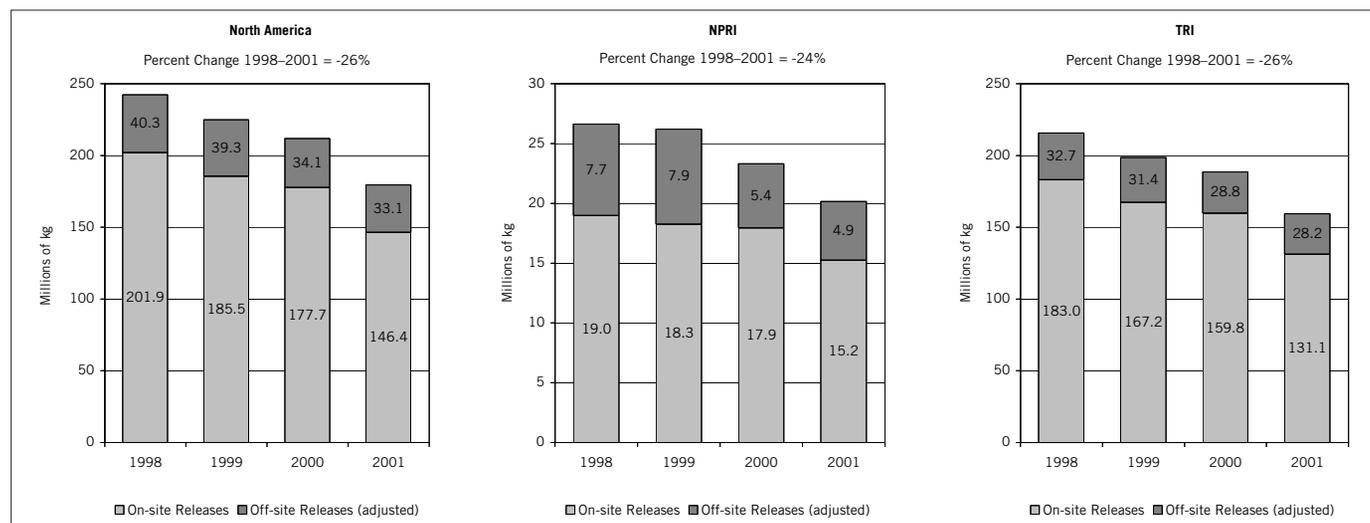
UIJ = underground injection.

### 9.3.3 Releases On- and Off-site of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 1998–2001

This section analyzes the 66 chemicals linked to cancer, birth defects or reproductive harm (California Proposition 65 chemicals) that have been consistently reported from 1998 to 2001. Reporting on nine chemicals (chlorthalidone, 3-chloro-2-methyl-1-propene, C.I. Direct Blue 218, 3,3'-dichlorobenzidine dihydrochloride, lithium carbonate, N-methyl-2-pyrrolidone, N-methylolacrylamide, potassium bromate, and tetracycline hydrochloride) is not included because these chemicals were added to NPRI in 1999. Also, mercury and its compounds are not included because the threshold for reporting mercury and its compounds was lowered for the 2000 reporting year.

- Total releases on- and off-site of the group of Proposition 65 chemicals decreased by 26 percent from 1998 to 2001, compared to a decrease of 16 percent for all matched chemicals.
- Total NPRI releases of Proposition 65 chemicals decreased by 24 percent from 1998 to 2001, including a 15-percent decrease in on-site releases from 2000 to 2001. Total TRI releases of these chemicals decreased by 26 percent from 1998 to 2001, including an 18-percent decrease in on-site releases from 2000 to 2001.
- Chromium and its compounds had the largest reported reductions in total releases on- and off-site from 1998 to 2001 of the Proposition 65 chemicals. The reductions for chromium were 40 percent, or 17.3 million kg. Two facilities accounted for reductions of 11.0 million kg. The Elementis Chromium L.P. primary metals facility in Corpus Christi, Texas, reported a reduction of 6.4 million kg in on-site land releases and the Occidental Chemical Co. in Castle Hayne, North Carolina, reported

Figure 9–5. Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1998–2001



Note: Canada and US data only. Mexico data not available for 1998–2001. Chemicals or chemical compounds linked to cancer, birth defects or reproductive harm by California on its Proposition 65 list (<[www.oeha.org/prop65.html](http://www.oeha.org/prop65.html)>). A chemical (and its compounds) is included if the chemical or any of its compounds is on the list. Off-site releases do not include those off-site releases also reported as on-site releases by another NPRI or TRI facility.

Table 9–9. Chemicals with Largest Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1998–2001

Rank	CAS Number	Chemical	Total Releases On- and Off-site (adjusted)*				Change 1998–2001	
			1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	kg	%
<b>Decreases</b>								
1	--	m,c,t Chromium (and its compounds)	43,592,212	43,368,016	31,387,695	26,313,672	-17,278,540	-40
2	108-88-3	Toluene	53,476,891	50,699,668	44,300,365	38,933,520	-14,543,371	-27
3	75-15-0	Carbon disulfide	19,780,847	16,368,405	18,485,170	8,231,184	-11,549,663	-58
4	75-09-2	c,t Dichloromethane	21,013,676	18,677,357	16,351,933	11,714,150	-9,299,526	-44
5	1332-21-4	c,t Asbestos (friable)	15,179,237	11,348,507	15,327,594	11,279,200	-3,900,037	-26
<b>Increases</b>								
1	107-13-1	c,t Acrylonitrile	2,348,377	2,595,067	2,433,381	5,214,133	2,865,755	122
2	606-20-2	c 2,6-Dinitrotoluene	242	14,920	1,281	591,627	591,385	244,195
3	75-07-0	c,t Acetaldehyde	6,333,786	6,800,655	7,142,563	6,879,733	545,947	9
4	79-06-1	c Acrylamide	2,887,781	3,423,753	3,929,955	3,430,729	542,948	19
5	--	m,c,t Cadmium (and its compounds)	4,103,471	2,510,357	2,431,279	4,420,150	316,678	8

Note: Canada and US data only. Mexico data not available for 1998–2001. Chemicals or chemical compounds linked to cancer, birth defects or reproductive harm by California on its Proposition 65 list (<[www.oeha.org/prop65.html](http://www.oeha.org/prop65.html)>). A chemical (and its compounds) is included if the chemical or any of its compounds is on the list.

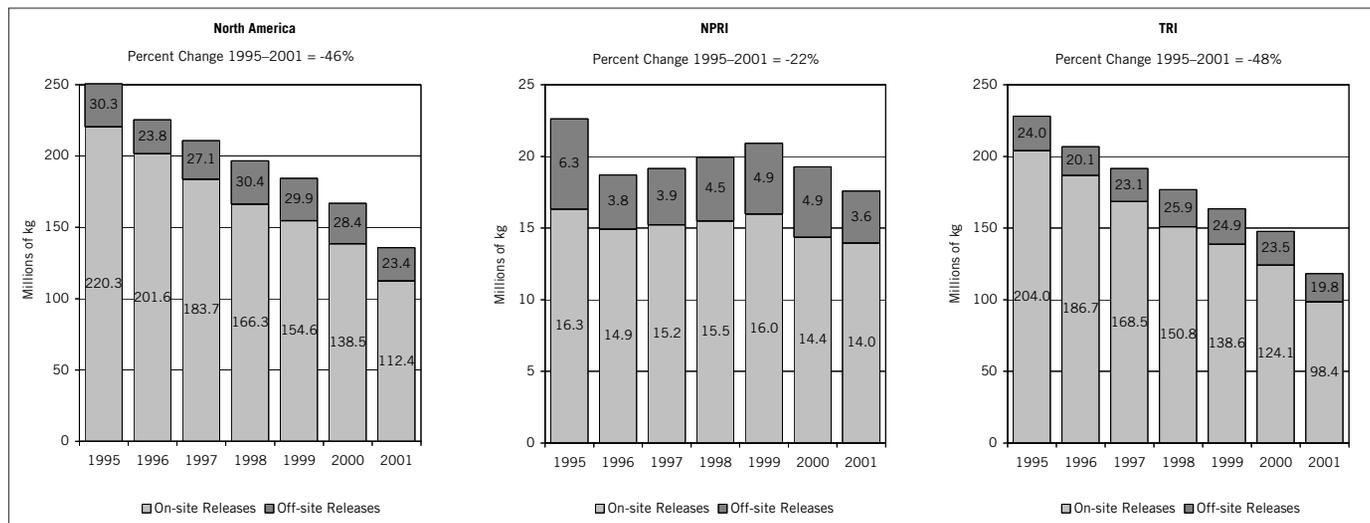
c = Known or suspected carcinogen.

m = Metal and its compounds.

t = CEPA Toxic chemical.

\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

**Figure 9–6. Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1995–2001**



Note: Canada and US data only. Mexico data not available for 1995–2001. Chemicals or chemical compounds linked to cancer, birth defects or reproductive harm by California on its Proposition 65 list (<[www.oeha.org/prop65.html](http://www.oeha.org/prop65.html)>). A chemical (and its compounds) is included if the chemical or any of its compounds is on the list.

**Table 9–10. Chemicals with Largest Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1995–2001**

Rank	CAS Number	Chemical	Total Releases On- and Off-site							Change 1995-2001	
			1995 (kg)	1996 (kg)	1997 (kg)	1998 (kg)	1999 (kg)	2000 (kg)	2001 (kg)	kg	%
<b>Decreases</b>											
1	108-88-3	Toluene	73,902,577	64,301,657	59,093,148	51,565,769	48,693,087	43,218,284	38,326,301	-35,576,276	-48
2	75-15-0	Carbon disulfide	38,195,290	33,116,048	23,227,479	19,780,416	16,368,271	18,484,567	8,230,774	-29,964,517	-78
3	75-09-2	c,t Dichloromethane	28,559,898	26,809,611	24,279,315	20,684,038	18,337,259	16,155,798	11,469,529	-17,090,369	-60
4	--	m,c,t Chromium (and its compounds)	26,869,436	26,371,604	29,787,869	32,598,317	33,203,885	22,069,663	16,101,821	-10,767,614	-40
5	79-01-6	c,t Trichloroethylene	12,621,975	10,784,980	9,067,334	6,855,513	5,564,648	5,086,241	4,494,351	-8,127,625	-64
<b>Increases</b>											
1	107-13-1	c,t Acrylonitrile	3,074,265	2,236,534	2,345,124	2,347,389	2,577,911	2,422,346	5,187,988	2,113,723	69
2	--	m,c,t Cadmium (and its compounds)	1,339,614	1,034,869	1,237,372	1,837,754	985,740	1,472,866	3,083,506	1,743,892	130
3	50-00-0	c Formaldehyde	10,073,961	11,241,860	11,585,414	11,564,524	12,661,353	13,036,737	11,552,426	1,478,465	15
4	79-06-1	c Acrylamide	2,859,445	2,687,843	3,294,204	2,887,644	3,418,037	3,929,948	3,423,812	564,367	20
5	--	m,c,t Arsenic (and its compounds)	2,197,818	2,015,839	3,789,498	4,466,429	5,536,639	5,220,678	2,680,124	482,305	22

Note: Canada and US data only. Mexico data not available for 1995–2001. Chemicals or chemical compounds linked to cancer, birth defects or reproductive harm by California on its Proposition 65 list (<[www.oeha.org/prop65.html](http://www.oeha.org/prop65.html)>). A chemical (and its compounds) is included if the chemical or any of its compounds is on the list.

c = Known or suspected carcinogens.  
 m = Metal and its compounds.  
 t = CEPA Toxic chemical.

a reduction of 4.5 million kg in on-site land releases.

- Acrylonitrile led the increases with 2.9 million kg, over 100 percent. One facility, BP Chemicals Inc. in Lima, Ohio, reported an increase of 1.9 million kg in on-site underground injection from 1998 to 2001.

### 9.3.4 Releases On- and Off-site of Chemicals Linked to Cancer, Birth Defects and Other Reproductive Harm (California Proposition 65 Chemicals), 1995–2001

There were 66 chemicals linked to cancer, birth defects and reproductive harm (California Proposition 65 chemicals) that have been consistently reported from 1995 to 2001. Reporting on nine Proposition 65 chemicals that were added to the NPRI list with the 1999 reporting year, as well as mercury and its compounds, whose reporting threshold changed with the 2000 reporting year, is not included when comparing trends from 1995 to 2001. Also, only the manufacturing industry sectors (US SIC codes 20–39) are included.

- Total releases on- and off-site of the Proposition 65 chemicals decreased by 46 percent from 1995 to 2001, compared to a decrease of 20 percent for all matched chemicals.
- Total releases of Proposition 65 chemicals reported by NPRI facilities decreased by 22 percent, with much of the reduction in the period from 1999 to 2001; releases by TRI facilities decreased by 48 percent, with steady reductions throughout the period from 1995 to 2001.
- Toluene, a developmental toxicant, had the largest reported reductions in total releases on- and off-site from 1995 to 2001 of the chemicals linked to cancer, birth defects or reproductive harm, with a 48-percent reduction, or 35.6 million kg.
- Acrylonitrile led the increases with 2.1 million kg, or 69 percent. Cadmium and its compounds and formaldehyde both showed increases of over one million kg.

## 9.4 On-site Air Emissions

In this section we take a more detailed look at on-site air emissions because they are the largest source of on-site releases. On-site air emissions account for almost 26 percent of all releases and transfers reported to the PRTR systems in Canada and the US. This section breaks down air releases into two components: 1) releases through the stack, and 2) fugitive and other releases.

A fugitive emission is any air emission that is not released through confined process streams. Fugitive releases include emissions from valves, pumps, seals, compressors, evaporative losses from surface impoundments and spills, releases from building ventilation systems, and other releases from land treatment and storage piles. On the other hand, stack emissions are emissions from stacks, vents, ducts, pipes, or other confined process streams, including pollution-control equipment.

Fugitive emissions can be compared to many small leaks in a long garden hose. Often hard to detect and repair, these leaks can release large quantities over time. Fugitive emissions can be very important from a community or worker perspective as they can occur continuously, are often emitted close to the ground, and can be emitted in high concentrations.

This breakdown is possible because NPRI divides air releases into five categories: stack releases, storage or handling releases, fugitive releases, spills, and other non-point releases. TRI reporting includes two categories: stack releases and fugitive releases. For this report, the more detailed NPRI reporting on air releases has been aggregated into two categories—stack releases and fugitive and other releases—to match the TRI categories.

### 9.4.1 On-site Air Releases, 2001

The matched TRI and NPRI facilities released 755.5 million kg of chemicals into the air in 2001. NPRI air releases were 87.7 million kg, with fugitive and other air releases accounting for 13 percent of the NPRI total. TRI air releases were 667.8 million kg in 2001, with fugitive air releases accounting for 12 percent of the TRI total.

Table 9–11. On-site Air Releases in North America, by Province/State, 2001 (Ordered by Total Air Releases within Each Country)

North American Rank	Province/State	Number of Facilities	Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Industry Sector reporting 70 percent or more of total air emissions in the province/state
<b>Canada</b>		<b>1,864</b>	<b>87,665,608</b>	<b>76,638,834</b>	<b>11,026,774</b>	
3	Ontario	1,014	45,480,752	40,007,975	5,472,778	Electric Utilities, Chemicals, Paper Products, Rubber and Plastics Products
22	Quebec	407	11,565,633	9,173,922	2,391,711	Paper Products, Lumber and Wood Products, Rubber and Plastics Products
25	British Columbia	115	8,422,984	7,877,622	545,362	Paper Products
27	Alberta	159	8,027,384	6,196,046	1,831,338	Chemicals, Electric Utilities
36	New Brunswick	31	4,769,390	4,697,675	71,715	Electric Utilities
38	Nova Scotia	31	4,367,968	4,282,587	85,381	Electric Utilities
39	Manitoba	64	3,285,637	3,175,417	110,220	Paper Products, Primary Metals
51	Saskatchewan	31	978,058	664,979	313,079	Paper Products, Petroleum and Coal Products
54	Newfoundland and Labrador	7	748,824	543,822	205,002	Electric Utilities
63	Prince Edward Island	5	18,978	18,789	189	Electric Utilities
<b>United States</b>		<b>19,390</b>	<b>667,836,068</b>	<b>585,987,532</b>	<b>81,848,536</b>	
1	North Carolina	700	50,066,939	47,758,135	2,308,804	Electric Utilities
2	Ohio	1,443	45,889,914	42,797,136	3,092,778	Electric Utilities
4	Texas	1,234	42,656,276	28,269,715	14,386,562	Chemicals, Electric Utilities
5	Pennsylvania	1,173	38,726,682	35,449,035	3,277,647	Electric Utilities
6	Georgia	620	37,206,973	34,285,093	2,921,880	Electric Utilities
7	Florida	506	34,967,590	32,617,861	2,349,729	Electric Utilities
8	Indiana	901	33,079,220	28,721,990	4,357,230	Electric Utilities, Rubber and Plastics Products
9	Alabama	445	32,055,435	28,849,818	3,205,616	Electric Utilities, Paper Products
10	Tennessee	560	31,634,010	26,720,520	4,913,490	Electric Utilities, Rubber and Plastics Products, Chemicals
11	West Virginia	159	26,109,457	25,023,826	1,085,631	Electric Utilities
12	Kentucky	404	25,199,214	22,912,668	2,286,546	Electric Utilities
13	Illinois	1,151	24,679,080	20,502,535	4,176,546	Electric Utilities, Food Products, Chemicals
14	Michigan	793	24,130,378	22,426,450	1,703,927	Electric Utilities
15	South Carolina	468	22,852,720	21,233,535	1,619,185	Electric Utilities, Paper Products
16	Virginia	389	21,764,358	18,598,552	3,165,806	Electric Utilities, Paper Products, Multiple codes
17	Louisiana	320	20,035,160	14,688,985	5,346,174	Chemicals
18	Maryland	151	15,332,648	15,043,096	289,552	Electric Utilities
19	Mississippi	272	13,784,416	11,788,022	1,996,394	Electric Utilities, Paper Products, Multiple codes
20	Missouri	490	13,186,055	11,850,192	1,335,863	Electric Utilities, Chemicals
21	New York	557	12,013,788	10,818,249	1,195,538	Electric Utilities
23	Wisconsin	786	10,451,604	9,380,051	1,071,554	Paper Products, Electric Utilities, Fabricated Metals Products
24	Iowa	368	8,554,214	7,105,810	1,448,405	Food Products, Electric Utilities, Chemicals
26	Utah	141	8,332,181	7,649,240	682,942	Primary Metals
28	Arkansas	329	7,127,836	5,621,407	1,506,430	Paper Products, Rubber and Plastics Products, Chemicals, Electric Utilities, Food Products
29	Puerto Rico	124	5,643,971	4,505,850	1,138,120	Electric Utilities
30	Washington	228	5,531,632	4,848,202	683,430	Paper Products, Multiple codes
31	California	1,123	5,519,720	4,028,766	1,490,954	Petroleum and Coal Products, Rubber and Plastics Products, Transportation Equipment, Chemicals
32	New Jersey	466	5,487,325	4,526,236	961,089	Electric Utilities
33	Minnesota	410	5,227,231	4,150,534	1,076,697	Transportation Equipment, Lumber and Wood Products, Food Products, Multiple codes
34	Oregon	221	4,974,839	4,210,802	764,036	Paper Products, Lumber and Wood Products
35	Kansas	248	4,941,749	3,860,581	1,081,169	Electric Utilities, Transportation Equipment, Multiple codes
37	Oklahoma	287	4,757,047	3,577,279	1,179,768	Paper Products, Chemicals, Electric Utilities
40	Nebraska	146	3,102,977	2,771,835	331,142	Electric Utilities, Food Products
41	Massachusetts	414	2,887,813	2,574,251	313,563	Electric Utilities, Paper Products
42	Delaware	59	2,771,802	2,572,250	199,552	Electric Utilities
43	Connecticut	281	2,021,705	1,493,194	528,511	Electric Utilities, Multiple codes
44	New Hampshire	92	1,956,768	1,843,228	113,540	Electric Utilities
45	North Dakota	40	1,740,764	1,554,112	186,652	Petroleum and Coal Products
46	Arizona	192	1,677,981	1,390,698	287,283	Electric Utilities, Rubber and Plastics Products, Primary Metals
47	Montana	34	1,641,073	1,581,220	59,853	Paper Products, Electric Utilities
48	Maine	70	1,638,173	1,485,779	152,395	Paper Products
49	Colorado	156	1,308,568	989,580	318,989	Electric Utilities, Fabricated Metals Products, Rubber and Plastics Products
50	Idaho	56	1,000,926	680,008	320,919	Multiple codes
52	Hawaii	15	978,008	924,973	53,034	Electric Utilities
53	Nevada	50	835,064	687,595	147,469	Electric Utilities
55	South Dakota	65	699,461	332,080	367,381	Food Products, Multiple codes
56	Wyoming	35	505,223	430,365	74,858	Electric Utilities
57	New Mexico	48	407,607	282,265	125,342	Electric Utilities
58	Rhode Island	118	276,456	192,195	84,261	Textile Mill Products, Paper Products, Fabricated Metals Products, Transportation Equipment
59	Virgin Islands	3	171,866	143,602	28,264	Petroleum and Coal Products
60	Alaska	10	160,684	125,395	35,288	Chemicals
61	Guam	2	75,551	75,348	203	Electric Utilities
62	Vermont	33	39,461	18,917	20,544	Chemicals, Fabricated Metals Products
64	District of Columbia	4	18,473	18,473	0	Electric Utilities
<b>Total</b>		<b>21,254</b>	<b>755,501,676</b>	<b>662,626,366</b>	<b>92,875,310</b>	

Note: Canada and US data 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.

Table 9–12. Chemicals with Largest On-site Air Releases in North America, 2001

Rank	CAS Number	Chemical	Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Percent Fugitive is of Total	Industry Sector reporting 70 percent or more of total air emissions of the chemical
1	7647-01-0	Hydrochloric acid	282,407,660	281,480,869	926,791	0.3	Electric Utilities
2	67-56-1	Methanol	90,336,714	81,395,457	8,941,257	10	Paper Products
3	7664-93-9	Sulfuric acid	73,531,087	73,272,115	258,972	0.4	Electric Utilities
4	108-88-3	p Toluene	37,428,079	24,196,355	13,231,724	35	Printing and Publishing, Rubber and Plastics Products, Chemicals, Paper Products, Transportation Equipment
5	7664-39-3	t Hydrogen fluoride	33,720,905	31,940,778	1,780,127	5	Electric Utilities
6	--	Xylenes	27,692,289	21,227,237	6,465,052	23	Transportation Equipment, Fabricated Metals Products, Chemicals, Lumber and Wood Products, Petroleum and Coal Products
7	110-54-3	n-Hexane	24,265,682	15,862,810	8,402,872	35	Food Products
8	100-42-5	c Styrene	22,791,087	17,226,134	5,564,953	24	Rubber and Plastics Products
9	78-93-3	Methyl ethyl ketone	17,162,448	11,216,341	5,946,107	35	Rubber and Plastics Products, Multiple codes 20–39*, Transportation Equipment, Petroleum and Coal Products, Chemicals, Fabricated Metals Products
10	74-85-1	Ethylene	13,159,787	7,806,189	5,353,598	41	Chemicals
11	75-09-2	c,p,t Dichloromethane	11,417,649	7,877,221	3,540,428	31	Rubber and Plastics Products
12	71-36-3	n-Butyl alcohol	8,618,226	6,947,701	1,670,525	19	Fabricated Metals Products
13	75-15-0	p Carbon disulfide	8,206,054	7,490,331	715,723	9	Chemicals
14	7782-50-5	Chlorine	7,865,983	7,496,115	369,868	5	Primary Metals
15	115-07-1	Propylene	7,101,585	3,078,704	4,022,880	57	Chemicals
16	50-00-0	c,p Formaldehyde	6,490,420	6,082,023	408,397	6	Lumber and Wood Products, Stone/Clay/Glass Products
17	75-07-0	c,p,t Acetaldehyde	6,465,324	5,801,436	663,888	10	Paper Products
18	108-10-1	Methyl isobutyl ketone	5,211,246	4,110,828	1,100,418	21	Transportation Equipment, Chemicals, Rubber and Plastics Products, Fabricated Metals Products
19	79-01-6	c,p,t Trichloroethylene	4,442,653	2,055,657	2,386,996	54	Fabricated Metals Products, Primary Metals, Rubber and Plastics Products
20	--	m Zinc (and its compounds)	4,141,916	3,274,166	867,751	21	Primary Metals, Electric Utilities
21	75-45-6	t Chlorodifluoromethane (HCFC-22)	4,079,699	2,022,342	2,057,357	50	Chemicals
22	95-63-6	1,2,4-Trimethylbenzene	3,746,552	2,842,851	903,701	24	Transportation Equipment, Fabricated Metals Products, Primary Metals, Petroleum and Coal Products
23	100-41-4	c Ethylbenzene	3,540,815	2,633,219	907,596	26	Transportation Equipment, Chemicals, Petroleum and Coal Products
24	71-43-2	c,p,t Benzene	3,421,853	1,676,935	1,744,918	51	Petroleum and Coal Products, Chemicals
25	1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	3,421,802	2,063,789	1,358,013	40	Electronic/Electrical Equipment, Rubber and Plastics Products
		<b>Subtotal</b>	<b>710,667,514</b>	<b>631,077,603</b>	<b>79,589,912</b>	<b>11</b>	
		<b>% of Total</b>	<b>94</b>	<b>95</b>	<b>86</b>		
		<b>Total</b>	<b>755,501,676</b>	<b>662,626,366</b>	<b>92,875,310</b>	<b>12</b>	

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

m = Metal and its compounds.

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

### On-site Air Releases by Province/State, 2001

- Facilities in North Carolina reported the largest air releases in the US and in North America, with 50.1 million kg, or 7 percent of the US total. Ohio reported the second-largest air releases in North America with 45.9 million kg. For both states, electric utilities were the industry sector with the largest air releases.
- Facilities in Ontario reported 45.5 million kg of chemicals released into the air in 2001 and ranked third in North America. Facilities in Ontario accounted for 52 percent of total on-site air releases in Canada. Facilities in Quebec accounted for 13 percent of the NPRI total.
- Texas, which ranked third in the US and fourth in North America, reported the largest fugitive air releases. Fugitive air releases in Texas accounted for 15 percent of fugitive air releases in the North America in 2001. Chemical manufacturers were the industry sector with the largest air releases, including fugitive air releases, in Texas.

### On-site Air Releases by Chemical, 2001

The 25 chemicals with the largest on-site air releases in 2001 accounted for 94 percent of all air releases.

- The chemical with the largest on-site air releases was hydrochloric acid, almost all of which were stack air releases. Hydrochloric acid air releases were 282.4 million kg, or 37 percent of total air releases in North America.
- Electric utilities reported more than 70 percent of air releases of hydrochloric acid, sulfuric acid (the third ranked chemical for air releases) and hydrogen fluoride (the fifth ranked chemical).
- Methanol, the chemical with the second-largest air releases, accounted for 12 percent (90.3 million kg) of all air releases in 2001. The paper products sector reported more than 70 percent of the air releases of methanol.

- Toluene, a developmental toxicant, had the largest amount of fugitive air releases in 2001, with 13.2 million kg. Methanol ranked second for fugitive air releases.

#### On-site Air Releases by Industry, 2001

- Electric utilities accounted for the largest amount of air releases in the US, with 322.4 million kg or 48 percent of the US total in 2001. Almost all were as stack emissions. Electric utilities in Canada accounted for 22 percent (18.9 million kg) of air releases in that country.
- The paper products industry accounted for the largest air releases in Canada, with 21.1 million kg, or 24 percent, and almost all were as stack emissions. Paper products sector in the US accounted for 10 percent of air releases in that country. For both NPRI and TRI, over 65 percent of air releases by the paper products sector was methanol.
- The average kilograms released per form were about the same for electric utilities in NPRI and TRI (NPRI/TRI ratio of 1.1). However, for the paper products industry, NPRI air releases were, on average, 40 percent higher than those of TRI (ratio of 1.4).
- Chemical manufacturers ranked second in TRI and third in NPRI for total air releases. NPRI chemical manufacturers reported, on average, 40 percent higher air releases per facility than TRI (ratio of 1.4).
- The rubber and plastics sector, which ranked fourth in both NPRI and TRI, reported on average, twice the amount of air releases per chemical form to NPRI than to TRI (ratio of 2.1). In NPRI, methyl ethyl ketone accounted for 22 percent of total air releases for this industry, dichloromethane (a designated carcinogen) for 20 percent, and styrene (a designated carcinogen) for 17 percent. In TRI, styrene accounted for 32 percent, dichloromethane for 12 percent, and carbon disulfide for 11 percent.

Table 9–13. On-site Air Releases in North America, NPRI and TRI, by Industry, 2001 (Ordered by Total Air Releases in TRI)

US SIC Code	Industry	Number of Forms	Total On-site Air Releases (kg)	NPRI			
				Rank	Stack Releases (kg)	Fugitive and Other Air Releases (kg)	Percent Fugitive is of Total
491/493	Electric Utilities	225	18,946,020	2	18,944,663	1,357	0.01
28	Chemicals	1,770	10,933,160	3	7,891,726	3,041,434	28
26	Paper Products	499	21,098,158	1	20,759,963	338,196	2
30	Rubber and Plastics Products	341	7,946,855	4	6,655,519	1,291,336	16
37	Transportation Equipment	517	4,812,298	6	4,279,280	533,018	11
--	Multiple codes 20–39*	0	0	--	0	0	--
33	Primary Metals	772	6,584,873	5	4,929,287	1,655,586	25
29	Petroleum and Coal Products	434	3,045,385	8	842,926	2,202,459	72
20	Food Products	138	1,666,151	11	910,209	755,942	45
24	Lumber and Wood Products	385	4,613,009	7	4,504,689	108,320	2
34	Fabricated Metals Products	622	2,504,372	9	1,942,609	561,763	22
32	Stone/Clay/Glass Products	167	1,732,564	10	1,711,950	20,614	1
27	Printing and Publishing	36	1,279,128	12	1,048,343	230,785	18
36	Electronic/Electrical Equipment	100	15,969	18	14,636	1,333	8
35	Industrial Machinery	94	111,130	16	101,701	9,429	8
25	Furniture and Fixtures	97	1,085,258	13	1,077,590	7,668	0.7
38	Measurement/Photographic Instruments	0	0	22	0	0	--
39	Misc. Manufacturing Industries	209	872,419	14	640,614	231,805	27
22	Textile Mill Products	21	372,874	15	362,243	10,631	3
5169	Chemical Wholesalers	41	4,181	20	2,293	1,888	45
495/738	Hazardous Waste Mgt./Solvent Recovery	207	29,419	17	6,208	23,211	79
21	Tobacco Products	0	0	23	0	0	--
31	Leather Products	11	12,384	19	12,384	0	0
23	Apparel and Other Textile Products	1	0	24	0	0	--
12	Coal Mining	0	0	25	0	0	--
<b>Total</b>		<b>6,687</b>	<b>87,665,608</b>		<b>76,638,834</b>	<b>11,026,774</b>	<b>13</b>

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

\* Multiple SIC codes reported only in TRI.

Table 9-13. (continued)

US SIC Code	Industry	TRI					Average kg per Form (NPRI/TRI)			
		Number of Forms	Total On-site Air Releases (kg)	Rank	Stack Releases (kg)	Fugitive and Other Air Releases (kg)	Percent Fugitive is of Total	Total On-site Air Releases	Stack Releases	Fugitive and Other Air Releases
491/493	Electric Utilities	4,292	322,415,623	1	322,338,675	76,949	0.02	1.1	1.1	0.3
28	Chemicals	16,250	73,011,824	2	47,853,822	25,158,003	34	1.4	1.5	1.1
26	Paper Products	2,067	64,412,084	3	60,514,517	3,897,566	6	1.4	1.4	0.4
30	Rubber and Plastics Products	3,017	33,908,059	4	25,023,121	8,884,938	26	2.1	2.4	1.3
37	Transportation Equipment	3,994	27,188,579	5	21,624,724	5,563,854	20	1.4	1.5	0.7
--	Multiple codes 20-39*	3,659	24,633,052	6	18,577,101	6,055,951	25	--	--	--
33	Primary Metals	5,635	19,776,653	7	15,282,510	4,494,143	23	2.4	2.4	2.7
29	Petroleum and Coal Products	3,175	18,538,580	8	11,212,797	7,325,782	40	1.2	0.6	2.2
20	Food Products	2,636	17,839,690	9	13,336,218	4,503,473	25	1.8	1.3	3.2
24	Lumber and Wood Products	1,567	13,113,384	10	11,811,972	1,301,412	10	1.4	1.6	0.3
34	Fabricated Metals Products	6,547	12,372,873	11	7,638,241	4,734,632	38	2.1	2.7	1.2
32	Stone/Clay/Glass Products	1,778	10,726,192	12	10,266,373	459,819	4	1.7	1.8	0.5
27	Printing and Publishing	337	8,459,827	13	4,085,250	4,374,577	52	1.4	2.4	0.5
36	Electronic/Electrical Equipment	2,213	4,747,000	14	3,512,986	1,234,014	26	0.1	0.1	0.0
35	Industrial Machinery	2,338	3,283,865	15	1,810,644	1,473,220	45	0.8	1.4	0.2
25	Furniture and Fixtures	467	3,283,674	16	2,833,510	450,164	14	1.6	1.8	0.1
38	Measurement/Photographic Instruments	491	3,018,726	17	2,728,935	289,791	10	--	--	--
39	Misc. Manufacturing Industries	497	2,949,891	18	2,397,536	552,355	19	0.7	0.6	1.0
22	Textile Mill Products	375	2,397,988	19	1,882,246	515,742	22	2.8	3.4	0.4
5169	Chemical Wholesalers	2,999	513,045	20	309,683	203,362	40	0.6	0.5	0.7
495/738	Hazardous Waste Mgt./Solvent Recovery	1,882	420,302	21	270,693	149,609	36	0.6	0.2	1.4
21	Tobacco Products	18	340,481	22	338,381	2,100	0.6	--	--	--
31	Leather Products	104	272,887	23	183,146	89,741	33	0.4	0.6	0.0
23	Apparel and Other Textile Products	32	131,793	24	84,917	46,877	36	--	--	--
12	Coal Mining	227	79,995	25	69,534	10,462	13	--	--	--
<b>Total</b>		<b>66,597</b>	<b>667,836,068</b>		<b>585,987,532</b>	<b>81,848,536</b>	<b>12</b>	<b>1.3</b>	<b>1.3</b>	<b>1.3</b>

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

\* Multiple SIC codes reported only in TRI.

### Facilities with Largest On-site Air Releases, NPRI and TRI, 2001

- The facility in Canada with the largest air releases in 2001 was the Ontario Power Generation Nanticoke Generating Station in Nanticoke, Ontario, with 6.9 million kg. Two other Ontario Power Generation facilities were also among the 10 facilities in Canada with the largest air releases.
- The facility in Canada with the second-largest air releases was the Bowater Pulp and Paper Canada Inc. facility in Thunder Bay, Ontario, reporting 2.6 million kg of mostly methanol and sulfuric acid.
- The facility in the United States with the largest air releases in 2001 was the CP&L Roxboro Steam Electric Plant owned by Progress Energy and located in Semora, North Carolina. It reported 8.7 million kg of air releases.
- Nine of the 10 facilities with the largest air releases in the United States were electric utilities, including the one with the second-largest air releases, Reliant Energy's Keystone Power Plant in Shelocta, Pennsylvania, with 7.9 million kg.

Table 9–14. Facilities with Largest On-site Air Releases in North America, NPRI and TRI, 2001

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes		Number of Forms	Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Major Chemicals Reported in On-site Air Releases (chemicals accounting for more than 70% of on-site air releases from the facility)
				Canada	US					
<b>Canada</b>										
	4	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	13	6,932,888	6,932,885	3	Hydrochloric acid
	35	Bowater Pulp and Paper Canada Inc., Thunder Bay Operations	Thunder Bay, ON	27	26	11	2,564,572	2,564,572	0	Methanol, Sulfuric acid
	40	Bayer Inc.	Sarnia, ON	37	28	21	2,362,310	2,006,219	356,091	n-Hexane, Chloromethane, Hydrochloric acid
	50	Ontario Power Generation Inc, Lambton Generating Station	Courtright, ON	49	491/493	12	1,981,682	1,981,679	3	Hydrochloric acid
	51	Nova Scotia Power Inc., Lingan Generating Station, Emera Inc.	New Waterford, NS	41	491/493	8	1,960,118	1,960,118	0	Hydrochloric acid
	73	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	13	1,552,231	1,506,786	45,445	Copper/Nickel/Arsenic/Zinc/Selenium/Chromium/Cadmium/Cobalt/Manganese and compounds
	89	Ontario Power Generation Inc., Lakeview GS	Mississauga, ON	49	491/493	10	1,293,528	1,293,527	1	Hydrochloric acid
	97	New Brunswick Power, Coleson Cove Generating Station	Saint John, NB	49	491/493	7	1,235,277	1,235,277	0	Sulfuric acid
	120	Tolko Manitoba Kraft Papers	The Pas, MB	27	26	7	1,084,028	1,077,420	6,608	Methanol
	129	Canadian General Tower Ltd.	Cambridge, ON	16	30	6	1,051,287	1,051,287	0	Methyl ethyl ketone
<b>United States</b>										
	1	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	8,714,345	8,714,104	241	Hydrochloric acid
	2	Reliant Energies Inc. Keystone Power Plant	Shelocta, PA		491/493	11	7,857,450	7,856,760	689	Hydrochloric acid
	3	Georgia Power Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	13	7,451,833	7,451,833	0	Hydrochloric acid
	5	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	3	6,509,751	6,439,909	69,841	Chlorine
	6	Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore, MD		491/493	15	6,323,603	6,323,599	4	Hydrochloric acid
	7	Duke Power Belews Creek Steam Station, Duke Energy Corp.	Belews Creek, NC		491/493	12	5,590,732	5,590,726	6	Hydrochloric acid
	8	Gulf Power Co. Plant Crist, Southern Co.	Pensacola, FL		491/493	12	5,143,406	5,143,406	0	Hydrochloric acid
	9	Duke Energy Marshall Steam Station	Terrell, NC		491/493	12	5,124,769	5,124,766	2	Hydrochloric acid
	10	Florida Power Crystal River Energy Complex, Progress Energy	Crystal River, FL		491/493	16	5,118,701	5,118,671	30	Hydrochloric acid
	11	American Electric Power John E. Amos Plant	Winfield, WV		491/493	13	4,689,699	4,689,603	97	Hydrochloric acid

Note: Canada and US data 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.

Table 9–15. Facilities with Largest On-site Fugitive Air Releases in North America, NPRI and TRI, 2001

North American Rank	Country	Facility	City, State/ Province	SIC Codes		Number of Forms	Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Major Chemicals Reported in On-site Air Releases (chemicals accounting for more than 70% of on-site air releases from the facility)
				Canada	US					
<b>Canada</b>										
26	1	Bayer Inc.	Sarnia, ON	37	28	21	2,362,310	2,006,219	356,091	Methanol, Chloromethane, Cyclohexane, Ethylene
30	2	Alcan Primary Metal - British Columbia, Kitimat Works	Kitimat, BC	29	33	7	378,170	57,294	320,876	Hydrogen fluoride
34	3	Canbra Foods Ltd., James Richardson & Sons Limited	Lethbridge, AB	10	20	1	305,567	0	305,567	n-Hexane
57	4	Imperial Oil, Sarnia Refinery Plant	Sarnia, ON	36	29	25	402,446	160,283	242,163	Methyl isobutyl ketone, Methyl ethyl ketone, Propylene, n-Hexane
60	5	Pétromont, Société en Commandite, Usine de Varennes	Varennes, QC	37	28	13	451,700	216,857	234,843	Propylene, Ethylene
62	6	ADM Agri-industries Ltd., Archer Daniels Midland Company	Windsor, ON	10	20	2	313,000	81,000	232,000	n-Hexane
66	7	NOVA Chemicals Corporation, Moore Site	Sarnia, ON	37	28	2	293,531	68,756	224,775	Ethylene
69	8	Stelco Inc., Hilton Works	Hamilton, ON	29	33	23	264,351	50,148	214,203	Benzene
70	9	AT Plastics Inc., Edmonton Site	Edmonton, AB	37	28	5	356,700	145,800	210,900	Ethylene, Vinyl acetate
72	10	Sunoco Inc., Sarnia Refinery, Suncor Energy	Sarnia, ON	36	29	14	210,187	2,365	207,822	Xylenes, Toluene, Ethylbenzene
<b>United States</b>										
1	1	Eastman Chemical Co. Texas Ops.	Longview, TX		28	45	1,709,491	616,675	1,092,816	Ethylene
2	2	QW Memphis Corp., Quebecor World Inc.	Memphis, TN		27	4	909,197	25,822	883,375	Toluene
3	3	ExxonMobil Oil Beaumont Refy.	Beaumont, TX		29	29	845,426	101,413	744,014	Methyl ethyl ketone, Toluene
4	4	Goodyear Tire & Rubber Co.	Cheek, TX		28	18	764,813	36,334	728,479	n-Hexane
5	5	Quebecor World Richmond Inc.	Richmond, VA		27	4	1,014,351	336,478	677,872	Toluene
6	6	Texas Recreation Corp.	Wichita Falls, TX		30	4	657,478	0	657,478	Methyl ethyl ketone, Toluene
7	7	Equistar Chemicals L.P.	Channelview, TX		28	28	843,970	264,649	579,321	Ethylene, Propylene, 1,3-Butadiene, Benzene
8	8	Quebecor World Inc. Corinth Div.	Corinth, MS		27	4	648,129	86,417	561,712	Toluene
9	9	Equistar Chemicals L.P. Clinton Plant	Clinton, IA		28	11	849,678	301,980	547,698	Ethylene
10	10	Chemsource Corp.	Guayama, PR		28	6	530,215	13,307	516,907	Methanol

Note: Canada and US data 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.

- The facility in Canada with the largest fugitive and other air releases in 2001 was the chemical manufacturer Bayer Inc. facility in Sarnia, Ontario, with over 356,000 kg. It reported fugitive releases primarily of methanol, chloromethane, cyclohexane and ethylene.
- The facility in Canada with the second-largest fugitive and other air releases was the Alcan Primary Metal facility in Kitimat, British Columbia, reporting 321,000 kg of mostly hydrogen fluoride.
- The facility in the United States with the largest fugitive air releases in 2001 was the Eastman Chemical Co. in Longview, Texas, with 1.1 million kg of primarily ethylene.
- The QW Memphis facility owned by Quebecor World Inc. and located in Memphis, Tennessee, reported the second-largest fugitive air releases in the United States for 2001. It reported over 883,000 kg of primarily toluene.

## 9.4.2 On-site Air Releases, 1998–2001

This section analyzes the 155 chemicals that have been consistently reported from 1998 to 2001.

- On-site air releases in North America decreased by 18 percent from 1998 to 2001. Stack air releases decreased by 17 percent and fugitive and other air releases decreased by 27 percent.
- NPRI air releases increased by 3 percent (2.1 million kg) from 1998 to 2001. This increase was driven by stack air releases, as fugitive and other releases decreased by 16 percent. As was seen in **Chapter 6 (Table 6-10)**, NPRI facilities newly reporting in 2001, who did not report in 1998, accounted for 6.1 million kg of air releases while NPRI facilities no longer reporting in 2001, but who did report in 1998, accounted for a 2.9 million kg drop in air releases. Without these two groups of facilities (as well as two facilities that had an increase of over one million kg), NPRI air releases from facilities reporting in both years decreased by 2 percent.
- TRI air releases decreased by 20 percent from 1998 to 2001. Both stack and fugitive air releases decreased, with stack air releases decreasing by 19 percent and fugitive by 29 percent. For TRI facilities reporting in both 1998 and 2001, the decrease in on-site air releases was 18 percent (see **Chapter 6, Table 6-11**).

### On-site Air Releases by Province/State, 1998–2001

- Facilities in North Carolina had the largest air releases in 2001 in North America after ranking second in 1998, despite reporting a decrease of 1 percent from 1998 to 2001. The state's stack air releases increased by 1 percent while fugitive air releases decreased by 26 percent.
- Ohio reported the second-largest air releases in 2001 after ranking first in 1998. Ohio's air releases decreased by 27 percent from 1998 to 2001, with decreases in both stack and fugitive air releases.

**Table 9–16. On-site Air Releases, by Province/State, 1998–2001 (Ordered by 2001 Total On-site Air Releases within Country)**

Province/State	1998				2001			
	Total On-site Air Releases (kg)	North American Rank	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	North American Rank	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)
<b>Canada</b>	<b>81,070,314</b>		<b>69,515,616</b>	<b>11,554,698</b>	<b>83,185,865</b>		<b>73,523,828</b>	<b>9,662,037</b>
Ontario	43,447,343	4	37,901,616	5,545,727	43,473,382	3	38,418,607	5,054,775
Quebec	10,455,522	24	8,037,022	2,418,500	10,706,336	22	8,573,540	2,132,796
Alberta	8,308,040	27	6,652,439	1,655,601	7,319,019	26	6,000,015	1,319,004
British Columbia	4,898,155	37	3,728,492	1,169,663	8,380,806	24	7,843,389	537,417
New Brunswick	6,134,748	34	6,075,003	59,745	4,608,054	34	4,541,994	66,060
Nova Scotia	3,561,979	40	3,372,919	189,060	4,351,111	36	4,282,302	68,809
Manitoba	3,088,696	43	2,983,346	105,350	2,891,402	39	2,808,825	82,577
Saskatchewan	708,106	55	433,108	274,998	815,114	52	607,974	207,140
Newfoundland and Labrador	453,683	58	326,649	127,034	622,324	54	429,022	193,302
Prince Edward Island	14,042	64	5,022	9,020	18,317	64	18,160	157
<b>United States</b>	<b>790,405,335</b>		<b>694,124,457</b>	<b>96,280,878</b>	<b>630,512,306</b>		<b>561,675,957</b>	<b>68,836,350</b>
North Carolina	49,193,642	2	47,017,222	2,176,420	48,897,722	1	47,283,287	1,614,435
Ohio	60,359,169	1	55,940,703	4,418,465	43,966,674	2	41,283,274	2,683,399
Texas	45,103,379	3	29,574,064	15,529,314	38,999,603	4	26,638,070	12,361,533
Pennsylvania	41,045,082	6	36,973,022	4,072,059	38,255,482	5	35,199,252	3,056,230
Georgia	37,600,649	8	35,484,383	2,116,266	36,198,716	6	33,579,850	2,618,866
Florida	35,839,429	9	34,052,682	1,786,748	34,461,382	7	32,192,177	2,269,205
Alabama	34,169,283	10	29,965,460	4,203,824	31,113,033	8	28,197,253	2,915,780
Indiana	38,124,258	7	32,467,793	5,656,465	30,545,283	9	27,075,125	3,470,158
Tennessee	41,992,178	5	36,944,723	5,047,454	30,237,444	10	25,788,291	4,449,154
West Virginia	33,023,910	11	31,839,983	1,183,927	25,970,822	11	24,929,245	1,041,577
Michigan	29,932,361	13	27,198,953	2,733,408	23,517,819	12	21,956,389	1,561,429
Kentucky	29,876,873	14	27,145,471	2,731,402	22,359,545	13	20,677,393	1,682,152
South Carolina	24,164,939	16	21,843,102	2,321,837	22,088,304	14	20,694,441	1,393,863
Virginia	23,460,880	17	20,125,840	3,335,040	20,727,124	15	18,214,913	2,512,211
Illinois	31,350,889	12	27,375,108	3,975,780	20,416,541	16	17,423,542	2,992,999
Louisiana	21,292,522	18	16,020,842	5,271,680	17,480,829	17	13,176,474	4,304,355
Maryland	13,548,499	23	13,139,402	409,097	15,124,441	18	14,868,334	256,107
Mississippi	16,127,092	21	13,937,073	2,190,019	12,815,754	19	11,078,776	1,736,979
Missouri	16,537,428	19	14,390,339	2,147,089	11,864,913	20	10,790,505	1,074,407
New York	14,979,700	22	13,274,207	1,705,493	11,843,770	21	10,674,782	1,168,988
Wisconsin	16,181,922	20	14,800,806	1,381,116	10,266,603	23	9,322,054	944,549
Utah	28,799,170	15	27,997,310	801,860	8,189,288	25	7,560,482	628,806
Iowa	10,424,777	25	8,475,507	1,949,270	6,533,476	27	5,500,881	1,032,595
Arkansas	8,372,249	26	6,921,490	1,450,759	6,056,634	28	5,071,449	985,185
Puerto Rico	6,905,344	31	5,808,526	1,096,818	5,544,489	29	4,454,525	1,089,964
Washington	8,108,989	28	6,873,019	1,235,970	5,440,927	30	4,794,160	646,767
New Jersey	6,751,509	32	5,578,238	1,173,271	5,148,732	31	4,422,170	726,562
Oregon	6,292,957	33	4,785,668	1,507,289	4,943,615	32	4,196,143	747,471
California	7,288,857	30	4,865,221	2,423,636	4,715,792	33	3,465,041	1,250,751
Oklahoma	6,037,797	35	4,530,396	1,507,400	4,537,938	35	3,484,164	1,053,774
Kansas	7,658,603	29	6,471,825	1,186,778	4,240,920	37	3,425,749	815,171
Minnesota	5,397,374	36	4,548,884	848,490	4,192,353	38	3,438,556	753,797
Massachusetts	3,263,404	42	2,832,890	430,514	2,788,245	40	2,504,021	284,223
Delaware	3,882,516	38	3,651,191	231,325	2,714,265	41	2,531,192	183,073
Nebraska	3,389,141	41	2,882,877	506,264	2,479,844	42	2,254,535	225,309
New Hampshire	2,745,159	44	2,633,389	111,771	1,933,799	43	1,831,459	102,340
Connecticut	2,299,471	46	1,544,990	754,480	1,717,426	44	1,247,057	470,369
Maine	2,425,943	45	2,070,503	355,440	1,628,320	45	1,478,050	150,270
Montana	1,945,683	47	1,699,222	246,461	1,612,107	46	1,558,988	53,119
Arizona	3,865,676	39	2,294,448	1,571,228	1,529,417	47	1,304,365	225,053
North Dakota	1,674,779	48	1,462,467	212,312	1,477,585	48	1,322,158	155,427
Colorado	1,468,474	49	1,131,791	336,683	1,195,565	49	965,271	230,294
Idaho	1,332,581	51	880,903	451,678	995,455	50	678,908	316,547
Hawaii	787,591	54	735,118	52,473	962,760	51	912,662	50,098
Nevada	1,091,906	52	935,944	155,961	800,901	53	680,171	120,729
Wyoming	1,367,586	50	1,170,223	197,363	470,115	55	403,268	66,847
South Dakota	652,195	56	482,743	169,452	429,268	56	328,294	100,975
New Mexico	907,470	53	581,090	326,380	372,674	57	259,796	112,878
Rhode Island	559,122	57	343,289	215,833	265,520	58	190,385	75,134
Virgin Islands	426,628	59	155,922	270,706	164,978	59	139,257	25,722
Alaska	224,985	60	138,215	86,771	152,530	60	123,038	29,492
Guam	66,813	61	66,813	0	68,951	61	68,941	10
Vermont	56,458	62	33,231	23,227	38,139	62	18,917	19,222
District of Columbia	30,045	63	29,932	113	18,473	63	18,473	0
<b>Total</b>	<b>871,475,649</b>		<b>763,640,073</b>	<b>107,835,576</b>	<b>713,698,171</b>		<b>635,199,785</b>	<b>78,498,387</b>

Note: Canada and US data only. Mexico data not available for 1998–2001. 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.

Table 9–16. (continued)

Province/State	Change 1998–2001			Change 1998–2001		
	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (%)	Stack Air Releases (%)	Fugitive and Other Air Releases (%)
<b>Canada</b>	<b>2,115,551</b>	<b>4,008,212</b>	<b>-1,892,661</b>	<b>3</b>	<b>6</b>	<b>-16</b>
Ontario	26,039	516,991	-490,952	0.1	1	-9
Quebec	250,814	536,518	-285,704	2	7	-12
Alberta	-989,021	-652,424	-336,597	-12	-10	-20
British Columbia	3,482,651	4,114,897	-632,246	71	110	-54
New Brunswick	-1,526,694	-1,533,009	6,315	-25	-25	11
Nova Scotia	789,132	909,383	-120,251	22	27	-64
Manitoba	-197,294	-174,521	-22,773	-6	-6	-22
Saskatchewan	107,008	174,866	-67,858	15	40	-25
Newfoundland and Labrador	168,641	102,373	66,268	37	31	52
Prince Edward Island	4,275	13,138	-8,863	30	262	-98
<b>United States</b>	<b>-159,893,028</b>	<b>-132,448,500</b>	<b>-27,444,528</b>	<b>-20</b>	<b>-19</b>	<b>-29</b>
North Carolina	-295,920	266,065	-561,985	-1	1	-26
Ohio	-16,392,495	-14,657,429	-1,735,066	-27	-26	-39
Texas	-6,103,775	-2,935,994	-3,167,781	-14	-10	-20
Pennsylvania	-2,789,600	-1,773,770	-1,015,830	-7	-5	-25
Georgia	-1,401,933	-1,904,533	502,600	-4	-5	24
Florida	-1,378,048	-1,860,505	482,457	-4	-5	27
Alabama	-3,056,250	-1,768,207	-1,288,044	-9	-6	-31
Indiana	-7,578,974	-5,392,668	-2,186,306	-20	-17	-39
Tennessee	-11,754,733	-11,156,433	-598,301	-28	-30	-12
West Virginia	-7,053,088	-6,910,738	-142,350	-21	-22	-12
Michigan	-6,414,542	-5,242,563	-1,171,978	-21	-19	-43
Kentucky	-7,517,328	-6,468,078	-1,049,250	-25	-24	-38
South Carolina	-2,076,635	-1,148,661	-927,974	-9	-5	-40
Virginia	-2,733,756	-1,910,927	-822,829	-12	-9	-25
Illinois	-10,934,348	-9,951,566	-982,782	-35	-36	-25
Louisiana	-3,811,693	-2,844,367	-967,325	-18	-18	-18
Maryland	1,575,942	1,728,932	-152,990	12	13	-37
Mississippi	-3,311,337	-2,858,298	-453,040	-21	-21	-21
Missouri	-4,672,515	-3,599,834	-1,072,682	-28	-25	-50
New York	-3,135,930	-2,599,425	-536,505	-21	-20	-31
Wisconsin	-5,915,319	-5,478,752	-436,567	-37	-37	-32
Utah	-20,609,882	-20,436,828	-173,054	-72	-73	-22
Iowa	-3,891,301	-2,974,626	-916,675	-37	-35	-47
Arkansas	-2,315,616	-1,850,041	-465,575	-28	-27	-32
Puerto Rico	-1,360,855	-1,354,001	-6,854	-20	-23	-1
Washington	-2,668,062	-2,078,859	-589,203	-33	-30	-48
New Jersey	-1,602,777	-1,156,068	-446,708	-24	-21	-38
Oregon	-1,349,343	-589,525	-759,818	-21	-12	-50
California	-2,573,065	-1,400,180	-1,172,885	-35	-29	-48
Oklahoma	-1,499,859	-1,046,232	-453,627	-25	-23	-30
Kansas	-3,417,683	-3,046,076	-371,607	-45	-47	-31
Minnesota	-1,205,020	-1,110,328	-94,692	-22	-24	-11
Massachusetts	-475,159	-328,869	-146,290	-15	-12	-34
Delaware	-1,168,250	-1,119,999	-48,252	-30	-31	-21
Nebraska	-909,297	-628,342	-280,955	-27	-22	-55
New Hampshire	-811,360	-801,930	-9,430	-30	-30	-8
Connecticut	-582,045	-297,934	-284,111	-25	-19	-38
Maine	-797,623	-592,454	-205,170	-33	-29	-58
Montana	-333,576	-140,234	-193,342	-17	-8	-78
Arizona	-2,336,259	-990,083	-1,346,175	-60	-43	-86
North Dakota	-197,194	-140,309	-56,885	-12	-10	-27
Colorado	-272,909	-166,520	-106,389	-19	-15	-32
Idaho	-337,126	-201,995	-135,131	-25	-23	-30
Hawaii	175,168	177,544	-2,376	22	24	-5
Nevada	-291,005	-255,773	-35,232	-27	-27	-23
Wyoming	-897,472	-766,956	-130,516	-66	-66	-66
South Dakota	-222,926	-154,449	-68,477	-34	-32	-40
New Mexico	-534,796	-321,294	-213,502	-59	-55	-65
Rhode Island	-293,603	-152,904	-140,699	-53	-45	-65
Virgin Islands	-261,649	-16,665	-244,985	-61	-11	-90
Alaska	-72,455	-15,176	-57,278	-32	-11	-66
Guam	2,138	2,128	10	3	3	--
Vermont	-18,319	-14,314	-4,005	-32	-43	-17
District of Columbia	-11,572	-11,459	-113	-39	-38	-100
<b>Total</b>	<b>-157,777,477</b>	<b>-128,440,288</b>	<b>-29,337,189</b>	<b>-18</b>	<b>-17</b>	<b>-27</b>

- Ontario ranked third in 2001, up from fourth in 1998, with a slight increase of 26,000 kg. While the province's stack releases increased by 1 percent, its fugitive and other releases decreased by 9 percent.
- Texas ranked fourth in 2001 and third in 1998, with a 14-percent decrease including decreases in both stack and fugitive releases.

### On-site Air Releases by Industry, 1998–2001

- The paper products sector reported the largest on-site air releases to NPRI in both 1998 and 2001, with an increase of 5 percent (1.0 million kg) over the period. The NPRI paper products sector reported increases of 1.6 million kg of hydrochloric acid, all as stack air releases. Fugitive and other air releases decreased for the paper products sector by 308,000 kg, including decreases of 178,000 kg of methanol.
- NPRI electric utilities reported the second-largest air releases in both years, with an increase of 10 percent from 1998 to 2001, mainly as hydrochloric acid stack air releases.
- Chemical manufacturers in Canada reported the third-largest total air releases and the largest fugitive and other air releases in both 1998 and 2001. This sector decreased total air releases by 13 percent and fugitive and other air releases by 22 percent.
- Lumber and wood products facilities reported the largest increase in air releases to NPRI, with an increase of 2.1 million kg, or 89 percent, from 1998 to 2001. Methanol accounted for 1.2 million kg of the increase, almost all as stack air releases.

Table 9–17. NPRI On-site Air Releases, by Industry, 1998–2001 (Ordered by Largest Total On-site Air Releases, 2001)

US SIC Code	Industry	1998			2001			Change 1998–2001			Percent Change 1998–2001		
		Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (%)	Stack Air Releases (%)	Fugitive and Other Air Releases (%)
26	Paper Products	19,961,555	19,315,181	646,374	20,979,415	20,641,220	338,195	1,017,860	1,326,039	-308,179	5	7	-48
491/493	Electric Utilities	17,058,350	17,058,200	150	18,734,928	18,733,571	1,357	1,676,578	1,675,371	1,207	10	10	805
28	Chemicals	11,379,575	7,591,918	3,787,657	9,900,670	6,935,472	2,965,198	-1,478,905	-656,446	-822,459	-13	-9	-22
30	Rubber and Plastics Products	6,122,504	5,412,556	709,948	7,105,736	6,045,568	1,060,168	983,232	633,012	350,220	16	12	49
33	Primary Metals	8,074,050	6,072,600	2,001,450	6,552,489	4,902,129	1,650,360	-1,521,561	-1,170,471	-351,090	-19	-19	-18
37	Transportation Equipment	5,791,601	5,223,942	567,659	4,765,279	4,244,690	520,589	-1,026,322	-979,252	-47,070	-18	-19	-8
24	Lumber and Wood Products	2,382,693	2,266,122	116,571	4,492,817	4,384,497	108,320	2,110,124	2,118,375	-8,251	89	93	-7
29	Petroleum and Coal Products	3,378,989	781,790	2,597,199	2,616,417	684,776	1,931,641	-762,572	-97,014	-665,558	-23	-12	-26
34	Fabricated Metals Products	2,178,602	1,614,651	563,951	2,471,105	1,919,944	551,161	292,503	305,293	-12,790	13	19	-2
32	Stone/Clay/Glass Products	794,850	782,023	12,827	1,720,033	1,699,419	20,614	925,183	917,396	7,787	116	117	61
27	Printing and Publishing	1,545,525	1,184,092	361,433	1,279,128	1,048,343	230,785	-266,397	-135,749	-130,648	-17	-11	-36
25	Furniture and Fixtures	1,064,429	1,062,069	2,360	1,085,258	1,077,590	7,668	20,829	15,521	5,308	2	1	225
39	Misc. Manufacturing Industries	446,131	357,221	88,910	869,024	640,025	228,999	422,893	282,804	140,089	95	79	158
22	Textile Mill Products	431,279	411,854	19,425	372,874	362,243	10,631	-58,405	-49,611	-8,794	-14	-12	-45
35	Industrial Machinery	224,403	221,564	2,839	110,880	101,701	9,179	-113,523	-119,863	6,340	-51	-54	223
20	Food Products	124,993	91,993	33,000	70,234	69,059	1,175	-54,759	-22,934	-31,825	-44	-25	-96
495/738	Hazardous Waste Mgt./Solvent Recovery	21,913	14,677	7,236	28,766	5,882	22,884	6,853	-8,795	15,648	31	-60	216
36	Electronic/Electrical Equipment	48,564	33,863	14,701	14,466	13,133	1,333	-34,098	-20,730	-13,368	-70	-61	-91
31	Leather Products	19,300	19,300	0	12,384	12,384	0	-6,916	-6,916	0	-36	-36	--
5169	Chemical Wholesalers	21,008	0	21,008	3,962	2,182	1,780	-17,046	2,182	-19,228	-81	--	-92
23	Apparel and Other Textile Products	0	0	0	0	0	0	0	0	0	--	--	--
	<b>Total</b>	<b>81,070,314</b>	<b>69,515,616</b>	<b>11,554,698</b>	<b>83,185,865</b>	<b>73,523,828</b>	<b>9,662,037</b>	<b>2,115,551</b>	<b>4,008,212</b>	<b>-1,892,661</b>	<b>3</b>	<b>6</b>	<b>-16</b>

Table 9–18. TRI On-site Air Releases, by Industry, 1998–2001 (Ordered by Largest Total On-site Air Releases, 2001)

US SIC Code	Industry	1998			2001			Change 1998–2001			Percent Change 1998–2001		
		Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (%)	Stack Air Releases (%)	Fugitive and Other Air Releases (%)
491/493	Electric Utilities	357,273,464	357,126,794	146,671	321,749,771	321,676,957	72,814	-35,523,694	-35,449,837	-73,857	-10	-10	-50
26	Paper Products	77,955,421	71,971,151	5,984,270	64,271,444	60,427,046	3,844,398	-13,683,977	-11,544,105	-2,139,872	-18	-16	-36
28	Chemicals	93,461,532	66,927,402	26,534,130	64,130,352	42,480,673	21,649,679	-29,331,180	-24,446,729	-4,884,451	-31	-37	-18
30	Rubber and Plastics Products	40,501,112	31,847,373	8,653,739	29,967,838	22,602,021	7,365,817	-10,533,274	-9,245,352	-1,287,922	-26	-29	-15
37	Transportation Equipment	36,340,723	28,686,365	7,654,359	26,094,007	20,976,471	5,117,536	-10,246,716	-7,709,893	-2,536,823	-28	-27	-33
--	Multiple codes 20–39*	30,379,107	21,925,096	8,454,012	22,340,944	16,857,966	5,482,978	-8,038,163	-5,067,130	-2,971,034	-26	-23	-35
33	Primary Metals	45,389,661	37,277,051	8,112,610	19,172,152	14,931,238	4,240,914	-26,217,509	-22,345,813	-3,871,696	-58	-60	-48
29	Petroleum and Coal Products	20,306,013	10,482,604	9,823,409	16,785,353	10,270,456	6,514,897	-3,520,659	-212,147	-3,308,512	-17	-2	-34
24	Lumber and Wood Products	14,056,006	12,256,439	1,799,567	12,928,319	11,642,488	1,285,831	-1,127,687	-613,951	-513,736	-8	-5	-29
34	Fabricated Metals Products	18,280,364	12,167,029	6,113,334	11,955,039	7,456,333	4,498,706	-6,325,325	-4,710,696	-1,614,629	-35	-39	-26
32	Stone/Clay/Glass Products	10,388,194	9,722,636	665,558	10,537,782	10,097,227	440,556	149,588	374,591	-225,002	1	4	-34
27	Printing and Publishing	9,556,039	5,023,883	4,532,156	8,434,165	4,072,725	4,361,440	-1,121,874	-951,159	-170,716	-12	-19	-4
20	Food Products	4,566,927	3,823,447	743,480	4,382,411	3,863,932	518,479	-184,517	40,484	-225,001	-4	1	-30
36	Electronic/Electrical Equipment	4,968,554	3,515,971	1,452,582	3,291,100	2,560,686	730,415	-1,677,453	-955,286	-722,168	-34	-27	-50
25	Furniture and Fixtures	7,243,595	6,176,905	1,066,691	3,236,612	2,812,420	424,192	-4,006,983	-3,364,484	-642,499	-55	-54	-60
39	Misc. Manufacturing Industries	4,026,175	3,180,037	846,138	2,827,051	2,326,010	501,042	-1,199,124	-854,027	-345,097	-30	-27	-41
35	Industrial Machinery	5,633,497	3,734,594	1,898,904	2,483,917	1,734,697	749,219	-3,149,581	-1,999,896	-1,149,684	-56	-54	-61
38	Measurement/Photographic Instruments	3,370,847	3,026,239	344,608	2,265,812	2,083,723	182,089	-1,105,034	-942,516	-162,518	-33	-31	-47
22	Textile Mill Products	4,274,898	3,421,239	853,659	2,180,517	1,708,698	471,819	-2,094,382	-1,712,541	-381,840	-49	-50	-45
5169	Chemical Wholesalers	435,933	277,554	158,380	394,301	271,618	122,684	-41,632	-5,936	-35,696	-10	-2	-23
495/738	Hazardous Waste Mgt./Solvent Recovery	531,888	247,905	283,984	388,191	256,562	131,629	-143,697	8,658	-152,355	-27	3	-54
21	Tobacco Products	547,010	544,218	2,792	340,414	338,314	2,100	-206,596	-205,903	-693	-38	-38	-25
31	Leather Products	465,117	315,325	149,793	197,124	122,639	74,485	-267,994	-192,686	-75,308	-58	-61	-50
12	Coal Mining	297,713	295,627	2,086	79,980	69,531	10,449	-217,733	-226,097	8,364	-73	-76	401
23	Apparel and Other Textile Products	155,541	151,574	3,967	77,709	35,526	42,183	-77,832	-116,048	38,215	-50	-77	963
	<b>Total</b>	<b>790,405,335</b>	<b>694,124,457</b>	<b>96,280,878</b>	<b>630,512,306</b>	<b>561,675,957</b>	<b>68,836,350</b>	<b>-159,893,028</b>	<b>-132,448,500</b>	<b>-27,444,528</b>	<b>-20</b>	<b>-19</b>	<b>-29</b>

\* Multiple SIC codes reported only in TRI.

- Electric utilities reported the largest on-site air releases to TRI in both 1998 and 2001. They reported a decrease of 10 percent (35.5 million kg) from 1998 to 2001. Sulfuric acid accounted 22.3 million kg of the decrease.
- The paper products sector reported the second-largest on-site air releases to TRI in 2001 and third-largest in 1998, with a decrease of 18 percent (13.7 million kg) over that time span. Methanol accounted for 6.0 million kg of the decrease, including a reduction of 1.2 million kg in fugitive releases.
- Chemical manufacturers in the US reported the third-largest total air releases in 2001. This sector had a decrease of 31 percent in total air releases.
- The chemical manufacturing sector reported the largest fugitive releases in both 1998 and 2001, despite a decrease of 18 percent in fugitive air releases over the period.
- All TRI industry sectors reported overall decreases from 1998 to 2001 except for the stone/clay/glass products industry, which reported an increase of 1 percent.

### On-site Air Releases by Chemical, 1998–2001

- Sulfuric acid had the largest decrease in air releases from 1998 to 2001, with 26.6 million kg, or 27 percent. Electric utilities reported decreases of 23.5 million kg of sulfuric acid.
- Chlorine was the chemical with the second-largest decrease, with a reduction of 19.8 million kg, or 72 percent. One primary metals facility, Magnesium Corp. of America located in Rowley, Utah, reported a decrease of 19.7 million kg of air releases of chlorine during this period.
- Acetaldehyde, a designated carcinogen, was the chemical with the largest increase in total on-site air releases from 1998 to 2001, with an increase of almost 480,000 kg, or 8 percent. Stack air releases of acetaldehyde were responsible for the increase. The lumber and wood products sector reported increases of 429,000 kg for acetaldehyde, mostly as stack air releases.

Table 9–19. Chemicals with Largest Change in On-site Air Releases, 1998–2001

Rank	CAS Number	Chemical	1998			2001		
			Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)
<b>Decreases</b>								
1	7664-93-9	Sulfuric acid	100,127,745	99,816,657	311,087	73,531,087	73,272,115	258,972
2	7782-50-5	Chlorine	27,673,906	27,179,700	494,206	7,865,983	7,496,115	369,868
3	108-88-3	p Toluene	50,660,098	33,761,545	16,898,553	37,428,079	24,196,355	13,231,724
4	67-56-1	Methanol	103,355,885	91,059,943	12,295,943	90,336,714	81,395,457	8,941,257
5	--	Xylenes	40,002,973	30,317,883	9,685,090	27,692,289	21,227,237	6,465,052
6	75-15-0	p Carbon disulfide	19,766,586	19,320,026	446,560	8,206,054	7,490,331	715,723
7	75-09-2	c,p,t Dichloromethane	20,496,286	13,950,104	6,546,182	11,417,649	7,877,221	3,540,428
8	78-93-3	Methyl ethyl ketone	25,602,407	16,268,327	9,334,079	17,162,448	11,216,341	5,946,107
9	7647-01-0	Hydrochloric acid	289,016,815	287,918,648	1,098,167	282,407,660	281,480,869	926,791
10	7664-39-3	t Hydrogen fluoride	39,692,566	37,267,279	2,425,286	33,720,905	31,940,778	1,780,127
<b>Increases</b>								
1	75-07-0	c,p,t Acetaldehyde	5,985,626	5,277,661	707,965	6,465,324	5,801,436	663,888
2	80-62-6	Methyl methacrylate	1,044,648	802,656	241,993	1,177,010	852,481	324,529
3	26471-62-5	c,p Toluenediisocyanate (mixed isomers)	25,907	18,166	7,742	106,079	101,193	4,886
4	--	m Selenium (and its compounds)	297,893	293,169	4,723	368,358	362,143	6,215
5	123-72-8	Butyraldehyde	131,515	80,113	51,402	199,483	130,882	68,601
6	123-38-6	Propionaldehyde	141,200	117,244	23,956	191,621	167,554	24,067
7	117-81-7	c,p,t Di(2-ethylhexyl) phthalate	108,567	78,262	30,306	156,602	128,937	27,665
8	75-65-0	tert-Butyl alcohol	207,944	90,115	117,830	252,400	81,149	171,251
9	55-63-0	Nitroglycerin	5,811	5,794	17	49,193	49,052	141
10	1163-19-5	Decabromodiphenyl oxide	14,111	12,038	2,073	48,716	46,984	1,732

Note: Canada and US data only. Mexico data not available for 1998–2001.

c = Known or suspected carcinogen.

m = Metal and its compounds.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

Table 9–19. (continued)

Rank	CAS Number	Chemical	Change 1998–2001			Percent Change 1998–2001		
			Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (%)	Stack Air Releases (%)	Fugitive and Other Air Releases (%)
<b>Decreases</b>								
1	7664-93-9	Sulfuric acid	-26,596,658	-26,544,542	-52,115	-27	-27	-17
2	7782-50-5	Chlorine	-19,807,923	-19,683,585	-124,338	-72	-72	-25
3	108-88-3	p Toluene	-13,232,019	-9,565,190	-3,666,829	-26	-28	-22
4	67-56-1	Methanol	-13,019,172	-9,664,486	-3,354,686	-13	-11	-27
5	--	Xylenes	-12,310,684	-9,090,647	-3,220,038	-31	-30	-33
6	75-15-0	p Carbon disulfide	-11,560,532	-11,829,695	269,163	-58	-61	60
7	75-09-2	c,p,t Dichloromethane	-9,078,637	-6,072,883	-3,005,754	-44	-44	-46
8	78-93-3	Methyl ethyl ketone	-8,439,958	-5,051,986	-3,387,972	-33	-31	-36
9	7647-01-0	Hydrochloric acid	-6,609,155	-6,437,780	-171,375	-2	-2	-16
10	7664-39-3	t Hydrogen fluoride	-5,971,661	-5,326,501	-645,159	-15	-14	-27
<b>Increases</b>								
1	75-07-0	c,p,t Acetaldehyde	479,697	523,775	-44,077	8	10	-6
2	80-62-6	Methyl methacrylate	132,361	49,825	82,536	13	6	34
3	26471-62-5	c,p Toluenediisocyanate (mixed isomers)	80,172	83,028	-2,856	309	457	-37
4	--	m Selenium (and its compounds)	70,466	68,973	1,492	24	24	32
5	123-72-8	Butyraldehyde	67,968	50,769	17,199	52	63	33
6	123-38-6	Propionaldehyde	50,421	50,310	112	36	43	0
7	117-81-7	c,p,t Di(2-ethylhexyl) phthalate	48,034	50,675	-2,641	44	65	-9
8	75-65-0	tert-Butyl alcohol	44,456	-8,965	53,421	21	-10	45
9	55-63-0	Nitroglycerin	43,382	43,258	124	747	747	718
10	1163-19-5	Decabromodiphenyl oxide	34,605	34,947	-341	245	290	-16

Note: Canada and US data only. Mexico data not available for 1998–2001.

c = Known or suspected carcinogen.

m = Metal and its compounds.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

### Facilities with Largest Change in On-site Air Releases, NPRI and TRI, 1998–2001

- The facility in Canada with the largest decrease in air releases from 1998 to 2001 was the Bowater Maritimes (formerly Avenor Maritimes) paper products facility in Dalhousie, New Brunswick. It reported a decrease of 1.7 million kg, primarily of sulfuric acid, due to a reduction in the sulfur content of the fuel used at the facility.
- The Inco Copper Cliff Smelter Complex in Copper Cliff, Ontario, reported the second-largest decrease, with 1.5 million kg, primarily of sulfuric acid. It reported pollution prevention measures of equipment or process modifications as the reason for the reduction.
- The facility in the United States with the largest decrease in air emissions from 1998 to 2001 was the Magnesium Corporation of America facility in Rowley, Utah. This facility reported a reduction of 19.7 million kg, primarily of chlorine. Some of these reductions were driven by new regulatory action.
- The Lenzing Fibers Corp. in Lowland, Tennessee, reported the second-largest reduction, with a 6.7 million kg decrease, primarily of stack releases of carbon disulfide.

### Table 9–20. Facilities with Largest Decrease in On-site Air Releases in North America, NPRI and TRI, 1998–2001

North American Rank	Country Rank	Facility	City, Province/State	SIC Codes		Change in Total Air Releases 1998–2001
				Canada	US	
<b>Canada</b>						
14	1	Bowater Maritimes Inc., Dalhousie Mill, Bowater Pulp and Paper/OJI Paper Co./Mitsui & Co.	Dalhousie, NB	27	26	-1,694,473
18	2	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	-1,480,126
42	3	Imperial Home Decor Group (Canada) ULC	Brampton, ON	27	26	-821,620
59	4	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	37	28	-653,722
61	5	Nexfor Fraser Papers Inc., Edmundston Operations	Edmundston, NB	27	26	-643,870
67	6	Paintplas Inc., 1254581 Ontario Ltd.	Ajax, ON	32	30	-604,800
68	7	NOVA Chemicals Corporation, St. Clair River Site	Corunna, ON	37	28	-583,601
120	8	Transalta Corporation, Sundance Thermal Generating Plant	Duffield, AB	49	49	-372,565
128	9	Papier de Communication Domtar, Centre d'Affaires Windsor	Windsor, QC	27	26	-362,713
138	10	Manitoba Hydro, Selkirk Generating Station	St. Clements, MB	49	491/493	-342,261
<b>United States</b>						
1	1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	-19,653,995
2	2	Lenzing Fibers Corp.	Lowland, TN		28	-6,678,674
3	3	EME Homer City Generation L.P., Edison Intl.	Homer City, PA		49	-4,011,616
4	4	Baldwin Energy Complex, Dynege Inc.	Baldwin, IL		49	-3,652,045
5	5	Acordis Cellulosic Fibers Inc., Acordis U.S. Holding Inc.	Axis, AL		28	-3,162,027
6	6	American Electric Power John E. Amos Plant	Winfield, WV		49	-2,887,600
7	7	Seminole Generating Station	Palatka, FL		49	-2,401,312
8	8	American Electric Power Cardinal Plant, Cardinal Operating Co.	Brilliant, OH		49	-2,178,922
9	9	W. H. Sammis Plant, FirstEnergy Corp.	Stratton, OH		49	-2,090,820
10	10	American Electric Power Mountaineer Plant	New Haven, WV		491/493	-1,827,989

Note: Canada and US data only. Mexico data not available for 1998–2001. 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.

### Table 9–21. Facilities with Largest Increase in On-site Air Releases in North America, NPRI and TRI, 1998–2001

North American Rank	Country Rank	Facility	City, Province/State	SIC Codes		Change in Total Air Releases 1998–2001
				Canada	US	
<b>Canada</b>						
3	1	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	2,076,009
21	2	Nova Scotia Power Inc., Trenton Generating Station, Emera Inc.	Trenton, NS	41	491/493	738,000
22	3	Norske Skog Canada Limited, Crofton Division	Crofton, BC	27	26	708,780
26	4	Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat, BC	27	26	659,162
40	5	Canadian Forest Products Ltd., Northwood Pulp Mill	Prince George, BC	27	26	463,605
42	6	Howe Sound Pulp and Paper Limited Partnership, OJI Paper Canada/Canadian Forest Products	Port Mellon, BC	27	26	446,097
45	7	J. D. Irving Ltd., Lake Utopia Paper	Utopia, NB	27	26	426,798
46	8	Agrium Products Inc., Redwater Fertilizer Operations	Redwater/Municipal District, AB	37	28	421,690
55	9	3M Canada Company (Perth)	Perth, ON	35	32	382,353
56	10	Nova Scotia Power Inc., Point Tupper Generating Station, Emera Inc.	Port Hawkesbury, NS	41	491/493	381,800
<b>United States</b>						
1	1	Reliant Energies Inc. Keystone Power Plant	Shelock, PA		491/493	3,901,684
2	2	Gibbons Creek Steam Electric Station	Carlos, TX		491/493	3,699,798
4	3	Alabama Power Co. Greene County Steam Plant, Southern Co.	Forkland, AL		491/493	2,024,028
5	4	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	1,849,530
6	5	U.S. TVA Johnsonville Fossil Plant	New Johnsonville, TN		491/493	1,779,039
7	6	CP&L Mayo Electric Generating Plant, Progress Energy	Roxboro, NC		491/493	1,776,394
8	7	Allegheny Energy Inc. Hatfield Power Station	Masontown, PA		491/493	1,423,045
9	8	Florida Power Crystal River Energy Complex, Progress Energy	Crystal River, FL		491/493	1,291,782
10	9	Wise Alloys L.L.C. Alloys Plant, Wise Metals Group	Muscle Shoals, AL		33	1,267,596
11	10	U.S. TVA Colbert Fossil Plant	Tuscumbia, AL		491/493	1,171,676

Note: Canada and US data only. Mexico data not available for 1998–2001. 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.

Table 9–20. (continued)

Country Rank	Number of Forms	1998			2001				Major Chemicals Reported in On-site Air Releases (chemicals accounting for more than 70% of increase in on-site air releases from the facility)
		Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Number of Forms	Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	
1	2	1,698,700	1,698,700	0	1	4,227	4,227	0	Sulfuric acid
2	3	3,032,346	3,007,872	24,474	3	1,552,220	1,506,775	45,445	Sulfuric acid
3	2	821,620	657,300	164,320	*	*	*	*	Methyl ethyl ketone, Toluene
4	20	829,183	604,962	224,221	20	175,461	55,605	119,856	Ethylene
5	4	1,054,952	1,043,432	11,520	3	411,082	386,750	24,332	Methanol
6	8	604,800	604,800	0	*	*	*	*	Xylenes, Toluene
7	3	1,133,950	928,000	205,950	3	550,349	479,420	70,929	Cyclohexane
8	10	848,880	848,880	0	10	476,315	476,315	0	Sulfuric acid
9	2	524,260	524,260	0	1	161,547	161,547	0	Methanol
10	4	345,600	345,600	0	1	3,339	3,339	0	Hydrochloric acid
1	5	26,163,746	26,031,746	132,000	3	6,509,751	6,439,909	69,841	Chlorine
2	1	7,875,397	7,800,454	74,943	1	1,196,722	858,152	338,570	Carbon disulfide
3	10	4,011,616	4,011,528	88	*	*	*	*	Hydrochloric acid
4	9	3,830,200	3,830,190	9	6	178,154	176,971	1,184	Hydrochloric acid, Sulfuric acid
5	3	4,835,374	4,705,215	130,159	3	1,673,347	1,596,703	76,644	Carbon disulfide
6	11	7,577,044	7,576,939	106	11	4,689,185	4,689,090	94	Hydrochloric acid
7	9	3,803,232	3,803,232	0	9	1,401,920	1,401,920	0	Sulfuric acid
8	11	5,134,008	5,133,959	49	11	2,955,086	2,955,034	52	Hydrochloric acid
9	9	5,493,179	5,492,726	454	8	3,402,359	3,402,299	60	Hydrochloric acid, Sulfuric acid
10	12	3,651,774	3,651,694	79	12	1,823,785	1,823,433	351	Hydrochloric acid

\* Facility did not report matched chemicals in year indicated.

Table 9–21. (continued)

Country Rank	Number of Forms	1998			2001				Major Chemicals Reported in On-site Air Releases (chemicals accounting for more than 70% of increase in on-site air releases from the facility)
		Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Number of Forms	Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	
1	11	4,854,980	4,854,980	0	11	6,930,989	6,930,986	3	Hydrochloric acid
2	1	156,000	156,000	0	6	894,000	894,000	0	Hydrochloric acid
3	3	9,000	9,000	0	8	717,780	717,780	0	Hydrochloric acid, Methanol
4	3	0	0	0	6	659,162	657,922	1,240	Methanol
5	4	220,700	217,900	2,800	8	684,305	668,753	15,552	Methanol
6	5	259,460	259,460	0	6	705,557	705,557	0	Hydrochloric acid
7	0	0	0	0	1	426,798	426,798	0	Methanol
8	14	95,780	82,440	13,340	13	517,470	503,660	13,810	Methanol
9	6	61,348	60,839	509	6	443,701	442,952	749	Toluene, Xylenes
10	5	110,100	110,100	0	4	491,900	491,900	0	Hydrochloric acid
1	9	3,954,493	3,954,431	62	9	7,856,177	7,855,601	576	Hydrochloric acid
2	4	86,657	86,648	9	5	3,786,455	3,786,451	5	Hydrochloric acid
3	10	2,158,551	2,158,551	0	10	4,182,580	4,182,580	0	Hydrochloric acid
4	12	6,863,418	6,863,252	166	11	8,712,948	8,712,707	241	Hydrochloric acid
5	11	2,286,447	2,285,533	914	11	4,065,485	4,065,238	247	Hydrochloric acid
6	10	2,139,204	2,139,197	6	10	3,915,598	3,915,549	49	Hydrochloric acid
7	11	2,517,113	2,514,599	2,514	12	3,940,158	3,936,259	3,899	Hydrochloric acid
8	13	3,826,254	3,826,054	200	13	5,118,036	5,118,009	27	Hydrochloric acid
9	15	203,710	190,863	12,847	15	1,471,307	1,390,656	80,651	Methyl ethyl ketone, Toluene, 1,2,4-Trimethylbenzene
10	11	1,531,029	1,530,227	803	11	2,702,705	2,701,791	914	Hydrochloric acid

- Ontario Power Generation Nanticoke Generating Station in Nanticoke, Ontario, reported the largest increase in air emissions in Canada, with an increase of 2.1 million kg. Two other electric utilities (owned by Nova Scotia Power) were also among the 10 facilities in Canada with the largest increase in air releases from 1998 to 2001.
- There were also five paper products facilities among the 10 facilities with the largest increase in air emissions in Canada from 1998 to 2001, with four located in British Columbia. These NPRI paper facilities explained their increases as due to increases in production levels and/or a change in the method of estimation during the time period. A handbook developed by the National Council of the Paper Industry for Air and Stream Improvement (NCASI) was cited as the source for improved estimation methods that resulted in increased estimates and/or numbers of chemicals reported.
- The facility in the United States with the largest increase in air releases from 1998 to 2001 was Reliant Energy's Keystone Power Plant in Shelocta, Pennsylvania, with an increase of 3.9 million kg, primarily of hydrochloric acid. However, the reported increase was primarily due to a change in estimation technique used.
- Nine of the 10 facilities in the United States with the largest increase in air releases from 1998 to 2001 were electric utilities. Their reported increases were all primarily of hydrochloric acid.

### On-site Air Releases of Dichloromethane in NPRI/TRI, 1998–2001

The designated carcinogen with the largest decrease from 1998 to 2001 was dichloromethane. The rubber and plastics sector had the largest air emissions of dichloromethane in both NPRI and TRI. This sector often uses dichloromethane as a blowing agent in the manufacture of foam, used in carpets, furniture and automotive parts. Previously, foam manufacturers had used CFCs, and then as these were phased out, they had switched to other chemicals—also carcinogens—which were also phased out. Some manufacturers had then switched to dichloromethane. Both Canada and the US have taken actions to reduce dichloromethane from this sector.

In the US, dichloromethane or methylene chloride as it is commonly known, was one of the chemicals targeted for voluntary reductions under the US EPA 33/50 program. Dichloromethane is classified as a hazardous air pollutant (HAP). Under the Amendments to the Clean Air Act, EPA is required to identify major sources of HAPs and develop reduction standards. The flexible polyurethane foam manufacturing sector was identified as a major source of HAPs, and national standards were proposed in 1996. These standards set different emission limits depending on the process and type of foam. In 1998, these standards were finalized and required compliance by 2001. These standards were expected to reduce HAPs from this sector by 12,500 tons per year, or 70 percent. EPA also developed a pollution prevention manual for this sector to encourage chemical substitution.

In Canada, dichloromethane was classified as toxic under the Canadian Environmental Protection Act. In 1998, stakeholders were consulted on possible reduction options. In 2002, a notice was published for a 60-day public comment period proposing that the new pollution prevention planning provisions under the renewed CEPA 1999 be used. In November 2003, a final notice was published requiring facilities using more than 1 tonne of dichloromethane in aircraft paint stripping, flexible polyurethane foam manufacturing, pharmaceuticals and chemical intermediates, industrial cleaning, and

Table 9–22. On-site Air Releases of Dichloromethane by Industry, NPRI, 1998–2001 (Ordered by 2001 Total)

US SIC Code	Industry	1998			2001		
		Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)
30	Rubber and Plastics Products	1,465,007	1,136,295	328,712	1,589,556	1,170,865	418,691
28	Chemicals	513,707	495,785	17,922	79,818	53,734	26,084
25	Furniture and Fixtures	21,985	21,985	0	25,509	25,509	0
32	Stone/Clay/Glass Products	16,082	16,082	0	14,105	14,098	7
39	Misc. Manufacturing Industries	13,600	13,600	0	12,300	0	12,300
26	Paper Products	11,500	11,500	0	11,030	11,030	0
33	Primary Metals	21,058	21,058	0	11,025	11,021	4
495/738	Hazardous Waste Mgt./Solvent Recovery	3,300	800	2,500	909	0	909
5169	Chemical Wholesalers	4,901	0	4,901	654	306	348
34	Fabricated Metals Products	94,740	94,740	0	1	0	1
37	Transportation Equipment	19,000	19,000	0	0	0	0
<b>Total for Dichloromethane</b>		<b>2,184,880</b>	<b>1,830,845</b>	<b>354,035</b>	<b>1,744,907</b>	<b>1,286,563</b>	<b>458,344</b>

Table 9–23. On-site Air Releases of Dichloromethane by Industry, TRI, 1998–2001 (Ordered by 2001 Total)

US SIC Code	Industry	1998			2001		
		Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)
30	Rubber and Plastics Products	8,390,917	5,927,882	2,463,035	4,162,648	2,816,943	1,345,705
28	Chemicals	3,641,993	2,281,728	1,360,265	2,818,821	1,829,803	989,018
--	Multiple codes 20–39*	2,425,969	1,223,994	1,201,975	823,730	495,617	328,113
38	Measurement/Photographic Instruments	978,293	893,694	84,600	442,965	417,118	25,847
39	Misc. Manufacturing Industries	279,337	182,002	97,335	254,885	203,058	51,828
34	Fabricated Metals Products	489,311	272,935	216,376	253,677	164,824	88,854
22	Textile Mill Products	246,483	239,197	7,286	205,923	204,827	1,096
33	Primary Metals	204,895	124,141	80,754	189,715	94,180	95,535
37	Transportation Equipment	426,649	84,251	342,398	133,605	105,278	28,328
36	Electronic/Electrical Equipment	236,835	189,576	47,259	102,712	92,672	10,040
26	Paper Products	269,722	269,722	0	64,646	64,646	0
25	Furniture and Fixtures	186,898	122,985	63,913	58,097	7,452	50,645
35	Industrial Machinery	120,629	86,207	34,422	43,305	38,032	5,273
5169	Chemical Wholesalers	69,358	53,236	16,122	41,333	34,893	6,441
24	Lumber and Wood Products	14,605	1	14,604	26,982	0	26,982
495/738	Hazardous Waste Mgt./Solvent Recovery	143,272	57,856	85,416	24,212	17,316	6,896
20	Food Products	56,417	11,066	45,351	17,739	470	17,269
32	Stone/Clay/Glass Products	64,244	41,399	22,845	7,746	3,532	4,215
27	Printing and Publishing	63,763	57,386	6,376	0	0	0
29	Petroleum and Coal Products	1,814	0	1,814	0	0	0
<b>Total for Dichloromethane</b>		<b>18,311,406</b>	<b>12,119,259</b>	<b>6,192,147</b>	<b>9,672,742</b>	<b>6,590,658</b>	<b>3,082,084</b>

\* Multiple SIC codes reported only in TRI.

Table 9–22. (continued)

US SIC Code	Industry	Change 1998–2001			Percent Change 1998–2001		
		Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (%)	Stack Air Releases (%)	Fugitive and Other Air Releases (%)
30	Rubber and Plastics Products	124,549	34,570	89,979	9	3	27
28	Chemicals	-433,889	-442,051	8,162	-84	-89	46
25	Furniture and Fixtures	3,524	3,524	0	16	16	--
32	Stone/Clay/Glass Products	-1,977	-1,984	7	-12	-12	--
39	Misc. Manufacturing Industries	-1,300	-13,600	12,300	-10	-100	--
26	Paper Products	-470	-470	0	-4	-4	--
33	Primary Metals	-10,033	-10,037	4	-48	-48	--
495/738	Hazardous Waste Mgt./Solvent Recovery	-2,391	-800	-1,591	-72	-100	-64
5169	Chemical Wholesalers	-4,247	306	-4,553	-87	--	-93
34	Fabricated Metals Products	-94,739	-94,740	1	-100	-100	--
37	Transportation Equipment	-19,000	-19,000	0	-100	-100	--
<b>Total for Dichloromethane</b>		<b>-439,973</b>	<b>-544,282</b>	<b>104,309</b>	<b>-20</b>	<b>-30</b>	<b>29</b>

Table 9–23. (continued)

US SIC Code	Industry	Change 1998–2001			Percent Change 1998–2001		
		Total On-site Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total On-site Air Releases (%)	Stack Air Releases (%)	Fugitive and Other Air Releases (%)
30	Rubber and Plastics Products	-4,228,269	-3,110,939	-1,117,331	-50	-52	-45
28	Chemicals	-823,172	-451,925	-371,247	-23	-20	-27
--	Multiple codes 20–39*	-1,602,239	-728,377	-873,862	-66	-60	-73
38	Measurement/Photographic Instruments	-535,329	-476,576	-58,753	-55	-53	-69
39	Misc. Manufacturing Industries	-24,452	21,055	-45,507	-9	12	-47
34	Fabricated Metals Products	-235,634	-108,112	-127,522	-48	-40	-59
22	Textile Mill Products	-40,560	-34,370	-6,190	-16	-14	-85
33	Primary Metals	-15,180	-29,961	14,781	-7	-24	18
37	Transportation Equipment	-293,044	21,026	-314,070	-69	25	-92
36	Electronic/Electrical Equipment	-134,123	-96,905	-37,218	-57	-51	-79
26	Paper Products	-205,076	-205,076	0	-76	-76	--
25	Furniture and Fixtures	-128,801	-115,534	-13,268	-69	-94	-21
35	Industrial Machinery	-77,324	-48,176	-29,149	-64	-56	-85
5169	Chemical Wholesalers	-28,025	-18,343	-9,682	-40	-34	-60
24	Lumber and Wood Products	12,377	-1	12,378	85	-100	85
495/738	Hazardous Waste Mgt./Solvent Recovery	-119,060	-40,540	-78,520	-83	-70	-92
20	Food Products	-38,678	-10,596	-28,083	-69	-96	-62
32	Stone/Clay/Glass Products	-56,498	-37,868	-18,631	-88	-91	-82
27	Printing and Publishing	-63,763	-57,386	-6,376	-100	-100	-100
29	Petroleum and Coal Products	-1,814	0	-1,814	-100	--	-100
<b>Total for Dichloromethane</b>		<b>-8,638,664</b>	<b>-5,528,601</b>	<b>-3,110,063</b>	<b>-47</b>	<b>-46</b>	<b>-50</b>

\* Multiple SIC codes reported only in TRI.

adhesives formulation to develop and implement a pollution prevention plan. The overall goal is to reduce total dichloromethane releases by 85 percent by 2007 from a 1995 baseline. Facilities have six months to develop the pollution prevention plan. In the plan, facilities “shall consider” sector specific “risk management objectives” of reduction of dichloromethane emissions of approximately 50 percent by 2004 and 80 percent by 2007. Plans must be implemented between 2005 and 2008, depending on the sector. Interim progress reports with detailed emissions data are also required. NPRI was not used for reporting because of the differences in threshold (this program has a 1 tonne threshold and NPRI has a 10 tonne threshold). Preliminary discussions with facilities indicate that many are planning to completely eliminate the use of dichloromethane due to regulatory actions and to avoid the need to file progress reports or additional reporting.

Facilities reporting to TRI show a greater rate of decrease in dichloromethane emissions than NPRI facilities. TRI facilities reported decreases of 47 percent from 1998 to 2001 while NPRI facilities had a 20-percent decrease. Indeed, for the rubber and plastics products sector, TRI reported a 50-percent reduction while NPRI had a 9-percent increase. The TRI facilities could be responding to many factors, including the EPA regulations, which were finalized in 1998 with compliance by 2001. NPRI facilities reported a slower rate of decrease perhaps because of the later regulatory actions, which took effect in 2003 with compliance dates of 2005 to 2008.



10

**Persistent Bioaccumulative Toxic Chemicals**



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## Key Findings

### Mercury and Mercury Compounds

- Mercury is a persistent, bioaccumulative toxic that can cause neurological and developmental damage, especially in children. Mercury is on the Proposition 65 list of chemicals and is a CEPA toxic.
- In 2001, 1,691 facilities in North America reported almost 384,000 kg of releases and transfers of mercury and its compounds, a reduction of 44 percent from 2000.
- Total releases on- and off-site decreased by 48 percent from 2000 to 2001 in North America. However, this was due to a decrease of 273,000 kg in TRI. One TRI facility reported a decrease of 261,500 kg, mainly in transfers to disposal. NPRI showed an increase of over 12,000 kg of total releases, with one facility reporting an increase in on-site releases to land of almost 13,000 kg.
- Reporting thresholds for mercury and its compounds are lower than for most other chemicals on the NPRI and TRI lists. They were lowered from approximately 10 tonnes to approximately 5 kg beginning with the 2000 reporting year, giving a more complete picture of releases and transfers of mercury from industrial sources.

### Dioxins and Furans

- Dioxin and furans are persistent, bioaccumulative toxics. Some members of the dioxin and furan family are carcinogens, suspected endocrine disruptors, and suspected neurological, developmental and reproductive toxicants. Dioxins and furans are formed during incomplete combustion, and air releases are the major type of release.
- Reports on dioxins and furans were required for the first time by NPRI and TRI for the 2000 reporting year. However, the reporting requirements differed so the PRTR data on dioxins and furans from the two countries are not comparable.
- About five percent of all TRI facilities reported on dioxins and furans in 2001.
- TRI facilities reported an increase of 7 percent in releases on- and off-site of dioxins and furans from 2000 to 2001 (in grams-iTEQ), with chemical manufacturers reporting the largest amounts.
- About 13 percent of all NPRI facilities reported on dioxins and furans in 2001. Depending on their activities or the processes they use, only certain NPRI facilities must report on dioxins and furans.
- NPRI facilities required to report on dioxins and furans reported a decrease of 44 percent in total releases on- and off-site from 2000 to 2001. The paper products industry reported the largest amounts in 2001, with an increase of 10 percent for that time period.

### Hexachlorobenzene

- Hexachlorobenzene is a persistent, bioaccumulative toxic and a probable carcinogen. It stays in the atmosphere a long time and can be transported long distances.
- For the 2000 reporting year, reports on hexachlorobenzene (HCB) were required for the first time by NPRI, and reporting thresholds were lowered under TRI. However, the reporting requirements differ so the PRTR data on hexachlorobenzene from the two countries are not comparable.
- TRI facilities reported a decrease of almost 30,500 kg, or 46 percent, in total reported releases and transfers of hexachlorobenzene from 2000 to 2001. One chemical facility accounted for much of the reduction, reporting a decrease in amounts sent to energy recovery of over 24,700 kg.
- NPRI facilities reported an increase of 20 kg or 42 percent from 2000 to 2001. Under NPRI reporting requirements, the primary metals sector reported the largest total releases and transfers, with almost 39 kg, which was an increase of 25 kg from 2000.

### Polycyclic Aromatic Compounds

- Polycyclic aromatic compounds (PACs) are persistent, bioaccumulative toxics. Some members are probable carcinogens, developmental toxins and endocrine disruptors. The main source of PACs is combustion byproducts.
- Reports on PACs were required for the first time in NPRI at an alternative threshold for 2000. However, reporting requirements differ so the PRTR data on PACs from the two countries are not comparable.
- Total releases and transfers of PACs listed under NPRI showed an increase of 31 percent from 2000 to 2001, with total releases on- and off-site also increasing by 31 percent.
- For the PACs listed on TRI at the lower thresholds, total releases and transfers decreased by 27 percent from 2000 to 2001, with on- and off-site releases decreasing but transfers to recycling increasing.

## 10.1 Introduction

This chapter presents analyses of persistent bioaccumulative toxic (PBT) chemicals, including mercury and its compounds, dioxins and furans, hexachlorobenzene, and polycyclic aromatic compounds. These chemicals are of environmental and health concern as they are toxic, can accumulate in the environment, are not easily broken down, can travel large distances, and may have a number of health effects including cancer, neurological harm, and reproductive damage. These chemicals have lower reporting thresholds than other chemicals. However, except for mercury and its compounds, their reporting requirements differ, so the NPRI and TRI data are presented separately and cannot be compared. As part of the CEC *Action Plan to Enhance Comparability of PRTRs in North America*, governments are developing methods to make these PBT data more comparable in the future.

## 10.2 Mercury and its Compounds

Mercury is a persistent, bioaccumulative compound with health and environmental effects. Health effects from exposure to mercury include damage to the stomach and large intestine, permanent damage to the brain and kidneys, lung damage, increased blood pressure and heart rate, and permanent damage to unborn children (US EPA 2002). Inorganic mercury salts also cause health problems, especially kidney failure and gastrointestinal damage. Highly irritating, they can cause blisters and ulcers on the lips and tongue, or rashes, excessive sweating, irritability, muscle twitching, and high blood pressure (Health Canada 2002).

Methylmercury is both a developmental toxicant and a neurotoxicant. When pregnant women eat fish contaminated with mercury, the methylmercury can cross the placenta membranes and distribute throughout the body of the developing child. It readily accumulates in the brain. Depending on how

much is absorbed, infants suffering from methylmercury poisoning can appear normal at birth but later show reduced attention, focus, fine motor function, language, drawing ability and memory. These children may struggle to keep up at school and require special education or remedial classes (National Academy of Science 2000, Goldman and Shannon 2001). Exposure to mercury can also damage the reproductive and neurological development of wildlife. 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 and bioaccumulates in fish. Humans are exposed through consumption of the fish. High levels of mercury in fish are one of the main reasons for fish consumption advisories.

Mercury and its compounds have been reported to NPRI and TRI since the programs' inception. However, for the 2000 reporting year, both NPRI and TRI lowered the reporting threshold for mercury and its compounds. This change increased the num-

ber of facilities and the amount of mercury reported, resulting in an improved picture of releases and transfers of mercury. NPRI lowered the activity threshold from 10 tonnes to 5 kg manufactured, processed or otherwise used. TRI lowered the activity threshold from 25,000 pounds (11 tonnes) manufactured or processed or 10,000 pounds (4.5 tonnes) otherwise used to 10 lbs (4.5 kg). The employee threshold remains at the equivalent of 10 employees for both NPRI and TRI. Elemental mercury and its inorganic compounds were on the list of chemicals to be reported under the RETC program for the 2001 reporting year, however, no data are publicly available. The following section provides information on mercury and its compounds from the matched data for 2000 and 2001.

**Table 10–1. Summary of Total Reported Amounts of Releases and Transfers in North America, Mercury and its Compounds, NPRI and TRI, 2000–2001**

	North America				NPRI*				TRI			
	2000	2001	Change 2000–2001		2000	2001	Change 2000–2001		2000	2001	Change 2000–2001	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	1,643	1,691	48	3	153	179	26	17	1,490	1,512	22	1
Total Forms	1,677	1,709	32	2	153	179	26	17	1,524	1,530	6	0.4
	kg	kg	kg	%	kg	kg	kg	%	kg	kg	kg	%
<b>Releases On- and Off-site</b>												
<b>On-site Releases</b>	<b>149,108</b>	<b>183,317</b>	<b>34,209</b>	<b>23</b>	<b>8,324</b>	<b>20,349</b>	<b>12,025</b>	<b>144</b>	<b>140,784</b>	<b>162,968</b>	<b>22,184</b>	<b>16</b>
Air	72,796	67,534	-5,262	-7	5,460	5,332	-128	-2	67,336	62,201	-5,134	-8
Surface Water	1,160	879	-281	-24	67	64	-3	-5	1,093	815	-278	-25
Underground Injection	1,090	879	-210	-19	26	22	-4	-15	1,064	858	-206	-19
Land	74,062	114,025	39,963	54	2,771	14,931	12,160	439	71,291	99,094	27,803	39
<b>Off-site Releases (Transfers of Metals)**</b>	<b>426,481</b>	<b>112,225</b>	<b>-314,256</b>	<b>-74</b>	<b>19,268</b>	<b>15,689</b>	<b>-3,579</b>	<b>-19</b>	<b>407,213</b>	<b>96,536</b>	<b>-310,677</b>	<b>-76</b>
<b>Total Reported Releases On- and Off-site</b>	<b>575,588</b>	<b>295,542</b>	<b>-280,047</b>	<b>-49</b>	<b>27,591</b>	<b>36,037</b>	<b>8,446</b>	<b>31</b>	<b>547,997</b>	<b>259,504</b>	<b>-288,493</b>	<b>-53</b>
Off-site Releases Omitted for Adjustment Analysis***	29,759	10,692	-19,068	-64	4,881	964	-3,917	-80	24,879	9,728	-15,151	-61
<b>Total Releases On- and Off-site (adjusted)****</b>	<b>545,829</b>	<b>284,850</b>	<b>-260,979</b>	<b>-48</b>	<b>22,710</b>	<b>35,073</b>	<b>12,363</b>	<b>54</b>	<b>523,119</b>	<b>249,777</b>	<b>-273,342</b>	<b>-52</b>
<b>Off-site Transfers to Recycling</b>	<b>104,237</b>	<b>88,075</b>	<b>-16,162</b>	<b>-16</b>	<b>30,055</b>	<b>15,841</b>	<b>-14,214</b>	<b>-47</b>	<b>74,182</b>	<b>72,234</b>	<b>-1,948</b>	<b>-3</b>
<b>Total Reported Amounts of Releases and Transfers</b>	<b>679,826</b>	<b>383,617</b>	<b>-296,209</b>	<b>-44</b>	<b>57,646</b>	<b>51,878</b>	<b>-5,768</b>	<b>-10</b>	<b>622,180</b>	<b>331,739</b>	<b>-290,441</b>	<b>-47</b>

Note: Canada and US data only. Mexico data not available for 2000–2001. 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.

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

\*\*\* Off-site releases also reported as on-site releases by another NPRI or TRI facility. This amount is subtracted from total reported releases on- and off-site to get total releases on- and off-site (adjusted).

\*\*\*\* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

## 10.2.1 Matched Data on Releases and Transfers of Mercury and its Compounds, 2000–2001

- In 2001, 1,691 facilities—179 in NPRI and 1,512 in TRI—reported almost 384,000 kg of mercury and its compounds released or transferred. This was a decrease of 44 percent from 2000. Total reported amounts decreased in both NPRI and TRI.
- Total releases decreased by 48 percent in North America. However, this was due to a decrease of 273,000 kg in TRI, where one hazardous waste facility in Texas reported a decrease of almost 261,500 kg mainly as transfers to disposal. NPRI showed an increase of over 12,000 kg of total releases, where one hazardous waste facility in Quebec reported an increase of almost 13,000 kg in on-site releases to land.
- On-site releases increased in both NPRI and TRI, due to increases in on-site land releases. Land releases increased by 54 percent (almost 40,000 kg) in North America with NPRI accounting for 12,000 kg and TRI for 28,000 kg. A TRI facility manufacturing lime in the stone/clay/glass products sector reported an increase of 37,400 kg in on-site land releases.
- On-site air releases decreased 7 percent (5,262 kg) with NPRI accounting for 128 kg (a decrease of 2 percent) and TRI for 5,134 kg (an 8-percent decrease).
- Off-site releases (transfers to disposal) decreased by 74 percent overall, with both NPRI and TRI showing a decrease. Off-site transfers to recycling also decreased in both countries.

## Releases and Transfers by State/Province

- Three states and provinces (Alabama, Illinois and Quebec) had more than 20,000 kg of total reported amounts of releases and transfers of mercury and its compounds in 2001.
- Alabama had over 49,000 kg in total releases and transfers in 2001—mostly as on-site land releases—representing an increase of 29,700 kg (or 153 percent) from 2000. Alabama's on-site land releases were the largest in 2001, with almost 46,000 kg, an increase of over 30,600 kg (over 200 percent) from 2000. One facility in the in stone/clay/glass products sector in Alabama, Chemical Lime Co., in Alabaster, accounted for 37,415 kg in on-site land releases in 2001 and did not report mercury or its compounds in 2000.
- Illinois facilities reported almost 38,000 kg in total releases and transfers—primarily as transfers to disposal—an increase of 2,166 kg from 2000. Transfers to disposal decreased slightly from 28,792 kg in 2000 to 28,059 kg in 2001. The Chicago hazardous waste facility Clean Harbors Services Inc. reported 26,900 kg, mainly as transfers to disposal, an increase of 4,100 kg from 2000.
- Quebec facilities had over 24,000 kg in total releases and transfers—mainly as on-site land releases and transfers to recycling—which represented a decrease of 6 percent from 2000. Quebec's on-site land releases of mercury and its compounds increased from 190 kg in 2000 to 12,981 kg in 2001, while its transfers to recycling decreased from 17,497 kg to 8,289 kg. One hazardous waste facility in Quebec, Stablex Canada in Blainville, accounted for an overall increase of 7,928 kg, with on-site land releases having increased by almost 13,000 kg and transfers to recycling having decreased by 5,000 kg.

**Table 10–2. Releases and Transfers of Mercury and its Compounds, by State/Province, 2000–2001 (Ordered by Total Releases and Transfers, 2001)**

State/Province	2000											
	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Off-site Releases (Transfers to Disposal)		Total Releases On- and Off-site		Transfers to Recycling (kg)	Total Releases and Transfers	
						Total On-site Releases* (kg)	(kg)	kg	Rank		kg	Rank
Alabama	41	2,981	23	9	15,299	18,312	1,121	19,433	5	30	19,463	7
Alaska	2	17	0	0	0	17	1	18	60	0	18	62
Alberta	22	769	0	26	312	1,106	893	1,999	31	455	2,454	32
Arizona	13	889	0	0	174	1,063	353	1,416	42	612	2,028	35
Arkansas	19	691	2	0	66	760	5,974	6,734	16	1,425	8,159	16
British Columbia	18	287	36	0	1	324	6,123	6,447	19	312	6,759	19
California	78	2,614	2	0	3,086	5,702	4,095	9,797	10	4,506	14,302	11
Colorado	27	409	1	0	519	929	237	1,166	46	15	1,180	47
Connecticut	15	53	0	0	0	53	6,341	6,395	20	2,446	8,841	14
Delaware	9	704	10	0	49	763	703	1,466	41	1,520	2,985	27
District of Columbia	1	4	0	0	0	4	0	4	61	18	22	61
Florida	46	1,108	7	0	1,188	2,303	189	2,492	27	527	3,019	26
Georgia	30	2,165	8	0	590	2,764	54	2,817	24	2,577	5,394	21
Hawaii	5	18	2	3	0	22	24	46	58	0	46	59
Idaho	6	337	0	0	593	930	4	934	47	64	999	48
Illinois	68	2,700	6	0	1,054	3,760	28,792	32,551	3	2,938	35,489	4
Indiana	52	3,329	140	0	1,144	4,613	2,610	7,223	14	771	7,994	17
Iowa	43	1,212	0	0	52	1,265	304	1,568	37	53	1,621	41
Kansas	19	852	0	0	307	1,158	74	1,233	45	180	1,412	45
Kentucky	45	2,394	257	116	1,701	4,468	4,701	9,169	11	5,502	14,671	10
Louisiana	45	1,593	35	202	705	2,536	4,053	6,589	17	1,858	8,447	15
Maine	5	23	1	0	1	25	18	43	59	3	46	58
Manitoba	8	1,311	3	0	28	1,342	0	1,342	44	470	1,812	38
Maryland	15	1,124	1	61	147	1,333	163	1,496	40	47	1,543	44
Massachusetts	18	133	0	0	2	135	27,559	27,694	4	17,897	45,590	2
Michigan	54	1,875	225	0	6,129	8,228	2,219	10,447	9	3,638	14,086	12
Minnesota	27	825	2	0	448	1,275	224	1,499	39	380	1,879	36
Mississippi	13	357	75	26	2,873	3,332	24	3,355	22	103	3,459	24
Missouri	34	1,337	1	0	465	1,803	197	2,000	30	70	2,069	34
Montana	16	1,955	0	0	335	2,290	659	2,949	23	18	2,967	28
Nebraska	13	289	0	0	306	595	70	665	49	7	672	49
Nevada	7	185	0	0	163	348	0	348	51	0	348	51
New Brunswick	9	294	2	0	69	366	1,275	1,640	35	118	1,759	39
New Hampshire	5	14	0	0	5	20	89	108	56	15	123	55
New Jersey	29	420	2	0	8	430	301	731	48	863	1,594	42
New Mexico	8	611	0	0	569	1,180	510	1,690	34	0	1,690	40
New York	40	620	8	0	783	1,412	764	2,176	28	408	2,583	31
North Carolina	38	1,603	10	0	828	2,441	186	2,627	25	27	2,655	30
North Dakota	12	1,120	0	0	109	1,229	166	1,396	43	0	1,396	46
Nova Scotia	6	275	0	0	25	300	12	312	52	6	318	52
Ohio	97	5,416	46	336	2,289	8,087	2,431	10,518	8	8,438	18,956	8
Oklahoma	20	685	2	0	742	1,429	288	1,716	33	99	1,816	37
Ontario	56	1,395	9	0	2,146	3,550	3,470	7,020	15	11,197	18,217	9
Oregon	18	210	0	0	7,281	7,492	81	7,572	13	151	7,723	18
Pennsylvania	101	4,896	11	0	3,773	8,681	27,253	35,934	2	888	36,822	3
Prince Edward Island	2	6	0	0	0	6	86	93	57	0	93	57
Puerto Rico	18	108	4	0	0	113	138	250	54	2	252	54
Quebec	29	848	17	0	190	1,055	7,409	8,464	12	17,497	25,961	5
Rhode Island	5	0	0	0	0	0	2	2	62	35	37	60
Saskatchewan	3	274	0	0	0	274	0	274	53	0	274	53
South Carolina	36	1,170	15	0	602	1,786	74	1,860	32	232	2,092	33
South Dakota	6	96	0	0	19	115	3	118	55	4	122	56
Tennessee	39	2,192	41	0	1,144	3,378	789	4,167	21	139	4,306	23
Texas	106	7,444	29	312	3,758	11,542	263,600	275,143	1	2,136	277,279	1
Utah	18	470	2	0	7,857	8,328	5,346	13,674	6	23	13,697	13
Vermont	1	0	0	0	0	0	1,633	1,633	36	1,587	3,220	25
Virgin Islands	4	343	0	0	131	474	17	492	50	0	492	50
Virginia	42	1,917	19	0	389	2,325	270	2,596	26	218	2,814	29
Washington	23	282	23	0	89	394	11,479	11,873	7	8,900	20,773	6
West Virginia	31	3,195	79	0	2,691	5,965	517	6,482	18	155	6,638	20
Wisconsin	43	1,584	2	0	73	1,659	491	2,150	29	2,656	4,806	22
Wyoming	18	766	0	0	752	1,518	26	1,544	38	0	1,544	43
<b>Total</b>	<b>1,677</b>	<b>72,796</b>	<b>1,160</b>	<b>1,090</b>	<b>74,062</b>	<b>149,108</b>	<b>426,481</b>	<b>575,588</b>		<b>104,237</b>	<b>679,826</b>	

Note: Canada and US data only. Mexico data not available for 2000–2001. 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. Transfers are from facilities located in the state/province.

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

Table 10–2. (continued)

State/Province	Number of Forms	Air (kg)	2001										Change in Total Releases and Transfers, 2000–2001		
			Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases* (kg)	Off-site Releases (Transfers to Disposal) (kg)		Total Releases On- and Off-site		Transfers to Recycling (kg)	Total Releases and Transfers		kg	%
							kg	Rank	kg	Rank		kg	Rank		
Alabama	45	2,677	24	5	45,952	48,659	420	49,078	1	85	49,164	1	29,700	153	
Alaska	3	26	0	0	0	26	1	27	58	0	27	59	9	50	
Alberta	26	779	0	22	245	1,046	642	1,688	30	247	1,935	34	-519	-21	
Arizona	15	602	0	0	209	812	123	935	46	564	1,499	43	-530	-26	
Arkansas	18	740	3	0	40	784	321	1,105	42	2,806	3,911	22	-4,248	-52	
British Columbia	19	806	29	0	0	835	8,488	9,323	12	101	9,425	16	2,666	39	
California	74	2,530	5	0	6,594	9,129	2,709	11,838	8	2,511	14,349	10	46	0	
Colorado	27	359	1	0	363	723	334	1,057	44	15	1,072	48	-109	-9	
Connecticut	12	56	0	0	0	56	9,028	9,084	13	9,816	18,899	4	10,059	114	
Delaware	9	672	9	0	98	779	498	1,277	40	1,604	2,881	27	-104	-3	
District of Columbia	0	0	0	0	0	0	0	0	--	0	0	62	-22	-100	
Florida	49	1,151	6	0	1,201	2,358	128	2,486	23	386	2,872	28	-147	-5	
Georgia	30	1,675	7	0	413	2,094	55	2,150	26	897	3,046	26	-2,347	-44	
Hawaii	6	52	2	1	0	55	33	88	55	1	88	56	43	93	
Idaho	4	292	0	0	686	978	0	978	45	0	978	49	-21	-2	
Illinois	64	2,707	7	0	847	3,562	28,059	31,621	2	6,034	37,655	2	2,166	6	
Indiana	62	3,251	57	0	1,361	4,669	681	5,350	16	1,101	6,452	18	-1,543	-19	
Iowa	45	1,230	3	0	57	1,290	231	1,522	34	74	1,596	39	-25	-2	
Kansas	22	960	0	0	135	1,096	200	1,296	39	136	1,432	44	20	1	
Kentucky	48	2,384	42	0	1,749	4,175	11,404	15,578	4	3,180	18,758	5	4,088	28	
Louisiana	47	2,026	39	1	1,261	3,327	2,582	5,909	14	1,857	7,765	17	-682	-8	
Maine	5	42	1	0	0	43	11	53	56	3	56	58	10	21	
Manitoba	7	1,102	3	0	15	1,120	0	1,120	41	891	2,012	33	200	11	
Maryland	20	1,008	1	61	201	1,270	321	1,592	32	15	1,606	38	63	4	
Massachusetts	18	107	0	0	2	109	130	239	52	233	472	52	-45,119	-99	
Michigan	50	1,812	10	0	6,607	8,429	3,290	11,720	9	3,734	15,453	7	1,367	10	
Minnesota	29	832	1	0	437	1,270	178	1,448	36	301	1,749	36	-130	-7	
Mississippi	18	287	61	478	2,449	3,275	99	3,374	19	58	3,432	24	-26	-1	
Missouri	35	1,620	1	0	320	1,941	1,397	3,338	20	199	3,537	23	1,468	71	
Montana	13	835	1	0	3,243	4,080	193	4,273	18	14	4,286	20	1,319	44	
Nebraska	13	250	0	0	430	681	175	856	47	12	867	50	195	29	
Nevada	8	265	0	0	1,389	1,654	4	1,658	31	0	1,658	37	1,310	376	
New Brunswick	8	314	2	0	70	385	1,082	1,467	35	110	1,577	41	-182	-10	
New Hampshire	5	13	0	0	3	16	31	46	57	18	64	57	-59	-48	
New Jersey	25	344	6	0	17	367	336	703	49	3,386	4,089	21	2,495	157	
New Mexico	8	680	0	0	466	1,146	411	1,557	33	0	1,557	42	-133	-8	
New York	33	608	8	0	886	1,502	218	1,720	29	157	1,877	35	-706	-27	
North Carolina	36	1,888	9	0	970	2,866	237	3,104	21	38	3,142	25	487	18	
North Dakota	10	1,046	0	0	126	1,172	162	1,334	38	0	1,334	46	-62	-4	
Nova Scotia	7	192	0	0	21	213	1,137	1,350	37	4	1,355	45	1,036	325	
Ohio	90	5,172	257	68	1,970	7,467	2,295	9,762	11	5,121	14,883	9	-4,073	-21	
Oklahoma	20	687	4	0	1,601	2,292	288	2,580	22	3	2,582	29	767	42	
Ontario	69	1,340	9	0	1,598	2,947	1,704	4,651	17	6,198	10,849	14	-7,369	-40	
Oregon	17	221	2	0	1,830	2,052	71	2,124	28	29	2,153	32	-5,570	-72	
Pennsylvania	105	3,998	31	0	2,519	6,548	8,011	14,559	5	4,125	18,684	6	-18,138	-49	
Prince Edward Island	2	12	0	0	0	12	8	20	59	0	20	60	-72	-78	
Puerto Rico	14	190	10	0	0	200	632	832	48	0	832	51	580	230	
Quebec	38	422	21	0	12,981	13,424	2,627	16,052	3	8,289	24,341	3	-1,619	-6	
Rhode Island	5	0	0	0	0	0	2	2	60	0	2	61	-35	-96	
Saskatchewan	3	365	0	0	0	365	0	365	51	0	365	53	91	33	
South Carolina	37	1,026	45	0	640	1,711	727	2,438	24	67	2,506	30	414	20	
South Dakota	6	104	0	0	21	125	0	125	54	2	127	55	6	5	
Tennessee	33	1,841	48	0	1,082	2,971	8,103	11,074	10	120	11,194	13	6,887	160	
Texas	112	6,696	23	243	2,837	9,800	2,603	12,403	7	2,875	15,278	8	-262,000	-94	
Utah	18	435	1	0	4,892	5,328	359	5,687	15	9	5,696	19	-8,001	-58	
Vermont	1	0	0	0	0	0	0	0	--	1,587	1,587	40	-1,633	-51	
Virgin Islands	3	80	0	0	23	102	64	166	53	14	180	54	-312	-63	
Virginia	42	1,323	10	0	321	1,654	561	2,215	25	95	2,310	31	-504	-18	
Washington	21	236	5	0	109	349	253	602	50	8,833	9,435	15	-11,337	-55	
West Virginia	37	2,849	75	0	2,350	5,274	8,048	13,322	6	252	13,573	11	6,935	104	
Wisconsin	44	1,543	3	0	102	1,648	492	2,140	27	9,862	12,001	12	7,195	150	
Wyoming	19	772	0	0	283	1,054	28	1,082	43	7	1,089	47	-455	-29	
<b>Total</b>	<b>1,709</b>	<b>67,534</b>	<b>879</b>	<b>879</b>	<b>114,025</b>	<b>183,317</b>	<b>112,225</b>	<b>295,542</b>		<b>88,075</b>	<b>383,617</b>		<b>-296,209</b>	<b>-44</b>	

- Texas facilities reported the largest on-site air emissions in 2001, with 6,696 kg, a decrease from 7,444 kg in 2000. Texas air emissions represented 10 percent of total on-site air emissions of mercury and its compounds in North America in 2001. Electric utilities in Texas accounted for 4,077 kg of air releases in 2001 and 4,260 kg in 2000, about 60 percent of total air releases of mercury and its compounds in Texas.
- Ohio facilities reported the second-largest air emissions, with 5,172 kg, also a decrease from 2000. Ohio's on-site air emissions represented almost 8 percent of the total in North America in 2001. Electric utilities in Ohio accounted for 3,650 kg of air releases in 2001 and 3,805 kg in 2000, about 70 percent of total air releases of mercury and its compounds in Ohio.

## Releases and Transfers by Industry

- Hazardous waste management facilities reported the largest amounts of releases and transfers of mercury and its compounds in both 2000 and 2001. The 152,000 kg in 2001 represented almost 40 percent of the total reported by all industry sectors in 2001. This was a decrease from 2000 of over 300,000 kg (66 percent). One hazardous waste facility in Texas, Waste Management of Port Arthur, reported a decrease of almost 261,500 kg, mainly as transfers to disposal.
- Hazardous waste management facilities also reported the largest on-site land disposal in 2001 and 2000, with over 41,000 kg in 2001—a 6-percent increase from 2000.
- Electric utilities reported the second-largest total and the largest on-site releases to air of mercury and its compounds in both 2000 and 2001. This sector's air emissions of over 43,000 kg in 2001 represented 64 percent of on-site air emissions reported by all industry sectors in 2001, but were down 5 percent from 2000.
- The stone/clay/glass sector reported the largest increase in total releases and transfers of mercury and its compounds from 2000 to 2001. It reported an increase of over 37,000 kg, mostly as on-site land releases. One facility, Chemical Lime Co. in Alabaster, Alabama, reported 37,415 kg of on-site land releases in 2001 and did not report any in 2000.

Table 10–3. Releases and Transfers of Mercury and its Compounds, by Industry, 2000–2001 (Ordered by Total Releases and Transfers, 2001)

US SIC		2000											
Code	Industry	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases* (kg)	Off-site Releases (Transfers to Disposal) (kg)	Total Releases On- and Off-site		Transfers to Recycling (kg)	Total Releases and Transfers	
									kg	Rank		kg	Rank
495/738	Hazardous Waste Mgt./Solvent Recovery	85	1,165	1	868	38,593	40,627	348,177	388,804	1	63,679	452,483	1
491/493	Electric Utilities	540	45,788	573	0	21,529	67,889	8,148	76,037	2	1,745	77,782	2
28	Chemicals	190	8,407	158	33	5,623	14,221	15,714	29,935	4	9,225	39,161	4
32	Stone/Clay/Glass Products	182	6,093	1	116	1,368	7,578	28	7,605	6	148	7,754	7
33	Primary Metals	158	7,040	188	0	3,619	10,847	35,957	46,804	3	7,611	54,415	3
36	Electronic/Electrical Equipment	41	596	0	0	0	597	3,100	3,696	8	15,300	18,997	5
38	Measurement/Photographic Instruments	15	30	2	0	13	45	663	708	11	4,857	5,566	8
29	Petroleum and Coal Products	138	982	59	4	95	1,140	2,727	3,868	7	370	4,238	9
12	Coal Mining	47	117	104	69	2,665	2,955	9	2,964	9	36	3,001	10
--	Multiple codes 20–39**	52	738	13	0	113	864	11,084	11,948	5	646	12,595	6
26	Paper Products	136	1,341	60	0	434	1,834	460	2,294	10	92	2,386	11
37	Transportation Equipment	12	31	0	0	0	31	48	78	16	104	183	15
20	Food Products	33	256	0	0	10	265	135	400	12	67	467	12
34	Fabricated Metals Products	14	22	0	0	0	22	58	81	15	121	202	14
21	Tobacco Products	4	31	1	0	0	32	70	102	14	0	102	18
35	Industrial Machinery	7	6	0	0	0	7	26	32	19	197	229	13
5169	Chemical Wholesalers	2	0	0	0	0	0	0	0	22	1	1	22
39	Misc. Manufacturing Industries	3	0	0	0	0	0	3	3	21	4	7	21
30	Rubber and Plastics Products	12	5	0	0	0	5	73	78	17	27	105	17
22	Textile Mill Products	1	107	0	0	0	107	0	107	13	0	107	16
24	Lumber and Wood Products	4	5	0	0	0	5	0	5	20	5	10	20
27	Printing and Publishing	1	36	0	0	0	36	0	36	18	0	36	19
<b>Total</b>		<b>1,677</b>	<b>72,796</b>	<b>1,160</b>	<b>1,090</b>	<b>74,062</b>	<b>149,108</b>	<b>426,481</b>	<b>575,588</b>		<b>104,237</b>	<b>679,826</b>	

Note: Canada and US data only. Mexico data not available for 2000–2001. 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. Transfers are from facilities located in the state/province.

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Multiple SIC codes reported only in TRI.

Table 10–3. (continued)

US SIC Code Industry-		2001													Change in Total Releases and Transfers, 2000–2001	
		Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases* (kg)	Off-site Releases (Transfers to Disposal) (kg)	Total Releases On- and Off-site (kg)	Rank	Transfers to Recycling (kg)	Total Releases and Transfers (kg)	Rank			
495/738	Hazardous Waste Mgt./Solvent Recovery	81	858	3	297	41,005	42,164	53,647	95,811	1	56,431	152,242	1	-300,241	-66	
491/493	Electric Utilities	539	43,384	191	0	17,562	61,137	9,814	70,951	2	2,503	73,454	2	-4,328	-6	
28	Chemicals	208	7,578	168	480	6,559	14,784	32,966	47,750	3	9,450	57,200	3	18,040	46	
32	Stone/Clay/Glass Products	196	6,125	1	0	38,811	44,938	76	45,014	4	104	45,117	4	37,364	482	
33	Primary Metals	172	6,345	85	0	6,608	13,038	9,681	22,718	5	6,555	29,273	5	-25,142	-46	
36	Electronic/Electrical Equipment	41	234	0	0	0	234	3,033	3,267	6	5,937	9,204	6	-9,793	-52	
38	Measurement/Photographic Instruments	13	49	2	0	1	53	13	65	14	4,686	4,751	7	-815	-15	
29	Petroleum and Coal Products	129	917	46	36	68	1,066	1,285	2,351	8	1,091	3,441	8	-797	-19	
12	Coal Mining	54	4	80	66	2,850	3,000	26	3,025	7	0	3,025	9	25	1	
--	Multiple codes 20–39**	51	659	17	0	119	795	1,080	1,875	10	530	2,405	10	-10,190	-81	
26	Paper Products	131	1,098	285	0	414	1,797	244	2,041	9	152	2,193	11	-193	-8	
37	Transportation Equipment	18	11	0	0	0	11	8	19	19	413	432	12	249	137	
20	Food Products	26	178	0	0	21	199	64	263	11	11	275	13	-192	-41	
34	Fabricated Metals Products	11	11	0	0	0	11	59	70	13	114	184	14	-18	-9	
21	Tobacco Products	4	67	1	0	0	68	59	127	12	0	127	15	24	24	
35	Industrial Machinery	4	0	0	0	0	0	45	45	16	74	119	16	-110	-48	
5169	Chemical Wholesalers	4	0	0	0	0	0	59	59	15	15	74	17	73	8,090	
39	Misc. Manufacturing Industries	6	0	0	0	7	7	29	36	18	10	46	18	39	531	
30	Rubber and Plastics Products	12	7	0	0	0	7	37	45	17	0	45	19	-60	-57	
22	Textile Mill Products	1	7	0	0	0	7	0	7	20	0	7	20	-100	-94	
24	Lumber and Wood Products	7	2	0	0	0	2	0	2	21	0	2	21	-8	-80	
27	Printing and Publishing	1	0	0	0	0	0	0	0	22	0	0	22	-36	-100	
<b>Total</b>		<b>1,709</b>	<b>67,534</b>	<b>879</b>	<b>879</b>	<b>114,025</b>	<b>183,317</b>	<b>112,225</b>	<b>295,542</b>		<b>88,075</b>	<b>383,617</b>		<b>-296,209</b>	<b>-44</b>	

\* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

\*\* Multiple SIC codes reported only in TRI.

### Facilities with Largest Releases

- The hazardous waste management/solvent recovery sector had the largest total releases of mercury and its compounds in 2001. Two facilities owned by Clean Harbors were the hazardous waste facilities with the largest total releases on- and off-site in the US. Clean Harbors Services Inc. in Chicago, Illinois, reported 21,754 kg of mercury and its compounds transferred off-site for disposal and Clean Harbors of Connecticut Inc. in Bristol, Connecticut, reported 8,783 kg also transferred off-site for disposal.
- The hazardous waste facility in Canada with the largest total releases was Stablex Canada Inc. in Blainville, Quebec which reported 12,977 kg as land disposal on-site. The Safety Kleen Ltd. facility in Corunna, Ontario, was the hazardous waste facility with the second largest total releases in Canada. This facility reported 1,160 kg of releases of mercury with 240 kg released to air and 920 kg of on-site land releases.
- The electric utility sector had the second largest releases of mercury and its compounds and the largest on-site air releases. 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.

There were large changes in releases and transfers of mercury and its compounds at several facilities from 2000 to 2001.

- One hazardous waste facility in Texas, Waste Management of Port Arthur, reported total releases and transfers of almost 261,500 kg in 2000—38 percent of the North American total for that year. However, the facility reported only 454 kg in 2001. Another hazardous waste management facility, Clean Harbors of Braintree, Massachusetts, reported the second-largest decrease in total releases and transfers of mercury, with a decrease of 44,260 kg.
- The facility with the largest decrease in total releases and transfers in Canada was the Services Safety-Kleen hazardous waste facility in Thurso, Quebec, which reported a reduction of 6,217 kg, as transfers to disposal and to recycling. The GE Lighting facility in Oakville, Ontario, reported the second-largest decrease among Canadian facilities, reporting 4,290 kg in 2000 and none in 2001.
- The Chemical Lime facility in Alabaster, Alabama, reported the largest increase in releases and transfers of mercury and its compounds. It reported over 37,400 kg as on-site land releases in 2001, having reported none in 2000. This facility reported on mercury compounds for the first time in 2001.
- The facility with the largest increase in total releases and transfers in Canada was the Stablex Canada hazardous waste management facility in Blainville, Quebec. It reported an increase of over 7,900 kg, with an increase of almost 13,000 kg in on-site land releases and a decrease in transfers to recycling from 2000 to 2001.

**Table 10–4. Facilities in North America with Largest Change in Total Releases and Transfers of Mercury and its Compounds, 2000–2001**

North American Rank	Facility	City, State/Province	SIC Codes		Number of Forms	2000							Total Releases On- and Off-site (kg)	Transfers to Recycling (kg)	Total Releases and Transfers (kg)
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases (Transfers to Disposal) (kg)				
<b>Decreases</b>															
<b>US</b>															
1	Waste Management Inc.	Port Arthur, TX	495/738		1	391	0	0	0	391	261,555	261,946	0	261,946	
2	Clean Harbors of Braintree Inc.	Braintree, MA	495/738		1	0	0	0	0	0	26,532	26,532	17,728	44,260	
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA	33		1	59	0	0	0	59	24,535	24,594	0	24,594	
4	Georgia-Pacific West Inc.	Bellingham, WA	Mult.		1	1	5	0	0	6	10,658	10,664	0	10,664	
5	Chemical Waste Management, Waste Management	Emelle, AL	495/738		1	0	0	0	14,523	14,523	824	15,347	0	15,347	
<b>Canada</b>															
6	Services Safety-Kleen (Québec) Ltée	Thurso, QC	77	495/738	1	0	0	0	0	0	4,372	4,372	9,280	13,652	
10	GE Lighting, Canada, Oakville Lamp Plant	Oakville, ON	33	36	1	42	0	0	0	42	108	151	4,139	4,290	
14	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	1	0	0	0	0	0	22	22	2,810	2,832	
15	Osram Sylvania Ltée	Drummondville, QC	33	36	1	334	0	0	0	334	267	601	2,236	2,837	
22	Philip Services Inc., Delta Facility	Delta, BC	49	495/738	1	0	0	0	0	0	1,679	1,679	112	1,791	
<b>Increases</b>															
<b>US</b>															
1	Chemical Lime Co. Alabaster Plant	Alabaster, AL		32	0	0	0	0	0	0	0	0	0	0	
2	Clean Harbors of Connecticut Inc.	Bristol, CT	495/738		1	0	0	0	0	0	6,220	6,220	1,646	7,865	
4	PPG Inds. Inc.	New Martinsville, WV		28	1	556	5	0	0	562	42	604	0	604	
5	Pollution Control Inds. of Tennessee L.L.C.	Millington, TN	495/738		0	0	0	0	0	0	0	0	0	0	
6	Onyx Environmental Services, Vivendi S.A.	Menomonee Falls, WI	495/738		1	0	0	0	0	0	0	0	2,549	2,549	
<b>Canada</b>															
3	Stablex Canada Inc.	Blainville, QC	77	495/738	1	0	0	0	49	49	0	49	5,000	5,049	
10	Nexen Chemicals Canada Limited Partnership, Squamish	Squamish, BC	37	28	1	0	6	0	0	6	3,800	3,806	0	3,806	
13	Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	Thorold, ON	49	495/738	1	0	0	0	0	0	283	283	3,894	4,177	
19	Safety-Kleen Limited, Debert Central Transfer Facility	Debert, NS	77	495/738	0	0	0	0	0	0	0	0	0	0	
30	Teck Cominco Metals Limited, Trail Operations	Trail, BC	29	33	1	150	20	0	0	170	0	170	0	170	

Table 10–4. (continued)

North American Rank	Facility	2001										Change in Total Releases and Transfers, 2000–2001 (kg)
		Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases (Transfers to Disposal) (kg)	Total Releases On- and Off-site (kg)	Transfers to Recycling (kg)	Total Releases and Transfers (kg)	
<b>Decreases</b>												
<b>US</b>												
1	Waste Management Inc.	1	208	0	0	0	0	246	454	0	454	-261,492
2	Clean Harbors of Braintree Inc.	0	0	0	0	0	0	0	0	0	0	-44,260
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	1	56	0	0	0	0	4,889	4,945	0	4,945	-19,649
4	Georgia-Pacific West Inc.	0	0	0	0	0	0	0	0	0	0	-10,664
5	Chemical Waste Management, Waste Management	1	0	0	0	7,438	0	3	7,441	60	7,501	-7,845
<b>Canada</b>												
6	Services Safety-Kleen (Québec) Ltée	1	0	0	0	0	0	0	0	7,435	7,435	-6,217
10	GE Lighting, Canada, Oakville Lamp Plant	0	0	0	0	0	0	0	0	0	0	-4,290
14	Philip Enterprises Inc., Fort Erie Facility	1	0	0	0	0	0	133	133	0	133	-2,698
15	Osram Sylvania Ltée	1	66	0	0	0	0	169	235	0	235	-2,602
22	Philip Services Inc., Delta Facility	1	0	0	0	0	0	311	311	61	372	-1,419
<b>Increases</b>												
<b>US</b>												
1	Chemical Lime Co. Alabaster Plant	1	1	0	0	37,415	0	0	37,416	0	37,416	37,416
2	Clean Harbors of Connecticut Inc.	1	0	0	0	0	0	8,783	8,783	9,520	18,303	10,437
4	PPG Inds. Inc.	1	577	13	0	0	0	7,555	8,145	54	8,199	7,595
5	Pollution Control Inds. of Tennessee L.L.C.	1	0	0	0	0	0	7,531	7,531	0	7,531	7,531
6	Onyx Environmental Services, Vivendi S.A.	1	0	0	0	0	0	0	0	9,732	9,732	7,183
<b>Canada</b>												
3	Stablex Canada Inc.	1	0	0	0	12,977	0	0	12,977	0	12,977	7,928
10	Nexen Chemicals Canada Limited Partnership, Squamish	1	9	1	0	0	0	7,827	7,837	0	7,837	4,031
13	Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	1	0	0	0	0	0	273	273	5,694	5,967	1,790
19	Safety-Kleen Limited, Debert Central Transfer Facility	1	0	0	0	0	0	1,135	1,135	0	1,135	1,135
30	Teck Cominco Metals Limited, Trail Operations	1	670	20	0	0	0	0	690	0	690	520

### 10.3 Dioxins and Furans

Each member of the dioxin and furan family has a different toxicity, with 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) generally being considered the most toxic. Some members of the dioxin family are considered carcinogens and are suspected neurotoxicants, developmental toxicants, and endocrine disruptors. Dioxins and furans are considered to be persistent, bioaccumulative and toxic compounds. In Canada, dioxins and furans are considered CEPA toxic, and releases to the environment as a result of human activity are slated for virtual elimination.

Dioxins and furans are formed during incomplete combustion, and air releases are the major type of release. Human exposure occurs largely through food. The chemicals become incorporated into food when airborne dioxin falls onto plants that are eaten by animals or when waterborne dioxins contaminate fish and aquatic animals.

Both TRI and NPRI required the reporting of dioxins and furans beginning with the 2000 reporting year. Both NPRI and TRI require reporting of a total amount for 17 congeners. However, other aspects of the reporting requirements differ in the two countries (see below). Therefore, direct comparison of the data on dioxins and furans is not possible. Both countries are considering revising their reporting on dioxins and furans in the future. This should make the reporting more comparable.

**Table 10–5. Congeners of Dioxins/Furans reported to TRI and NPRI**

CAS Number	Dioxin/Furan	Toxic Equivalency Factor (TEF)
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.01
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.1
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.1
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	0.1
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.1
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.1
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.01
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.001
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.001
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.05
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.5
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.5
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.1
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1

Note: The TEFs are those developed by international convention and adopted in 1989.

Table 10–6. NPRI Dioxin/Furan Reporting Requirements

Reporting Threshold: 0 grams

Amounts Reported in grams-iTEQ

Industrial Activities: reporting restricted to certain activities and meeting threshold of 10 employees or more (except no employee threshold for wood preservation or incineration)

**Specific activities (10-employee threshold):**

Base metals smelting (copper, lead, nickel, zinc)  
Smelting of secondary lead or secondary aluminum  
Sintering process in manufacture of iron  
Electric arc furnace in steel making and steel foundries  
Production of magnesium  
Manufacture of Portland cement  
Production of chlorinated organic solvents  
Combustion of fossil fuel to produce electricity  
Combustion of salt-laden logs in pulp and paper sector  
Combustion of fuel in kraft liquor boilers in pulp and paper sector

**Primary Industry Sectors Reporting these Activities in 2001**

Metal mining, Primary metals  
Primary metals  
Primary metals  
Primary metals  
Primary metals  
Stone/Clay/Glass Products  
Chemicals  
Electric utilities, Paper products  
Paper products  
Paper products

**Specific activities (No employee threshold):**

Wood preservation using pentachlorophenol  
Non-hazardous/hospital/hazardous waste/sewage sludge incineration

Lumber and wood products  
Lumber and wood products, Air/Water/Solid Waste Management\*,  
Paper products, Hazardous waste management, Sewerage systems\*

Note: See Guide for Reporting to the National Pollutant Release Inventory 2001 ([www.ec.gc.ca/pdb/npri/documents/Guide\\_2001.pdf](http://www.ec.gc.ca/pdb/npri/documents/Guide_2001.pdf)) for complete description of activities.

\* Facilities not required to report under TRI

### 10.3.1 Reporting Requirements

#### What is Reported

For TRI, dioxins and furans are reported by weight. The amounts in total grams for the 17 congeners and the distribution of the 17 congeners are also reported. The distribution represents either the distribution of the total quantity of dioxins and furans released to all media from the facility or the facility's one best media-specific distribution.

For NPRI, dioxins and furans are reported using a toxicity approach. The amounts of dioxins and furan are reported in toxic equivalents (TEQ), using the International Toxic Equivalency Factors (i-TEF) adopted by international convention in 1989, as grams-iTEQ. The International Toxic Equivalency Factors (TEF) for each of the 17 congeners are shown in Table 10–5. The amount in grams of each congener is multiplied by its TEF. The sum of the individual TEQs for all 17 congeners is reported as one amount to NPRI. This is done for each type of release and transfer.

#### Reporting Threshold

NPRI reporting on dioxins and furans does not depend on the amounts manufactured, processed or otherwise used, or the amounts released or transferred off-site. That is, all amounts are reportable from specified processes or activities. However, if the level is below typical method detection limits, the facility can indicate that the release is less than the level of quantification (LOQ) and not report an amount.

For TRI, the reporting threshold is 0.1 grams per year, based on the total grams of the 17 congeners. This threshold applies to each of the amounts manufactured, processed or otherwise used. “Manufacturing” includes coincidental manufacture as a by-product or impurity. “Processing or otherwise used” applies to dioxins and furans that are present as contaminants in a chemical or that are created during the manufacture of that chemical.

### Industry Sectors Required to Report

NPRI requires facilities with 10 or more employees to report on dioxins and furans only for specific listed activities. If a facility does not engage in a listed activity, it does not have to report on dioxins and furans. For several activities—wood preservation using pentachlorophenol and incineration—the employee threshold does not apply.

For TRI, all facilities with 10 or more employees that are required to report to TRI are also required to report on dioxins and furans if they meet the reporting threshold of 0.1 grams. Thus, manufacturing-sector facilities, electric utilities, hazardous waste management and solvent recovery facilities, petroleum bulk terminals, chemicals wholesalers, and metal and coal mines are all required to report dioxins and furans.

This is one of the main differences between NPRI and TRI reporting. TRI requires all facilities within the TRI industry sectors to report, while NPRI only requires a subset of all facilities to report, albeit from more industry sectors.

**Table 10–7. TRI Dioxin/Furan Reporting Requirements**

**Reporting Threshold: 0.1 grams**

**Employee Threshold: 10 employees**

**Amounts reported in grams**

**Distribution of congeners also reported**

**Industrial Activities: reporting for all activities for certain industry sectors**

US SIC Code	Industry Sectors Required to Report	Industry Sectors Reporting Releases and Transfers, 2001
10	Metal Mining	X
12	Coal Mining	X
20	Food Products	X
21	Tobacco Products	X
22	Textile Mill Products	X
23	Apparel and Other Textile Products	
24	Lumber and Wood Products	X
25	Furniture and Fixtures	X
26	Paper Products	X
27	Printing and Publishing	
28	Chemicals	X
29	Petroleum and Coal Products	X
30	Rubber and Plastics Products	X
31	Leather Products	X
32	Stone/Clay/Glass Products	X
33	Primary Metals	X
34	Fabricated Metals Products	X
35	Industrial Machinery	X
36	Electronic/Electrical Equipment	
37	Transportation Equipment	X
38	Measurement/Photographic Instruments	X
39	Misc. Manufacturing Industries	
491/493	Electric Utilities	X
495/738	Hazardous Waste Mgt./Solvent Recovery	X
5169	Chemical Wholesalers	X
5171	Petroleum Bulk Terminals	X

Table 10–8. Facilities Reporting Dioxins/Furans, TRI and NPRI, 2001

US SIC Code	Industry	US TRI - for facilities meeting reporting threshold of 0.1 grams or more and 10 employees or more			Canadian NPRI - for facilities conducting certain activities meeting threshold of 10 employees or more except for wood preservation or incineration		
		Number of Facilities Reporting to TRI	Number of TRI Facilities Reporting Dioxins/Furans		Number of Facilities Reporting to NPRI	Number of NPRI Facilities Reporting Dioxins/Furans	
			Number of Facilities	% of Industry Total		Number of Facilities	% of Industry Total
<b>Manufacturing Industry Sectors</b>							
20	Food Products	1,688	24	1	126	1	1
21	Tobacco Products	31	1	3	0	0	0
22	Textile Mill Products	289	1	0.3	16	0	0
23	Apparel	16	0	0	4	0	0
24	Lumber and Wood Products	1,006	124	12	185	86	46
25	Furniture and Fixtures	282	8	3	29	2	7
26	Paper Products	507	166	33	134	55	41
27	Printing	231	0	0	28	0	0
28	Chemicals	3,618	137	4	447	11	2
29	Petroleum and Coal Products	542	63	12	37	0	0
30	Rubber and Plastics Products	1,822	2	0.1	189	0	0
31	Leather Products	60	1	2	4	0	0
32	Stone/Clay/Glass Products	1,027	108	11	89	15	17
33	Primary Metals	1,941	121	6	186	51	27
34	Fabricated Metals Products	2,959	1	0.03	235	3	1
35	Industrial Machinery	1,143	1	0.1	38	0	0
36	Electronic/Electrical Equipment	1,831	0	0	59	1	2
37	Transportation Equipment	1,348	4	0.3	150	0	0
38	Measurement/Photographic Instruments	375	1	0.3	1	0	0
39	Misc. Manufacturing Industries	312	0	0	86	3	3
--	Multiple codes 20–39*	1,317	36	3	--	--	--
<b>Other Industry Sectors</b>							
09	Fishing, Hunting, Trapping	NA			1	1	100
10	Metal Mining**	89	11	12	4	2	50
1094	Uranium Mines	NA			46	3	7
12	Coal Mining	88	1	1	1	0	0
13	Oil and Gas Extraction	NA			121	2	2
14	Nonmetallic Minerals Mining	NA			14	2	14
47	Transportation Services	NA			1	1	100
49	Sewerage Systems	NA			65	6	9
491/493	Electric Utilities	732	481	66	62	35	56
5169	Chemical Wholesale Distributors	475	1	0.2	6	0	0
5171	Petroleum Bulk Terminals/Bulk Storage	596	1	0.2	1	0	0
495/738	Hazardous Waste Mgt./Solvent Recovery	223	14	6	36	7	19
80	Health and Allied Services	NA			4	3	75
89	Other Scientific & Technical Services	NA			10	1	10
95	Air, Water & Solid Waste Management	NA			57	37	65
--	No codes 20–39***	348	7	2	--	--	--
	Other Industry Sectors with no NPRI reporting on Dioxins	--	--	--	145	0	0
<b>Total</b>		<b>24,896</b>	<b>1,315</b>	<b>5</b>	<b>2,617</b>	<b>328</b>	<b>13</b>

NA = Not applicable (Sector not required to report).

\* Multiple SIC codes reported only in TRI.

\*\* Metal mining sector reports chemicals in waste rock in TRI but not in NPRI.

\*\*\* Includes US Federal Facilities and US facilities reporting no SIC code or an invalid SIC code.

### 10.3.2 Releases and Transfers of Dioxins and Furans from Industrial Sources, NPRI and TRI, 2000–2001

#### Facilities Reporting, 2001

- For the 2001 reporting year, 1,315 TRI facilities and 328 NPRI facilities reported on dioxins and furans—about five percent of all TRI facilities and about 13 percent of NPRI facilities. Two-thirds of TRI electric utilities and over one-half of NPRI electric utilities reported. Sectors with a higher percentage reporting to NPRI than to TRI included pulp and paper facilities, with 41 percent reporting in NPRI and one-third in TRI; lumber and wood products; primary metals; stone/clay/glass products; and hazardous waste management facilities. Sectors with lower reporting to NPRI than to TRI include the chemical sector and petroleum and coal products.
- In NPRI, almost two-thirds of the facilities in the air, water and solid waste management sector reported on dioxins and furans. These include municipal waste incinerators, which are not required to report to TRI.

## TRI Reporting on Dioxins and Furans

For the year 2001, 1,315 TRI facilities reported releasing 148,774 grams of dioxins and furans. Of these facilities, 906 reported their distribution of the 17 congeners. These 906 facilities reported 146,900 grams of dioxins and furans, or 99 percent of the total grams reported. With the distribution, a value for grams-iTEQ can be calculated. The facility is asked to provide the distribution for total releases or the best one-media specific distribution. The TRI form does not indicate to which it applies so, for *Taking Stock*, the distribution has been applied to total releases at the facility. The 906 facilities, then, released on and off-site the equivalent of 1,132 grams-iTEQ of dioxins and furans in 2001.

- The industry with the largest amounts of releases of dioxins and furans (grams-iTEQ) was the chemical sector, with 739 grams-iTEQ. The chemical sector accounts for about two-thirds of the total releases reported to TRI. These chemical manufacturers reported an increase in total releases of dioxins and furans of 7 percent from 2000 to 2001.
- The primary metals sector reported the second-largest amounts of dioxins and furans in 2001, with 200 grams-iTEQ. These facilities reported an overall decrease of 5 percent from 2000 to 2001.

**Table 10–9. Total Releases On-site and Off-site of Dioxins/Furans in Grams-iTEQ, TRI, 2000–2001 (Ordered by Grams-iTEQ, 2001)**

US SIC Code Industry	2000			2001			Change 2000–2001		
	Forms with Dioxin/Furan Distribution			Forms with Dioxin/Furan Distribution			Forms with Dioxin/Furan Distribution		
	Number of Facilities	Total Reported Releases On- and Off-site		Number of Facilities	Total Reported Releases On- and Off-site		Number of Facilities	Total Reported Releases On- and Off-site	
	Grams-iTEQ*	% of Total		Grams-iTEQ*	% of Total		Grams-iTEQ*	% of Total	
28 Chemicals	98	689.34	65	98	738.61	65	0	49.27	7
33 Primary Metals	82	211.50	20	78	200.35	18	-4	-11.15	-5
491/493 Electric Utilities	314	91.91	9	361	105.87	9	47	13.96	15
26 Paper Products	141	15.00	1	145	28.17	2	4	13.17	88
10 Metal Mining	11	2.82	0.3	10	11.89	1	-1	9.07	322
25 Furniture and Fixtures	ND	ND	--	6	11.53	1	--	--	--
32 Stone/Clay/Glass Products	54	17.10	2	50	11.19	1	-4	-5.91	-35
Hazardous Waste Mgt./Solvent									
495/738 Recovery	10	12.03	1	9	10.78	1	-1	-1.25	-10
24 Lumber and Wood Products	65	1.97	0.2	78	6.90	0.6	13	4.94	251
-- Multiple codes 20–39**	29	13.33	1	28	4.55	0.4	-1	-8.79	-66
29 Petroleum and Coal Products	23	2.93	0.3	24	1.03	0.09	1	-1.90	-65
Measurement/Photographic									
38 Instruments	1	0.18	0.02	1	0.42	0.04	0	0.24	128
20 Food Products	16	0.42	0.04	15	0.33	0.03	-1	-0.09	-21
-- No codes 20–39***	2	0.05	0.01	1	0.03	0.003	-1	-0.02	-39
37 Transportation Equipment	2	0.10	0.01	1	0.03	0.003	-1	-0.08	-72
5169 Chemical Wholesalers	1	0.01	0.00	1	0.02	0.002	0	0.02	250
5171 Petroleum Bulk Terminals	1	2.69	0.3	ND	ND	--	--	--	--
34 Fabricated Metals Products	1	0.03	0.003	ND	ND	--	--	--	--
12 Coal Mining	ND	ND	--	ND	ND	--	--	--	--
21 Tobacco Products	ND	ND	--	ND	ND	--	--	--	--
22 Textile Mill Products	ND	ND	--	ND	ND	--	--	--	--
30 Rubber and Plastics Products	ND	ND	--	ND	ND	--	--	--	--
31 Leather Products	ND	ND	--	ND	ND	--	--	--	--
35 Industrial Machinery	ND	ND	--	ND	ND	--	--	--	--
36 Electronic/Electrical Equipment	ND	ND	--	ND	ND	--	--	--	--
<b>Total</b>	<b>851</b>	<b>1,061.43</b>	<b>100</b>	<b>906</b>	<b>1,131.71</b>	<b>100</b>	<b>55</b>	<b>70.29</b>	<b>7</b>

ND = No data.

\* Grams-iTEQ calculated from reported weight, congener distribution, and toxic equivalency factors developed by international convention adopted in 1989.

\*\* Multiple SIC codes reported only in TRI.

\*\*\* Includes US Federal Facilities and facilities reporting no SIC code or an invalid SIC code.

Table 10–10. TRI Facilities with Largest Releases On- and Off-site of Dioxins/Furans (Grams-iTEQ) in 2001, 2000–2001

Rank	Facility	City, State	US SIC Codes			Facility probably not required to report to NPRI (based on US SIC Code)	Total Reported Releases On- and Off-site		
							2000 Grams- iTEQ*	2001 Grams- iTEQ*	Change 2000–2001 Grams- iTEQ*
1	Dow Chemical Co. Freeport	Freeport, TX	2812	2813	2819		71.08	221.27	150.19
2	Oxy Vinyls L.P. La Porte VCM Plant, Occidental Petroleum Corp.	La Porte, TX	2869				162.12	172.82	10.70
3	Du Pont Edge Moor	Edgemoor, DE	2816			X	96.30	137.54	41.24
4	Northern States Power Co.	Becker, MN	4911				68.33	86.31	17.97
5	Du Pont Delisle Plant	Pass Christian, MS	2816			X	82.70	77.22	-5.48
6	Du Pont Johnsonville Plant	New Johnsonville, TN	2816			X	71.32	38.33	-32.99
7	Imco Recycling Inc.	Morgantown, KY	3341				24.66	24.62	-0.03
8	USS Gary Works, U.S. Steel Corp.	Gary, IN	3312				2.58	17.21	14.64
9	Imco Recycling of Ohio Inc.	Uhrichsville, OH	3341				16.37	15.51	-0.87
10	PPG Inds. Inc.	Lake Charles, LA	2812	2816	2869		24.82	14.23	-10.59
11	Dow Chemical Co. Midland Ops.	Midland, MI	2899	2819	2821		12.87	13.99	1.11
12	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	3339				13.87	13.12	-0.75
13	Wabash Alloys L.L.C.	Wabash, IN	3341				12.05	11.75	-0.30
14	Du Pont Chemicals Starke Facility	Starke, FL	1099			X	1.94	10.99	9.05
15	Weyerhaeuser Co. Kingsport Paper Mill	Kingsport, TN	2611	2621			0.05	10.66	10.61
16	Bethlehem Steel Corp. Sparrows Point Div.	Sparrows Point, MD	3312	3316			10.81	10.40	-0.41
17	Dow Chemical Co. Louisiana Div.	Plaquemine, LA	2812	2821	2869		15.71	9.02	-6.69
18	Formosa Plastics Corp. Louisiana	Baton Rouge, LA	2821	2869	2812		7.47	8.67	1.20
19	Bethlehem Steel Corp. Burns Harbor Div.	Burns Harbor, IN	3312				8.95	8.49	-0.46
20	Ormet Aluminum Mill Prods. Corp.	Friendly, WV	3341				10.78	8.06	-2.72
21	Safety-Kleen (Aragonite) Inc.	Aragonite, UT	4953				8.95	7.44	-1.51
22	GB Biosciences Corp.	Houston, TX	2879	2819			5.47	6.73	1.26
23	Imco Recycling of Michigan L.L.C.	Coldwater, MI	3341				6.41	6.25	-0.17
24	Alchem Aluminum Inc., Imco Recycling Inc.	Coldwater, MI	3341				7.14	6.14	-0.99
25	Imco Recycling Of Idaho Inc.	Post Falls, ID	3341				7.28	6.10	-1.18
<b>Subtotal</b>							<b>750.02</b>	<b>942.86</b>	<b>192.84</b>
<b>% of Total</b>							<b>71</b>	<b>83</b>	
<b>Total</b>							<b>1,061.43</b>	<b>1,131.71</b>	<b>70.28</b>

\* Grams-iTEQ calculated from reported weight, congener distribution, and toxic equivalency factors developed by international convention adopted in 1989.

- The facility with the largest reported amounts of dioxins and furans (grams-iTEQ) was the Dow Chemical Company in Freeport, Texas. This chemical manufacturer reported the equivalent of 221 grams-iTEQ, an increase of 150 grams-iTEQ, or more than double the amount of 2000.
- The Oxy Vinyls L.P. La Porte VCM Plant in La Porte, Texas, reported the second-largest amount of dioxins and furans in 2001, the equivalent of over 172 grams-iTEQ. This was an increase of almost 7 percent.
- The 25 facilities with the largest releases (grams-iTEQ) in 2001 accounted for 83 percent of total releases of dioxins and furans reported to TRI.

## NPRI Reporting on Dioxins and Furans

- The paper products industry in NPRI reported the largest total releases (grams-iTEQ) of dioxins and furans in 2001. These facilities reported 142 grams-iTEQ in 2001, an increase of 10 percent from 2000. Some facilities indicated that this increase was due to increased production and updated estimation methods.
- The chemical manufacturing industry in NPRI reported the second-largest releases of dioxins and furans, with 67 grams-iTEQ in 2001, an increase of almost 32 grams-iTEQ, or 88 percent, from 2000. One chemical manufacturer, Dow Chemical Canada in Fort Saskatchewan, Alberta, reported an increase of almost 31 grams-iTEQ.
- The air, water and solid waste management sector (municipal waste incinerators) reported the third-largest releases, with over 47 grams-iTEQ, a decrease of 11 percent from 2000. This sector is not required to report to TRI.
- The primary metals sector reported the fourth-largest releases of dioxins and furans in 2001 after reporting the third-largest in 2000. This sector reported a decrease of more than 70 grams i-TEQ or 60 percent from 2000 to 2001. One primary metals facility, Wabash Alloys in Mississauga, Ontario, reported a decrease of more than 44 grams-iTEQ due to results of new testing.

Table 10–11. Total Releases On- and Off-site of Dioxins/Furans by Industry, NPRI, 2000–2001 (Ordered by Total Grams-iTEQ, 2001)

US SIC Code	Industry	2000			2001			Change 2000–2001		
		Number of Facilities	Total Reported Releases On- and Off-site Grams-iTEQ*	% of Total	Number of Facilities	Total Reported Releases On- and Off-site Grams-iTEQ*	% of Total	Number of Facilities	Total Reported Releases On- and Off-site Grams-iTEQ*	%
26	Paper Products	51	129.03	21	55	141.88	40	4	12.85	10
28	Chemicals**	9	35.67	6	11	67.19	19	2	31.52	88
95	Air, Water & Solid Waste Management***	41	53.10	9	37	47.47	14	-4	-5.63	-11
33	Primary Metals	47	117.36	19	51	47.06	13	4	-70.30	-60
49	Sewerage Systems***	5	1.89	0.3	6	24.20	7	1	22.31	1,180
491/493	Electric Utilities	34	11.19	2	35	15.29	4	1	4.10	37
24	Lumber and Wood Products	65	269.96	43	86	4.95	1	21	-265.01	-98
32	Stone/Clay/Glass Products	14	1.85	0.3	15	1.42	0.4	1	-0.43	-23
495/738	Hazardous Waste Mgt./Solvent Recovery	7	1.28	0.2	7	0.98	0.3	0	-0.30	-23
80	Health and Allied Services***	2	0.00	0.0	3	0.33	0.1	1	0.33	--
34	Fabricated Metals Products	3	0.05	0.01	3	0.04	0.01	0	-0.01	-20
08	Forestry Products***	1	0.01	0.002	0	0.00	0	-1	-0.01	-100
09	Fishing, Hunting, Trapping***	1	0.00	0	1	0.00	0	0	0.00	--
10	Metal Mining	2	0.00	0	2	0.00	0	0	0.00	--
1094	Uranium Mines***	3	0.01	0.002	3	0.00	0	0	-0.01	-100
13	Oil and Gas Extraction***	2	0.00	0	2	0.00	0	0	0.00	--
14	Nonmetallic Minerals Mining***	1	0.00	0	2	0.00	0	1	0.00	--
20	Food Products	1	0.00	0	1	0.00	0	0	0.00	--
25	Furniture and Fixtures	0	0.00	0	2	0.00	0	2	0.00	--
35	Industrial Machinery	1	0.00	0	0	0.00	0	-1	0.00	--
36	Electronic/Electrical Equipment	1	0.00	0	1	0.00	0	0	0.00	--
37	Transportation Equipment	2	0.00	0	0	0.00	0	-2	0.00	--
39	Misc. Manufacturing Industries	2	0.00	0	3	0.00	0	1	0.00	--
47	Transportation Services***	1	0.00	0	1	0.00	0	0	0.00	--
50	Wholesale Durable Goods***	1	0.04	0.006	0	0.00	0	-1	-0.04	-100
89	Other Scientific & Technical Services***	1	0.01	0.002	1	0.00	0	0	-0.01	-100
<b>Total</b>		<b>298</b>	<b>621.45</b>	<b>100</b>	<b>328</b>	<b>350.81</b>	<b>100</b>	<b>30</b>	<b>-270.64</b>	<b>-44</b>

Note: Only certain activities within these industries must be reported under NPRI.

\* Grams-iTEQ as reported are based on toxic equivalency factors developed by international convention adopted in 1989.

\*\* Only manufacturers of chlorinated organic solvents or chlorinated monomers are required to report dioxins/furans to NPRI.

\*\*\* Industry not required to report to TRI.

Table 10–12. NPRI Facilities with Largest Releases On- and Off-site of Dioxins/Furans (Grams-iTEQ) in 2001, 2000–2001

Rank	Facility	City, Province	SIC Code		Facility not required to report to TRI	Activity Reported	Total Reported Releases On- and Off-site		
			Canada	US			2000 Grams-iTEQ*	2001 Grams-iTEQ*	Change 2000–2001 Grams-iTEQ*
1	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	3711	2812		Production of chlorinated organic solvents or monomers	35.53	66.19	30.66
2	NorskeCanada, Elk Falls Mill	Campbell River, BC	2711	2611		Combustion of salt laden logs, Combustion of fuel in kraft liquor boilers	3.71	37.67	33.96
3	Norske Skog Canada Limited, Port Alberni Division	Port Alberni, BC	2712	2621		Combustion of salt laden logs in pulp and paper sector	40.86	35.96	-4.90
4	Howe Sound Pulp and Paper Limited Partnership, OJI Paper Canada/Canadian Forest Products	Port Mellon, BC	2711	2611		Combustion of salt laden logs, Combustion of fuel in kraft liquor boilers, Combustion of fossil fuel to product electricity	36.57	25.87	-10.70
5	Ville de Québec Incinérateur	Québec, QC	4999	4961	X	Non-hazardous solid waste incineration	1.70	23.08	21.38
6	Norske Skog Canada Limited, Powell River Division	Powell River, BC	2712	2621		Combustion of salt laden logs, Combustion of fuel in kraft liquor boilers	19.75	13.34	-6.41
7	AltaSteel Ltd., Stelco Inc.	Edmonton, AB	2919	3312		Operation of electric arc furnaces in steel manufacturing	10.59	10.79	0.20
8	City of Hamilton, Swaru Incinerator	Hamilton, ON	4911	4911		Non-hazardous solid waste incineration	5.49	10.04	4.55
9	Wabash Alloys, Wabash Alloys Mississauga	Mississauga, ON	2999	3341		Smelting of secondary aluminum	53.53	9.20	-44.33
10	Exploits Regional Services Board Solid Waste Disposal Site	Grand Falls-Windsor, ON	8373	9511	X	Non-hazardous solid waste incineration	8.01	8.01	0.00
11	Wabash Alloys, Wabash Alloys Guelph	Guelph, ON	2999	3341		Smelting of secondary aluminum	25.06	7.02	-18.04
12	Gerdau MRM Steel Inc., MRM Steel, Gerdau Steel Inc.	Selkirk, MB	2919	3312		Operation of electric arc furnaces in steel manufacturing	4.31	6.61	2.30
13	Pope & Talbot Ltd., Harmac Pulp Operations	Nanaimo, BC	2711	2611		Combustion of salt laden logs, Combustion of fuel in kraft liquor boilers	6.95	6.27	-0.68
14	Norske Skog Canada Limited, Crofton Division	Crofton, BC	2711	2611		Combustion of salt laden logs, Combustion of fuel in kraft liquor boilers	3.89	5.68	1.79
15	Conception Bay North, Harbour Grace Conception Bay North Incinerator Association	Harbour Grace, NL	8373	9511	X	Non-hazardous solid waste incineration	9.29	5.26	-4.03
16	UPM-Kymmene Miramichi Inc., Kraft Pulp and Paper Division	Miramichi, NB	2791	2679		Combustion of fuel in kraft liquor boilers, Combustion of fossil fuel to product electricity	0.01	5.23	5.22
17	Western Pulp Limited Partnership, Doman Industries	Squamish, BC	2711	2611		Combustion of salt laden logs, Combustion of fuel in kraft liquor boilers	2.46	5.02	2.56
18	Town of Wabush Incinerator	Wabush, NL	8373	9511	X	Non-hazardous solid waste incineration	3.52	3.52	0.00
19	Selkirk Forest Products, McFarland Cascade Holdings Inc.	Galloway, BC	2591	2491		Wood Preservation	3.42	3.30	-0.12
20	Town of Marystown Waste Disposal Site Jean de Baie	Marystown, NL	8373	9511	X	Non-hazardous solid waste incineration	3.26	3.26	0.00
21	Town of Holyrood Incinerator	Holyrood, NL	8373	9511	X	Non-hazardous solid waste incineration	2.58	2.58	0.00
22	Town of Channel - Port aux Basques Incinerator	Port aux Basques, NL	8373	9511	X	Non-hazardous solid waste incineration	2.56	2.56	0.00
23	Town of Deer Lake Incinerator	Deer Lake, NL	8373	9511	X	Non-hazardous solid waste incineration	2.56	2.56	0.00
24	Town of Stephenville Incinerator	Stephenville, NL	8373	9511	X	Non-hazardous solid waste incineration	2.21	2.21	0.00
25	Town of Clarendville Incinerator	Clarendville, NL	8373	9511	X	Non-hazardous solid waste incineration	1.84	1.84	0.00
<b>Subtotal</b>							<b>289.66</b>	<b>303.07</b>	<b>13.41</b>
<b>% of Total</b>							<b>47</b>	<b>86</b>	
<b>Total</b>							<b>621.45</b>	<b>350.81</b>	<b>-270.64</b>

\* Grams-iTEQ as reported are based on toxic equivalency factors developed by international convention adopted in 1989.

- The NPRI facility reporting the largest releases of dioxins and furans was the Dow Chemical Canada facility in Fort Saskatchewan, Alberta. This manufacturer of chlorinated organic solvents or monomers reported 66 grams-iTEQ in 2001, up from 35.5 grams-iTEQ in 2000. The increase was reported as due to the cleaning out of tanks and a sludge pond.
- The pulp mill, NorskeCanada in Campbell River, British Columbia, reported the second-largest releases, reporting 37.7 grams-iTEQ from the combustion of salt-laden logs and the combustion of fuel in kraft liquor boilers. This mill, as well as others among the top 25, reported that it is a partner in a work group of coastal pulp and paper mills investigating dioxin and furan generation from power boilers burning salt-laden logs as fuel in conjunction with the Pulp and Paper Research Institute of Canada. The purpose of the study is to determine the factors that contribute to the formation of dioxins and furans in these boilers and to develop control technologies or strategies to reduce the releases of these compounds.
- The 25 facilities with the largest releases on- and off-site (grams-iTEQ) in 2001 accounted for 86 percent of total releases of dioxins and furans reported to NPRI.

## 10.4 Hexachlorobenzene

Hexachlorobenzene is a persistent, bioaccumulative toxic and a probable carcinogen. In Canada, it is a CEPA toxic and slated for virtual elimination of releases to the environment. It stays in the atmosphere a long time and can be transported long distances. Human exposure occurs mainly through eating contaminated fish and plants or breathing it in urban air.

Starting with the 2000 reporting year, NPRI required the reporting of hexachlorobenzene (HCB) and TRI lowered the threshold for this chemical. Direct comparison of the data on hexachlorobenzene is not possible. HCB is on the list of chemicals to be reported under the RETC program.

### 10.4.1 Reporting Requirements

NPRI requires facilities with 10 or more employees to report on hexachlorobenzene only for specific listed activities. If a facility does not engage in a listed activity, it does not have to report on HCB. For several activities (wood preserving using pentachlorophenol and incineration) the employee threshold of 10 or more employees does not apply. The listed activities are the same as those for dioxins and furans (see Table 10-6).

NPRI reporting on hexachlorobenzene does not depend on the amounts manufactured, processed or otherwise used, or the amounts released or transferred off-site. That is, all amounts are reportable. However, if the level is below typical method detection limits, the facility can indicate that the release is less than the level of quantification (LOQ) and not report an amount.

For TRI, the reporting threshold is 10 lbs (4.5 kg). This threshold applies to each of the amounts manufactured, processed or otherwise used. All facilities with 10 or more employees that are required to report to TRI for any listed substance are required to report on hexachlorobenzene. Thus, manufacturing sector facilities, electric utilities, hazardous-waste management and solvent recovery facilities, petroleum bulk terminals, chemicals wholesalers, and metal and coal mines are all required to report.

Table 10-13. Facilities Reporting Hexachlorobenzene, TRI and NPRI, 2001

US SIC Code	Industry	US TRI - for facilities meeting reporting threshold of 0.1 grams or more and 10 employees or more				Canadian NPRI - for facilities conducting certain activities meeting threshold of 10 employees or more except for wood preservation or incineration			
		Number of Facilities Reporting to TRI	Number of TRI Facilities Reporting Hexachlorobenzene			Number of Facilities Reporting to NPRI	Number of NPRI Facilities Reporting Hexachlorobenzene		
			Number of Facilities	% of Industry Total	Number of Facilities Reporting Releases and Transfers of Hexachlorobenzene		Number of Facilities	% of Industry Total	Number of Facilities Reporting Releases and Transfers of Hexachlorobenzene
<b>Manufacturing Industry Sectors</b>									
20	Food Products	1,688				126	1	1	
21	Tobacco Products	31				0		0	
22	Textile Mill Products	289				16		0	
23	Apparel	16				4		0	
24	Lumber and Wood Products	1,006	21	2	7	185	84	45	17
25	Furniture and Fixtures	282				29	2	7	
26	Paper Products	507				134	54	40	13
27	Printing	231				28		0	
28	Chemicals	3,618	35	1	32	447	10	2	4
29	Petroleum and Coal Products	542				37		0	
30	Rubber and Plastics Products	1,822	3	0.2	3.0	189		0	
31	Leather Products	60				4		0	
32	Stone/Clay/Glass Products	1,027	2	0.2	2.0	89	15	17	13
33	Primary Metals	1,941	5	0.3	5.0	186	50	27	15
34	Fabricated Metals Products	2,959				235	3	1	
35	Industrial Machinery	1,143				38		0	
36	Electronic/Electrical Equipment	1,831				59	1	2	
37	Transportation Equipment	1,348				150		0	
38	Measurement/Photographic Instruments	375				1		0	
39	Misc. Manufacturing Industries	312				86	3	3	1
--	Multiple codes 20-39*	1,317				--	--	--	--
<b>Other Industry Sectors</b>									
09	Fishing, Hunting, Trapping	NA				1	1	100	1
10	Metal Mining**	89				4	2	50	
1094	Uranium Mines	NA				46	3	7	1
12	Coal Mining	88				1		0	
13	Oil and Gas Extraction	NA				121	2	2	1
14	Nonmetallic Minerals Mining	NA				14	2	14	1
47	Transportation Services	NA				1	1	100	1
49	Sewerage Systems	NA				65	5	8	3
491/493	Electric Utilities	732	8	1	8	62	35	56	19
5169	Chemical Wholesale Distributors	475	1	0.2	0	6		0	
5171	Petroleum Bulk Terminals/Bulk Storage	596				1		0	
495/738	Hazardous Waste Mgt./Solvent Recovery	223	21	9	21	36	7	19	4
80	Health and Allied Services	NA				4	3	75	3
89	Other Scientific & Technical Services	NA				10	1	10	
95	Air, Water & Solid Waste Management	NA				57	37	65	34
--	No codes 20-39***	348	3	1	2	--	--	--	--
	Other Industry Sectors with no NPRI reporting on Hexachlorobenzene	--	--	--		145	0	0	
	<b>Total</b>	<b>24,896</b>	<b>99</b>	<b>0.4</b>	<b>80</b>	<b>2,617</b>	<b>322</b>	<b>12</b>	<b>131</b>

NA = Not applicable (Sector not required to report).

\* Multiple SIC codes reported only in TRI.

\*\* Metal mining sector reports chemicals in waste rock in TRI but not in NPRI.

\*\*\* Includes US Federal Facilities and US facilities reporting no SIC code or an invalid SIC code.

Table 10–14. Summary of Total Reported Amounts of Releases and Transfers, TRI, Hexachlorobenzene, 2000–2001

	2000	2001	Change 2000–2001	
	Number	Number	Number	%
Total Facilities	100	99	-1	-1
Total Facilities Reporting Releases and Transfers	83	80	-3	-4
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases</b>	<b>11,371</b>	<b>11,369</b>	<b>-2</b>	<b>-0.0</b>
Air	904	544	-360	-40
Surface Water	150	146	-4	-3
Underground Injection	22	10	-12	-54
Land	10,295	10,669	374	4
<b>Off-site Releases (Transfers off-site to disposal)</b>	<b>6,464</b>	<b>8,196</b>	<b>1,732</b>	<b>27</b>
<b>Total Reported Releases On- and Off-site</b>	<b>17,835</b>	<b>19,565</b>	<b>1,730</b>	<b>10</b>
<b>Off-site Transfers to Recycling</b>	6,087	649	-5,438	-89
<b>Other Off-site Transfers for Further Management</b>	<b>42,955</b>	<b>16,113</b>	<b>-26,841</b>	<b>-62</b>
Energy Recovery (except metals)	25,663	967	-24,696	-96
Treatment (except metals)	17,288	15,137	-2,151	-12
Sewage (except metals)	5	9	5	96
<b>Total Reported Amounts of Releases and Transfers</b>	<b>66,877</b>	<b>36,328</b>	<b>-30,549</b>	<b>-46</b>

#### 10.4.2 Releases and Transfers of Hexachlorobenzene from Industrial Sources, NPRI and TRI, 2000–2001

##### Facilities Reporting, 2001

The difference in reporting requirements for the various industry sectors resulted in quite different reporting under TRI and NPRI.

- Less than 1 percent of all TRI facilities reported on HCB, compared to 12 percent of NPRI facilities. However, many NPRI facilities, while submitting a form for HCB, did not report any amounts for releases and transfers of HCB. Only 5 percent (131 NPRI facilities) reported non-zero amounts of releases or transfers of HCB for 2001.

- Over one-third of the TRI facilities reporting releases and transfers of hexachlorobenzene were in the chemical manufacturing sector (35 facilities). Only chemical manufacturers of chlorinated organic solvents or chlorinated monomers are required to report to NPRI.
- The hazardous waste management sector and the lumber and wood products industries both had 21 TRI facilities reporting. These two sectors, along with the chemical industry, accounted for over three-quarters of all TRI facilities reporting releases and transfers of hexachlorobenzene.
- In NPRI, the top sectors reporting releases and transfers of hexachlorobenzene were somewhat different than TRI.

The air, water and solid waste management sector had the largest number of facilities reporting releases and transfers of hexachlorobenzene, with 34 facilities. These are municipal waste incinerators, which are not required to report to TRI. The electric utilities sector had the second-largest number of NPRI facilities reporting releases and transfers of hexachlorobenzene—19 facilities—and lumber and wood products was third with 17 facilities.

#### TRI Releases and Transfers

- In 2001, TRI facilities reported 36,300 kg of total releases and transfers of hexachlorobenzene in 2001. This was a decrease of 46 percent from 2000.
- On-site releases were about the same as in 2000, with almost 11,400 kg. Air releases decreased by 40 percent.
- Transfers off-site for energy recovery dropped dramatically, from almost 25,700 kg in 2000 to 967 kg in 2001. One TRI facility reported most of the transfers to energy recovery in both 2000 and 2001. The Amvac Chemical Corporation in Los Angeles, California, reported transferring 25,600 kg of HCB to energy recovery. In 2001, the facility transferred 935 kg to energy recovery. This facility makes agricultural chemicals, including pesticides.
- Increases were seen in transfers off-site to disposal, which increased by 27 percent, and in on-site land disposal, which increased by 4 percent.

- The TRI chemical manufacturing industry reported the largest releases and transfers in 2001, with over 24,200 kg, or 67 percent of the total. This sector reported a decrease of 58 percent from 2000 to 2001.
- The hazardous waste management sector reported the second-largest amount, with over 11,000 kg in 2001, an increase of 32 percent from 2000.

**Table 10–15. Total Releases and Transfers of Hexachlorobenzene, TRI, by Industry, 2000–2001 (Ordered by Total Releases and Transfers, 2001)**

US SIC Code	Industry	2000		2001		Change 2000–2001		
		Number of Facilities Reporting Releases and Transfers	Total Reported Releases and Transfers (kg)	Number of Facilities Reporting Releases and Transfers	Total Reported Releases and Transfers (kg)	Number of Facilities Reporting Releases and Transfers	Total Reported Releases and Transfers (kg)	%
28	Chemicals	35	57,479	32	24,238	-3	-33,241	-58
495/738	Hazardous Waste Mgt./Solvent Recovery	18	8,362	21	11,053	3	2,691	32
33	Primary Metals	5	418	5	576	0	158	38
491/493	Electric Utilities	7	27	8	261	1	234	870
30	Rubber and Plastics Products	3	161	3	154	0	-7	-4
32	Stone/Clay/Glass Products	2	388	2	28	0	-361	-93
--	No codes 20–39*	2	32	2	18	0	-15	-45
24	Lumber and Wood Products	9	0.64	7	0.80	-2	0.16	26
--	Multiple codes 20–39**	2	9	0	0	-2	-9	-100
	<b>Total</b>	<b>83</b>	<b>66,877</b>	<b>80</b>	<b>36,328</b>	<b>-3</b>	<b>-30,549</b>	<b>-46</b>

\* Includes US Federal Facilities and facilities reporting no SIC code or an invalid SIC code.

\*\* Multiple SIC codes reported only in TRI.

**Table 10–16. TRI Facilities with Largest Total Reported Amounts of Releases and Transfers of Hexachlorobenzene in 2001, 2000–2001**

Rank	Facility	City, State	US SIC Code				2000		2001		Change 2000–2001	
							Number of Forms	Total Releases and Transfers (kg)	Number of Forms	Total Releases and Transfers (kg)	Number of Forms	Total Releases and Transfers (kg)
1	GB Biosciences Corp.	Houston, TX	2879	2819	1	5,941	1	8,581	0	2,640		
2	Chemical Waste Management Lake Charles Facility	Sulphur, LA	4953		1	4,989	1	3,402	0	-1,587		
3	Oxy Vinyls L.P. La Porte VCM Plant, Occidental Petroleum Corp.	La Porte, TX	2869		1	4,314	1	3,243	0	-1,072		
4	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI	4953		1	995	1	3,063	0	2,068		
5	US Ecology Inc., American Ecology Corp.	Beatty, NV	4953		0	0	1	2,491	1	2,491		
6	PPG Inds. Inc.	Lake Charles, LA	2812	2816 2869	1	1,572	1	2,307	0	735		
7	Du Pont Delisle Plant	Pass Christian, MS	2816		1	1,465	1	1,354	0	-111		
8	Clariant LSM (Florida) Inc.	Gainesville, FL	2869		1	1,163	1	1,277	0	114		
9	Velsicol Chemical Corp.	Memphis, TN	2869		1	643	1	1,208	0	565		
10	Occidental Chemical Corp. Niagara Plant	Niagara Falls, NY	2812	2865 2819 2869	1	9,818	1	1,200	0	-8,618		
<b>Subtotal</b>						<b>9</b>	<b>30,900</b>	<b>10</b>	<b>28,125</b>	<b>1</b>	<b>-2,775</b>	
<b>% of Total</b>						<b>11</b>	<b>46</b>	<b>13</b>	<b>77</b>			
<b>Total</b>						<b>83</b>	<b>66,877</b>	<b>80</b>	<b>36,411</b>	<b>-3</b>	<b>-30,466</b>	

- The TRI facility with the largest reported releases and transfers of hexachlorobenzene in 2001 was GB Biosciences Corp. in Houston, Texas, with 8,581 kg, an increase of 2,640 kg from 2000 to 2001. This facility makes agricultural and industrial inorganic chemicals and reported more than twice the amount of the second-largest reporter.
- The 10 TRI facilities with the largest reported releases and transfers accounted for over three-quarters of the total releases and transfers of hexachlorobenzene in 2001.

## NPRI Releases and Transfers

- In 2001, NPRI facilities reported 68 kg of total releases and transfers of hexachlorobenzene. This was an increase of 20 kg, or 42 percent, from 2000. The number of facilities reporting releases or transfers of HCB increased by 5 percent.
- On-site releases increased by 16 percent, with much of the increase as air emissions and underground injection. Off-site releases also increased, by over 3.5 kg, from less than 0.3 kg in 2000. Total releases on- and off-site increased by 25 percent.
- Other off-site transfers for further waste management doubled from 2000 to 2001 from over 10 kg to almost 21 kg, mainly as transfers to treatment.

**Table 10–17. Summary of Total Reported Amounts of Releases and Transfers, NPRI, Hexachlorobenzene, 2000–2001**

	2000	2001	Change 2000–2001	
	Number	Number	Number	%
Total Facilities	298	322	24	8
Total Facilities Reporting Releases and Transfers	125	131	6	5
<b>Releases On- and Off-site</b>	<b>kg</b>	<b>kg</b>	<b>kg</b>	<b>%</b>
<b>On-site Releases</b>	<b>37.40</b>	<b>43.28</b>	<b>5.88</b>	<b>16</b>
Air	37.23	40.91	3.68	10
Surface Water	0.17	0.00	-0.17	-98
Underground Injection	0.00	2.15	2.15	--
Land	0.00	0.22	0.22	--
<b>Off-site Releases (Transfers Off-site to Disposal)</b>	<b>0.24</b>	<b>3.82</b>	<b>3.58</b>	<b>1,489</b>
<b>Total Reported Releases On- and Off-site</b>	<b>37.64</b>	<b>47.10</b>	<b>9.46</b>	<b>25</b>
<b>Off-site Transfers to Recycling</b>	<b>0.05</b>	<b>0.14</b>	<b>0.09</b>	<b>181</b>
<b>Other Off-site Transfers for Further Management</b>	<b>10.26</b>	<b>20.91</b>	<b>10.66</b>	<b>104</b>
Energy Recovery (except metals)	0.00	0.00	0.00	--
Treatment (except metals)	10.21	20.78	10.57	104
Sewage (except metals)	0.00	0.00	0.00	2,500
<b>Total Reported Amounts of Releases and Transfers</b>	<b>47.90</b>	<b>68.02</b>	<b>20.12</b>	<b>42</b>

**Table 10–18. Total Releases and Transfers of Hexachlorobenzene, NPRI, by Industry, 2000–2001  
(Ordered by Total Releases and Transfers, 2001)**

Number Code	Industry	2000		2001		Change 2000–2001		
		Number of Facilities	Total Reported Releases and Transfers (kg)	Number of Facilities	Total Reported Releases and Transfers (kg)	Number of Facilities	Total Reported Releases and Transfers kg	%
33	Primary Metals	7	13.57	15	38.72	8	25.15	185
491/493	Electric Utilities	19	19.30	19	12.63	0	-6.66	-35
49	Sewerage Systems*	3	8.01	3	8.12	0	0.11	1
28	Chemicals**	3	0.33	4	2.92	1	2.59	795
95	Air, Water & Solid Waste Management*	39	2.62	34	2.24	-5	-0.38	-15
32	Stone/Clay/Glass Products	13	2.09	13	1.94	0	-0.15	-7
495/738	Hazardous Waste Mgt./Solvent Recovery	4	0.12	4	0.93	0	0.81	706
26	Paper Products	14	0.29	13	0.33	-1	0.04	12
24	Lumber and Wood Products	11	0.52	17	0.13	6	-0.39	-76
39	Misc. Manufacturing Industries	1	0.03	1	0.03	0	0.00	0
14	Nonmetallic Minerals Mining	0	0.00	1	0.01	1	0.01	--
47	Transportation Services*	1	0.01	1	0.01	0	0.00	0
80	Health and Allied Services*	2	0.003	3	0.004	1	0.001	28
09	Fishing, Hunting, Trapping*	1	0.003	1	0.003	0	0.000	2
13	Oil and Gas Extraction*	1	0.002	1	0.001	0	-0.000	-24
1094	Uranium Mines*	1	0.001	1	0.000	0	-0.001	-72
37	Transportation Equipment	2	0.51	0	0.00	-2	-0.51	-100
50	Wholesale Durable Goods*	1	0.42	0	0.00	-1	-0.42	-100
36	Electronic/Electrical Equipment	1	0.05	0	0.00	-1	-0.05	-100
34	Fabricated Metals Products	1	0.03	0	0.00	-1	-0.03	-100
<b>Total</b>		<b>125</b>	<b>47.90</b>	<b>131</b>	<b>68.02</b>	<b>6</b>	<b>20.12</b>	<b>42</b>

\* Industry not required to report to TRI.

\*\* Only manufacturers of chlorinated organic solvents or chlorinated monomers are required to report hexachlorobenzene to NPRI.

- The primary metals sector in NPRI reported the largest amount of releases and transfers of hexachlorobenzene in 2001, with almost 39 kg, or over half of the total. This was an increase of 25 kg from 2000.
- The electric utilities sector had the second-largest total releases and transfers in 2001, with almost 13 kg, which was a decrease of almost 7 kg from 2000.

- Two NPRI facilities reported over 17 kg of hexachlorobenzene in 2001, accounting for one-half of the total releases and transfers of hexachlorobenzene reported by all NPRI facilities in 2001. The Norsk Hydro Canada Inc. facility in Bécancour, Quebec, owned by Hydro Magnesium Canada, and Métallurgie Magnola Inc. in Danville, Quebec, owned by Noranda and the Société générale de financement du Québec, are both primary metals facilities that smelt and refine non-ferrous metals.
- The 10 NPRI facilities with the largest releases and transfers of hexachlorobenzene accounted for 83 percent of total releases and transfers in 2001.

**Table 10–19. NPRI Facilities with Largest Total Reported Amounts of Releases and Transfers of Hexachlorobenzene in 2001, 2000–2001**

Rank	Facility	City, Province	SIC Code		2000		2001		Change 2000–2001		
			Canada	US	Number of Forms	Total Releases and Transfers (kg)	Number of Forms	Total Releases and Transfers (kg)	Number of Forms	Total Releases and Transfers (kg)	
1	Norsk Hydro Canada Inc., Hydro Magnesium Canada	Bécancour, QC	29	33	1	12.21	1	17.79	0	5.58	
2	Métallurgie Magnola Inc., Noranda/Société générale de financement du Québec	Danville, QC	29	33	1	0.32	1	17.19	0	16.87	
3	Ville de Québec Incinérateur	Québec, QC	49	4961	1	8.00	1	8.11	0	0.11	
4	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	37	28	1	0.32	1	2.89	0	2.57	
5	Sheerness Generating Station, Alberta Power/Transalta Utilities Corp.	Hanna, AB	49	491/493	1	2.01	1	2.22	0	0.21	
6	Edmonton Power Inc., Genesee Thermal Generating Station, EPCOR	Warburg, AB	41	491/493	1	2.11	1	2.08	0	-0.03	
7	Atco Power, Battle River Generating Station	Forestburg, AB	49	491/493	1	1.65	1	1.93	0	0.28	
8	City of Hamilton, Swaru Incinerator	Hamilton, ON	49	491/493	1	1.23	1	1.78	0	0.55	
9	Canada Pipe Company Ltd, Fonderie Bibby Saint-Croix	Sainte-Croix, QC	29	33	1	0.00	1	1.56	0	1.56	
10	Nova Scotia Power Inc., Lingan Generating Station, Emera Inc.	New Waterford, NS	41	491/493	1	1.00	1	1.00	0	0.00	
<b>Subtotal</b>						<b>10</b>	<b>28.85</b>	<b>10</b>	<b>56.55</b>	<b>0</b>	<b>27.69</b>
<b>% of Total</b>						<b>8</b>	<b>60</b>	<b>8</b>	<b>83</b>		
<b>Total</b>						<b>125</b>	<b>47.90</b>	<b>131</b>	<b>68.01</b>	<b>6</b>	<b>20.12</b>

**Table 10–20. Polycyclic Aromatic Compounds (PACs/PAHs) Reported at Lower Thresholds, NPRI and TRI**

CAS Number	Chemical	NPRI	TRI
56-55-3	Benzo(a)anthracene	X	X
218-01-9	Benzo(a)phenanthrene	X	X
50-32-8	Benzo(a)pyrene	X	X
205-99-2	Benzo(b)fluoranthene	X	X
205-82-3	Benzo(j)fluoranthene	X	X
207-08-9	Benzo(k)fluoranthene	X	X
224-42-0	Dibenzo(a,i)acridine	X	X
53-70-3	Dibenzo(a,h)anthracene	X	X
189-55-9	Dibenzo(a,i)pyrene	X	X
194-59-2	7H-Dibenzo(c,g)carbazole	X	X
206-44-0	Fluoranthene	X	X
193-39-5	Indeno[1,2,3-cd]pyrene	X	X
191-24-2	Benzo(g,h,i)perylene	X	X*
85-01-8	Phenanthrene	X	X**
192-97-2	Benzo(e)pyrene	X	
129-00-0	Pyrene	X	
198-55-0	Perylene	X	
226-36-8	Dibenzo(a,h)acridine		X
5385-75-1	Dibenzo(a,e)fluoranthene		X
192-65-4	Dibenzo(a,e)pyrene		X
189-64-0	Dibenzo(a,h)pyrene		X
191-30-0	Dibenzo(a,l)pyrene		X
57-97-6	7,12-Dimethylbenz(a)anthracene		X
56-49-5	3-Methylcholanthrene		X
3697-24-3	5-Methylchrysene		X
5522-43-0	1-Nitropyrene		X

Note: TRI reports on PACs as one amount for the group of chemicals. NPRI reports amounts for each chemical individually.

\* Reported separately from PAC group in TRI at lower threshold of 4.5 kg.

\*\* Reported separately from PAC group in TRI at higher threshold of 11,340 kg.

## 10.5 Polycyclic Aromatic Compounds (PACs)

Polycyclic aromatic compounds (PACs) are a group of chemicals with similar chemical structure. PACs are also known as polycyclic aromatic hydrocarbons (PAHs). PACs are persistent, bioaccumulative toxics and have been classified as CEPA toxic. Some PACs are known or suspected carcinogens, developmental toxins and endocrine disruptors. The main source of PACs is combustion byproducts. Human exposure can occur through breathing air contaminated by such sources as wood stoves, agricultural burning, certain industrial facilities, vehicles, and tobacco smoke.

For the 2000 reporting year, NPRI added PACs at an alternative threshold and, under its PBT program, TRI added two PACs and lowered the threshold for others. The reporting of PACs differs between NPRI and TRI, which makes the data difficult to compare. PACs are not on the list of chemicals to be reported under the current RETC program.

### 10.5.1 Reporting Requirements

Some PACs have been reported to TRI since 1995; others were added under the PBT program for the reporting year 2001. In TRI, one amount for a group of 21 PACs is reported, while the amount for benzo(g,h,i)perylene is reported separately. For NPRI, each of the 17 PACs on the NPRI list is reported separately. Only if the amounts for the individual PACs are not known can the amounts for the group or any combination of the 17 be reported. The list of PACs differs between NPRI and TRI, as seen in **Table 10–20**. Under the CEC Action Plan, the governments have discussed methods to make these lists more comparable.

In addition, NPRI and TRI have different reporting thresholds. In TRI, it is 100 pounds (45.5 kg) manufactured, processed or otherwise used. This applies to the sum of the quantities for the 21 PACs in the TRI PAC group. The threshold for benzo(g,h,i)perylene is 4.5 kg. For NPRI, the alternative threshold is 50 kg incidentally manufactured and released or transferred

for the group of 17 PACs together. Also, all PACs released or transferred from a wood-preservation process using creosote must be reported, regardless of amount or number of employees.

These differences mean that NPRI and TRI data on PACs are not comparable. This section, therefore, presents the data separately.

## 10.5.2 Releases and Transfers of Polycyclic Aromatic Compounds from Industrial Sources, NPRI and TRI, 2000–2001

### NPRI Releases and Transfers of PACs

- For the year 2001, 1,101 forms were submitted by NPRI facilities reporting on one or more polycyclic aromatic compounds.
- Total releases and transfers of PACs were over 812,000 kg. This was an increase of 31 percent from 2000. The number of facilities reporting PACs increased by 18 percent from 2000.
- If we analyze the NPRI data using the same PACs reported to TRI (the 12 PACs plus benzo(g,h,i)perylene), this TRI PAC group accounted for over 400,000 kg or almost half of the total releases and transfers reported to NPRI. Total releases and transfers for this TRI PAC group increased by 29 percent from 2000.

Table 10–21. NPRI Releases and Transfers of Polycyclic Aromatic Compounds (PACs), by Chemical, 2000–2001

CAS Number	Chemical	Forms			Total On-site Releases			Total Off-site Releases			Total Releases On- and Off-site		
		2000 Number	2001 Number	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)
<b>NPRI PAC Chemicals Included in TRI PAC Group</b>													
206-44-0	Fluoranthene	68	82	21	97,202	108,481	12	16,157	22,362	38	113,359	130,843	15
205-99-2	Benzo(b)fluoranthene	64	78	22	45,672	51,803	13	6,423	19,052	197	52,096	70,855	36
56-55-3	Benzo(a)anthracene	63	74	17	29,314	34,406	17	6,182	12,508	102	35,496	46,914	32
50-32-8	Benzo(a)pyrene	64	76	19	22,412	23,047	3	7,894	10,419	32	30,305	33,465	10
193-39-5	Indeno(1,2,3-CD)pyrene	60	73	22	10,852	16,244	50	4,499	5,640	25	15,351	21,884	43
207-08-9	Benzo(k)fluoranthene	63	72	14	17,444	16,543	-5	2,019	3,539	75	19,463	20,083	3
218-01-9	Benzo(a)phenanthrene	52	57	10	5,563	10,648	91	3,071	8,636	181	8,634	19,285	123
205-82-3	Benzo(j)fluoranthene	41	46	12	8,954	13,372	49	7	5,765	80,551	8,961	19,137	114
53-70-3	Dibenzo(a,h)anthracene	60	70	17	5,415	5,338	-1	1,421	838	-41	6,836	6,176	-10
189-55-9	Dibenzo(a,i)pyrene	35	37	6	3,197	2,611	-18	72	69	-4	3,269	2,680	-18
224-42-0	Dibenz(a,j)acridine	32	33	3	71	12	-83	0	0	--	71	12	-83
194-59-2	7H-Dibenzo(c,g)carbazole	30	33	10	70	4	-94	0	0	262	70	4	-94
	<b>Subtotal</b>	<b>632</b>	<b>731</b>	<b>16</b>	<b>246,166</b>	<b>282,510</b>	<b>15</b>	<b>47,744</b>	<b>88,828</b>	<b>86</b>	<b>293,910</b>	<b>371,339</b>	<b>26</b>
<b>NPRI PAC Chemicals not Included in TRI PAC Group but Reported Separately to TRI</b>													
85-01-8	Phenanthrene*	72	85	18	146,359	181,131	24	18,754	23,605	26	165,112	204,736	24
191-24-2	Benzo(g,h,i)perylene**	62	74	19	10,524	18,348	74	4,011	4,479	12	14,534	22,826	57
	<b>Subtotal</b>	<b>134</b>	<b>159</b>	<b>19</b>	<b>156,882</b>	<b>199,479</b>	<b>27</b>	<b>22,764</b>	<b>28,084</b>	<b>23</b>	<b>179,647</b>	<b>227,563</b>	<b>27</b>
<b>NPRI PAC Chemicals not Included in TRI PAC Group and not Reported to TRI</b>													
129-00-0	Pyrene	69	84	22	81,240	97,360	20	12,814	33,212	159	94,055	130,572	39
192-97-2	Benzo(e)pyrene	44	57	30	31,420	45,313	44	4,497	16,610	269	35,917	61,923	72
--	PACs, Total***	17	22	29	4,540	2,845	-37	69	303	339	4,609	3,148	-32
198-55-0	Perylene	39	48	23	1,231	863	-30	971	1,237	27	2,202	2,099	-5
	<b>Subtotal</b>	<b>169</b>	<b>211</b>	<b>25</b>	<b>118,431</b>	<b>146,380</b>	<b>24</b>	<b>18,351</b>	<b>51,361</b>	<b>180</b>	<b>136,783</b>	<b>197,742</b>	<b>45</b>
	<b>Total</b>	<b>935</b>	<b>1,101</b>	<b>18</b>	<b>521,480</b>	<b>628,370</b>	<b>20</b>	<b>88,860</b>	<b>168,274</b>	<b>89</b>	<b>610,340</b>	<b>796,643</b>	<b>31</b>

Note: Chemicals subject to the alternative threshold of 50 kg total releases and transfers for the 17 chemicals.

\* This chemical is reported under a higher threshold (11,340 kg) in TRI and not part of the TRI PAC group.

\*\* This chemical is reported under a lower threshold (4.5 kg) in TRI and not part of the TRI PAC group.

\*\*\* NPRI facilities can report one total for all or any combination of the 17 PACs if the information is not available to estimate releases and transfers for the individual PACs.

Table 10–21. (continued)

CAS Number	Chemical	Total Transfers to Recycling			Total Other Transfers for Further Management			Total Reported Releases and Transfers		
		2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)
<b>NPRI PAC Chemicals Included in TRI PAC Group</b>										
206-44-0	Fluoranthene	20	24	21	1,184	2,780	135	114,562	133,646	17
205-99-2	Benzo(b)fluoranthene	7	12	73	151	41	-73	52,253	70,908	36
56-55-3	Benzo(a)anthracene	7	10	32	120	785	555	35,623	47,709	34
50-32-8	Benzo(a)pyrene	4	6	48	74	661	792	30,384	34,133	12
193-39-5	Indeno(1,2,3-CD)pyrene	1	2	12	37	414	1,031	15,389	22,300	45
207-08-9	Benzo(k)fluoranthene	2	2	-16	6	45	699	19,471	20,129	3
218-01-9	Benzo(a)phenanthrene	6	3	-50	14	813	5,644	8,655	20,100	132
205-82-3	Benzo(j)fluoranthene	0	2	839	2	1	-44	8,963	19,140	114
53-70-3	Dibenzo(a,h)anthracene	2	2	-2	9	75	731	6,847	6,254	-9
189-55-9	Dibenzo(a,i)pyrene	0	0	-15	4	2	-47	3,273	2,683	-18
224-42-0	Dibenz(a,j)acridine	8	0	-100	0	0	--	79	12	-84
194-59-2	7H-Dibenzo(c,g)carbazole	10	0	-100	0	0	--	80	4	-94
	<b>Subtotal</b>	<b>69</b>	<b>63</b>	<b>-9</b>	<b>1,600</b>	<b>5,617</b>	<b>251</b>	<b>295,579</b>	<b>377,019</b>	<b>28</b>
<b>NPRI PAC Chemicals not Included in TRI PAC Group but Reported Separately to TRI</b>										
85-01-8	Phenanthrene*	56	111	97	1,712	5,786	238	166,881	210,633	26
191-24-2	Benzo(g,h,i)perylene**	83	122	46	38	428	1,018	14,656	23,376	60
	<b>Subtotal</b>	<b>139</b>	<b>232</b>	<b>67</b>	<b>1,751</b>	<b>6,214</b>	<b>255</b>	<b>181,537</b>	<b>234,009</b>	<b>29</b>
<b>NPRI PAC Chemicals not Included in TRI PAC Group and not Reported to TRI</b>										
129-00-0	Pyrene	41	58	41	2,196	2,099	-4	96,292	132,729	38
192-97-2	Benzo(e)pyrene	25	35	36	6	391	6,509	35,948	62,348	73
--	PACs, Total***	21	0	-100	1,543	729	-53	6,173	3,877	-37
198-55-0	Perylene	0	0	--	36	7	-80	2,238	2,106	-6
	<b>Subtotal</b>	<b>88</b>	<b>93</b>	<b>6</b>	<b>3,781</b>	<b>3,226</b>	<b>-15</b>	<b>140,652</b>	<b>201,061</b>	<b>43</b>
	<b>Total</b>	<b>296</b>	<b>388</b>	<b>31</b>	<b>7,131</b>	<b>15,058</b>	<b>111</b>	<b>617,768</b>	<b>812,089</b>	<b>31</b>

Note: Chemicals subject to the alternative threshold of 50 kg total releases and transfers for the 17 chemicals.

\* This chemical is reported under a higher threshold (11,340 kg) in TRI and not part of the TRI PAC group.

\*\* This chemical is reported under a lower threshold (4.5 kg) in TRI and not part of the TRI PAC group.

\*\*\* NPRI facilities can report one total for all or any combination of the 17 PACs if the information is not available to estimate releases and transfers for the individual PACs.

### TRI Releases and Transfers of PACs

For the year 2001, 3,922 forms were submitted by TRI facilities for polycyclic aromatic compounds or benzo(g,h,i)perylene or phenanthrene. Except for nine chemicals (see Table 10–20), these chemicals are reported to NPRI under alternative thresholds.

- The total releases and transfers in TRI for PACs were 2.4 million kg in 2001, a decrease of 27 percent from 2000. On-site releases also decreased by 27 percent. Off-site releases decreased by 48 percent, and other off-site transfers for further management decreased by 41 percent. Transfers to recycling increased by 41 percent.
- The group of 21 PACs plus benzo(g,h,i)perylene that are reported under lower thresholds as PBTs in TRI totaled 1.9 million kg and accounted for 81 percent of the total for all PACs. This set of chemicals does not include phenanthrene, which only NPRI lists as a PAC.
- The group of 21 PACs plus benzo(g,h,i)perylene showed a decrease of 32 percent in total releases and transfers from 2000 to 2001, with total releases on- and off-site decreasing by 41 percent.

Table 10–22. TRI Releases and Transfers of Polycyclic Aromatic Compounds (PACs), by Chemical, 2000–2001

CAS Number	Chemical	Forms			Total On-site Releases			Total Off-site Releases			Total Releases On- and Off-site		
		2000 Number	2001 Number	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)
	<b>TRI Chemicals Listed as PAC/PBT on NPRI and TRI</b>												
--	Polycyclic aromatic compounds*	2,257	2,304	2	809,100	599,846	-26	1,447,930	718,884	-50	2,257,030	1,318,729	-42
191-24-2	Benzo(g,h,i)perylene**	1,427	1,509	6	21,511	18,464	-14	52,936	39,181	-26	74,447	57,645	-23
	<b>Subtotal</b>	<b>3,684</b>	<b>3,813</b>	<b>4</b>	<b>830,611</b>	<b>618,310</b>	<b>-26</b>	<b>1,500,866</b>	<b>758,065</b>	<b>-49</b>	<b>2,331,477</b>	<b>1,376,374</b>	<b>-41</b>
	<b>TRI Chemical Listed as PAC/PBT on NPRI only</b>												
85-01-8	Phenanthrene***	103	109	6	62,036	33,795	-46	13,113	33,844	158	75,149	67,639	-10
	<b>Total</b>	<b>3,787</b>	<b>3,922</b>	<b>4</b>	<b>892,647</b>	<b>652,105</b>	<b>-27</b>	<b>1,513,979</b>	<b>791,908</b>	<b>-48</b>	<b>2,406,626</b>	<b>1,444,013</b>	<b>-40</b>

\* Includes 21 individual chemicals reported as a group and subject to reporting threshold of 45.4 kg manufactured, processed or otherwise used for any individual chemical. Twelve of the 21 are listed on NPRI.

\*\* Subject to lower reporting threshold of 4.5 kg manufactured, processed or otherwise used.

\*\*\* Subject to higher reporting threshold of 11,340 kg manufactured, processed or otherwise used.

Table 10–22. (continued)

CAS Number	Chemical	Total Transfers to Recycling			Total Other Transfers for Further Management			Total Reported Releases and Transfers		
		2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)	2000 (kg)	2001 (kg)	Change 2000–2001 (%)
	<b>TRI Chemicals Listed as PAC/PBT on NPRI and TRI</b>									
--	Polycyclic aromatic compounds*	287,212	398,936	39	206,722	138,832	-33	2,750,964	1,856,498	-33
191-24-2	Benzo(g,h,i)perylene**	4,476	16,993	280	4,096	2,648	-35	83,020	77,285	-7
	<b>Subtotal</b>	<b>291,689</b>	<b>415,928</b>	<b>43</b>	<b>210,818</b>	<b>141,480</b>	<b>-33</b>	<b>2,833,984</b>	<b>1,933,783</b>	<b>-32</b>
	<b>TRI Chemical Listed as PAC/PBT on NPRI only</b>									
85-01-8	Phenanthrene***	242,592	336,929	39	128,369	57,788	-55	446,111	462,356	4
	<b>Total</b>	<b>534,281</b>	<b>752,858</b>	<b>41</b>	<b>339,188</b>	<b>199,268</b>	<b>-41</b>	<b>3,280,094</b>	<b>2,396,139</b>	<b>-27</b>

\* Includes 21 individual chemicals reported as a group and subject to reporting threshold of 45.4 kg manufactured, processed or otherwise used for any individual chemical. Twelve of the 21 are listed on NPRI.

\*\* Subject to lower reporting threshold of 4.5 kg manufactured, processed or otherwise used.

\*\*\* Subject to higher reporting threshold of 11,340 kg manufactured, processed or otherwise used.

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## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\*

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
50-00-0	Formaldehyde	Formaldéhyde	Formaldehído	X	X	X
50-29-3	DDT	DDT	DDT			X
50-32-8	Benzo(a)pyrene	Benzo(a)pyrène	Benzo(a)pireno	**	X	
51-03-6	Piperonyl butoxide	Pipéronyl butoxyde	Piperonil butóxido	X		
51-21-8	Fluorouracil	Fluoro-uracil	Fluorouracilo	X		
51-28-5	2,4-Dinitrophenol	2,4-Dinitrophenól	2,4-Dinitrofenol	X		
51-75-2	Nitrogen mustard	Moutarde azotée	Mostaza de nitrógeno	X		
51-79-6	Urethane	Uréthane	Uretano	X		
52-68-6	Trichlorfon	Trichlorfon	Triclorfón	X		
52-85-7	Famphur	Famphur	Famfur	X		
53-70-3	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracène	Dibenzo(a,h)antraceno	**	X	
53-96-3	2-Acetylaminofluorene	2-Acétylaminofluorène	2-Acetilaminofluoreno	X		
55-18-5	N-Nitrosodiethylamine	N-Nitrosodiéthylamine	N-Nitrosodietilamina	X		
55-21-0	Benzamide	Benzamide	Benzamida	X		
55-38-9	Fenthion	Fenthion	Fentió	X		
55-63-0	Nitroglycerin	Nitroglycérine	Nitroglicerina	X	X	
56-23-5	Carbon tetrachloride	Tétrachlorure de carbone	Tetracloruro de carbono	X	X	X
56-35-9	Bis(tributyltin) oxide	Oxyde de bis(tributylétain)	Óxido de tributilestano	X		
56-38-2	Parathion	Parathion	Paratió	X		
56-55-3	Benzo(a)anthracene	Benzo(a)anthracène	Benzo(a)antraceno	**	X	
57-14-7	1,1-Dimethylhydrazine	1,1-Diméthylhydrazine	1,1-Dimetilhidracina	X		
57-33-0	Pentobarbital sodium	Pentobarbital sodique	Pentobarbital sódico	X		
57-41-0	Phenytoin	Phénytoïne	Fenitoina	X		
57-57-8	beta-Propiolactone	bêta-Propiolactone	beta-Propiolactona	X		
57-74-9	Chlordane	Chlordane	Clordano	X		X
58-89-9	Lindane	Lindane	Lindano	X		X
58-90-2	2,3,4,6-Tetrachlorophenol	2,3,4,6-Tétrachlorophénol	2,3,4,6-Tetraclorofenol			X
59-89-2	N-Nitrosomorpholine	n-Nitrosomorpholine	N-Nitrosomorfolina	X		
60-09-3	4-Aminoazobenzene	4-Aminoazobenzène	4-Aminoazobenceno	X		
60-11-7	4-Dimethylaminoazobenzene	4-Diméthylaminoazobenzène	4-Dimetilaminoazobenceno	X		
60-34-4	Methylhydrazine	Méthylhydrazine	Metilhidracina	X		
60-35-5	Acetamide	Acétamide	Acetamida	X		
60-51-5	Dimethoate	Diméthoate	Dimetoato	X		
60-57-1	Dieldrin	Dieldrine	Dieldrín			X
61-82-5	Amitrole	Amitrole	Amitrol	X		
62-53-3	Aniline	Aniline	Anilina	X	X	X
62-55-5	Thioacetamide	Thioacétamide	Tioacetamida	X		
62-56-6	Thiourea	Thio-urée	Tiourea	X	X	
62-73-7	Dichlorvos	Dichlorvos	Diclorvos	X		
62-74-8	Sodium fluoroacetate	Fluoroacétate de sodium	Fluoroacetato de sodio	X		
62-75-9	N-Nitrosodimethylamine	N-Nitrosodiméthylamine	N-Nitrosodimetilamina	X		X
63-25-2	Carbaryl	Carbaryl	Carbaril	X		
64-18-6	Formic acid	Acide formique	Ácido fórmico	X	X	
64-67-5	Diethyl sulfate	Sulfate de diéthyle	Sulfato de dietilo	X	X	
64-75-5	Tetracycline hydrochloride	Chlorhydrate de tétracycline	Clorhidrato de tetraciclina	X	X	
67-56-1	Methanol	Méthanol	Metanol	X	X	
67-63-0	Isopropyl alcohol	Alcool iso-propylique	Alcohol isopropílico	X	X	
67-66-3	Chloroform	Chloroforme	Cloroformo	X	X	X
67-72-1	Hexachloroethane	Hexachloroéthane	Hexacloroetano	X	X	X
68-12-2	N,N-Dimethylformamide	N,N-Diméthyl formamide	N,N-Dimetilformamida	X	X	

\* RETC list of chemicals for voluntary reporting in Section V of COA.

\*\* Reported under TRI as part of polycyclic aromatic compounds group.

**Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)**

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
68-76-8	Triaziquone	Triaziquone	Triaziquone	X		
70-30-4	Hexachlorophene	Hexachlorophène	Hexaclorofeno	X	X	
71-36-3	n-Butyl alcohol	Butan-1-ol	Alcohol n-butílico	X	X	
71-43-2	Benzene	Benzène	Benceno	X	X	X
71-55-6	1,1,1-Trichloroethane	1,1,1-Trichloroéthane	1,1,1-Tricloroetano	X		X
72-02-8	Endrin	Endrine	Endrín			X
72-43-5	Methoxychlor	Méthoxychlore	Metoxicloro	X		X
72-57-1	Trypan blue	Bleu trypan	Azultripán	X		
74-82-8	Methane	Méthane	Metano			X
74-83-9	Bromomethane	Bromométhane	Bromometano	X	X	X
74-85-1	Ethylene	Éthylène	Etileno	X	X	
74-87-3	Chloromethane	Chlorométhane	Clorometano	X	X	X
74-88-4	Methyl iodide	Iodométhane	Yoduro de metilo	X	X	
74-90-8	Hydrogen cyanide	Cyanure d'hydrogène	Ácido cianhídrico	X	X	
74-95-3	Methylene bromide	Bromure de méthyle	Bromuro de metilo	X		
75-00-3	Chloroethane	Chloroéthane	Cloroetano	X	X	
75-01-4	Vinyl chloride	Chlorure de vinyle	Cloruro de vinilo	X	X	X
75-05-8	Acetonitrile	Acétonitrile	Acetonitrilo	X	X	
75-07-0	Acetaldehyde	Acétaldéhyde	Acetaldehído	X	X	X
75-09-2	Dichloromethane	Dichlorométhane	Diclorometano	X	X	X
75-15-0	Carbon disulfide	Disulfure de carbone	Disulfuro de carbono	X	X	
75-21-8	Ethylene oxide	Oxyde d'éthylène	Oxido de etileno	X	X	
75-25-2	Bromoform	Bromoforme	Bromoformo	X		X
75-27-4	Dichlorobromomethane	Dichlorobromométhane	Diclorobromometano	X		
75-34-3	1,1-Dichloroethane	1,1-Dichloroéthane	1,1-Dicloroetano	X		
75-35-4	Vinylidene chloride	Chlorure de vinylidène	Cloruro de vinilideno	X	X	
75-43-4	Dichlorofluoromethane (HCFC-21)	Dichlorofluorométhane (HCFC-21)	Diclorofluorometano (HCFC-21)	X		
75-44-5	Phosgene	Phosgène	Fosgeno	X	X	
75-45-6	Chlorodifluoromethane (HCFC-22)	Chlorodifluorométhane (HCFC-22)	Clorodifluorometano (HCFC-22)	X	X	X
75-55-8	Propylenimine	Propylenimine	Propilenimina	X		
75-56-9	Propylene oxide	Oxyde de propylène	Oxido de propileno	X	X	
75-63-8	Bromotrifluoromethane (Halon 1301)	Bromotrifluorométhane (Halon 1301)	Bromotrifluorometano (Halon 1301)	X	X	X
75-65-0	tert-Butyl alcohol	2-Méthylpropan-2-ol	Alcohol terbutílico	X	X	
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	1-Chloro-1,1-difluoroéthane (HCFC-142b)	1-Cloro-1,1-difluoroetano (HCFC-142b)	X	X	X
75-69-4	Trichlorofluoromethane (CFC-11)	Trichlorofluorométhane (CFC-11)	Triclorofluorometano (CFC-11)	X	X	X
75-71-8	Dichlorodifluoromethane (CFC-12)	Dichlorodifluorométhane (CFC-12)	Diclorodifluorometano (CFC-12)	X	X	X
75-72-9	Chlorotrifluoromethane (CFC-13)	Chlorotrifluorométhane (CFC-13)	Clorotrifluorometano (CFC-13)	X	X	X
75-86-5	2-Methylactonitrile	Acétonecyanhydrine	2-Metilactonitrilo	X		
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	2-Chloro-1,1,1-trifluoroéthane (HCFC-133a)	2-Cloro-1,1,1-trifluoroetano (HCFC-133a)	X		
76-01-7	Pentachloroethane	Pentachloroéthane	Pentacloroetano	X	X	
76-02-8	Trichloroacetyl chloride	Chlorure de trichloroacétyle	Cloruro de tricloroacetilo	X		
76-06-2	Chloropicrin	Chloropicrine	Cloropicrina	X		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	1,1,2-Trichloro-1,2,2-trifluoroéthane (CFC-113)	1,1,2-Tricloro-1,2,2-trifluoroetano (CFC-113)	X		X
76-14-2	Dichlorotetrafluoroethane (CFC-114)	Dichlorotétrafluoroéthane (CFC-114)	Diclorotetrafluoroetano (CFC-114)	X	X	X
76-15-3	Monochloropentafluoroethane (CFC-115)	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)	X	X	X
76-44-8	Heptachlor	Heptachlore	Heptacloro	X		X
76-87-9	Triphenyltin hydroxide	Hydroxyde de triphénylétain	Hidróxido de trifenilestaño	X		
77-47-4	Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorociclopentadieno	X	X	X
77-73-6	Dicyclopentadiene	Dicyclopentadiène	Dicloropentadieno	X	X	
77-78-1	Dimethyl sulfate	Sulfate de diméthyle	Sulfato de dimetilo	X	X	

\* RETC list of chemicals for voluntary reporting in Section V of COA.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
78-00-2	Tetraethyl lead	Plomb tétraéthyle	Tetraetilo de plomo	X	X	X
78-48-8	S,S,S-Tributyltrithiophosphate	Trithiophosphate de S,S,S-tributyle	S,S,S-Tributiltritifosfato	X		
78-79-5	Isoprene	Isoprène	Isopreno		X	
78-83-1	i-Butyl alcohol	2-Méthylpropan-1-ol	Alcohol i-butílico		X	
78-84-2	Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído	X	X	
78-87-5	1,2-Dichloropropane	1,2-Dichloropropane	1,2-Dicloropropano	X	X	
78-88-6	2,3-Dichloropropene	2,3-Dichloropropène	2,3-Dicloropropeno	X		
78-92-2	sec-Butyl alcohol	Butan-2-ol	Alcohol sec-butílico	X	X	
78-93-3	Methyl ethyl ketone	Méthyléthylcétone	Metil etil cetona	X	X	
79-00-5	1,1,2-Trichloroethane	1,1,2-Trichloroéthane	1,1,2-Tricloroetano	X	X	X
79-01-6	Trichloroethylene	Trichloroéthylène	Tricloroetileno	X	X	X
79-06-1	Acrylamide	Acrylamide	Acrilamida	X	X	X
79-10-7	Acrylic acid	Acide acrylique	Ácido acrílico	X	X	
79-11-8	Chloroacetic acid	Acide chloroacétique	Ácido cloroacético	X	X	
79-19-6	Thiosemicarbazide	Thiosemicarbazide	Tiosemicarbacida	X		
79-21-0	Peracetic acid	Acide peracétique	Ácido peracético	X	X	
79-22-1	Methyl chlorocarbonate	Chlorocarbonate de méthyle	Clorocarbonato de metilo	X		
79-34-5	1,1,2,2-Tetrachloroethane	1,1,2,2-Tétrachloroéthane	1,1,2,2-Tetracloroetano	X	X	X
79-44-7	Dimethylcarbonyl chloride	Chlorure de diméthylcarbamyle	Cloruro de dimetilcarbamil	X		
79-46-9	2-Nitropropane	2-Nitropropane	2-Nitropropano	X	X	X
79-94-7	Tetrabromobisphenol A	tétrabromobisphénol A	Tetrabromobisfenol A	X		
80-05-7	4,4'-Isopropylidenediphenol	p,p'-Isopropylidenediphénol	4,4'-Isopropilidenedifenol	X	X	
80-15-9	Cumene hydroperoxide	Hydroperoxyde de cumène	Cumeno hidroperóxido	X	X	
80-62-6	Methyl methacrylate	Méthacrylate de méthyle	Metacrilato de metilo	X	X	
81-07-2	Saccharin	Saccharine	Sacarina	X		
81-88-9	C.I. Food Red 15	Indice de couleur Rouge alimentaire 15	Rojo 15 alimenticio	X	X	
82-28-0	1-Amino-2-methylantraquinone	1-Amino-2-méthylantraquinone	1-Amino-2-metiltraquinona	X		
82-68-8	Quintozene	Quintozène	Quintoceno	X		
84-66-2	Diethyl phthalate	Phtalate de diéthyle	Dietil ftalato		X	
84-74-2	Dibutyl phthalate	Phtalate de dibutyle	Dibutil ftalato	X	X	X
85-01-8	Phenanthrene	Phénanthrène	Fenantreno	X	X	
85-44-9	Phthalic anhydride	Anhydride phtalique	Anhídrido ftálico	X	X	
85-68-7	Butyl benzyl phthalate	Phtalate de benzyle et de butyle	Butilencil ftalato		X	
86-30-6	N-Nitrosodiphenylamine	N-Nitrosodiphénylamine	N-Nitrosodifenilamina	X	X	
87-62-7	2,6-Xylidine	2,6-Xylidine	2,6-Xilidina	X		
87-68-3	1,1,2,3,4,4-Hexachloro-1,3-butadiene	1,1,2,3,4,4-Hexachloro-1,3-butadiène	1,1,2,3,4,4-Hexacloro-1,3-butadieno	X		X
87-86-5	Pentachlorophenol	Pentachlorophénol	Pentaclorofenol	X		X
88-06-2	2,4,6-Trichlorophenol	2,4,6-Trichlorophénol	2,4,6-Triclorofenol	X		X
88-75-5	2-Nitrophenol	2-Nitrophénol	2-Nitrofenol	X		
88-85-7	Dinitrobutyl phenol	Dinosébé	Dinitrobutilfenol	X		
88-89-1	Picric acid	Acide picrique	Ácido picrico	X		
90-04-0	o-Anisidine	o-Anisidine	o-Anisidina	X		
90-43-7	2-Phenylphenol	o-Phénylphénol	o-Fenilfenol	X	X	
90-94-8	Michler's ketone	Cétone de Michler	Cetona Michler	X	X	
91-08-7	Toluene-2,6-diisocyanate	Toluène-2,6-diisocyanate	Toluen-2,6-diisocianato	X	X	
91-20-3	Naphthalene	Naphtalène	Naftaleno	X	X	
91-22-5	Quinoline	Quinoléine	Quinoleína	X	X	
91-59-8	beta-Naphthylamine	bêta-Naphtylamine	beta-Naftilamina	X		X
91-94-1	3,3'-Dichlorobenzidine	3,3'-Dichlorobenzidine	3,3'-Diclorobencidina	X		
92-52-4	Biphenyl	Biphényle	Bifenilo	X	X	X

\* RETC list of chemicals for voluntary reporting in Section V of COA.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
92-67-1	4-Aminobiphenyl	4-Aminobiphényle	4-Aminobifenilo	X		X
92-87-5	Benzidine	Benzidine	Bencidina	X		X
92-93-3	4-Nitrobiphenyl	4-Nitrobiphényle	4-Nitrobifenilo	X		X
93-65-2	Mecoprop	Mécoprop	Mecoprop	X		
94-11-1	2,4-D Isopropyl ester	2,4-Dichlorophénoxyacétate d'isopropyle	2,4-D isopropilester	X		
94-36-0	Benzoyl peroxide	Peroxyde de benzoyle	Peróxido de benzoilo	X	X	
94-58-6	Dihydrosafrole	Dihydrosafrole	Dihydrosafrol	X		
94-59-7	Safrole	Safrole	Safrol	X	X	
94-74-6	Methoxone	Méthoxone	Metoxona	X		
94-75-7	2,4-D (Acetic acid)	Acide dichloro-2,4-phénoxyacétique	Ácido 2,4-diclorofenoxyacético	X		X
94-80-4	2,4-D Butyl ester	2,4-Dichlorophénoxyacétate de butyle	2,4-D butilester	X		
94-82-6	2,4-DB	Acide 4-(2,4-dichlorophénoxy)butyrique	2,4-DB	X		
95-47-6	o-Xylene	o-Xylène	o-Xileno	X	X	
95-48-7	o-Cresol	o-Crésol	o-Cresol	X	X	
95-50-1	1,2-Dichlorobenzene	o-Dichlorobenzène	1,2-Diclorobenceno	X	X	X
95-53-4	o-Toluidine	o-Toluidine	o-Toluidina	X		
95-54-5	1,2-Phenylenediamine	1,2-Phénylènediamine	1,2-Fenilènediamina	X		
95-63-6	1,2,4-Trimethylbenzene	1,2,4-Triméthylbenzène	1,2,4-Trimetilbenceno	X	X	
95-69-2	p-Chloro-o-toluidine	4-Chloro-o-toluidine	p-Chloro-o-toluidina	X		
95-80-7	2,4-Diaminotoluene	2,4-Diaminotoluène	2,4-Diaminotolueno	X	X	
95-95-4	2,4,5-Trichlorophenol	Trichloro-2,4,5-phénol	2,4,5-Triclorofenol	X		X
96-09-3	Styrene oxide	Oxyde de styrène	Oxido de estireno	X	X	
96-12-8	1,2-Dibromo-3-chloropropane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-3-cloropropano	X		
96-18-4	1,2,3-Trichloropropane	1,2,3-Trichloropropane	1,2,3-Tricloropropano	X		
96-33-3	Methyl acrylate	Acrylate de méthyle	Acrilato de metilo	X	X	
96-45-7	Ethylene thiourea	Imidazolidine-2-thione	Etilén tiourea	X	X	
97-23-4	Dichlorophene	Dichlorophène	Diclorofeno	X		
97-56-3	C.I. Solvent Yellow 3	Indice de couleur Jaune de solvant 3	Solvante de amarillo 3	X		
98-07-7	Benzoic trichloride	Trichlorure de benzylidène	Benzotricloruro	X		
98-82-8	Cumene	Cumène	Cumeno	X	X	
98-86-2	Acetophenone	Acétophénone	Acetofenona	X	X	
98-87-3	Benzal chloride	Chlorure de benzale	Cloruro de benzal	X		
98-88-4	Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo	X	X	
98-95-3	Nitrobenzene	Nitrobenzène	Nitrobenceno	X	X	
99-30-9	Dichloran	Chlorure de dichlorobenzalkonium	Cloruro de diclorobenzalconio	X		
99-55-8	5-Nitro-o-toluidine	5-Nitro-o-toluidine	5-Nitro-o-toluidina	X		
99-59-2	5-Nitro-o-anisidine	5-Nitro-o-anisidine	5-Nitro-o-anisidina	X		
99-65-0	m-Dinitrobenzene	m-Dinitrobenzène	m-Dinitrobenceno	X		
100-01-6	p-Nitroaniline	p-Nitroaniline	p-Nitroanilina	X	X	
100-02-7	4-Nitrophenol	p-Nitrophénol	4-Nitrofenol	X	X	
100-25-4	p-Dinitrobenzene	p-Dinitrobenzène	p-Dinitrobenceno	X		
100-41-4	Ethylbenzene	Éthylbenzène	Etilbenceno	X	X	
100-42-5	Styrene	Styrène	Estireno	X	X	X
100-44-7	Benzyl chloride	Chlorure de benzyle	Cloruro de bencilo	X	X	
100-75-4	N-Nitrosopiperidine	N-Nitrosopiperidine	N-Nitrosopiperidina	X		
101-05-3	Anilazine	Anilazine	Anilacina	X		
101-14-4	4,4'-Methylenebis(2-chloroaniline)	4,4'-Méthylènebis(2-chloroaniline)	4,4'-Metilenobis(2-cloroanilina)	X	X	
101-61-1	4,4'-Methylenebis(N,N-dimethyl)benzeneamine	4,4'-Méthylènebis(N,N-diméthyl)benzèneamine	4,4'-Metilenobis(N,N-dimetil)bencenamina	X		
101-68-8	Methylenebis(phenylisocyanate)	Méthylènebis(phénylisocyanate)	Metilenobis(fenilisocianato)	**	X	
101-77-9	4,4'-Methylenedianiline	4,4'-Méthylènedianiline	4,4'-Metilenodianilina	X	X	

\* RETC list of chemicals for voluntary reporting in Section V of COA.

\*\* Reported under TRI as part of polycyclic aromatic compounds group.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
101-80-4	4,4'-Diaminodiphenyl ether	Éther 4,4'-diaminodiphényle	Éter 4,4'-diaminodifenílico	X		
101-90-6	Diglycidyl resorcinol ether	Éther de résorcinol et de diglycidyle	Diglicidil resorcinol éter	X		
103-23-1	Bis(2-ethylhexyl) adipate	Adipate de bis(2-éthylhexyle)	Bis(2-etilhexil) adipato		X	
104-12-1	p-Chlorophenyl isocyanate	Isocyanate de 4-chlorophényle	p-Clorofenil isocianato	X		
104-35-8	2-(p-Nonylphenoxy) ethanol	2-(p-Nonylphénoxy) éthanol	Etanol 2-(nonilfenoxi)		X	
104-40-5	Nonylphenol	Nonylphénol	Nonilfenol		X	
104-94-9	p-Anisidine	p-Anisidine	p-Anisidina	X		
105-67-9	2,4-Dimethylphenol	2,4-Diméthylphénol	2,4-Dimetilfenol	X		
106-42-3	p-Xylene	p-Xylène	p-Xileno	X	X	
106-44-5	p-Cresol	p-Crésol	p-Cresol	X	X	
106-46-7	1,4-Dichlorobenzene	p-Dichlorobenzène	1,4-Diclorobenceno	X	X	X
106-47-8	p-Chloroaniline	p-Chloroaniline	p-Cloroanilina	X		
106-50-3	p-Phenylenediamine	p-Phénylènediamine	p-Fenilenediamina	X	X	
106-51-4	Quinone	p-Quinone	Quinona	X	X	
106-88-7	1,2-Butylene oxide	1,2-Époxybutane	Óxide de 1,2-butileno	X	X	
106-89-8	Epichlorohydrin	Épichlorohydrine	Epichlorohidrina	X	X	X
106-93-4	1,2-Dibromoethane	1,2-Dibromoéthane	1,2-Dibromoetano	X		
106-99-0	1,3-Butadiene	Buta-1,3-diène	1,3-Butadieno	X	X	X
107-02-8	Acrolein	Acroléine	Acroleína	X	X	X
107-04-0	1-Bromo-2-chloroethane	1-Bromo-2-chloroéthane	1-Bromo-1-chloroetano		X	
107-05-1	Allyl chloride	Chlorure d'allyle	Cloruro de alilo	X	X	
107-06-2	1,2-Dichloroethane	1,2-Dichloroéthane	1,2-Dicloroetano	X	X	X
107-11-9	Allylamine	Allylamine	Alil amina	X		
107-13-1	Acrylonitrile	Acrylonitrile	Acrlonitrilo	X	X	X
107-18-6	Allyl alcohol	Alcool allylique	Alcohol aliílico	X	X	
107-19-7	Propargyl alcohol	Alcool propargylique	Alcohol propargílico	X	X	
107-21-1	Ethylene glycol	Éthylèneglycol	Etilén glicol	X	X	
107-30-2	Chloromethyl methyl ether	Éther de méthyle et de chlorométhyle	Éter clorometil metílico	X		
108-05-4	Vinyl acetate	Acétate de vinyle	Acetato de vinilo	X	X	
108-10-1	Methyl isobutyl ketone	Méthylisobutylcétone	Metil isobutil cetona	X	X	
108-31-6	Maleic anhydride	Anhydride maléique	Anhídrido maleico	X	X	
108-38-3	m-Xylene	m-Xylène	m-Xileno	X	X	
108-39-4	m-Cresol	m-Crésol	m-Cresol	X	X	
108-45-2	1,3-Phenylenediamine	m-Phénylènediamine	1,3-Fenilenediamina	X		
108-60-1	Bis(2-chloro-1-methylethyl) ether	Éther di(2-chloro-1-méthyléthyle)	Éter bis(2-cloro-1-metil etil)	X		
108-88-3	Toluene	Toluène	Tolueno	X	X	
108-90-7	Chlorobenzene	Chlorobenzène	Clorobenceno	X	X	X
108-93-0	Cyclohexanol	Cyclohexanol	Ciclohexanol	X	X	
108-95-2	Phenol	Phénol	Fenol	X	X	X
109-06-8	2-Methylpyridine	2-Méthylpyridine	2-Metilpiridina	X	X	
109-77-3	Malononitrile	Malononitrile	Malononitrilo	X		
109-86-4	2-Methoxyethanol	2-Méthoxyéthanol	2-Metoxietanol	X	X	
110-49-6	2-Methoxyethyl acetate	Acétate de 2-méthoxyéthyle	2-Metoxietil acetato		X	
110-54-3	n-Hexane	n-Hexane	n-Hexano	X	X	
110-57-6	trans-1,4-Dichloro-2-butene	1,4-Dichloro-2-butène	Trans-1,4-Dicloro-2-buteno	X		
110-80-5	2-Ethoxyethanol	2-Éthoxyéthanol	2-Etoxietanol	X	X	X
110-82-7	Cyclohexane	Cyclohexane	Ciclohexano	X	X	
110-86-1	Pyridine	Pyridine	Piridina	X	X	X
111-15-9	2-Ethoxyethyl acetate	Acétate de 2-éthoxyéthyle	2-Etoxietil acetato		X	
111-42-2	Diethanolamine	Diéthanolamine	Dietanolamina	X	X	

\* RETC list of chemicals for voluntary reporting in Section V of COA.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
111-44-4	Bis(2-chloroethyl) ether	Éther di(2-chloroéthyle)	Éter bis(2-cloroetil)	X		
111-76-2	2-Butoxyethanol	2-Butoxyéthanol	2-Butoxiethanol		X	
111-91-1	Bis(2-chloroethoxy) methane	Méthane di(2-chloroéthoxy)	Bis(2-cloroetoxi) metano	X		
114-26-1	Propoxur	Propoxur	Propoxur	X		
115-07-1	Propylene	Propylène	Propileno	X	X	
115-28-6	Chlorendic acid	Acide chlorendique	Ácido cloréndico	X	X	
115-29-7	Endosulfan	Endosulfan	Endosulfán			X
115-32-2	Dicofol	Dicofol	Dicofol	X		
116-06-3	Aldicarb	Aldicarbe	Aldicarb	X		
117-79-3	2-Aminoanthraquinone	2-Aminoanthraquinone	2-Aminoantraquinona	X		
117-81-7	Di(2-ethylhexyl) phthalate	Phtalate de bis(2-éthylhexyle)	Di(2-etilhexil) ftalato	X	X	
117-84-0	Di-n-octyl phthalate	Phtalate de di-n-octyle	Di-n-octil ftalato		X	
118-74-1	Hexachlorobenzene	Hexachlorobenzène	Hexaclorobenceno	X	X	X
119-90-4	3,3'-Dimethoxybenzidine	3,3'-Diméthoxybenzidine	3,3'-Dimetoxibencidina	X		
119-93-7	3,3'-Dimethylbenzidine	3,3'-Diméthylbenzidine	3,3'-Dimetilbencidina	X		
120-12-7	Anthracene	Anthracène	Antraceno	X	X	
120-36-5	2,4-DP	Dichlorprop	2,4-DP	X		
120-58-1	Isosafrole	Isosafrole	Isosafrol	X	X	
120-71-8	p-Cresidine	p-Crésidine	p-Cresidina	X		
120-80-9	Catechol	Catéchol	Catecol	X	X	
120-82-1	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzène	1,2,4-Triclorobenceno	X	X	X
120-83-2	2,4-Dichlorophenol	2,4-Dichlorophénol	2,4-Diclorofenol	X	X	
121-14-2	2,4-Dinitrotoluene	2,4-Dinitrotoluène	2,4-Dinitrotolueno	X	X	X
121-44-8	Triethylamine	Triéthylamine	Trietilamina	X	X	
121-69-7	N,N-Dimethylaniline	N,N-Diméthylaniline	N,N-Dimetilanilina	X	X	
121-75-5	Malathion	Malathion	Malatió	X		
122-34-9	Simazine	Simazine	Simacina	X		
122-39-4	Diphenylamine	Dianiline	Difenilamina	X	X	
122-66-7	1,2-Diphenylhydrazine	1,2-Diphénylhydrazine	1,2-Difenilhidracina	X		
123-31-9	Hydroquinone	Hydroquinone	Hydroquinona	X	X	
123-38-6	Propionaldehyde	Propionaldéhyde	Propionaldehído	X	X	
123-63-7	Paraldehyde	Paraldéhyde	Paraldehído	X	X	
123-72-8	Butyraldehyde	Butyraldéhyde	Butiraldehído	X	X	
123-91-1	1,4-Dioxane	1,4-Dioxane	1,4-Dioxano	X	X	X
124-38-9	Carbon dioxide	Dioxyde de carbone	Bióxido de carbono			X
124-40-3	Dimethylamine	Diméthylamine	Dimetilamina	X	X	
124-73-2	Dibromotetrafluoroethane (Halon 2402)	Dibromotétrafluoroéthane (Halon 2402)	Dibromotetrafluoroetano (Halon 2402)	X		
126-72-7	Tris(2,3-dibromopropyl) phosphate	Phosphate de tris(2,3-dibromopropyle)	Tris(2,3-dibromopropil) fosfato	X		
126-98-7	Methacrylonitrile	Méthacrylonitrile	Metacrilonitrilo	X		
126-99-8	Chloroprene	Chloroprène	Cloropreno	X		
127-18-4	Tetrachloroethylene	Tétrachloroéthylène	Tetracloroetileno	X	X	
128-03-0	Potassium dimethyldithiocarbamate	Diméthyldithiocarbamate de potassium	Dimetilditiocarbamato de potasio	X		
128-04-1	Sodium dimethyldithiocarbamate	Diméthyldithiocarbamate de sodium	Dimetilditiocarbamato de sodio	X		
128-37-0	2,6-Di-t-butyl-4-methylphenol	2,6-Di-t-butyl-4-méthylphénol	2,6-Di-t-butil-4-metilfenol		X	
128-66-5	C.I. Vat Yellow 4	Indice de couleur Jaune 4	Amarillo 4	X		
129-00-0	Pyrene	Pyréne	Pireno		X	
131-11-3	Dimethyl phthalate	Phtalate de diméthyle	Dimetil ftalato	X	X	
131-52-2	Sodium pentachlorophenate	Pentachlorophénate de sodium	Pentaclorofenato de sodio	X		
132-27-4	Sodium o-phenylphenoxide	2-Biphénylate de sodium	Ortofenilfenóxido de sodio	X		
132-64-9	Dibenzofuran	Dibenzofurane	Dibenzofurano	X		

\* RETC list of chemicals for voluntary reporting in Section V of COA.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
133-06-2	Captan	Captan	Captan	X		
133-07-3	Folpet	Folpet	Folpet	X		
133-90-4	Chloramben	Chlorambène	Cloramben	X		
134-29-2	o-Anisidine hydrochloride	Chlorhydrate d' o-anisidine	o-Anisidina hydrocloruro	X		
134-32-7	alpha-Naphthylamine	alpha-Naphthylamine	alfa-Naftilamina	X		
135-20-6	Cupferron	Cupferron	Cupferron	X		
136-45-8	Dipropyl isocinchomerionate	Pyridine-2,5-dicarboxylate de dipropyle	Dipropilisocinchomerionato	X		
137-26-8	Thiram	Thirame	Tiram	X		
137-41-7	Potassium N-methyldithiocarbamate	Méthyldithiocarbamate de potassium	N-Metilditiocarbamate de potasio	X		
137-42-8	Metham sodium	Métam-sodium	N-Metilditiocarbamate de sodio	X		
138-93-2	Disodium cyanodithioimidocarbonate	Cyanodithiocarbamate de disodium	Cianoditiocarbamate de disodio	X		
139-13-9	Nitritotriacetic acid	Acide nitritotriacétique	Ácido nitritotriacético	X	X	
139-65-1	4,4'-Thiodianiline	4,4'-Thiodianiline	4,4'-Tiodianilina	X		
140-88-5	Ethyl acrylate	Acrylate d'éthyle	Acrilato de etilo	X	X	
140-66-9	4-tert-Octylphenol	4-tert-Octylphénol	4-ter-Octifenol			X
141-32-2	Butyl acrylate	Acrylate de butyle	Acrilato de butilo	X	X	
142-59-6	Nabam	Nabame	Nabam	X		
148-79-8	Thiabendazole	Thiabendazole	Tiabendazol	X		
149-30-4	2-Mercaptobenzothiazole	Benzothiazole-2-thiol	2-Mercaptobenzotiazol	X	X	
150-50-5	Merphos	Trithiophosphate de tributyle	Merfos	X		
150-68-5	Monuron	Monuron	3-(4-cloro fenil)-1,1-dimetilurea	X		
151-56-4	Ethyleneimine	Éthylène imine	Etilenimina	X		
156-10-5	p-Nitrosodiphenylamine	p-Nitrosodiphénylamine	p-Nitrosodifeniamina	X		
156-62-7	Calcium cyanamide	Cyanamide calcique	Cianamida de calcio	X	X	
189-55-9	Dibenzo(a,i)pyrene	Dibenzo(a,i)pyrène	Dibenzo(a,i)pireno	**	X	
191-24-2	Benzo(g,h,i)perylene	Benzo(g,h,i)pérylène	Benzo(g,h,i)perinelo	**	X	
192-97-2	Benzo(e)pyrene	Benzo(e)pyrène	Benzo(e)pireno		X	
193-39-5	Indeno(1,2,3-c,d)pyrene	Indeno(1,2,3-c,d)pyrène	Indeno(1,2,3-c,d)pireno	**	X	
194-59-2	7H-Dibenzo(c,g)carbazole	7H-Dibenzo(c,g)carbazole	7H-Dibenzo(c,g)carbazole	**	X	
198-55-0	Perylene	Pérylène	Perinelo		X	
205-82-3	Benzo(j)fluoranthene	Benzo(j)fluoranthène	Benzo(j)fluoranteno	**	X	
205-99-2	Benzo(b)fluoranthene	Benzo(b)fluoranthène	Benzo(b)fluoranteno	**	X	
206-44-0	Fluoranthene	Fluoranthène	Fluoranteno	**	X	
207-08-9	Benzo(k)fluoranthene	Benzo(k)fluoranthène	Benzo(k)fluoranteno	**	X	
218-01-9	Benzo(a)phenanthrene	Benzo(a)phenanthrène	Benzo(a)fenanteno	**	X	
224-42-0	Dibenz(a,j)acridine	Dibenz(a,j)acridine	Dibenz(a,j)acridine	**	X	
298-00-0	Methyl parathion	Parathion-méthyl	Metilparatió	X		X
300-76-5	Naled	Naled	Naled	X		
301-12-2	Oxydemeton methyl	Oxydémeton-méthyl	Metiloximetón	X		
302-01-2	Hydrazine	Hydrazine	Hidracina	X	X	X
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	2,2-Dichlo-1,1,1-trifluoroéthane (HCFC-123)	2,2-Dicloro-1,1,1-trifluoroetano (HCFC-123)	X		X
309-00-2	Aldrin	Aldrine	Aldrín	X		X
314-40-9	Bromacil	Bromacil	Bromacilo	X		
319-84-6	alpha-Hexachlorocyclohexane	alpha-Hexachlorocyclohexane	alfa-Hexaclorociclohexano	X		
330-54-1	Diuron	Diuron	3-(3,4 dicloro-fenil)-1,1-dimetil urea	X		
330-55-2	Linuron	Linuron	3-(3,4 dicloro-fenil)-1-metoxi-1-metil urea	X		
333-41-5	Diazinon	Diazinon	Diazinon	X		
334-88-3	Diazomethane	Diazométhane	Diazometano	X		
353-59-3	Bromochlorodifluoromethane (Halon 1211)	Bromochlorodifluorométhane (Halon 1211)	Bromoclorodifluorometano (Halon 1211)	X	X	X
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane	1,1,1,2-Tétrachloro-2-fluoroéthane	1,1,1,2-Tetracloro-2- fluoroetano	X		

\* RETC list of chemicals for voluntary reporting in Section V of COA.

\*\* Reported under TRI as part of polycyclic aromatic compounds group.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
354-14-3	1,1,2,2-Tetrachloro-1-fluoroethane	1,1,2,2-Tétrachloro-1-fluoroéthane	1,1,2,2-Tetracloro-1-fluoroetano	X		
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	1,2-Dichloro-1,1,2-trifluoroéthane (HCFC-123a)	1,2-Dicloro-1,1,2-trifluoroetano (HCFC-123a)	X		
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	1-Chloro-1,1,2,2-tétrafluoroéthane (HCFC-124a)	1-Cloro-1,1,2,2-tetrafluoroetano (HCFC-124a)	X		
357-57-3	Brucine	Brucine	Brucina	X		
422-44-6	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1,2-Dicloro-1,1,2,3,3-pentafluoropropano (HCFC-225bb)	X		
422-48-0	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	2,3-Dicloro-1,1,1,2,3-pentafluoropropano (HCFC-225ba)	X		
422-56-0	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	3,3-Dicloro-1,1,1,2,2-pentafluoropropano (HCFC-225ca)	X		X
431-86-7	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1,2-Dicloro-1,1,3,3,3-pentafluoropropano (HCFC-225da)	X		
460-35-5	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	3-Cloro-1,1,1-trifluoropropano (HCFC-253fb)	X		
463-58-1	Carbonyl sulfide	Sulfure de carbonyle	Sulfuro de carbonilo	X		
465-73-6	Isodrin	Isodrine	Isodrin	X		
492-80-8	C.I. Solvent Yellow 34	Indice de couleur Jaune de solvant 34	Solvante amarillo 34	X		
505-60-2	Mustard gas	Gaz moutarde	Gas mostaza	X		
507-55-1	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1,3-Dicloro-1,1,2,2,3-pentafluoropropano (HCFC-225cb)	X		X
510-15-6	Chlorobenzilate	Chlorobenzilate	Clorobencilato	X		
528-29-0	o-Dinitrobenzene	o-Dinitrobenzène	o-Dinitrobenceno	X		
532-27-4	2-Chloroacetophenone	2-Chloroacétophénone	2-Cloroacetofenona	X		
533-74-4	Dazomet	Dazomet	Dazomet	X		
534-52-1	4,6-Dinitro-o-cresol	4,6-Dinitro-o-crésol	4,6-Dinitro-o-cresol	X	X	X
540-59-0	1,2-Dichloroethylene	1,2-Dichloroéthylène	1,2-Dicloroetileno	X		
541-41-3	Ethyl chloroformate	Chloroformiate d'éthyle	Cloroformiato de etilo	X	X	
541-53-7	2,4-Dithiobiuret	2,4-Dithiobiuret	2,4-Ditiobiuret	X		
541-73-1	1,3-Dichlorobenzene	1,3-Dichlorobenzène	1,3-Diclorobenceno	X		
542-75-6	1,3-Dichloropropylene	1,3-Dichloropropylène	1,3-Dicloropropileno	X		
542-76-7	3-Chloropropionitrile	3-Chloropropionitrile	3-Cloropropionitrilo	X	X	
542-88-1	Bis(chloromethyl) ether	Éther di(chlorométhylque)	Bis(chlorometil) éter	X		X
554-13-2	Lithium carbonate	Carbonate de lithium	Carbonato de litio	X	X	
556-61-6	Methyl isothiocyanate	Isothiocyanate de méthyle	Isocianato de metilo	X		
563-47-3	3-Chloro-2-methyl-1-propene	3-Chloro-2-méthylpropène	3-Cloro-2-metil-1-propeno	X	X	
569-64-2	C.I. Basic Green 4	Indice de couleur Vert de base 4	Verde 4 básico	X	X	
584-84-9	Toluene-2,4-diisocyanate	Toluène-2,4-diisocyanate	Toluen-2,4-diisocianato	X	X	
593-60-2	Vinyl bromide	Bromure de vinyle	Bromuro de vinilo	X		
594-42-3	Perchloromethyl mercaptan	Perchlorométhylmercaptan	Perclorometilmercaptano	X		
606-20-2	2,6-Dinitrotoluene	2,6-Dinitrotoluène	2,6-Dinitrotolueno	X	X	
608-93-5	Pentachlorobenzene	Pentachlorobenzène	Pentaclorobenceno	X		
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	Dichlorhydrate de 4,4'-bi-o-toluidine	Dihidrocloruro de 3,3'-dimetilbencidina	X		
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	Dichlorhydrate de 3,3'-dichlorobenzidine	Dihidrocloruro de 3,3'-diclorobencidina	X	X	
615-05-4	2,4-Diaminoanisole	2,4-Diaminoanisole	2,4-Diaminoanisol	X		
615-28-1	1,2-Phenylenediamine dihydrochloride	Dichlorhydrate d'o-phénylènediamine	Dihidrocloruro de 1,2-fenilendiamina	X		
621-64-7	N-Nitrosodi-n-propylamine	N-Nitrosodi-n-propylamine	N-Nitrosodi-n-propilamina	X		
624-18-0	1,4-Phenylenediamine dihydrochloride	Dichlorhydrate de benzène-1,4-diamine	Dihidrocloruro de 1,4-fenilendiamina	X		
624-83-9	Methyl isocyanate	Isocyanate de méthyle	Isocianato de metilo	X		
630-20-6	1,1,1,2-Tetrachloroethane	1,1,1,2-Tétrachloroéthane	1,1,1,2-Tetracloroetano	X	X	
636-21-5	o-Toluidine hydrochloride	Chlorhydrate de o-toluidine	o-Toluidina hidrocloruro	X		
639-58-7	Triphenyltin chloride	Chlorure de triphénylétain	Cloruro de trifenilestaño	X		
680-31-9	Hexamethylphosphoramide	Hexaméthylphosphoramide	Hexametifosforamida	X		
684-93-5	N-Nitroso-N-methylurea	N-Nitroso-N-méthylurée	N-Nitroso-N-metilurea	X		
709-98-8	Propanil	Propanil	Propanilo	X		
759-73-9	N-Nitroso-N-ethylurea	N-Nitroso-N-éthylurée	N-Nitroso-N-etilurea	X		
759-94-4	Ethyl dipropylthiocarbamate	EPTC	Dipropiltiocarbamato de etilo	X		

\* RETC list of chemicals for voluntary reporting in Section V of COA.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
764-41-0	1,4-Dichloro-2-butene	1,4-Dichloro-2-butène	1,4-Dicloro-2-buteno	X		
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	1,1-Dichloro-1,2,2-trifluoroéthane (HCFC-123b)	1,1-Dicloro-1,2,2-trifluoroetano (HCFC-123b)	X		
834-12-8	Ametryn	Amétryne	Ametrin	X		
842-07-9	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvante	X	X	
872-50-4	N-Methyl-2-pyrrolidone	N-Méthyl-2-pyrrolidone	N-Metil2-pirrolidona	X	X	
924-16-3	N-Nitrosodi-n-butylamine	N-Nitrosodi-n-butylamine	N-Nitrosodi-n-butilamina	X		
924-42-5	N-Methylolacrylamide	N-(Hydroxyméthyl)acrylamide	N-Metilolacrilamida	X	X	
957-51-7	Diphenamid	Difénamide	Difenamida	X		
961-11-5	Tetrachlorvinphos	Tétrachlorvinphos	Tetraclorvinfos	X		
989-38-8	C.I. Basic Red 1	Indice de couleur Rouge de base 1	Rojo 1 básico	X	X	
1114-71-2	Pebulate	Pébulate	Pebulato	X		
1120-71-4	Propane sultone	Propanesultone	Propane sultone	X		
1134-23-2	Cycloate	Cicloate	Ciclotato	X		
1163-19-5	Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo	X	X	
1300-71-6	Dimethyl phenol	Diméthylphénol	Dimetilfenol		X	
1313-27-5	Molybdenum trioxide	Trioxyde de molybdène	Trióxido de molibdeno	X	X	
1314-20-1	Thorium dioxide	Dioxyde de thorium	Dióxido de torio	X	X	
1319-77-3	Cresol (mixed isomers)	Crésol (mélange d'isomères)	Crésol (mezcla de isómeros)	X	X	
1320-18-9	2,4-D Propylene glycol butyl ether ester	(2,4-Dichlorophénoxy)acétate de 2-butoxyméthyléthyle	Ester de 2,4-D propilen glicolbutileter	X		
1330-20-7	Xylene (mixed isomers)	Xylène (mélange d'isomères)	Xileno (mezcla de isómeros)	X	X	
1332-21-4	Asbestos (friable form)	Amiante (forme friable)	Asbestos (friables)	X	X	X
1335-87-1	Hexachloronaphthalene	Hexachloronaphtalène	Hexacloronaphtaleno	X		
1336-36-3	Polychlorinated biphenyls (PCBs)	Biphényles polychlorés (BPC)	Bifenilos policlorados (BPC)	X		X
1344-28-1	Aluminum oxide (fibrous forms)	Oxyde d'aluminium (formes fibreuses)	Óxido de aluminio (formas fibrosas)	X	X	
1464-53-5	Diepoxybutane	Diépoxybutane	Diepoxibutano	X		
1563-66-2	Carbofuran	Carbofuran	Carbofurano	X		
1582-09-8	Trifluralin	Trifuraline	Trifluralín	X		
1634-04-4	Methyl tert-butyl ether	Oxyde de tert-butyle et de méthyle	Éter metil terbutílico	X	X	
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1,2-Dichloro-1,1-difluoroéthane (HCFC-132b)	1,2-Dicloro-1,1-difluoroetano (HCFC-132b)	X		
1689-84-5	Bromoxynil	Bromoxynil	Bromoxinilo	X		
1689-99-2	Bromoxynil octanoate	Octanoate de 2,6-dibromo-4-cyanophényle	Bromoxinil octanoato	X		
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	1,1-Dichloro-1-fluoroéthane (HCFC-141b)	1,1-Dicloro-1-fluoroetano (HCFC-141b)	X	X	X
1836-75-5	Nitrofen	Nitrofène	Nitroféen	X		
1861-40-1	Benfluralin	Benfluralin	Benfluralín	X		
1897-45-6	Chlorothalonil	Chlorothalonil	Clorotalonil	X		
1910-42-5	Paraquat dichloride	Paraquat-dichlorure	Dicloruro de Paracuat	X		
1912-24-9	Atrazine	Atrazine	Atracina	X		
1918-00-9	Dicamba	Dicamba	Dicamba	X		
1918-02-1	Picloram	Piclorame	Picloram	X		
1918-16-7	Propachlor	Propachlore	Propaclor	X		
1928-43-4	2,4-D 2-Ethylhexyl ester	2,4-Dichlorophénoxyacétate de 2-éthylhexyle	2,4-D 2-Etilexil ester	X		
1929-73-3	2,4-D Butoxyethyl ester	2,4-Dichlorophénoxyacétate de 2-butoxyéthyle	2,4-D Butoxyetilester	X		
1929-82-4	Nitrapyrin	Nitrapyrine	Nitrapirina	X		
1937-37-7	C.I. Direct Black 38	Indice de couleur Noir direct 38	Negro 38	X		
1982-69-0	Sodium dicamba	3,6-Dichloro-o-anisate de sodium	Dicamba de sodio	X		
1983-10-4	Tributyltin fluoride	Fluorure de tributylétain	Fluoruro de tributilestaño	X		
2032-65-7	Methiocarb	Méthiocarbe	Metiocarb	X		
2155-70-6	Tributyltin methacrylate	Méthacrylate de tributylétain	Metacrilato de tributilestaño	X		
2164-07-0	Dipotassium endothall	Endothal-potassium	Endotal dipotásico	X		
2164-17-2	Fluometuron	Fluométureon	Fluometurón	X		

\* RETC list of chemicals for voluntary reporting in Section V of COA.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
2212-67-1	Molinate	Molinate	Molinato	X		
2234-13-1	Octochloronaphthalene	Octochloronaphtalène	Octacloronaftaleno	X		
2300-66-5	Dimethylamine dicamba	Acide 3,6-dichloro-o-anisique, composé avec diméthylamine	Dicamba dimetilamina	X		
2303-16-4	Diallate	Diallate	Diallate	X		
2303-17-5	Triallate	Triallate	Triallato	X		
2312-35-8	Propargite	Propargite	Propargita	X		
2385-85-5	Mirex	Mirex	Mirex			X
2439-01-2	Chinomethionat	Chinométhionate	Quinometionato	X		
2439-10-3	Dodine	Dodine	Dodina	X		
2524-03-0	Dimethyl chlorothiophosphate	Thiophosphorochloridate de O,O-diméthyle	Clorotiofosfato de dimetilo	X		
2551-62-4	Sulfur hexachoride	Hexachlorure de soufre	Hexacloruro de azufre		X	X
2602-46-2	C.I. Direct Blue 6	Indice de couleur Bleu direct 6	Azul 6	X		
2655-15-4	2,3,5-Trimethylphenyl methylcarbamate	Méthylcarbamate de 2,3,5-triméthylphényle	Méthylcarbamato de 2,3,5-trimetilfenilo	X		
2699-79-8	Sulfuryl fluoride	Fluorure de sulfuryle	Fluoruro de sulfurilo	X		
2702-72-9	2,4-D Sodium salt	2,4-Dichlorophénoxyacetate de sodium	Sal sódica del 2,4-D	X		
2832-40-8	C.I. Disperse Yellow 3	Indice de couleur Jaune de dispersion 3	Amarillo 3 disperso	X	X	
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	2-Chloro-1,1,1,2-tétrafluoroéthane (HCFC-124)	2-Cloro-1,1,1,2-tetrafluoroetano (HCFC-124)	X		X
2971-38-2	2,4-D Chlorocrotyl ester	(2,4-Dichlorophénoxy)acétate de 4-chlorobutén-2-yle	Ester clorocrotílico del 2,4-D	X		
3118-97-6	C.I. Solvent Orange 7	Indice de couleur Orange de solvant 7	Naranja 7 solvente	X	X	
3383-96-8	Temephos	Téméphos	Temefos	X		
3653-48-3	Methoxone, sodium salt	Acide (4-chloro-2-méthylphenoxy)acétique, sel de sodium	Sal sódica de metoxona	X		
3761-53-3	C.I. Food Red 5	Indice de couleur Rouge alimentaire 5	Rojo 5 alimenticio	X		
4080-31-3	1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	3-Chloroallylochlorure de méthénamine	Cloruro de 1-(3-Cloroalil)-3,5,7-triasa-1-azoniaadamantano	X		
4098-71-9	Isophorone diisocyanate	Diisocyanate d'isophorone	Diisocianatos de isoforona	**	X	
4170-30-3	Crotonaldehyde	Crotonaldéhyde	Crotonaldehído	X	X	
4549-40-0	N-Nitrosomethylvinylamine	N-Nitrosométhylvinylamine	N-Nitrosometilvinilamina	X		
4680-78-8	C.I. Acid Green 3	Indice de couleur Vert acide 3	Verde 3 ácido	X	X	
5124-30-1	1,1-Methylenebis(4-isocyanatocyclohexane)	1,1-Méthylènebis(4-isocyanatocyclohexane)	1,1-Metilenebis(4-isociano de ciclohexano)		X	
5234-68-4	Carboxin	Carboxine	Carboxina	X		
5598-13-0	Chlorpyrifos methyl	Chlorpyrifos-méthyl	Metil clorpirifos	X		
5902-51-2	Terbacil	Terbacile	Metilterbacilo	X		
6459-94-5	C.I. Acid Red 114	Indice de couleur Rouge acide 114	Índice de color rojo ácido 114	X		
7287-19-6	Prometryn	Prométryne	Prometrín	X		
7311-27-5	2-(2-(2-(2-(p-Nonylphenoxy) ethoxy)ethoxy)ethoxy) ethanol	2-(2-(2-(2-(p-Nonylphénoxy) éthoxy)éthoxy)éthoxy) éthanol	Etanol 2-(2-(2-(2-(p-nonilfenoxi) etoxi)etoxi)etoxi)		X	
7429-90-5	Aluminum (fume or dust)	Aluminium (fumée ou poussière)	Aluminio (humo o polvo)	X	X	
7439-92-1	Lead	Plomb	Plomo	X		
7439-96-5	Manganese	Manganèse	Manganeso	X		
7439-97-6	Mercury	Mercur	Mercurio	X		
7440-02-0	Nickel	Nickel	Níquel	X		
7440-22-4	Silver	Argent	Plata	X		
7440-28-0	Thallium	Thallium	Talio	X		
7440-36-0	Antimony	Antimoine	Antimonio	X		
7440-38-2	Arsenic	Arsenic	Arsénico	X		
7440-39-3	Barium	Baryum	Bario	X		
7440-41-7	Beryllium	Béryllium	Berilio	X		
7440-43-9	Cadmium	Cadmium	Cadmio	X		
7440-47-3	Chromium	Chrome	Cromo	X		
7440-48-4	Cobalt	Cobalt	Cobalto	X		
7440-50-8	Copper	Cuivre	Cobre	X		
7440-62-2	Vanadium	Vanadium	Vanadio	X	X	

\* RETC list of chemicals for voluntary reporting in Section V of COA.

\*\* Reported under TRI as part of diisocyanates group.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
7440-66-6	Zinc (fume or dust)	Zinc (fumée ou poussière)	Zinc (humo o polvo)	X		
7550-45-0	Titanium tetrachloride	Tétrachlorure de titane	Tetracloruro de titanio	X	X	
7632-00-0	Sodium nitrite	Nitrite de sodium	Nitrato de sodio	X	X	
7637-07-2	Boron trifluoride	Trifluorure de bore	Trifluoruro de boro	X	X	
7647-01-0	Hydrochloric acid	Acide chlorhydrique	Ácido clorhídrico	X	X	
7664-39-3	Hydrogen fluoride	Fluorure d'hydrogène	Ácido fluorhídrico	X	X	
7664-41-7	Ammonia	Ammoniac	Amoniaco	X	X	
7664-93-9	Sulfuric acid	Acide sulfurique	Ácido sulfúrico	X	X	
7681-49-4	Sodium fluoride	Fluorure de sodium	Fluoro de sodio		X	
7696-12-0	Tetramethrin	Tétraméthrine	Tetrametrina	X		
7697-37-2	Nitric acid	Acide nitrique	Ácido nítrico	X	X	
7723-14-0	Phosphorus (yellow or white)	Phosphore (jaune ou blanc)	Fósforo (amarillo o blanco)	X	X	
7726-95-6	Bromine	Brome	Bromo	X	X	
7758-01-2	Potassium bromate	Bromate de potassium	Bromato de potasio	X	X	
7782-41-4	Fluorine	Fluor	Fluor	X	X	
7782-49-2	Selenium	Sélénium	Selenio	X		
7782-50-5	Chlorine	Chlore	Cloro	X	X	
7783-06-4	Hydrogen sulfide	Hydrogène sulfuré	Ácido sulfhídrico		X	X
7786-34-7	Mevinphos	Mevinphos	Mevinfos	X		
7789-75-5	Calcium fluoride	Fluorure de calcium	Fluoro de calcio		X	
7803-51-2	Phosphine	Phosphine	Fosfina	X		
8001-35-2	Toxaphene	Toxaphène	Toxafeno	X		X
8001-58-9	Creosote	Créosote	Creosota	X		
9006-42-2	Metiram	Métirame	Metiram	X		
9016-45-9	Nonylphenol polyethylene glycol ether	Nonylphénol, éther de polyéthyléneglycol	Éter de nonilfenol polietilenglicol		X	
9016-87-9	Polymeric diphenylmethane diisocyanate	Diisocyanate de diphénylméthane (polymérisé)	Difenilmetano diisocianato polimérico	**	X	
10028-15-6	Ozone	Ozone	Ozono	X		
10034-93-2	Hydrazine sulfate	Sulfate d'hydrazine	Sulfato de hidracina	X		
10049-04-4	Chlorine dioxide	Dioxyde de chlore	Dióxido de cloro	X	X	X
10061-02-6	trans-1,3-Dichloropropene	(E)-1,3-Dichloroprop-1-ène	Trans-1,3-dicloropropeno	X		
10102-43-9	Nitric oxide	Monoxyde d'azote	Oxido nítrico			X
10102-44-0	Nitrogen dioxide	Dioxyde d'azote	Bióxido de nitrógeno			X
10294-34-5	Boron trichloride	Trichlorure de bore	Tricloruro de Boro	X		
10453-86-8	Resmethrin	Resmethrine	Resmetrina	X		
12122-67-7	Zineb	Zinèbe	Zineb	X		
12427-38-2	Maneb	Manèbe	Maneb	X		
13194-48-4	Ethoprop	Éthoprophos	Etoprofos	X		
13356-08-6	Fenbutatin oxide	Fenbutatin oxyde	Óxido de fenbutaestaño	X		
13463-40-6	Iron pentacarbonyl	Fer-pentacarbonyle	Pentacarbonilo de hierro	X	X	
13474-88-9	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1,1-Dicloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	X		
13684-56-5	Desmedipham	Desmédiphame	Desmedifam	X		
14484-64-1	Ferbam	Ferbane	Ferban	X		
15646-96-5	2,4,4-Trimethylhexamethylene diisocyanate	Diisocyanate 2,4,4-Triméthylhexaméthylène	2,4,4-Trimethylhexametileno diisocyanato	**	X	
15972-60-8	Alachlor	Alachlore	Alaclor	X		
16071-86-6	C.I. Direct Brown 95	Indice de couleur Brun direct 95	Café 95	X		
16543-55-8	N-Nitrososornicotine	N-Nitrososornicotine	N-Nitrososornicotina	X		
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate	Diisocyanate 2,2,4-Triméthylhexaméthylène	2,2,4-Trimethylhexametileno diisocyanato	**	X	
17804-35-2	Benomyl	Bénomyl	Benomil	X		
19044-88-3	Oryzalin	Oryzalin	Orizalina	X		
19666-30-9	Oxydiazon	Oxydiazon	Oxidiazono	X		

\* RETC list of chemicals for voluntary reporting in Section V of COA.

\*\* Reported under TRI as part of diisocyanates group.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	Dichlorure de 3,3'-diméthoxybiphényl-4,4'-ylènediammonium	Dicloruro de 3,3'-dimetoxibencidina	X		
20354-26-1	Methazole	Méthazole	Metazol	X		
20427-84-3	2-(2-(p-Nonylphenoxy)ethoxy) ethanol	2-(2-(p-Nonylphénoxy) éthoxy) éthanol	Etanol 2-(2-(p-nonilfenoxi) etoxi)		X	
20816-12-0	Osmium tetroxide	Tétroxyde d'osmium	Tétróxido de osmio	X		
20859-73-8	Aluminum phosphide	Phosphure d'aluminium	Fosfuro de aluminio	X		
21087-64-9	Metribuzin	Métribuzine	Metribucina	X		
21725-46-2	Cyanazine	Cyanazine	Cianacina	X		
22781-23-3	Bendiocarb	Bendiocarbe	Bendiocarb	X		
23564-05-8	Thiophanate-methyl	Thiophanate-méthyl	Metiltiofanato	X		
23564-06-9	Thiophanate ethyl	Thiophanate	Etiltiofanato	X		
23950-58-5	Pronamide	Pronamide	Pronamida	X		
25154-52-3	n-Nonylphenol (mixed isomers)	n-Nonylphénol (mélange d'isomères)	n-Nonilfenol (mezcla de isómeros)		X	
25311-71-1	Isofenphos	Isofenphos	Isofenfos	X		
25321-14-6	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)	X	X	
25321-22-6	Dichlorobenzene (mixed isomers)	Dichlorobenzène (mélange d'isomères)	Diclorobenceno (mezcla de isómeros)	X		
25376-45-8	Diaminotoluene (mixed isomers)	Diaminotoluène (mélange d'isomères)	Diaminotolueno (mezcla de D594+D565)	X		
26002-80-2	Phenothrin	Phénothrine	Phenotrina	X		
26027-38-3	p-Nonylphenol polyethylene glycol ether	p-Nonylphénol, éther de polyéthylène glycol	Éter de p-nonilfenol polietilenglicol		X	
26471-62-5	Toluenediisocyanate (mixed isomers)	Toluènediisocyanate (mélange d'isomères)	Toluèndiisocianatos (mezcla de isómeros)	X	X	X
26628-22-8	Sodium azide	Azide de sodium	Azida de Sodio	X		
26644-46-2	Triforine	Triforine	Triforina	X		
27177-05-5	Nonylphenol hepta(oxyethylene) ethanol	Nonylphénol, dérivé hepta(oxyéthylène)éthanol	Etanol nonilfenol heptaoxietileno		X	
27177-08-8	Nonylphenol nona(oxyethylene) ethanol	Nonylphénol, dérivé nona(oxyéthylène)éthanol	Etanol nonilfenol nonaoxietileno		X	
27314-13-2	Norflurazon	Norflurazon	Norflurazona	X		
27986-36-3	Nonylphenoxy ethanol	Nonylphénoxy éthanol	Etanol nonilfenoxi		X	
28057-48-9	d-trans-Allethrin	Alléthrine	d-trans-Alletrina	X		
28249-77-6	Thiobencarb	Diéthylthiocarbamate de S-4-chlorobenzyle	Tiobencarb	X		
28407-37-6	C.I. Direct Blue 218	Indice de couleur Bleu direct 218	Índice de color Azul directo 218	X	X	
28679-13-2	Ethoxynonyl benzene	Éthoxynonyl benzène	Benceno etoxinonil		X	
29082-74-4	Octachlorostyrene	Octachlorostyrène	Octaclorostireno	X		
29232-93-7	Pirimiphos methyl	Pirimiphos-méthyl	Metilpirimifos	X		
30560-19-1	Acephate	Acéphate	Acefato	X		
31218-83-4	Propetamphos	Propétamphos	Propetamfos	X		
33089-61-1	Amitraz	Amitraze	Amitraz	X		
34014-18-1	Tebuthiuron	Tébutiuron	Tebutiurón	X		
34077-87-7	Dichlorotrifluoroethane (HCFC-123 and isomers)	Dichlorotrifluoroéthane	Diclorotrifluoroetano	X	X	X
35367-38-5	Diflubenzuron	Diflubenzuron	Diflubenzurón	X		
35400-43-2	Sulprofos	Sulprofos	Sulprofos	X		
35554-44-0	Imazalil	Imazalil	Imazalil	X		
35691-65-7	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	2-Bromo-2-(bromométhyl)pentanedinitrile	1-Bromo-1-(bromometil)-1,3-propanedicarbonitrilo	X		
37251-69-7	Oxirane, methyl-, polymer with oxirane, mono(nonylphenyl)ether	Oxirane, méthyl-, polymérisé avec l'oxirane, dérivé éther monononylphénylique	Oxireno, metil-, polímero con oxireno, mono(nonifenil) éter		X	
38727-55-8	Diethylatyl ethyl	N-(chloroacetyl)-N-(2,6-diethylphenyl) glycinate d'éthyle	Etildietatil	X		
39156-41-7	2,4-Diaminoanisole sulfate	Sulfate de 2,4-diaminoanisole	Sulfato de 2,4-diaminoanisol	X		
39300-45-3	Dinocap	Dinocap	Dinocap	X		
39515-41-8	Fenpropathrin	Fenpropathrine	Fenpropatrina	X		
40487-42-1	Pendimethalin	Pendiméthaline	Pendimetalina	X		
41198-08-7	Profenofos	Profenofos	Profenofos	X		
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride	Dihydrofluorure de 3,3'-diméthylbenzidine	Difluoruro de 3,3'-dimetilbencidina	X		
41834-16-6	HCFC-122 and all isomers	HCFC-122 et tous ses isomères	HCFC-122 e isómeros		X	

\* RETC list of chemicals for voluntary reporting in Section V of COA.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
42874-03-3	Oxyfluorfen	Oxyfluorène	Oxifluorfero	X		
43121-43-3	Triadimefon	Triadiméfon	Triadimefón	X		
50471-44-8	Vinclozolin	Vinclozoline	Vinclosolín	X		
51235-04-2	Hexazinone	Hexazinone	Hexacinona	X		
51338-27-3	Diclofop methyl	Diclofop-méthyl	Metildiclofop	X		
51630-58-1	Fenvalerate	Fenvalérate	Fenvalerato	X		
52645-53-1	Permethrin	Perméthrine	Permitrina	X		
53404-19-6	Bromacil, lithium salt	Bromacil, sel de lithium	Sal de litio bromacilica	X		
53404-37-8	2,4-D 2-Ethyl-4-methylpentyl ester	2,4-D 2-Ethyl-4-méthylpentyle	2,4-D 2-Etil-4-metilpentil éster	X		
53404-60-7	Dazomet, sodium salt	Dazomet, sel de sodium	Sal de sodio diazoméica	X		
55290-64-7	Dimethipin	Diméthipin	Dimetipina	X		
55406-53-6	3-Iodo-2-propynyl butylcarbamate	Butylcarbamate de 3-iodo-2-propynyle	3-yodo-2-propinil butilcarbamat	X		
57213-69-1	Triclopyr triethylammonium salt	Acide [(3,5,6-trichloro-2-pyridyl)oxy]acétique,	Sal de triclopir trietilamonio	X		
59669-26-0	Thiodicarb	Thiodicarbe	Tiodicarb	X		
60168-88-9	Fenarimol	Fénarimol	Fenarimol	X		
60207-90-1	Propiconazole	Propiconazole	Propiconazol	X		
62476-59-9	Acifluorfen, sodium salt	Acifluorfen, sel de sodium	Sal de sodio de acifluorfero	X		
63938-10-3	Chlorotetrafluoroethane (HCFC-124 and isomers)	Chlorotétrafluoroéthane	Clorotetrafluoroetano	X	X	
64902-72-3	Chlorsulfuron	Chlorsulfuron	Clorsulfurón	X		
64969-34-2	3,3'-Dichlorobenzidine sulfate	Dihydrogénébis(sulfate) de 3,3'-dichlorobenzidine	Sulfato de 3,3'-diclorobencidina	X		
66441-23-4	Fenoxaprop ethyl	Fénoxaprop-p-éthyl	Etilfenoxaprop	X		
67485-29-4	Hydramethylnon	Hydraméthylnon	Hidrametilnona	X		
68085-85-8	Cyhalothrin	Cyhalothrine	Cialotrina	X		
68359-37-5	Cyfluthrin	Cyfluthrine	Ciflutrina	X		
68920-70-7	Polychlorinated alkanes (C6-C18)	Alcanes psychlorés (C8-C18)	Alcanos policlorinados (C8-C18)		X	
69409-94-5	Fluvalinate	Fluvalinate	Fluvalinato	X		
69806-50-4	Fluazifop butyl	Fluazifop-butyl	Butil flucifop	X		
71751-41-2	Abamectin	Abamectine	Abamectina	X		
72178-02-0	Fomesafen	Fomésafène	Fomesafén	X		
72490-01-8	Fenoxycarb	Fénoxycarbe	Fenoxicarb	X		
74051-80-2	Sethoxydim	Séthoxydime	Setoxidime	X		
76578-14-8	Quizalofop-ethyl	Quizalofop	Etilquizalofop	X		
77501-63-4	Lactofen	Lactofène	Lactofén	X		
82657-04-3	Bifenthrin	Bifenthrine	Bifentrina	X		
84852-15-3	Nonylphenol, industrial	Nonylphénol de qualité industrielle	Nonilfenol industrial		X	
88671-89-0	Myclobutanil	Myclobutanil	Miclobutanilo	X		
90454-18-5	Dichloro-1,1,2-trifluoroethane	Dichloro-1,1,2-trifluoroéthane	Dicloro-1,1,2-trifluoroetano	X		
90982-32-4	Chlorimuron ethyl	Chlorimuron	Etil clorimurón	X		
101200-48-0	Tribenuron methyl	Tribénuron	Metiltribenurón	X		
111512-56-2	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dicloro-1,2,3,3,3-pentafluoropropano (HCFC-225eb)	X		
111984-09-9	3,3'-Dimethoxybenzidine hydrochloride	Hydrochlorure de 3,3'-ddiméthoxybenzidine	Hidrocloruro de 3,3'-dimetoxibencidina	X		
127564-92-5	Dichloropentafluoropropane	Dichloropentafluoropropane	Dicloropentafluoropropano	X		
128903-21-9	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	2,2-Dicloro-1,1,1,3,3-pentafluoropropano (HCFC-225aa)	X		
136013-79-1	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1,3-Dicloro-1,1,2,3,3-pentafluoropropano (HCFC-225ea)	X		
	Antimony and its compounds**	Antimoine (et ses composés)	Antimonio y compuestos	X	X	
	Arsenic and its compounds	Arsenic (et ses composés)	Arsénico y compuestos	X	X	X
	Barium and its compounds	Baryum (et ses composés)	Bario y compuestos	X		
	Beryllium and its compounds	Béryllium (et ses composés)	Berilio y compuestos	X		
	Cadmium and its compounds	Cadmium (et ses composés)	Cadmio y compuestos	X	X	X
	Chlorophenols	Chlorophénols	Clorofenoles	X		

\* RETC list of chemicals for voluntary reporting in Section V of COA.

\*\* Elemental compounds are reported separately from their respective element in TRI and RETC and aggregated with it in NPRI.

## Appendix A – A Comparison of Chemicals Listed under 2001 TRI, NPRI and RETC\* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
	Chromium and its compounds	Chrome (et ses composés)	Cromo y compuestos	X	X	X
	Cobalt and its compounds	Cobalt (et ses composés)	Cobalto y compuestos	X	X	
	Copper and its compounds	Cuivre (et ses composés)	Cobre y compuestos	X	X	
	Cresol (mixed isomers)**	Crésol (mélange d'isomères)	Cresol (mezcla de isómeros)	X	X	
	Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos	X	X	X
	Diisocyanates	Diisocyanates	Diisocyanatos	X		
	Dioxins	Dioxines	Dioxinas			X
	Ethylenebisdithiocarbamic acid, salts and esters	Acide, sels et éthers éthylènebisdithiocarbamiques	Ácido etilenebisditiocarbámico, sales y ésteres	X		
	Furans	Furanes	Furanos			X
	Glycol ethers	Éthers glycoliques	Éteres glicólicos	X		
	Hydrobromofluorocarbons	Hydrobromofluorocarbures	Hidrobromofluorocarbonos			X
	Hydrofluorocarbons	Hydrofluorocarbures	Hidrofluorocarbonos			X
	Lead and its compounds	Plomb (et ses composés)	Plomo y compuestos	X	X	X
	Manganese and its compounds	Manganèse (et ses composés)	Manganeso y compuestos	X	X	
	Mercury and its compounds	Mercure (et ses composés)	Mercurio y compuestos	X	X	X
	Nickel and its compounds	Nickel (et ses composés)	Niquel y compuestos	X	X	X
	Nicotine and salts	Nicotine et sels	Nicotina y sales	X		
	Nitrate compounds	Composés de nitrate	Compuestos nitrados	X	X	
	Perfluorocarbons	Perfluorocarbures	Perfluorocarbonos			X
	Polybrominated biphenyls	Biphényles polybromés	Bifenilos polibromados	X		
	Polychlorinated alkanes (C10-C13)	Alcanes psychlorés (C10-C13)	Alcanos policlorinados (C10-C13)	X	X	
	Polycyclic aromatic compounds	Composés aromatiques polycycliques	Compuestos aromáticos policíclicos	X		
	Selenium and its compounds	Sélénium (et ses composés)	Selenio y compuestos	X	X	
	Silver and its compounds	Argent (et ses composés)	Plata y compuestos	X	X	
	Strychnine and salts	Strychnine et sels	Estricnina y sales	X		
	Thallium and its compounds	Thallium (et ses composés)	Talio y compuestos	X		
	Vanadium compounds	Vanadium et ses composés	Vanadio y compuestos	X	X	
	Warfarin and salts	Warfarine et sels	Warfarina y sales	X		X
	Xylenes***	Xylènes	Xilenos	X	X	
	Zinc and its compounds	Zinc (et ses composés)	Zinc y compuestos	X	X	

\* RETC list of chemicals for voluntary reporting in Section V of COA.

\*\* Cresol isomers are reported separately in TRI and aggregated in NPRI.

\*\*\* Xylene isomers are reported separately in TRI and aggregated in NPRI.

## Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2001

CAS Number	In 1995–2001 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
50-00-0	X	c,p	Formaldehyde	Formaldéhyde	Formaldehído
55-63-0	X		Nitroglycerin	Nitroglycérine	Nitroglicerina
56-23-5	X	c,p,t	Carbon tetrachloride	Tétrachlorure de carbone	Tetracloruro de carbono
62-53-3	X	p	Aniline	Aniline	Anilina
62-56-6	X	c,p	Thiourea	Thio-urée	Tiourea
64-18-6			Formic acid	Acide formique	Ácido fórmico
64-67-5	X	c,p	Diethyl sulfate	Sulfate de diéthyle	Sulfato de dietilo
64-75-5		p	Tetracycline hydrochloride	Chlorhydrate de tétracycline	Clorhidrato de tetraciclina
67-56-1	X		Methanol	Méthanol	Metanol
67-66-3	X	c,p	Chloroform	Chloroforme	Cloroformo
67-72-1	X	c,p	Hexachloroethane	Hexachloroéthane	Hexacloretano
68-12-2			N,N-Dimethylformamide	N,N-Diméthyl formamide	N,N-Dimetilformamida
70-30-4			Hexachlorophene	Hexachlorophène	Hexaclorofeno
71-36-3	X		n-Butyl alcohol	Butan-1-ol	Alcohol n-butílico
71-43-2	X	c,p,t	Benzene	Benzène	Benceno
74-83-9	X	p,t	Bromomethane	Bromométhane	Bromometano
74-85-1	X		Ethylene	Éthylène	Etileno
74-87-3	X	p	Chloromethane	Chlorométhane	Clorometano
74-88-4	X	p	Methyl iodide	Iodométhane	Yoduro de metilo
74-90-8	X		Hydrogen cyanide	Cyanure d'hydrogène	Ácido cianhídrico
75-00-3	X	p	Chloroethane	Chloroéthane	Cloroetano
75-01-4	X	c,p,t	Vinyl chloride	Chlorure de vinyle	Cloruro de vinilo
75-05-8	X		Acetonitrile	Acétonitrile	Acetonitrilo
75-07-0	X	c,p,t	Acetaldehyde	Acétaldéhyde	Acetaldehído
75-09-2	X	c,p,t	Dichloromethane	Dichlorométhane	Diclorometano
75-15-0	X	p	Carbon disulfide	Disulfure de carbone	Disulfuro de carbono
75-21-8	X	c,p,t	Ethylene oxide	Oxyde d'éthylène	Óxido de etileno
75-35-4	X	t	Vinylidene chloride	Chlorure de vinylidène	Cloruro de vinilideno
75-44-5	X		Phosgene	Phosgène	Fosgeno
75-45-6		t	Chlorodifluoromethane (HCFC-22)	Chlorodifluorométhane (HCFC-22)	Clorodifluorometano (HCFC-22)
75-56-9	X	c,p	Propylene oxide	Oxyde de propylène	Óxido de propileno
75-63-8		t	Bromotrifluoromethane (Halon 1301)	Bromotrifluorométhane (Halon 1301)	Bromotrifluorometano (Halon 1301)
75-65-0	X		tert-Butyl alcohol	2-Méthylpropan-2-ol	Alcohol terbutílico
75-68-3			1-Chloro-1,1-difluoroethane (HCFC-142b)	1-Chloro-1,1-difluoroéthane (HCFC-142b)	1-Cloro-1,1-difluoroetano (HCFC-142b)
75-69-4		t	Trichlorofluoromethane (CFC-11)	Trichlorofluorométhane (CFC-11)	Triclorofluorometano (CFC-11)
75-71-8		t	Dichlorodifluoromethane (CFC-12)	Dichlorodifluorométhane (CFC-12)	Diclorodifluorometano (CFC-12)
75-72-9		t	Chlorotrifluoromethane (CFC-13)	Chlorotrifluorométhane (CFC-13)	Clorotrifluorometano (CFC-13)
76-01-7			Pentachloroethane	Pentachloroéthane	Pentacloroetano
76-14-2		t	Dichlorotetrafluoroethane (CFC-114)	Dichlorotetrafluoroéthane (CFC-114)	Diclorotetrafluoroetano (CFC-114)
76-15-3		t	Monochloropentafluoroethane (CFC-115)	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)
77-47-4	X		Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorociclopentadieno
77-73-6			Dicyclopentadiene	Dicyclopentadiène	Dicloropentadieno
77-78-1	X	c,p	Dimethyl sulfate	Sulfate de diméthyle	Sulfato de dimetilo
78-84-2	X		Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído
78-87-5	X	p	1,2-Dichloropropane	1,2-Dichloropropane	1,2-Dicloropropano

c = Known or suspected carcinogen.  
p = California Proposition 65 chemical.  
t = CEPA Toxic chemical.

## Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2001 (continued)

CAS Number	In 1995–2001 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
78-92-2	X		sec-Butyl alcohol	Butan-2-ol	Alcohol sec-butílico
78-93-3	X		Methyl ethyl ketone	Méthyléthylcétone	Metil etil cetona
79-00-5	X	p	1,1,2-Trichloroethane	1,1,2-Trichloroéthane	1,1,2-Tricloroetano
79-01-6	X	c,p,t	Trichloroethylene	Trichloroéthylène	Tricloroetileno
79-06-1	X	c,p	Acrylamide	Acrylamide	Acrilamida
79-10-7	X		Acrylic acid	Acide acrylique	Ácido acrílico
79-11-8	X		Chloroacetic acid	Acide chloroacétique	Ácido cloroacético
79-21-0	X		Peracetic acid	Acide peracétique	Ácido peracético
79-34-5	X	p	1,1,2,2-Tetrachloroethane	1,1,2,2-Tétrachloroéthane	1,1,2,2-Tetracloroetano
79-46-9	X	c,p	2-Nitropropane	2-Nitropropane	2-Nitropropano
80-05-7	X		4,4'-Isopropylidenediphenol	p,p'-Isopropylidenediphénol	4,4'-Isopropilidenodifenol
80-15-9	X		Cumene hydroperoxide	Hydroperoxyde de cumène	Cumeno hidroperóxido
80-62-6	X		Methyl methacrylate	Méthacrylate de méthyle	Metacrilato de metilo
81-88-9	X	p	C.I. Food Red 15	Indice de couleur Rouge alimentaire 15	Rojo 15 alimenticio
84-74-2	X		Dibutyl phthalate	Phtalate de dibutyle	Dibutil ftalato
85-44-9	X		Phthalic anhydride	Anhydride phtalique	Anhídrido ftálico
86-30-6	X	p	N-Nitrosodiphenylamine	N-Nitrosodiphénylamine	N-Nitrosodifenilamina
90-43-7	X	p	2-Phenylphenol	o-Phénylphénol	2-Fenilfenol
90-94-8	X	c,p	Michler's ketone	Cétone de Michler	Cetona Michler
91-08-7	X	c	Toluene-2,6-diisocyanate	Toluène-2,6-diisocyanate	Toluen-2,6-diisocianato
91-20-3	X		Naphthalene	Naphtalène	Naftaleno
91-22-5	X	p	Quinoline	Quinoléine	Quinoleína
92-52-4	X		Biphenyl	Biphényle	Bifenilo
94-36-0	X		Benzoyl peroxide	Peroxyde de benzoyle	Peróxido de benzoilo
94-59-7	X	c,p	Safrole	Safrole	Safrol
95-50-1	X		1,2-Dichlorobenzene	o-Dichlorobenzène	1,2-Diclorobenceno
95-63-6	X		1,2,4-Trimethylbenzene	1,2,4-Triméthylbenzène	1,2,4-Trimetilbenceno
95-80-7	X	c,p	2,4-Diaminotoluene	2,4-Diaminotoluène	2,4-Diaminotolueno
96-09-3	X	c,p	Styrene oxide	Oxyde de styrène	Óxido de estireno
96-33-3	X		Methyl acrylate	Acrylate de méthyle	Acrilato de metilo
96-45-7	X	c,p	Ethylene thiourea	Imidazolidine-2-thione	Etilén tiourea
98-82-8	X		Cumene	Cumène	Cumeno
98-86-2	X		Acetophenone	Acétophénone	Acetofenona
98-88-4	X		Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo
98-95-3	X	c,p	Nitrobenzene	Nitrobenzène	Nitrobencono
100-01-6			p-Nitroaniline	p-Nitroaniline	p-Nitroanilina
100-02-7	X		4-Nitrophenol	p-Nitrophénol	4-Nitrofenol
100-41-4	X	c	Ethylbenzene	Éthylbenzène	Etilbenceno
100-42-5	X	c	Styrene	Styrène	Estireno
100-44-7	X	c,p	Benzyl chloride	Chlorure de benzyle	Cloruro de bencilo
101-14-4	X	c,p	4,4'-Methylenebis(2-chloroaniline)	p,p'-Méthylènebis(2-chloroaniline)	4,4'-Metilenobis(2-cloroanilina)
101-77-9	X	c,p	4,4'-Methylenedianiline	p,p'-Méthylènedianiline	4,4'-Metilenodianilina
106-46-7	X	c,p	1,4-Dichlorobenzene	p-Dichlorobenzène	1,4-Diclorobenceno
106-50-3	X		p-Phenylenediamine	p-Phénylènediamine	p-Fenilenodiamina
106-51-4	X	c	Quinone	p-Quinone	Quinona

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

## Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2001 (continued)

CAS Number	In 1995–2001 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
106-88-7	X	c	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno
106-89-8	X	c,p,t	Epichlorohydrin	Épichlorohydrine	Epichlorohidrina
106-99-0	X	c,p,t	1,3-Butadiene	Buta-1,3-diène	1,3-Butadieno
107-02-8		t	Acrolein	Acroléine	Acroleína
107-05-1	X		Allyl chloride	Chlorure d'allyle	Cloruro de alilo
107-06-2	X	c,p,t	1,2-Dichloroethane	1,2-Dichloroéthane	1,2-Dicloroetano
107-13-1	X	c,p,t	Acrylonitrile	Acrylonitrile	Acrlonitrilo
107-18-6	X		Allyl alcohol	Alcool allylique	Alcohol alílico
107-19-7			Propargyl alcohol	Alcool propargylique	Alcohol propargílico
107-21-1	X		Ethylene glycol	Éthylèneglycol	Etilén glicol
108-05-4	X	c	Vinyl acetate	Acétate de vinyle	Acetato de vinilo
108-10-1	X		Methyl isobutyl ketone	Méthylisobutylcétone	Metil isobutil cetona
108-31-6	X		Maleic anhydride	Anhydride maléique	Anhídrido maleico
108-88-3	X	p	Toluene	Toluène	Tolueno
108-90-7	X		Chlorobenzene	Chlorobenzène	Clorobenceno
108-93-0			Cyclohexanol	Cyclohexanol	Ciclohexanol
108-95-2	X		Phenol	Phénol	Fenol
109-06-8			2-Methylpyridine	2-Méthylpyridine	2-Metilpiridina
109-86-4	X	p	2-Methoxyethanol	2-Méthoxyéthanol	2-Metoxietanol
110-54-3			n-Hexane	n-Hexane	n-Hexano
110-80-5	X	p	2-Ethoxyethanol	2-Éthoxyéthanol	2-Etoxietanol
110-82-7	X		Cyclohexane	Cyclohexane	Ciclohexano
110-86-1	X		Pyridine	Pyridine	Piridina
111-42-2	X		Diethanolamine	Diéthanolamine	Dietanolamina
115-07-1	X		Propylene	Propylène	Propileno
115-28-6		c,p	Chlorendic acid	Acide chlorendique	Ácido cloréndico
117-81-7	X	c,p,t	Di(2-ethylhexyl) phthalate	Phtalate de bis(2-éthylhexyle)	Di(2-etilhexil) ftalato
120-12-7	X		Anthracene	Anthracène	Antraceno
120-58-1	X	p	Isosafrole	Isosafrole	Isosafrol
120-80-9	X	c,p	Catechol	Catéchol	Catecol
120-82-1	X		1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzène	1,2,4-Triclorobenceno
120-83-2	X		2,4-Dichlorophenol	2,4-Dichlorophénol	2,4-Diclorofenol
121-14-2	X	c,p	2,4-Dinitrotoluene	2,4-Dinitrotoluène	2,4-Dinitrotolueno
121-44-8			Triethylamine	Triéthylamine	Trietilamina
121-69-7	X		N,N-Dimethylaniline	N,N-Diméthylaniline	N,N-Dimetilanilina
122-39-4			Diphenylamine	Dianiline	Difenilamina
123-31-9	X		Hydroquinone	Hydroquinone	Hidroquinona
123-38-6	X		Propionaldehyde	Propionaldéhyde	Propionaldehído
123-63-7			Paraldehyde	Paraldéhyde	Paraldehído
123-72-8	X		Butyraldehyde	Butyraldéhyde	Butiraldehído
123-91-1	X	c,p	1,4-Dioxane	1,4-Dioxane	1,4-Dioxano
124-40-3			Dimethylamine	Diméthylamine	Dimetilamina
127-18-4	X	c,p,t	Tetrachloroethylene	Tétrachloroéthylène	Tetracloroetileno
131-11-3	X		Dimethyl phthalate	Phtalate de diméthyle	Dimetil ftalato
139-13-9	X	c,p	Nitriiotriacetic acid	Acide nitrilotriacétique	Ácido nitrilotriacético

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

## Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2001 (continued)

CAS Number	In 1995–2001 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
140-88-5	X	c,p	Ethyl acrylate	Acrylate d'éthyle	Acrilato de etilo
141-32-2	X		Butyl acrylate	Acrylate de butyle	Acrilato de butilo
149-30-4			2-Mercaptobenzothiazole	Benzothiazole-2-thiol	2-Mercaptobenzotiazol
156-62-7	X		Calcium cyanamide	Cyanamide calcique	Cianamida de calcio
302-01-2	X	c,p	Hydrazine	Hydrazine	Hidracina
353-59-3		t	Bromochlorodifluoromethane (Halon 1211)	Bromochlorodifluorométhane (Halon 1211)	Bromoclorodifluorometano (Halon 1211)
534-52-1	X		4,6-Dinitro-o-cresol	4,6-Dinitro-o-crésol	4,6-Dinitro-o-cresol
541-41-3	X		Ethyl chloroformate	Chloroformiate d'éthyle	Cloroformiato de etilo
542-76-7			3-Chloropropionitrile	3-Chloropropionitrile	3-Cloropropionitrilo
554-13-2		p	Lithium carbonate	Carbonate de lithium	Carbonato de litio
563-47-3		c,p	3-Chloro-2-methyl-1-propene	3-Chloro-2-méthylpropène	3-Cloro-2-metil-1-propeno
569-64-2	X		C.I. Basic Green 4	Indice de couleur Vert de base 4	Verde 4 básico
584-84-9	X	c	Toluene-2,4-diisocyanate	Toluène-2,4-diisocyanate	Toluen-2,4-diisocianato
606-20-2	X	c,p	2,6-Dinitrotoluene	2,6-Dinitrotoluène	2,6-Dinitrotolueno
612-83-9		c,p	3,3'-Dichlorobenzidine dihydrochloride	Dichlorhydrate de 3,3'-dichlorobenzidine	Dihidrocloruro de 3,3'-diclorobencidina
630-20-6			1,1,1,2-Tetrachloroethane	1,1,1,2-Tétrachloroéthane	1,1,1,2-Tetracloroetano
842-07-9	X	p	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvante
872-50-4		p	N-Methyl-2-pyrrolidone	N-Méthyl-2-pyrrolidone	N-Metil2-pirrolidona
924-42-5		p	N-Methylolacrylamide	N-(Hydroxyméthyl)acrylamide	N-Metilolacrilamida
989-38-8	X		C.I. Basic Red 1	Indice de couleur Rouge de base 1	Rojo 1 básico
1163-19-5	X		Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo
1313-27-5	X		Molybdenum trioxide	Trioxyde de molybdène	Trióxido de molibdeno
1314-20-1	X	p	Thorium dioxide	Dioxyde de thorium	Dióxido de torio
1332-21-4	X	c,p,t	Asbestos (friable form)	Amiante (forme friable)	Asbestos (friables)
1344-28-1	X		Aluminum oxide (fibrous forms)	Oxyde d'aluminium (formes fibreuses)	Óxido de aluminio (formas fibrosas)
1634-04-4	X		Methyl tert-butyl ether	Oxyde de tert-butyle et de méthyle	Éter metil terbutílico
1717-00-6			1,1-Dichloro-1-fluoroethane (HCFC-141b)	1,1-Dichloro-1-fluoroéthane (HCFC-141b)	1,1-Dicloro-1-fluoroetano (HCFC-141b)
2832-40-8	X		C.I. Disperse Yellow 3	Indice de couleur Jaune de dispersion 3	Amarillo 3 disperso
3118-97-6	X		C.I. Solvent Orange 7	Indice de couleur Orange de solvant 7	Naranja 7 solvante
4170-30-3			Crotonaldehyde	Crotonaldéhyde	Crotonaldehído
4680-78-8	X		C.I. Acid Green 3	Indice de couleur Vert acide 3	Verde 3 ácido
7429-90-5	X	m	Aluminum (fume or dust)	Aluminium (fumée ou poussière)	Aluminio (humo o polvo)
7550-45-0	X		Titanium tetrachloride	Tétrachlorure de titane	Tetracloruro de titanio
7632-00-0			Sodium nitrite	Nitrite de sodium	Nitrato de sodio
7637-07-2			Boron trifluoride	Trifluorure de bore	Trifluoruro de boro
7647-01-0	X		Hydrochloric acid	Acide chlorhydrique	Ácido clorhídrico
7664-39-3	X	t	Hydrogen fluoride	Fluorure d'hydrogène	Ácido fluorhídrico
7664-93-9	X		Sulfuric acid	Acide sulfurique	Ácido sulfúrico
7697-37-2	X		Nitric acid*	Acide nitrique	Ácido nítrico
7723-14-0	X		Phosphorus (yellow or white)	Phosphore (jaune ou blanc)	Fósforo (amarillo o blanco)
7726-95-6			Bromine	Brome	Bromo
7758-01-2		c,p	Potassium bromate	Bromate de potassium	Bromato de potasio
7782-41-4			Fluorine	Fluor	Fluor
7782-50-5	X		Chlorine	Chlore	Cloro
10049-04-4	X		Chlorine dioxide	Dioxyde de chlore	Dióxido de cloro

m = Metal and its compounds

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

\* Nitric acid, nitrate ion and nitrate compounds are aggregated into one category called nitric acid and nitrate compounds in the matched data set.

## Appendix B – Matched Chemicals—Listed in both TRI and NPRI, 2001 (continued)

CAS Number	In 1995–2001 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
13463-40-6			Iron pentacarbonyl	Fer-pentacarbonyle	Pentacarbonilo de hierro
25321-14-6	X	p	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)
26471-62-5	X	c,p	Toluenediisocyanate (mixed isomers)	Toluènediisocyanate (mélange d'isomères)	Toluenediisocianatos (mezcla de isómeros)
28407-37-6		p	C.I. Direct Blue 218	Indice de couleur Bleu direct 218	Índice de color Azul directo 218
--	X	m	Antimony and its compounds*	Antimoine (et ses composés)	Antimonio y compuestos
--	X	m,c,p,t	Arsenic and its compounds*	Arsenic (et ses composés)	Arsénico y compuestos
--	X	m,c,p,t	Cadmium and its compounds*	Cadmium (et ses composés)	Cadmio y compuestos
--			Chlorotetrafluoroethane (HCFC-124 and isomers)	Chlorotétrafluoroéthane	Clorotetrafluoroetano
--	X	m,c,p,t	Chromium and its compounds*	Chrome (et ses composés)	Cromo y compuestos
--	X	m,c,p	Cobalt and its compounds*	Cobalt (et ses composés)	Cobalto y compuestos
--	X	m	Copper and its compounds*	Cuivre (et ses composés)	Cobre y compuestos
--	X		Cresol (mixed isomers)**	Crésol (mélange d'isomères)	Cresol (mezcla de isómeros)
--	X		Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos
--			Dichlorotrifluoroethane (HCFC-123 and isomers)	Dichlorotrifluoroéthane	Diclorotrifluoroetano
--	X	m	Manganese and its compounds*	Manganèse (et ses composés)	Manganeso y compuestos
--		m,p,t	Mercury and its compounds*	Mercuré (et ses composés)	Mercurio y compuestos
--	X	m,c,p,t	Nickel and its compounds*	Nickel (et ses composés)	Níquel y compuestos
--	X		Nitric acid and nitrate compounds***	Acide nitrique et composés de nitrate	Ácido nítrico y compuestos nitrados
--		c,t	Polychlorinated alkanes (C10-C13)	Alcanes polychlorés (C10-C13)	Alcanos policlorinados (C10-C13)
--	X	m	Selenium and its compounds*	Sélénium (et ses composés)	Selenio y compuestos
--	X	m	Silver and its compounds*	Argent (et ses composés)	Plata y compuestos
--		m	Vanadium and its compounds*	Vanadium (et ses composés)	Vanadio y compuestos
--	X		Xylenes****	Xylènes	Xilenos
--	X	m	Zinc and its compounds*	Zinc (et ses composés)	Zinc y compuestos

m = Metal and its compounds

c = Known or suspected carcinogen.

p = California Proposition 65 chemical.

t = CEPA Toxic chemical.

\* Elemental compounds are reported separately from their respective element in TRI and aggregated with it in NPRI and in the matched data set.

\*\* o-Cresol, m-cresol, p-cresol and cresol (mixed isomers) are aggregated into one category called cresols in the matched data set.

\*\*\* Nitric acid, nitrate ion and nitrate compounds are aggregated into one category called nitric acid and nitrate compounds in the matched data set.

\*\*\*\* o-Xylene, m-xylene, p-xylene and xylene (mixed isomers) are aggregated into one category called xylenes in the matched data set.



**Appendix C – List of Facilities Appearing in *Taking Stock 2001***

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in		
21 Emi RI	Warick	RI	02886TCM 25GRA	8-17		
3M Canada Company (Perth)	Perth	ON	000003201	9-21		
AAM Tonawanda Forge	Tonawanda	NY	14240GNRLM2390K	8-18		
Acordis Cellulosic Fibers Inc., Acordis U.S. Holding Inc.	Axis	AL	36505CRTLDUSHIG	7-7	9-8	9-20
ADM Agri-industries Ltd., Archer Daniels Midland Company	Windsor	ON	0000005694	9-15		
Advanced Flex Inc.	Minnetonka	MN	55345DVNCD15115	8-17		
Agrium Products Inc., Redwater Fertilizer Operations	Redwater/ Municipal District	AB	0000002134	9-21		
Aimco Solrec Ltd.	Milton	ON	0000004893	8-4	8-15	8-16
AK Steel Corp.	Rockport	IN	47635KSTLC6500N	4-4	5-6	7-7
AK Steel Corp. Butler Works (Rte. 8 S.)	Butler	PA	16003RMC DVROUTE	4-4	5-6	6-9
Alabama Power Co. Greene County Steam Plant, Southern Co.	Forkland	AL	36732LBPWWHY43	5-6	9-21	
Albemarle Corp.	Tyrone	PA	16686QLTYCINDUS	8-5		
Alberta Pacific Forest Industries Inc.	Boyle	AB	0000000001	6-19		
Alcan Primary Metal - British Columbia, Kitimat Works	Kitimat	BC	0000002788	9-15		
Alcatel	Montréal-Est	QC	0000000959	8-15		
Alcatel Canada Wire	Simcoe	ON	0000000953	8-15		
Alchem Aluminum Inc., Imco Recycling Inc.	Coldwater	MI	49036LCHML368WG	8-15	10-10	
Algoma Steel Inc	Sault Ste. Marie	ON	0000001070	7-6		
Allegheny Energy Inc. Hatfield Power Station	Masontown	PA	15461HTFLDRD1BO	9-21		
AltaSteel Ltd., Stelco Inc.	Edmonton	AB	0000001106	10-12		
Amcan Castings Limited	Hamilton	ON	0000002496	8-15		
American Axle & Mfg. Gear Facility	Detroit	MI	48212GMCSG1840H	8-5	8-18	
American Axle & Mfg. Inc. Buffalo Facility	Buffalo	NY	14215GNRLM1001E	8-18		
American Axle & Mfg. Inc. Cheektowaga	Cheektowaga	NY	14211MRCNX2799W	8-18		
American Electric Power Cardinal Plant, Cardinal Operating Co.	Brilliant	OH	43913CRDNL306CO	9-20		
American Electric Power John E. Amos Plant	Winfield	WV	25213JHNMS1530W	5-6	9-14	9-20
American Electric Power Mitchell Plant	Moundsville	WV	26041MTCHLSTATE	5-6		
American Electric Power Mountaineer Plant	New Haven	WV	25265MNTNRRE33	9-20		
Amvac Chemical Corporation, American Vanguard Corp.	Los Angeles	CA	90023MVCCH4100E	Section 10.4.2		
Anachemia Ltee/Ltd	Lachine	QC	0000003564	8-15		
Arco Alloys Corp.	Detroit	MI	48211RCLLY1891T	8-7		
ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Americas Mining Corp.	Hayden	AZ	85235SRCNC64ASA	4-4	5-6	7-7 Executive Summary
ASARCO Inc., Americas Mining Corp.	East Helena	MT	59635SRCNCSEMLT	4-4	5-6	6-9 7-7
AT Plastics Inc., Edmonton Site	Edmonton	AB	0000000126	9-15		
Atco Power, Battle River Generating Station	Forestburg	AB	0000001033	10-19		
Attleboro Refining Co. Inc.	Attleboro	MA	02703HNDYH47FRA	8-17		
AV Cell Inc., Tembec/Grasim Industries/Thai Rayon LP/P.T. Indo Bharat Co. Ltd.	Atholville	NB	0000005008	6-19		
Avaya Inc.	Omaha	NE	68137TTNTW120TH	8-17		
Baldwin Energy Complex, Dynegy Inc.	Baldwin	IL	62217LLNSP1901B	9-20		
Ball Brass & Aluminum Fndy.	Auburn	IN	46706BLLBR520HA	8-18		
Ball Packaging Products Canada, Inc.	Burlington	ON	0000003117	8-4		
BASF Corp.	Freeport	TX	77541BSFCR602CO	4-4	5-6	Executive Summary
Bayer Inc.	Sarnia	ON	0000001944	9-7	9-14	9-15
Behr Specialty Metals Inc.	Rockford	IL	61104BHRPR1100S	8-17		
Belden Canada Inc.	Cobourg	ON	0000002670	8-15		
Bethlehem Steel Corp. Burns Harbor Div.	Burns Harbor	IN	46304BTHLHBURNS	10-10		
Bethlehem Steel Corp. Sparrows Point Div.	Sparrows Point	MD	21219BTHLHDUALH	10-10		
Big River Zinc Corp.	Sauget	IL	62201BGRVRRTE3M	9-3	9-8	
Bowater Maritimes Inc., Dalhousie Mill, Bowater Pulp and Paper/OJI Paper Co./Mitsui & Co.	Dalhousie	NB	0000004876	6-8	9-20	
Bowater Pulp and Paper Canada Inc., Thunder Bay Operations	Thunder Bay	ON	0000000930	9-14	Executive Summary	

Appendix C – List of Facilities Appearing in *Taking Stock 2001 (continued)*

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in			
BP Chemicals Green Lake Facility, BP America Inc.	Port Lavaca	TX	77979BPCHMTEXAS	5-6	9-3		
BP Chemicals Inc., BP America Inc.	Lima	OH	45805BPCHMFORTA	5-6	9-3	9-8	Sections 9.2.3 and 9.3.3
Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore	MD	21226BRNDN1000B	4-4	5-6	9-14	
Brass Craft Canada Ltd.	St. Thomas	ON	0000004463	8-4	8-16		
Brazeway Inc.	Adrian	MI	49221BRZWY2711E	8-18			
Browning Ferris Industries, BFI Calgary Landfill District #236	Calgary	AB	0000005200	6-8			
Browning-Ferris Industries - Arbor Hills Landfill	Northville	MI	--	8-15			
Brush Wellman Inc.	Shoemakersville	PA	19555BRSHWSHOEM	8-17			
Brushwellman Inc. Elmore Plant	Elmore	OH	43416BRSHWSOUTH	8-17			
Cal Met Trading	Morgan Hills	CA	--	8-16			
Canada Pipe Company Ltd, Fonderie Bibby Saint-Croix	Sainte-Croix	QC	0000004330	10-19			
Canadian Forest Products Ltd., Northwood Pulp Mill	Prince George	BC	0000001797	7-6	9-21		
Canadian General Tower Ltd.	Cambridge	ON	0000003475	9-14			
Canadian Technical Tape, Montreal Plant	St-Laurent	QC	0000004399	9-7			
Canbra Foods Ltd., James Richardson & Sons Limited	Lethbridge	AB	0000004829	9-15			
Cargill Foods	High River	AB	0000005235	7-6			
Carpenter Canada Co.	Woodbridge	ON	0000002567	9-2	9-7		
Casco Impregnated Papers, Inc.	Cobourg	ON	0000000177	8-15			
Celanese Canada Inc., Edmonton Facility	Edmonton	AB	0000001162	6-8	9-2		
Celanese Ltd. Bay City Site	Bay City	TX	77414HCHSTPOBOX	8-18			
Celanese Ltd. Clear Lake Plant	Pasadena	TX	77507HCHST9502B	4-4	7-7		
Central Machinery & Metals	Weston	ON	--	8-8	8-18		
Cerro Metals	Bellefonte	PA	16823CRRMTBOX38	8-6			
Chemetco inc.	Hartford	IL	--	8-16			
Chemical Lime Co. Alabaster Plant	Alabaster	AL	35007CHMCL404FI	10-4	Section 10.2.1		
Chemical Waste Management Inc., Waste Management Inc.	Kettleman City	CA	93239CHMCL35251	5-6	9-3	9-8	
Chemical Waste Management Lake Charles Facility	Sulphur	LA	70665CHMCL7170J	10-16			
Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington	OR	97812CHMCL17629	4-4	5-6	9-3	9-8
Chemical Waste Management, Waste Management	Emelle	AL	35459CHMCLHWY17	10-4			
Chemrec Inc.	Cowansville	QC	0000002413	8-9	8-15	8-16	
Chemsource Corp.	Guayama	PR	00785CHMSRRD3KM	9-15			
Chevron Phillips Chemical Co. L.P. Port Arthur Facility	Port Arthur	TX	77640CHVRN2001S	4-4			
Chicago Faucet Co.	Des Plaines	IL	60018THCHC2100S	8-17			
Choctaw Maid Farms Carthage Plant	Carthage	MS	39051CHCTWHWY35	6-22			
City of Hamilton, Swaru Incinerator	Hamilton	ON	0000005860	10-12	10-19		
Clariant LSM (Florida) Inc.	Gainesville	FL	32602PCRNCS5002S	10-16			
Clean Harbors of Braintree Inc.	Braintree	MA	02184CLNHR385QU	10-4			
Clean Harbors of Connecticut Inc.	Bristol	CT	06010CLNHR51BRO	10-4			
Clean Harbors Services Inc.	Chicago	IL	60617CNLHR11800	Section 10.2.1			
Conagra Poultry Co., Conagra Foods Inc.	Enterprise	AL	36330CNGRBHWY14	6-22			
Conagra Poultry Co., Conagra Foods Inc.	Farmerville	LA	71241CNGRBHWY15	6-22			
Conbraco Inds. Inc.	Pageland	SC	29728CNBRC1509V	8-18			
Conception Bay North, Harbour Grace Conception Bay North Incinerator Association	Harbour Grace	NL	0000005036	10-12			
Co-Steel Lasco	Whitby	ON	0000003824	6-8	7-6	8-4	8-16
CP&L Mayo Electric Generating Plant, Progress Energy	Roxboro	NC	27573MYLCT10660	9-21			
CP&L Roxboro Steam Electric Plant, Progress Energy	Semora	NC	27343RXBRS1700D	4-4	5-6	9-14	9-21
Cyanokem Inc.	Detroit	MI	48227CYNKM12381	8-18			Executive Summary
Cytec Inds. Inc. Fortier Plant	Westwego	LA	70094MRCNC10800	8-18	7-7		
Delphi Harrison Thermal Sys. Lockport	Lockport	NY	14094GNRLM200UP	8-17			
Delphi Packard Electric Sys. N. River Road Facility	Warren	OH	44483GMCPCNORTH	8-17			

**Appendix C – List of Facilities Appearing in *Taking Stock 2001* (continued)**

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in				
Detroit Edison Monroe Power Plant, DTE Energy Co.	Monroe	MI	48161DTRTD3500E	5-6				
DNN Galvanizing	Windsor	ON	0000000276	8-4				
Doe Run Co. Recycling Facility, Renco Group Inc.	Boss	MO	65440BCKSMHIGHW	-				
Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum	MO	63048HRCLN881MA	5-6				
Dofasco Inc., Dofasco Hamilton	Hamilton	ON	0000003713	8-4	8-16	4-4	6-8	7-6
Dominion Castings Ltd., NACO Inc.	Hamilton	ON	0000004739	7-6				
Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan	AB	0000000280	9-20	10-12	10-19		
Dow Chemical Co. Freeport	Freeport	TX	77541THDWCBUILD	10-10				
Dow Chemical Co. Louisiana Div.	Plaquemine	LA	70765THDWCHIGHW	10-10				
Dow Chemical Co. Midland Ops.	Midland	MI	48667THDWCMI	10-10				
Dow Corning Corp.	Carrollton	KY	41008DWCRNUSHIG	8-17				
Dow Corning Corp.	Midland	MI	48686DWCRN3901S	8-5				
Du Pont Chemicals Starke Facility	Starke	FL	32091DPNTCSTATE	10-10				
Du Pont Delisle Plant	Pass Christian	MS	39571DPNTD7685K	5-6	10-10	10-16		
Du Pont Edge Moor	Edgemoor	DE	19809DPNTD104HA	10-10				
Du Pont Johnsonville Plant	New Johnsonville	TN	37134DPNTJ1DUPO	5-6	10-10			
Du Pont Victoria Plant	Victoria	TX	77902DPNTVOLDBL	5-6	6-9	7-7		
Duke Energy Marshall Steam Station	Terrell	NC	28682DKNRG8320E	5-6	9-14			
Duke Power Belews Creek Steam Station, Duke Energy Corp.	Belews Creek	NC	27052DKNRGPINEH	5-6	9-14			
Duracell Inc.	Lancaster	SC	29720DRCLLHWY9B	8-18				
Duracell Inc.	Cleveland	TN	37311DRCLLMOUSE	8-18				
Eastman Chemical Co. Texas Ops.	Longview	TX	75607TXSSTOFFHI	9-15				
Eastman Kodak Co. Kodak Park	Rochester	NY	14652STMNK1669L	8-17				
Edmonton Power Inc., Genesee Thermal Generating Station, EPCOR	Warburg	AB	0000000267	10-19				
Elementis Chromium L.P.	Corpus Christi	TX	78407MRCNC3800B	6-9	Section 9.2.3 and 9.3.3			
Elkhart Brass Mfg. Co. Inc.	Elkhart	IN	46514LKHRT1302W	8-18				
Ellwood Quality Steels Co.	New Castle	PA	16101LLWDD700MO	6-28				
Emballages Smurfit-Stone Canada Inc., Smurfit-Stone Container Corp.	La Tuque	QC	0000003140	7-6				
EME Homer City Generation L.P., Edison Intl.	Homer City	PA	15748MHMRC1750P	9-20				
Encycle Texas Inc.	Corpus Christi	TX	78407NCYCL5500R	8-5				
Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon	OH	43616NVRSF8760T	5-6	6-9	Executive Summary		
EQ Resource Recovery Inc., EQ Holding Co.	Romulus	MI	48174MCHGN36345	8-5				
Equistar Chemicals L.P.	Channelview	TX	77530LYNDL8280S	9-15				
Equistar Chemicals L.P. Clinton Plant	Clinton	IA	52732QNTMCUSHWY	9-15				
Equistar Chemicals L.P. Victoria Facility	Victoria	TX	77902CCDNTOLDBL	4-4				
Erie Bronze & Aluminum	Erie	PA	16506RBRNZ6300W	8-17				
Eurocan Pulp and Paper Company, West Fraser Mills	Kitimat	BC	0000003171	6-8	6-19	7-6	9-21	
Exploits Regional Services Board Solid Waste Disposal Site	Grand Falls-Windsor	ON	0000005034	10-12				
Extruded Metals Inc.	Belding	MI	48809XTRDD302AS	8-7	8-16			
ExxonMobil Oil Beaumont Refy.	Beaumont	TX	77701BMNTREASTE	9-15				
Falconbridge Ltd. Kidd Creek Metallurgical Div.	Timmins	ON	0000002815	8-18	8-8			
Fielding Chemical Technologies Inc.	Mississauga	ON	0000001260	8-16				
Firestone Polymers	Sulphur	LA	70602FRSTNLA108	4-4				
Florida Power Crystal River Energy Complex, Progress Energy	Crystal River	FL	34428FLRDP15760	5-6	9-14	9-21		
Ford Motor Company	Windsor	ON	0000003416	8-15				
Ford Motor Co. Livonia Transmission Plant	Livonia	MI	48150FRDMT36200	8-5				
Ford Motor Company of Canada Limited	Windsor	ON	0000004416	8-15				
Ford of Canada	Windsor/Essex	ON	0000004781	8-15				
Formosa Plastics Corp. Louisiana	Baton Rouge	LA	70805FRMSPGULFS	10-10				

**Appendix C – List of Facilities Appearing in *Taking Stock 2001* (continued)**

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in			
Gage Products	Ferndale	MI	48220GGPRD625WA	8-7			
GB Biosciences Corp.	Houston	TX	77015FRMNT2239H	10-10	10-16		
GE Co. Silicone Prods.	Waterford	NY	12188GNRLL260HU	8-5	8-17		
GE Lighting, Canada, Oakville Lamp Plant	Oakville	ON	0000001281	10-4			
GE Plastics	Selkirk	NY	12158GNRLLNORYL	8-17			
General Cable Inds.	Taunton	MA	02780CRWNW37CUS	8-17			
General Cable Inds.	Cass City	MI	48726GNRLC6285G	8-17			
General Cable Inds. Inc.	Monticello	IL	61856GNRLCROUTE	8-17			
General Cable Inds. Inc.	Lawrenceburg	KY	40342GNRLC1381B	8-17			
General Cable Inds. Inc.	Manchester	NH	03102CRLCB345MC	8-17			
General Cable Inds. Inc.	Bonham	TX	75418GNRLC800E2	8-17			
General Cable Inds. Inc.	Plano	TX	75074CPTLW91010	8-17			
General Cable Inds. L.L.C.	Sanger	CA	93657GNRLC1075N	8-17			
General Motors of Canada Limited	Oshawa	ON	0000003870	8-15			
General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa	ON	0000003893	9-7			
Georgia Power Bowen Steam Electric Generating Plant, Southern Co.	Cartersville	GA	30120BWNST317CO	4-4	5-6	9-14	Executive Summary
Georgia-Pacific West Inc.	Bellingham	WA	98225GRGPC300WL	10-4			
Gerdau MRM Steel Inc., MRM Steel, Gerdau Steel Inc.	Selkirk	MB	0000001651	10-12			
Gibbons Creek Steam Electric Station	Carlos	TX	77830GBBNS25MIL	6-9	9-21		
Gibbs Die Casting Corp.	Harlingen	TX	78550GBBSD1209I	8-17			
Gibbs Die-Casting Corp.	Henderson	KY	42420GBBSDUS60W	8-17			
GM Lansing Plants 2 3 & 6 (Body)	Lansing	MI	48921BCLNS401NO	8-17			
GMC Powertrain Defiance, General Motors Corp.	Defiance	OH	43512GMC STATE	7-7			
Goodyear Tire & Rubber Co.	Cheek	TX	77720THGDYINTER	9-15			
Gould Electronics Inc. Electronic Materials	Mc Connelssville	OH	43756GLDNC5045N	8-18			
Griffin Pipe Prods. Co., Amsted Inds. Inc.	Florence	NJ	08518GRFFN1100W	6-28			
Gulf Power Co. Plant Crist, Southern Co.	Pensacola	FL	32514GLFPW11999	5-6	9-14		
H. Kramer & Co.	Chicago	IL	60608HKRMR1359W	8-17			
H.E. Vannatter Ltd.	Wallaceburg	ON	0000005713	8-15			
Hadco Corp. Owego Div.	Owego	NY	13827HDCCRBODLE	8-17	8-18		
Heritage Environmental Services L.L.C.	Indianapolis	IN	46231HRTGN7901W	9-3	9-8		
Horsehead Resource Development	Palmerton	PA	18071HRSHDDELAW	8-6	8-16		
Howe Sound Pulp and Paper Limited Partnership, OJI Paper Canada/Canadian Forest Products	Port Mellon	BC	0000001419	6-8	9-21	10-12	
Imco Recycling Inc.	Morgantown	KY	42261MCRCY609GA	10-10			
Imco Recycling Of Idaho Inc.	Post Falls	ID	83845MCRCYW4000	10-10			
Imco Recycling of Michigan L.L.C.	Coldwater	MI	49036MCRCY267NO	10-10			
Imco Recycling of Ohio Inc.	Uhrichsville	OH	44683MCRCY7335N	10-10			
Imperial Home Decor Group (Canada) ULC	Brampton	ON	0000002263	9-20			
Imperial Oil, Sarnia Refinery Plan	Sarnia	ON	0000003704	9-15			
Inco Limited, Copper Cliff Smelter Complex	Copper Cliff	ON	0000000444	6-8	7-6	9-14	9-20
Inco Limited, Thompson Operations	Thompson	MB	0000001473	9-2			
International Wire Group Auburn Facility	Jordan	NY	13080LRBWR24NBE	8-17			
International Wire Group Omega Wire Facility	Williamstown	NY	13493MGWRNMAINS	8-17			
International Wire Group OWI Facility	Camden	NY	13316LRBWR29HAR	8-17			
Invensus Metering Sys. Inc.	Uniontown	PA	15401RCKWLBAILE	8-18			
Irving Pulp & Paper Limited / Irving Tissue Company, J. D. Irving Limited	Saint John	NB	0000002604	7-6			
ITW Foils - Windsor, Illinois Tool Works	Windsor	ON	0000005627	7-6			
Ivaco Rolling Mills Limited Partnership	L'Original	ON	0000001520	6-8	8-4	8-16	
J & L Specialty Steel Inc.	Louisville	OH	44641JLSPC1500W	4-4			
J. D. Irving Ltd., Lake Utopia Paper	Utopia	NB	0000001572	9-21			

Appendix C – List of Facilities Appearing in *Taking Stock 2001* (continued)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in									
J. M. Stuart Station, Dayton Power & Light Co.	Manchester	OH	45144DYTNP745US	5-6									
Jayhawk Fine Chemicals Corp.	Galena	KS	66739LLCCH22MIS	4-4									
Kearny Smelting & Refining Corp.	Kearny	NJ	07029KRNY936HA	8-17									
Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna	UT	84006KNNCT8362W	4-4	5-6	7-7	9-3	9-8				Executive Summary	
Kimberly-Clark Inc.	New Glasgow	NS	0000000815	6-19									
Krupp Gerlach Veedersburg	Veedersburg	IN	47987KRPPG12918	4-4									
L&M Screw Machine Products Limited	North York	ON	0000000715	8-16									
Lafarge Cement	Saint-Constant	QC	0000005474	8-9									
Lafarge Corporation	Alpena	MI	49707LFRGCFORDA	8-7	8-15								
Laird Techs.	Delaware Water Gap	PA	18327NSTRMINTER	8-18									
Lenzing Fibers Corp.	Lowland	TN	37778LNZNGTENNE	6-9	7-7	9-20							
Lofthouse Brass Manufacturing Limited	Burks Falls	ON	0000003854	8-4	8-16								
Lofthouse Brass Manufacturing Limited	Whitby	ON	0000003853	8-16									
Louisiana-Pacific Canada Ltd., LP Dawson Creek OSB	Dawson Creek	BC	0000000718	6-25									
Madison Inds. Inc.	Old Bridge	NJ	08857MDSNNOLDWA	5-6	6-9	7-7							
Magnesium Aluminum Corp.	Cleveland	OH	44111MGNSM3425S	8-17									
Magnesium Corp. of America, Renco Group Inc.	Rowley	UT	84074MXMGNROWLE	4-4	5-6	6-9	7-7	9-14	9-20	10-10	Section 9.4.2	Executive Summary	
Manitoba Hydro, Selkirk Generating Station	St. Clements	MB	0000000823	9-20									
Maple Leaf Metal Industries Ltd.	Edmonton	AB	0000005202	8-4	8-16								
Marisol Inc.	Middlesex	NJ	08846MRSLN125FA	4-4									
McConway & Torley Corp., Trinity Inds. Inc.	Pittsburgh	PA	15201MCCNW10948	6-28									
Metal Chem (U.S. Zinc)	Pittsburgh	PA	--	8-6									
Métallurgie Magnola Inc., Noranda/Société générale de financement du Québec	Danville	QC	0000005520	10-19									
Methanex Corporation, Medicine Hat Plant	Medicine Hat	AB	0000001782	7-6									
Microprecision Die Casting Inc.	Burlington	ON	0000002499	8-15									
Moeller Land & Cattle Co.	Caneyville	KY	42721MLLRL7804B	8-18									
Monsanto Luling, Pharmacia Corp.	Luling	LA	70070MNSNTRIVER	5-6	9-3	9-8							
Mt. Storm Power Station, Dominion Resources Inc.	Mount Storm	WV	26739MTSTRHC76B	Section 10.2.1								Executive Summary	
Mueller Brass Co.	Port Huron	MI	48060MLLRB1925L	8-7									
National Steel Corp. Greatlakes Ops.	Ecorse	MI	48229GRTLKNO1QU	4-4	5-6								
Neenah Fndy. Co., NFC Castings Inc.	Neenah	WI	54956NNHFN2121B	6-28									
New Brunswick Power, Coleson Cove Generating Station	Saint John	NB	0000001696	9-14									
New Jersey Shell Casting Corp.	Marietta	PA	17547NWJRSSDECA	8-18									
Nexans Magnet Wire USA Inc.	La Grange	KY	40031MGNTW2615E	8-18									
Nexans Magnet Wire USA Inc.	Mexico	MO	65265PTCDD5701H	8-18									
Nexen Chemicals Canada Limited Partnership, Nanaimo	Nanaimo	BC	0000003526	7-6									
Nexen Chemicals Canada Limited Partnership, Squamish	Squamish	BC	0000005394	10-4									
Nexfor Fraser Papers Inc., Edmundston Operations	Edmundston	NB	0000001221	9-20									
NGK Metals Corp.	Sweetwater	TN	37874NGKMT917ST	8-5									
Noma Cable Tech	Stouffville	ON	0000002700	8-15									
Noranda Inc. (Fonderie Horne)	Rouyn-Noranda	QC	0000003623	8-9	8-17								
Norbord Industries Inc., Val d'Or Division, Nexfor Inc.	Val d'Or	QC	0000001745	6-25									
Norsk Hydro Canada Inc., Hydro Magnesium Canada	Bécancour	QC	0000000747	8-17	10-19								
Norske Skog Canada Limited, Crofton Division	Crofton	BC	0000001266	6-8	7-6	9-21	10-12						
Norske Skog Canada Limited, Port Alberni Division	Port Alberni	BC	0000001593	10-12									
Norske Skog Canada Limited, Powell River Division	Powell River	BC	0000000723	6-8	7-6	10-12							
NorskeCanada, Elk Falls Mill	Campbell River	BC	0000000333	10-12									
North Star BHP Steel L.L.C.	Delta	OH	43515NRTHS6767C	4-4									
Northern States Power Co.	Becker	MN	55308NRTHR13999	10-10									

Appendix C – List of Facilities Appearing in *Taking Stock 2001* (continued)

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in								
Northwestern Steel & Wire Co.	Sterling	IL	61081NRTHW121WA	6-9								
NOVA Chemicals Corporation, Moore Site	Sarnia	ON	0000001788	9-15								
NOVA Chemicals Corporation, St. Clair River Site	Corunna	ON	0000004700	7-6	9-20							
Nova Scotia Power Inc., Lingan Generating Station, Emera Inc.	New Waterford	NS	0000003992	9-14	10-19							
Nova Scotia Power Inc., Point Tupper Generating Station, Emera Inc.	Port Hawkesbury	NS	0000003994	9-21								
Nova Scotia Power Inc., Trenton Generating Station, Emera Inc.	Trenton	NS	0000003996	6-8	9-21							
Nucor Steel Arkansas	Blytheville	AR	72315NCRST7301E	4-4								
Nucor Steel, Nucor Corp.	Crawfordsville	IN	47933NCRST400SO	4-4	5-6	7-7	Executive Summary					
Nucor Steel, Nucor Corp.	Huger	SC	29450NCRST1455H	4-4	5-6	6-9	7-7					
Nucor-Yamato Steel Co., Nucor Corp.	Blytheville	AR	72316NCRYM5929E	4-4	5-6	7-7						
Occidental Chemical Corp. Niagara Plant	Niagara Falls	NY	14302CCDNT4700B	10-16								
Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne	NC	28429CCDNTOFFST	6-9	Sections 9.2.3 and 9.3.3							
Olin Corp. Zone 17 Facility	East Alton	IL	62024LNCRPLEWIS	4-4								
Ontario Power Generation Inc, Lambton Generating Station	Courtright	ON	0000001809	9-14								
Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke	ON	0000001861	4-4	5-6	6-8	8-15	9-14	9-21	Section 10.2.1	Executive Summary	
Ontario Power Generation Inc., Lakeview GS	Mississauga	ON	0000002844	9-14								
Onyx Environmental Services L.L.C.	West Carrollton	OH	45449CWMRS4301I	4-4	5-6	6-9						
Onyx Environmental Services, Vivendi S.A.	Menomonee Falls	WI	53051TSCNTW124N	10-4								
Orlick Industries Limited	Hamilton	ON	0000005904	8-15								
Orlick Industries Limited	Stoney Creek	ON	0000005906	8-15								
Ormet Aluminum Mill Prods. Corp.	Friendly	WV	26135BNSRNSTATE	10-10								
Osram Sylvania Ltée	Drummondville	QC	0000001816	10-4								
Owens-Corning Canada Inc.	Candiac	QC	0000001858	8-15								
Oxy Vinyls L.P. La Porte VCM Plant, Occidental Petroleum Corp.	La Porte	TX	77571LPRTC2400M	10-10	10-16							
Paintplas Inc., 1254581 Ontario Ltd.	Ajax	ON	0000000733	9-20								
Papier de Communication Domtar, Centre d'Affaires Windsor	Windsor	QC	0000001195	9-20								
Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria	IL	61615PRDSP4349W	4-4	5-6	Executive Summary						
Petro-Canada	Montreal	QC	0000003897	8-15								
Petro-Chem Processing Group/Solvent Distillers Group	Detroit	MI	48214PTRCH421LY	4-4	8-5	8-17	8-18	Section 8.2	Executive Summary			
Pétromont, Société en Commandite, Usine de Varennes	Varennes	QC	0000003634	9-15								
Pfizer Inc. Parke-Davis Div.	Holland	MI	49424PRKDV188HO	4-4								
Pharmacia & Upjohn Co.	Kalamazoo	MI	49001THPJH7171P	4-4								
Phelps Dodge Hildago Inc.	Playas	NM	88009PHLPSHIDAL	6-9	7-7							
Phelps Dodge Miami Inc.	Claypool	AZ	85532NSPRTPBOX	7-7								
Philip Enterprises Inc., Fort Erie Facility	Fort Erie	ON	0000005646	8-4	9-2	9-7	10-4					
Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton	ON	0000005645	6-8	8-8	8-15						
Philip Services	Barrie	ON	0000005647	8-17								
Philip Services (Burlington St. East)	Hamilton	ON	--	8-17								
Philip Services (Centennial Parkway)	Hamilton	ON	--	8-17								
Philip Services (Parkdale Ave. North), Hamilton, ON	Hamilton	ON	--	8-18								
Philip Services Corp.	Windsor	ON	0000004627	8-15								
Philip Services Inc., Delta Facility	Delta	BC	0000005111	10-4								
Philip Services Inc., Yard 3 Facility	Hamilton	ON	0000001928	6-8								
Photocircuits Corp.	Glen Cove	NY	11542PHTCR31SEA	8-17	8-18							
Pilgrim's Pride Corp. Mt. Pleasant Complex	Mount Pleasant	TX	75455PLGR11000S	6-22								
Pollution Control Inds. of Tennessee L.L.C.	Millington	TN	38054PLLTN5485T	10-4								
Pope & Talbot Ltd., Harmac Pulp Operations	Nanaimo	BC	0000001383	10-12								
PPG Inds. Inc.	Lake Charles	LA	70669PPGNDCOLUM	10-10	10-16							
PPG Inds. Inc.	New Martinsville	WV	26155PPGNDSTATE	10-4								
Precision Kidd Steel Co.	West Aliquippa	PA	15001PRCSN2NDER	4-4	5-6	6-9	7-7	Executive Summary				

**Appendix C – List of Facilities Appearing in *Taking Stock 2001* (continued)**

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in						
Printed Circuit Corp.	Woburn	MA	01801PRNTD10MIC	8-18						
Quebecor World Inc. Corinth Div.	Corinth	MS	38834KRGRRONEGO	9-15						
Quebecor World Inc., Quebecor World Islington	Etobicoke	ON	0000003447	9-7						
Quebecor World Richmond Inc.	Richmond	VA	23228MXWLL7400I	9-15						
QW Memphis Corp., Quebecor World Inc.	Memphis	TN	38116MXWLL828EA	9-15						
Recmix of Pennsylvania	Canonsburg	PA	15317RCMXF586PL	8-6						
Reed & Barton Silversmiths	Taunton	MA	02780RDND144WE	8-18						
Reliant Energies Inc. Keystone Power Plant	Shelocta	PA	15774KYSTNRTE21	4-4	5-6	6-9	9-14	9-21	Section 10.2.1	Executive Summary
Republic Techs. Intl. L.L.C.	Blasdell	NY	14218BTHLHBARRO	8-18						
Revere Copper Prods. Inc.	New Bedford	MA	02741RVRCP24NOR	8-18						
Revere Copper Prods. Inc.	Rome	NY	13440RVRCPSENECE	8-17						
Rineco	Benton	AR	72015RNC001007V	4-4						
River Recycling Inds. Inc.	Cleveland	OH	44109RVRR4195B	8-18						
Rochester Plating Works Inc.	Rochester	NY	14611RCHST2CAIR	8-18						
Rouge Steel Co., Rouge Inds. Inc.	Dearborn	MI	48121RGSTL3001M	4-4	5-6					
Safety-Kleen	Mercier	QC	0000005449	8-9						
Safety-Kleen (Aragonite) Inc.	Aragonite	UT	84029SFTYK11600	10-10						
Safety-Kleen Envirosystems Co. of Puerto Rico Inc.	Manati	PR	00674SFTYK510	4-4						
Safety-Kleen Limited, Debert Central Transfer Facility	Debert	NS	0000005011	10-4						
Safety-Kleen Ltd.	Mississauga	ON	0000004948	8-15						
Safety-Kleen Ltd., Lambton Facility	Corunna	ON	0000002537	6-8	8-8				Section 10.2.1	
Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	Thorold	ON	0000005625	10-4						
Safety-Kleen Sys. Inc.	Smithfield	KY	40068SFTYK3700L	4-4						
Sam Adelstein & Co. Limited	St. Catharines	ON	--	8-8	8-18					
Schilberg Integrated Metals	East Hartford	CT	--	8-15						
Schilberg/Upstate Metals Corp.	Canastota	NY	--	8-15						
Selkirk Forest Products, McFarland Cascade Holdings Inc.	Galloway	BC	0000005156	10-12						
Seminole Generating Station	Palatka	FL	32177SMNLGUSHWY	9-20						
Services Safety-Kleen (Québec) Ltée	Thurso	QC	0000005455	10-4						
Sheerness Generating Station, Alberta Power/Transalta Utilities Corp.	Hanna	AB	0000001036	10-19						
Shell Canada Products, Sarnia Manufacturing Centre	Corunna	ON	0000003962	9-2	9-7					
Shell Norco Chemical Plant East Site	Norco	LA	70079SHLLL1205R	4-4						
Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan	AB	0000002132	7-6						
Slater Stainless Corp., Aciers Inoxydables Atlas	Sorel-Tracy	QC	0000003953	9-2	9-7					
Slater Stainless Corp., Atlas Specialty Steels	Welland	ON	0000003158	9-2						
Solutia Chocolate Bayou	Alvin	TX	77511SLTNCFM291	5-6	6-9	7-7	9-3	9-8		
Solutia Inc.	Cantonment	FL	32533MNSNT30000	4-4	5-6				Executive Summary	
Southeastern Chemical & Solvent Co. Inc.	Sumter	SC	29151STHST755IN	4-4						
Southwire Co.	Kingman	AZ	86401GNRLC4900I	8-17						
Southwire Co.	Watkinsville	GA	30677LLDTBBARNE	8-17						
St Marys Cement Company, St Marys Cement Plant	St Marys	ON	0000005871	6-8	7-6					
Stablex Canada Inc.	Blainville	QC	0000005491	6-8	8-9	9-2	9-7	10-4	Section 10.2.1	
Stackpole Limited	Toronto	ON	0000003980	8-15						
Steel Dynamics Inc.	Butler	IN	46721STLDY4500C	4-4	5-6	6-9	7-7		Executive Summary	
Stelco Inc., Hilton Works	Hamilton	ON	0000002984	9-2	9-7	9-15				
Stelco McMaster Ltée, Stelco Inc.	Contrecoeur	QC	0000002986	6-8	7-6					
Sunoco Inc., Sarnia Refinery, Suncor Energy	Sarnia	ON	0000003071	9-15						
Superior Brass & Aluminum Casting Co.	East Lansing	MI	48823SPRRB4893D	8-18						
Systech Environmental Corporation, Lafarge Corporation	Paulding	OH	--	8-16						
Tampa Electric Co. Gannon Station, TECO Energy Inc.	Tampa	FL	33619TMPLC3602P	5-6						

Appendix C – List of Facilities Appearing in *Taking Stock 2001 (continued)*

Facility Name	City	State/ Province	PRTR ID Number	Tables and/or Section Facility Appears in					
Teck Cominco Metals Limited, Trail Operations	Trail	BC	000003802	10-4					
Temple Pembroke Inc., Temple Inland Forest Products Corp.	Pembroke	ON	000005609	6-25					
Teris L.L.C. (dba Heat Treatment Services)	Dallas	TX	75212HTNRG4460S	4-4					
Texas Instruments Inc.	Attleboro	MA	02703TXSNS34FOR	8-17					
Texas Recreation Corp.	Wichita Falls	TX	76305TXSRC908NO	9-15					
Tolko Manitoba Kraft Papers	The Pas	MB	000002051	7-6	9-14				
Town of Channel - Port aux Basques Incinerator	Port aux Basques	NL	000005028	10-12					
Town of Clarendville Incinerator	Clarendville	NL	000005029	10-12					
Town of Deer Lake Incinerator	Deer Lake	NL	000005031	10-12					
Town of Holyrood Incinerator	Holyrood	NL	000005037	10-12					
Town of Marystown Waste Disposal Site Jean de Baie	Marystown	NL	000005040	10-12					
Town of Stephenville Incinerator	Stephenville	NL	000005051	10-12					
Town of Wabush Incinerator	Wabush	NL	000005054	10-12					
Transalta Corporation, Sundance Thermal Generating Plant	Duffield	AB	000002284	9-20	Section 10.2.1		Executive Summary		
TRI-Smith Recycling	North York	ON	--	8-18					
Tuyaux Wolverine (Canada) inc.	Montréal-Est	QC	000002312	8-16					
U.S. Department of the Treasury Philadelphia Mint	Philadelphia	PA	19106NTDST151NI	4-4					
U.S. TVA Colbert Fossil Plant	Tuscumbia	AL	35674STVCL900CO	9-21					
U.S. TVA Johnsonville Fossil Plant	New Johnsonville	TN	37134STVJH535ST	5-6	9-21				
Uniboard Canada Inc., MDF La Baie Inc., Uniboard Canada/Sodexpan	La Baie	QC	000005442	6-25					
UPM-Kymmene Miramichi Inc., Kraft Pulp and Paper Division	Miramichi	NB	000001617	10-12					
US Ecology Idaho Inc., American Ecology Corp.	Grand View	ID	83624NVRSF1012M	4-4	5-6		Executive Summary		
US Ecology Inc., American Ecology Corp.	Beatty	NV	89003SCLGYHWHY95	10-16					
USS Gary Works, U.S. Steel Corp.	Gary	IN	46402SSGRYONENO	4-4	5-6		10-10		
Velsicol Chemical Corp.	Memphis	TN	38108VLSCL1100W	10-16					
Viasystems Techs. Corp. L.L.C.	Richmond	VA	23231TTMCR4500S	8-17					
Vickery Environmental Inc., Waste Management Inc.	Vickery	OH	43464WSTMN3956S	4-4	5-6		Executive Summary		
Ville de Québec Incinérateur	Québec	QC	000000211	10-12	10-19				
Vitafoam Products Canada Ltd., Toronto	Downsview	ON	000004552	9-2					
W. H. Sammis Plant, FirstEnergy Corp.	Stratton	OH	43961FRSTNSTATE	9-20					
Wabash Alloys L.L.C.	Wabash	IN	46992WBSHLOLDUS	10-10					
Wabash Alloys, Wabash Alloys Guelph	Guelph	ON	000001067	10-12					
Wabash Alloys, Wabash Alloys Mississauga	Mississauga	ON	000005732	10-12					
Waltec Forgings Inc.	Port Huron	MI	48060WLTCM24402	8-5	8-18				
Waste Management Inc.	Port Arthur	TX	77643WSTMNHWHY73	10-4	Section 10.2.1				
Watts Regulator Wacasco	Spindale	NC	28160WTTSR200WA	8-18					
Wayne Disposal Inc., EQ Holding Co.	Belleville	MI	48111WYNDS49350	4-4	5-6	6-9	9-3	9-8	10-16
Wayne Farms L.L.C. Danville, Contigroup Cos.	Danville	AR	72833CNTNNG15MA	6-22					
Webster Fndy. Co.	Franklin	NH	03235WBSTRSOMAI	8-18					
Western Pulp Limited Partnership, Doman Industries	Squamish	BC	000002872	6-19	10-12				
Weyerhaeuser Co. Kingsport Paper Mill	Kingsport	TN	37662MDPPRPOBOX	10-10					
Weyerhaeuser Co. Ltd., Miramichi OSB	Miramichi	NB	000005003	6-25					
Wise Alloys L.L.C. Alloys Plant, Wise Metals Group	Muscle Shoals	AL	35660RYNLDEAST2	9-21					
Wolverine Tube (Canada) Inc	Fergus	ON	000002715	8-16					
Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor	ON	000004980	6-8	8-15				
Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca	PA	15061ZNCCR300FR	4-4	5-6	8-6	10-4		Executive Summary

## Appendix D – Human Health Effects of Chemicals on the “Top 25” Lists for Releases and/or for Total Reported Amounts of Releases and Transfers

**Note 1:** Chemicals can have a variety of health and environmental effects, and the fact that a chemical is reported to NPRI or TRI does not mean that the chemical is considered to pose toxic risks to humans. In some cases, chemicals may be of greater concern for effects on ecosystems. For example, a relatively non-toxic chemical may serve as an excess nutrient in aquatic systems, leading to a buildup of algae that can deplete oxygen and kill fish and other aquatic life (eutrophication). Other chemicals may be of concern because they contribute to acid precipitation, or are lead to the formation of tropospheric ozone (photochemical smog). Further, all effects are dose-dependent and may not occur at levels found in the environment or associated with PRTR releases. Effects shown in workers are likely to reflect exposures significantly higher than those occurring in the environment. PRTRs do not collect data on exposure or risk associated with the releases they report.

**Note 2:** The data in this table reflect three sources:

- *ToxFAQs* distributed by the US Agency for Toxic Substances and Disease Registry <[www.atsdr.cdc.gov/toxfaq.html](http://www.atsdr.cdc.gov/toxfaq.html)>
- *Chemical Fact Sheets* distributed by the Office of Pollution Prevention and Toxics of the US Environmental Protection Agency <[www.epa.gov/chemfact/](http://www.epa.gov/chemfact/)>
- *Hazardous Substance Fact Sheets* distributed by the New Jersey Department of Health and Senior Services <[www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm](http://www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm)>

Data from these sources were extracted in the above order, such that if multiple sources had documented toxic effects, the ATSDR data were taken as a first preference, followed by US EPA and New Jersey data.

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
75-05-8	Acetonitrile	EPA	Range from abnormal salivation, vomiting, confusion, rapid breathing and heart rate to coma and death. Contact with liquid or vapor is irritating to skin, eyes, nose and throat.	Adverse effects on blood, nervous system, lungs, liver and thymus, as well as fetal toxicity in laboratory studies.
7429-90-5	Aluminum (fume or dust)	ATSDR	Inhalation effects include coughing and asthma. Large doses in medical settings have led to bone disease.	Delays in skeletal and neurological development in laboratory studies. Association with Alzheimer's disease of uncertain nature.
--	Arsenic (and its compounds)	ATSDR	Levels above 60 parts per million in food or water can be fatal. Inhalation can irritate respiratory system.	Long-term exposure can lead to darkening of skin and “corns” or “warts” on palms, soles and torso. Inorganic arsenic is a <b>known carcinogen</b> .
1332-21-4	Asbestos (friable)	ATSDR	Inhalation leads to asbestosis (scar tissue buildup in lungs and surrounding tissue)	A known carcinogen by inhalation: lung cancer and mesothelioma (cancer of the tissues lining the chest cavity). Some evidence for <b>cancer</b> of stomach, intestines, esophagus, pancreas, and kidneys. Risks from ingestion unclear.
71-36-3	n-Butyl alcohol	NJDOH	Inhalation leads to headaches, shortness of breath, irregular heartbeat. Contact with liquid or vapor irritates eyes, nose, and throat. Contact with liquid irritates skin. Can cause nausea, vomiting, or dizziness.	Can damage liver, heart and kidneys. Damage hearing and sense of balance. Repeated contact may cause drying and cracking of skin. Limited evidence that is a teratogen (reproductive hazard) in animals.
75-15-0	Carbon disulfide	ATSDR	Inhalation effects include headache, fatigue, sleep disturbance, breathing changes, and chest pains. Skin burns from dermal contact.	Damage to nervous system in workers from high or repeated exposure. Effects on brain, liver and kidneys, and heart, as well as fetal toxicity in laboratory studies.
7782-50-5	Chlorine	EPA	Effects range from coughing and chest pain to water retention in the lungs; irritation to skin, eyes, and respiratory system.	Adverse effects on immune system, blood, heart, and respiratory system in laboratory studies.
--	Chromium (and its compounds)	ATSDR	Hexavalent forms (Cr VI) are more toxic than trivalent (Cr III). Inhalation effects include irritation/damage to nose, lungs, stomach, and intestines. Some persons are allergic and high exposure may trigger asthma. Ingestion effects include stomach upset and ulcers, convulsions, damage to kidneys and liver, and death.	Some Chromium VI compounds are <b>known human carcinogens</b> , based on both exposed workers and laboratory studies. Animal studies indicate reproductive effects and fetal toxicity.
--	Copper (and its compounds)	ATSDR	Exposure to dust and fume can irritate eyes, nose and throat. May also cause “metal fume fever,” with symptoms similar to flu, dizziness, headaches and diarrhea. Onset may be delayed for hours or days following exposure.	Repeated high exposure can affect liver, kidneys and blood. Drinking water with higher than normal levels can cause vomiting, diarrhea, stomach cramps, and nausea.

Appendix D – Human Health Effects of Chemicals on the “Top 25” Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
75-09-2	Dichloromethane	ATSDR	Inhalation effects include slower reaction time, loss of fine motor control, dizziness, nausea, tingling or numbness in fingers and toes, increasing up to unconsciousness or death. Dermal contact causes burning sensation and skin reddening; contact with eyes can burn cornea.	Impairment of hearing and vision. Causes <b>cancer</b> in laboratory studies.
100-41-4	Ethylbenzene	ATSDR	Inhalation may cause dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels in the air.	None listed.
74-85-1	Ethylene	NJDOH	Inhalation can cause dizziness, lightheadedness, lead to unconsciousness. Skin contact with liquid can cause frostbite	None listed.
107-21-1	Ethylene glycol	ATSDR	Ingestion can lead to nausea, convulsions, slurred speech, disorientation, heart and kidney problems, or death. Increased acidity of body tissues (metabolic acidosis).	Fetal toxicity at large doses in laboratory studies.
50-00-0	Formaldehyde	ATSDR	Can cause irritation of the skin, eyes, nose, and throat. Ingestion of large amounts can cause severe pain, vomiting, coma and possible death.	Causes <b>cancer</b> of the nasal passages in laboratory studies or rats. Low levels can irritation of the eyes, nose, throat, and skin. People with asthma may be more sensitive.
110-54-3	n-Hexane	ATSDR	Inhalation of large amounts cause numbness in hands and feet, followed by muscle weakness in the feet and lower legs.	Causes nerve and lung damage in laboratory studies of rats.
7647-01-0	Hydrochloric acid	NJDOH	Inhalation can irritate the lungs, as well as mouth, nose and throat; higher exposures can lead to fluid buildup (pulmonary edema), a medical emergency. Dermal contact can cause severe, permanent eye and skin damage.	Repeated inhalation can lead to bronchitis. Exposure to vapor may cause erosion of teeth. Some evidence of increased lung <b>cancer</b> in exposed workers.
7664-39-3	Hydrogen fluoride	NJDOH	Inhalation effects include damage to nose, throat and lungs causing coughing and/or shortness of breath. Can lead to a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath. Dermal contact will burn skin and eyes.	Irritation of eyes, skin, and lungs. Repeated exposures may cause bronchitis. Long-term exposure may damage liver and kidneys.
--	Manganese (and its compounds)	ATSDR	Inhalation can affect motor skills such as steadiness of hands, rapid hand movements and balance. Exposure can cause respiratory problems and sexual dysfunction.	Repeated exposure may cause brain damage, developing mental and emotional disturbances and slow and clumsy body movements. These symptoms are called “manganism.”
67-56-1	Methanol	EPA	Ingestion effects range from headache and lack of coordination to severe pain in abdomen, leg, and back and blindness following inebriation.	Headaches, sleep disorders, and gastrointestinal problems ranging up to optic nerve damage in workers and in laboratory studies.
78-93-3	Methyl ethyl ketone	NJDOH	Contact can severely irritate and burn eyes, leading to permanent damage. Inhalation effects include irritation of nose, throat, and mouth, causing coughing and wheezing. Can cause dizziness, headache, nausea, blurred vision.	Repeated exposure can damage nervous system and may affect the brain, including reduced memory and concentration, personality changes, fatigue, sleep disturbances, reduced coordination. Limited evidence that it is a teratogen (reproductive hazard) in animals.

Appendix D – Human Health Effects of Chemicals on the “Top 25” Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
108-10-1	Methyl isobutyl ketone	EPA	Range from headaches, dizziness, nausea and numbness in fingers and toes to unconsciousness and death. Vapor irritates eyes, nose and throat. Liquid irritates eyes and skin.	Nausea, headaches, weakness, and adverse liver effects in workers. Kidney and liver effects, as well as fetal toxicity, in laboratory studies.
--	Nickel (and its compounds)	ATSDR	Inhalation effects include bronchitis and reduced lung function. Ingestion leads to stomach problems, blood, and kidney effects, as well as liver, immune system, and reproductive effects in laboratory studies	Small amounts are essential for animal nutrition, may be for humans. Allergic skin rashes. <b>Cancer</b> of lung and nasal sinus seen in nickel workers, inhalation of insoluble nickel compounds caused cancer in laboratory studies.
--	Nitric acid and nitrate compounds	NJDOH	Inhalation of nitric acid can irritate the lungs, as well as mouth, nose and throat; higher exposures can lead to fluid buildup (pulmonary edema), a medical injury. Dermal contact can cause severe, permanent eye and skin damage.	Exposure to vapor may cause erosion of teeth.
100-42-5	Styrene	ATSDR	Inhalation effects include depression, trouble concentrating, muscle weakness, fatigue, and nausea; possibly irritation of eye, nose, and throat. Laboratory studies show damage to nose and liver, reproductive and fetal toxicity. Ingestion led to damage of liver, kidney, brain, and lungs in laboratory studies.	Studies not reported.
7664-93-9	Sulfuric acid	ATSDR	Inhalation can irritate the lungs. Ingestion can burn mouth, throat, and stomach and result in death. Contact with skin and eyes can cause third-degree burns and blindness.	Exposure to vapor may cause chronic runny nose, tearing of the eyes, nose bleeds and stomach upset, as well as erosion and pitting of teeth. Evidence of increased <b>cancer</b> of the larynx in exposed workers who smoke.
108-88-3	Toluene	ATSDR	Dizziness, fatigue, unconsciousness and death. Permanent brain and nervous system damage from repeated high-level exposure, including speech damage, vision and hearing problems, loss of muscle control and poor balance. Also affects kidneys and leads to fetal toxicity.	Fatigue, confusion, weakness, appearance of intoxication, memory loss, nausea, loss of appetite, hearing loss.
--	Vanadium (and its compounds)	ATSDR	Inhalation can cause lung irritation, coughing, wheezing, chest pain, a runny nose and sore throat.	High levels in the water of pregnant laboratory animals resulted in minor birth defects. Some animals had minor kidney or liver changes after breathing or ingesting over a long term.
--	Xylenes	ATSDR	Effects include headaches, lack of coordination, dizziness, confusion, and changes in balance. Short high levels can also cause irritation of skin, eyes, nose, and throat, difficulty breathing, lung problems, delayed reaction time, memory difficulties, stomach discomfort, and possibly liver and kidney changes; unconsciousness and death at highest levels.	Prolonged exposure can lead to headaches, lack of coordination, dizziness, confusion, and changes in balance. Fetal toxicity observed in high-dose laboratory studies.
--	Zinc (and its compounds)	ATSDR	Ingestion of high concentrations can lead to stomach cramps, nausea, and vomiting. Inhalation can cause “metal fume fever,” probably an immune reaction of lungs and body temperature.	Zinc is an essential element in the human diet. Prolonged ingestion of excessive levels can cause anemia, damage to pancreas, and reduction of beneficial cholesterol. While insufficient zinc during pregnancy may lead to growth retardation in children, laboratory animals fed large amounts became infertile or had smaller babies.



## Appendix E – Uses of Chemicals on the “Top 25” Lists for Releases and/or for Total Reported Amounts of Releases and Transfers

**Note 1:** Releases and transfers reported to PRTRs may result from particular uses of the listed substances themselves. For example, many of the PRTR-listed substances are used as chemical agents in the production of other substances. Many also serve as solvents, which may be used in industrial processes or in cleaning (such as removing grease and oil from metal parts). PRTR-listed substances may be constituents of products sold for consumer uses, such as pesticides. Uses of chemicals reported in large amounts in 2000 are summarized below. However, uses described in this table and in other sources do not necessarily represent the majority of sources of releases and transfers of a substance. Releases and transfers also result from generation of listed substances as byproducts of production processes. A prime example is methanol, generated as a byproduct of a variety of processes including chemical pulping in paper manufacture and the production of anhydrous ammonia (a fertilizer).

**Note 2:** Data in this table are drawn from:

- *ChemExpo* Commercial Chemical Profiles <[www.chemexpo.com/news/PROFILE.cfm#menu](http://www.chemexpo.com/news/PROFILE.cfm#menu)>
- *ToxFAQs*, Agency for Toxic Substances and Disease Registry <[www.atsdr.cdc.gov/](http://www.atsdr.cdc.gov/)>
- OPPT Chemical Fact Sheets, EPA Office of Pollution Prevention and Toxics <[www.epa.gov/chemfact/](http://www.epa.gov/chemfact/)>
- Chemical Backgrounders, Environment Writer, National Safety Council's Environmental Health Center <[www.nsc.org/EHC/ew/chemical.htm](http://www.nsc.org/EHC/ew/chemical.htm)>
- *Kirk-Othmer Concise Encyclopedia of Chemical Technology* (New York and Toronto: John Wiley & Sons, 1985).

CAS Number	Name	Uses
75-05-8	Acetonitrile	Primarily used by chemicals industry to extract inorganic and organic chemicals, especially butadiene. Also used in the manufacture of pesticides.
7429-90-5	Aluminum (fume or dust)	Often used in cooking utensils, containers (including cans and packaging), appliances and building materials, also in automotive and aircraft manufacture. Used in paints and fireworks and to produce glass, rubber and ceramics. Compounds of aluminum are used in antacids and deodorants and to treat drinking water.
--	Arsenic (and its compounds)	Produced as a byproduct of the operation of copper and lead smelters. Inorganic arsenic compounds are mainly used to preserve wood. Also used to make agricultural insecticides and weed killers.
1332-21-4	Asbestos (friable)	Principal use is in asbestos cement products. Resistant to heat and most chemicals, asbestos fibers are also used in roofing shingles, paper products and friction products (automobile clutch, brake and transmission parts).
71-36-3	n-Butyl alcohol	Main use (more than half) is in production of butyl acrylate and methacrylate esters, used in making latex (water-based) paints. Added to plastics, hydraulic fluids and detergent formulations. Also used by pharmaceutical industry as an extractant and as an additive in certain medicines.
75-15-0	Carbon disulfide	Primarily used (more than half) in production of rayon. Also in production of chemicals for agriculture (fumigants), for production of rubber and cellophane. Some uses as an industrial solvent, including metal cleaning. Formerly, a principal use was as a feedstock for production of carbon tetrachloride, an ozone-depleting chemical.
7782-50-5	Chlorine	Used to make ethylene dichloride/vinyl chloride, polyurethanes and other organic chemicals. Used as a bleach in pulp and paper production. Also used in water and wastewater treatment.
--	Chromium (and its compounds)	Used in steel and other alloys, in making refractories (bricks used in industrial furnaces), dyes and pigments and in plating chrome, tanning leather and preserving wood. Chromium and its compounds are also used as cleaning agents in electroplating, as mordants in textile manufacture and in other processes.
--	Copper (and its compounds)	Used in electrical and electronic products, building construction and industrial machinery and equipment. Copper and its compounds appear in electroplated coatings, cooking utensils, piping, dyes and dye processes, wood preservatives and pesticides. Also used in mildew preventives, corrosion inhibitors, fuel additives, printing and photocopying, pigments for glass and ceramic production. Copper compounds are also used as catalysts, as a purifying agent in the petroleum industry and in alloys and metal refining.
75-09-2	Dichloromethane	Widely used as a solvent in paint strippers, including furniture strippers, home paint removers and aircraft maintenance products. Used as a solvent and degreasing agent in metal cleaning and a process solvent in pharmaceutical production. Also used in production of plastics (polycarbonate and triacetate fiber) and polyurethane foam. Other uses include electronics manufacturing, film processing, food processing and production of pesticides, synthetic fibers, paints and coatings. No longer widely used as an aerosol propellant.

Appendix E – Uses of Chemicals on the “Top 25” Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Uses
100-41-4	Ethylbenzene	Used primarily to make styrene, but also as a solvent, in fuels and to make other chemicals. Found in manufactured products such as inks, insecticides and paints.
74-85-1	Ethylene	Principally used (more than half) in producing low-density and high-density polyethylenes. Also serves as an intermediate in production of vinyl chloride, ethylene oxide, ethylbenzene and others. Used as a solvent, a refrigerant, a raw material for anesthetics and a medication. Also used to regulate plant growth and, as a compressed gas and to ripen various fruits.
107-21-1	Ethylene glycol	Primary use (about one third) in antifreeze and de-icing solutions (for cars, airplanes, boats). Also used in manufacturing polyester fiber and PET resins (for bottles and film). Also used as a solvent by the paint and plastics industries and as a constituent of photographic developing solutions, hydraulic brake fluids and inks.
50-00-0	Formaldehyde	Largest use is in production of resins including urea-formaldehyde (UF) and phenolic resins (used in particleboard and plywood, respectively) and acetal resins. Also in production of acetylenic chemicals (butanediol), methylene diisocyanate (MDI) and other industrial chemical products. Also serves as a preservative in medical laboratories and as an embalming fluid and sterilizer.
110-54-3	n-Hexane	Mixed with similar chemicals for use as a solvent. Major use is to extract vegetable oils from crops such as soybeans. Solvents also used as cleaning agents in printing, textile, furniture, and shoemaking industries. Contained in special glues used in roofing, shoe and leather industries. Also contained in gasoline, quick-drying glues used in various hobbies and in rubber cement.
7647-01-0	Hydrochloric acid	Uses include brine treatment for chloralkali, steel pickling, food processing (including production of corn syrup) and production of calcium chloride. Also used in oil well acidulation (to stimulate oil and gas production), production of chlorine and in water treatment for swimming pools. Other uses (together representing more than 40 percent of usage) include metal recovery from used catalysts, pH control, sludge removal, sand and clay purification and production of inorganics such as sodium chlorate, metal chlorides, activated carbon and iron oxide pigments and organics like polycarbonate resins, bisphenol-A, polyvinyl chloride resins and synthetic glycerine. Hydrochloric acid is also a byproduct of the manufacture of isocyanates.
7664-39-3	Hydrogen fluoride	Used mainly to make aluminum and chlorofluorocarbons (CFCs). Used in oil well acidulation (to stimulate oil and gas production) and in froth flotation (to separate metals from ores). Used as a chemical intermediary for fluorocarbons, aluminum fluoride, cryolite, uranium hexafluoride, and fluoride salts. Used in fluorination processes (especially in the aluminum industry, in dye chemistry and in fluoride manufacture), as a catalyst (especially in the petroleum industry) and in alkylation, isomerization, condensation, dehydration, and polymerization reactions. Used as a cleaning agent (for cast iron, copper, brass, brick and stone) and in etching and polishing.
--	Manganese (and its compounds)	Manganese is used in steel production to improve hardness, stiffness and strength. Manganese compounds are used in production of dry-cell batteries, in glazes, ceramics and fertilizers, as fungicides, as oxidizing agents and disinfectants and in other uses.
67-56-1	Methanol	Largest use of methanol in the United States has been in production of methyl t-butyl ether (MTBE), added to gasoline to improve octane and reduce hydrocarbons and carbon monoxide (concerns about its safety have been raised in both Canada and the United States). Also used in production of formaldehyde, acetic acid, chloromethanes and methyl methacrylate. Also used as a solvent in paint strippers, aerosol spray paints, wall paints, carburetor cleaners and windshield washing products. Methanol is used in coating wood and paper, in producing synthetic fibers (acetate and triacetate) and in manufacturing pharmaceuticals.

**Appendix E – Uses of Chemicals on the “Top 25” Lists for Releases and/or for Total Reported Amounts of Releases and Transfers (continued)**

CAS Number	Name	Uses
78-93-3	Methyl ethyl ketone	The largest use (two-thirds) is as a solvent in protective surface coatings, although this use is decreasing. Also added to adhesives, used in lube oil dewaxing and added to printing inks. Used in manufacture of organic chemicals, including drugs and cosmetics.
108-10-1	Methyl isobutyl ketone	The largest use (two-thirds) is as a solvent in protective surface coatings, although this use is decreasing. Also added to adhesives. Also used in production of other chemicals, including rubber antioxidants and acetylenic surfactants (for inks, paints and pesticides) and in solvent extraction.
--	Nickel (and its compounds)	In alloys, used in making metal coins and jewelry and metal parts for industrial uses. Nickel compounds are also used for nickel plating (electroplating), in nickel-cadmium battery manufacture, to color ceramics and as catalysts.
--	Nitric acid and nitrate compounds	The chief use of nitric acid is in producing ammonium nitrate fertilizer. Also used in the manufacture of cyclohexanone and as a raw material for adipic acid and caprolactam, both used in making nylon. Nitrates are used in producing explosives, including gunpowder.
100-42-5	Styrene	Mainly used (two-thirds) in producing polystyrene. Also used in production of acrylonitrile-butadiene-styrene (ABS) resins and acrylonitrile-styrene resins; these are used in automobile parts, appliances (including refrigerators and freezers), pipe, business machines and luggage and recreational goods. Also used to produce styrene-butadiene latex and rubber, unsaturated polyester resins, thermoplastics elastomers and various styrene copolymers.
7664-93-9	Sulfuric acid	Principal use (almost three-quarters) is in fertilizer production, generally produced by fertilizer manufacturers themselves. Sulfuric acid generated during smelting is sold for numerous chemical and industrial uses, but is also used in leaching copper. Industrial uses include production of explosives, other acids, dyestuffs, glue, wood preservatives and lead-acid vehicle batteries. Also used in purifying petroleum, pickling metal, electroplating and nonferrous metallurgy.
108-88-3	Toluene	By far, the largest use is in gasoline; most toluene is never separated from petroleum crude oil (its largest source), but is pumped from refineries to other locations where it is added directly to gasoline. Toluene “recovered” from crude oil is principally used to make benzene. Toluene is also a byproduct of gasoline production, the manufacture of coke from coal and production of styrene. Uses include paints, lacquers, thinners and strippers, adhesives, cosmetic nail products and others.
--	Vanadium (and its compounds)	Most of vanadium in US is used to make steel; is also mixed with iron to make parts for aircraft engines. Small amounts are used in making rubber, plastics, ceramics and other chemicals. Vanadium oxide is component in specialty steels used to make automobile parts, springs, and ball bearings.
--	Xylenes	Used as a solvent in the printing, rubber and leather industries. Also used as a cleaning agent, a thinner for paint and in paints and varnishes.
--	Zinc (and its compounds)	The most common use of zinc is in galvanizing metals (including steel). Zinc is also used in dry cell batteries and in alloys such as brass and bronze. Zinc compounds are used in production of paint, rubber, dye, wood preservatives and ointments. Zinc sulfate, as one example, is used principally in fertilizers, but also in animal feed, water treatment, chemical manufacture and froth flotation (to extract metals from ore).



(IMPORTANT: Type or print; read instructions before completing form)



# FORM R

## TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

United States Environmental Protection Agency

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

**WHERE TO SEND COMPLETED FORMS:** 1. EPCRA Reporting Center  
P.O. Box 3348  
Merrifield, VA 22116-3348  
ATTN: TOXIC CHEMICAL RELEASE INVENTORY

2. APPROPRIATE STATE OFFICE  
(See instructions in Appendix F)

Enter "X" here if this is a revision  
For EPA use only

**Important: See instructions to determine when "Not Applicable (NA)" boxes should be checked.**

### PART I. FACILITY IDENTIFICATION INFORMATION

#### SECTION 1. REPORTING YEAR

#### SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 2 trade secret?  
 Yes  No  (Do not answer 2.2; Go to Section 3)  
 Is this copy  Sanitized  Unsanitized  
 (Answer only if "YES" in 2.1)

#### SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official: \_\_\_\_\_ Signature: \_\_\_\_\_ Date Signed: \_\_\_\_\_

#### SECTION 4. FACILITY IDENTIFICATION

4.1 TRI Facility ID Number \_\_\_\_\_  
 Facility or Establishment Name \_\_\_\_\_ Facility or Establishment Name or Mailing Address (if different from street address) \_\_\_\_\_  
 Street \_\_\_\_\_ Mailing Address \_\_\_\_\_  
 City/County/State/Zip Code \_\_\_\_\_ City/State/Zip Code \_\_\_\_\_ Country (Non-US) \_\_\_\_\_

4.2 This report contains information for:  
 (Important : check a or b; check c or d if applicable) a.  An entire facility b.  Part of a facility c.  A Federal facility d.  GOCO

4.3 Technical Contact Name \_\_\_\_\_ Telephone Number (include area code) \_\_\_\_\_

4.4 Public Contact Name \_\_\_\_\_ Telephone Number (include area code) \_\_\_\_\_

4.5 SIC Code (s) (4 digits) \_\_\_\_\_ Primary a. \_\_\_\_\_ b. \_\_\_\_\_ c. \_\_\_\_\_ d. \_\_\_\_\_ e. \_\_\_\_\_ f. \_\_\_\_\_  
 Degrees Minutes Seconds Longitude Degrees Minutes Seconds

4.6 Dun & Bradstreet Number(s) (9 digits) 4.8 EPA Identification Number (RCRA I.D. No.) (12 characters) 4.9 Facility NPDES Permit Number(s) (9 characters) 4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)

a. \_\_\_\_\_ b. \_\_\_\_\_  
 a. \_\_\_\_\_ b. \_\_\_\_\_

#### SECTION 5. PARENT COMPANY INFORMATION

5.1 Name of Parent Company NA

5.2 Parent Company's Dun & Bradstreet Number NA

EPA Form 9350-1 (Rev. 01/2001) - Previous editions are obsolete.

<b>EPA FORM R</b>		TRI Facility ID Number
<b>PART II. CHEMICAL-SPECIFIC INFORMATION</b>		Toxic Chemical, Category or Generic Name

**SECTION 1. TOXIC CHEMICAL IDENTITY** (Important: DO NOT complete this section if you completed Section 2 below.)

<b>1.1</b>	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
<b>1.2</b>	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
<b>1.3</b>	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "yes". Generic Name must be structurally descriptive.)

**1.4 Distribution of Each Member of the Dioxin and Dioxin-like Compounds Category.**  
 (If there are any numbers in boxes 1-17, then every field must be filled in with either 0 or some number between 0.01 and 100. Distribution should be reported in percentages and the total should equal 100%. If you do not have specification data available, indicate NA.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NA																

**SECTION 2. MIXTURE COMPONENT IDENTITY** (Important: DO NOT complete this section if you completed Section 1 above.)

<b>2.1</b>	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)
------------	--

**SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY**  
 (Important: Check all that apply.)

3.1	Manufacture the toxic chemical:	3.2	Process the toxic chemical:																						
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">a. <input type="checkbox"/> Produce</td> <td style="width: 50%;">b. <input type="checkbox"/> Import</td> </tr> <tr> <td colspan="2" style="text-align: center;">If produce or import:</td> </tr> <tr> <td colspan="2">c. <input type="checkbox"/> For on-site use/processing</td> </tr> <tr> <td colspan="2">d. <input type="checkbox"/> For sale/distribution</td> </tr> <tr> <td colspan="2">e. <input type="checkbox"/> As a byproduct</td> </tr> <tr> <td colspan="2">f. <input type="checkbox"/> As an impurity</td> </tr> </table>	a. <input type="checkbox"/> Produce	b. <input type="checkbox"/> Import	If produce or import:		c. <input type="checkbox"/> For on-site use/processing		d. <input type="checkbox"/> For sale/distribution		e. <input type="checkbox"/> As a byproduct		f. <input type="checkbox"/> As an impurity		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">a. <input type="checkbox"/> As a reactant</td> <td style="width: 50%;">As a chemical processing aid</td> </tr> <tr> <td>b. <input type="checkbox"/> As a formulation component</td> <td>As a manufacturing aid</td> </tr> <tr> <td>c. <input type="checkbox"/> As an article component</td> <td>Ancillary or other use</td> </tr> <tr> <td>d. <input type="checkbox"/> Repackaging</td> <td></td> </tr> <tr> <td>e. <input type="checkbox"/> As an impurity</td> <td></td> </tr> </table>	a. <input type="checkbox"/> As a reactant	As a chemical processing aid	b. <input type="checkbox"/> As a formulation component	As a manufacturing aid	c. <input type="checkbox"/> As an article component	Ancillary or other use	d. <input type="checkbox"/> Repackaging		e. <input type="checkbox"/> As an impurity		3.3	Otherwise use the toxic chemical:
a. <input type="checkbox"/> Produce	b. <input type="checkbox"/> Import																								
If produce or import:																									
c. <input type="checkbox"/> For on-site use/processing																									
d. <input type="checkbox"/> For sale/distribution																									
e. <input type="checkbox"/> As a byproduct																									
f. <input type="checkbox"/> As an impurity																									
a. <input type="checkbox"/> As a reactant	As a chemical processing aid																								
b. <input type="checkbox"/> As a formulation component	As a manufacturing aid																								
c. <input type="checkbox"/> As an article component	Ancillary or other use																								
d. <input type="checkbox"/> Repackaging																									
e. <input type="checkbox"/> As an impurity																									

**SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ONSITE AT ANY TIME DURING THE CALENDAR YEAR**

<b>4.1</b>	<input type="text"/> (Enter two-digit code from instruction package.)
------------	---

**SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE**

	A. Total Release (pounds/year*) (Enter range code or estimate**)	B. Basis of Estimate (enter code)	C. % From Stormwater
<b>5.1</b>	Fugitive or non-point air emissions	NA <input type="text"/>	
<b>5.2</b>	Stack or point air emissions	NA <input type="text"/>	
<b>5.3</b>	Discharges to receiving streams or water bodies (enter one name per box)		
	Stream or Water Body Name		
<b>5.3.1</b>			
<b>5.3.2</b>			
<b>5.3.3</b>			

If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box and indicate the Part II, Section 5.3 page number in this box.  (example: 1,2,3, etc.)

\* For Dioxin or Dioxin-like compounds, report in grams/year  
 \*\* Range Codes: A= 1 - 10 pounds; B= 11 - 499 pounds; C= 500 - 999 pounds.  
 EPA Form 9350-1 (Rev. 01/2001) - Previous editions are obsolete.

<b>EPA FORM R</b>		TRI Facility ID Number
<b>PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)</b>		Toxic Chemical, Category or Generic Name

**SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE (Continued)**

	A. Total Release (pounds/year*) (enter range code** or estimate)	B. Basis of Estimate (enter code)
	NA	
<b>5.4.1</b>	Underground Injection onsite to Class I Wells <input type="checkbox"/>	
<b>5.4.2</b>	Underground Injection onsite to Class II-V Wells <input type="checkbox"/>	
<b>5.5</b>	Disposal to land onsite	
<b>5.5.1A</b>	RCRA Subtitle C landfills <input type="checkbox"/>	
<b>5.5.1B</b>	Other landfills <input type="checkbox"/>	
<b>5.5.2</b>	Land treatment/application farming <input type="checkbox"/>	
<b>5.5.3</b>	Surface Impoundment <input type="checkbox"/>	
<b>5.5.4</b>	Other disposal <input type="checkbox"/>	

**SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS**

**6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)**

**6.1.A Total Quantity Transferred to POTWs and Basis of Estimate**

**6.1.A.1. Total Transfers (pounds/year\*)** (enter range code\*\* or estimate)

**6.1.A.2 Basis of Estimate** (enter code)

**6.1.B. \_\_\_** POTW Name

POTW Address

City	State	County	Zip
------	-------	--------	-----

**6.1.B. \_\_\_** POTW Name

POTW Address

City	State	County	Zip
------	-------	--------	-----

If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box  and indicate the Part II, Section 6.1 page number in this box  (example: 1,2,3, etc.)

**SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS**

**6.2. \_\_\_** Off-Site EPA Identification Number (RCRA ID No.)

Off-Site Location Name

Off-Site Address

City	State	County	Zip	Country (Non-US)
------	-------	--------	-----	------------------

Is location under control of reporting facility or parent company?  Yes  No

\* For Dioxin or Dioxin-like compounds, report in grams/year  
 \*\* Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.  
 EPA Form 9350-1 (Rev. 01/2001) - Previous editions are obsolete.

<b>EPA FORM R</b>		TRI Facility ID Number
<b>PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)</b>		
Toxic Chemical, Category or Generic Name		

**SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (Continued)**

A. Total Transfers (enter range code** or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1. <b>M</b>
2.	2.	2. <b>M</b>
3.	3.	3. <b>M</b>
4.	4.	4. <b>M</b>

**6.2. \_\_\_** Off-Site EPA Identification Number (RCRA ID No.)

Off-Site location Name

Off-Site Address

City	State	County	Zip	Country (Non-US)
------	-------	--------	-----	---------------------

Is location under control of reporting facility or parent company?  Yes  No

A. Total Transfers (enter range code** or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1. <b>M</b>
2.	2.	2. <b>M</b>
3.	3.	3. <b>M</b>
4.	4.	4. <b>M</b>

**SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY**

Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence (enter 3-character code(s))	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data ?
<b>7A.1a</b>	7A.1b 1	7A.1c	7A.1d	7A.1e
	3	4	%	Yes <input type="checkbox"/> No <input type="checkbox"/>
	6	7		
<b>7A.2a</b>	7A.2b 1	7A.2c	7A.2d	7A.2e
	3	4	%	Yes <input type="checkbox"/> No <input type="checkbox"/>
	6	7		
<b>7A.3a</b>	7A.3b 1	7A.3c	7A.3d	7A.3e
	3	4	%	Yes <input type="checkbox"/> No <input type="checkbox"/>
	6	7		
<b>7A.4a</b>	7A.4b 1	7A.4c	7A.4d	7A.4e
	3	4	%	Yes <input type="checkbox"/> No <input type="checkbox"/>
	6	7		
<b>7A.5a</b>	7A.5b 1	7A.5c	7A.5d	7A.5e
	3	4	%	Yes <input type="checkbox"/> No <input type="checkbox"/>
	6	7		

If additional pages of Part II, Section 6.2/7A are attached, indicate the total number of pages in this box and indicate the Part II, Section 6.2/7A page number in this box :  (example: 1,2,3, etc)

\* For Dioxin or Dioxin-like compounds, report in grams/year  
 \*\* Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.  
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**EPA FORM R**  
**PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)**

TRI Facility ID Number	
Toxic Chemical, Category or Generic Name	

**SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES**

Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods [enter 3-character code(s)]

1		2		3		4	
---	--	---	--	---	--	---	--

**SECTION 7C. ON-SITE RECYCLING PROCESSES**

Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

Recycling Methods [enter 3-character code(s)]

1.		2.		3.		4.		5.	
6.		7.		8.		9.		10.	

**SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES**

	Column A Prior Year (pounds/year*)	Column B Current Reporting Year (pounds/year*)	Column C Following Year (pounds/year*)	Column D Second Following Year (pounds/year*)
8.1	Quantity released **			
8.2	Quantity used for energy recovery onsite			
8.3	Quantity used for energy recovery offsite			
8.4	Quantity recycled onsite			
8.5	Quantity recycled offsite			
8.6	Quantity treated onsite			
8.7	Quantity treated offsite			
8.8	Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year)			
8.9	Production ratio or activity index			

8.10 Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.

Source Reduction Activities [enter code(s)]	Methods to Identify Activity (enter codes)			
8.10.1	a.	b.	c.	c.
8.10.2	a.	b.	c.	c.
8.10.3	a.	b.	c.	c.
8.10.4	a.	b.	c.	c.

8.11 Is additional information on source reduction, recycling, or pollution control activities included with this report? (Check one box)

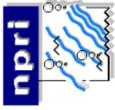
	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>

\* For Dioxin or Dioxin-like compounds, report in grams/year

\*\* Report releases pursuant to EPCRA Section 329(b) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment." Do not include any quantity treated onsite.

EPA Form 9350-1 (Rev. 01/2001) - Previous editions are obsolete.





# NPRI - The National Pollutant Release Inventory

## PART A - FACILITY IDENTIFICATION

All fields are mandatory unless otherwise noted.  
 PLEASE PRINT.  
 For additional information please refer to the  
 2001 Guide for Reporting to the National Pollutant Release Inventory.

A1.0	Reporting Year:	2001
A1.1	NPRI ID:	
A1.4	Web Site Address:	http:// (Optional)
A1.5	D&B D-U-N-S Number:	- - - - - (Optional)

FACILITY IDENTIFICATION & SITE ADDRESS	
A2.1	Company Name:
A2.2	Facility Name:
A2.3	Street Address:
A2.4	Street Address:
A2.5	City / District:
A2.6	Province / Territory:
A2.7	Postal Code:

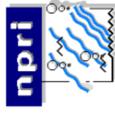
PARENT COMPANY INFORMATION	
A3.0	
A3.1	Is the facility controlled by another company or companies? ( ) Y ( ) N If YES, please use Appendix A.

FACILITY PUBLIC CONTACT (Optional)	
A4.0	
A4.1	Title: Dr. ( ) Mr. ( ) Mrs. ( ) Miss ( ) Ms. ( )
A4.2	First Name:
A4.3	Last Name:
A4.4	Position:
A4.5 - 6	Telephone No: ( ) - - Ext.:
A4.7 - 8	Facsimile No: ( ) - -
A4.8	E-mail Address:

FACILITY PUBLIC CONTACT ADDRESS (Optional)	
A5.0	
Is the mailing address for the public contact in A4.0 different from the facility's site address in A2.0? ( ) Y ( ) N If YES, please provide the address below.	
A5.1	Company Name:
A5.2	Facility Name:
A5.3	Mailing Address:
A5.4	Mailing Address:
A5.5	City / District:
A5.6 - 7	Province / Territory: Postal Code:
A5.8 - 9	State: Zip Code/Other:
A5.10	Country:



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# NPRI - The National Pollutant Release Inventory

## PART A - FACILITY IDENTIFICATION

FACILITY TECHNICAL CONTACT	
A6.0	
A6.1	Title: Dr. ( ) Mr. ( ) Mrs. ( ) Miss ( ) Ms. ( )
A6.2	First Name:
A6.3	Last Name:
A6.4	Position:
A6.5 - 6	Telephone No: ( ) - - Ext.:
A6.7	Facsimile No: ( ) - -
A6.8	E-mail Address:

FACILITY TECHNICAL CONTACT ADDRESS	
A7.0	
Is the mailing address for the technical contact in ( ) Y ( ) N	
A6.0	different from the facility's site address in A2.0? If YES, please provide the address below.
A7.1	Company Name:
A7.2	Facility Name:
A7.3	Mailing Address:
A7.4	Mailing Address:
A7.5	City / District:
A7.6 - 7	Province / Territory: Postal Code:
A7.8 - 9	State: Zip Code/Other:
A7.10	Country:

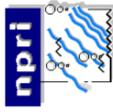
COMPANY COORDINATOR (Optional)	
A8.0	
Send information to a central contact? ( ) Y ( ) N	
If YES, please provide the information below.	
A8.1	Title:
A8.2	First Name:
A8.3	Last Name:
A8.4	Position:
A8.5 - 6	Telephone No: ( ) - - Ext.:
A8.7	Facsimile No: ( ) - -
A8.8	E-mail Address:

COMPANY COORDINATOR ADDRESS (Optional)	
A9.0	
Is the mailing address for the company coordinator in ( ) Y ( ) N	
A8.0	different from the A2.0 facility site address? If YES, please provide the address below.
A9.1	Company Name:
A9.2	Facility Name:
A9.3	Mailing Address:
A9.4	Mailing Address:
A9.5	City / District:
A9.6 - 7	Province / Territory: Postal Code:
A9.8 - 9	State: Zip Code/Other:
A9.10	Country:



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# NPRI - The National Pollutant Release Inventory

## PART A - FACILITY IDENTIFICATION

<b>A10.0</b>	<b>STANDARD INDUSTRIAL CLASSIFICATION CODE (SIC) AND THE NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM CODE (NAICS)</b>
<b>A10.2</b>	<b>4-Digit Canadian SIC Code:</b> _____
<b>A10.3</b>	<b>4-Digit American SIC Code:</b> _____
<b>A10.6</b>	<b>6-Digit NAICS Code:</b> _____

<b>A11.0</b>	<b>NUMBER OF FULL-TIME EMPLOYEES OR EQUIVALENT</b>
<b>A11.1</b>	<b>Number of Employees:</b> _____
<b>A11.2</b>	<b>ACTIVITIES FOR WHICH THE 20 000-HOUR EMPLOYEE THRESHOLD DOES NOT APPLY</b>
<b>A11.2.1</b>	<b>Was the facility used for: (Check the choices that apply)</b>
<b>a)</b>	<input type="checkbox"/> Non-hazardous solid waste incineration ( $\geq 100$ tonnes / year)
<b>b)</b>	<input type="checkbox"/> Biomedical or hospital waste incineration ( $\geq 100$ tonnes / year)
<b>c)</b>	<input type="checkbox"/> Hazardous waste incineration
<b>d)</b>	<input type="checkbox"/> Sewage sludge incineration
<b>e)</b>	<input type="checkbox"/> Wood preservation
<b>f)</b>	<input type="checkbox"/> None of the above

<b>A12.0</b>	<b>ACTIVITIES RELEVANT TO REPORTING DIOXINS/FURANS AND HEXACHLOROBENZENE</b>
<b>A12.1</b>	<b>Was the facility engaged in: (Check the choices that apply)</b>
<b>a)</b>	<input type="checkbox"/> Non-hazardous solid waste incineration ( $\geq 100$ tonnes / year)
<b>b)</b>	<input type="checkbox"/> Biomedical or hospital waste incineration ( $\geq 100$ tonnes / year)
<b>c)</b>	<input type="checkbox"/> Hazardous waste incineration
<b>d)</b>	<input type="checkbox"/> Sewage sludge incineration
<b>e)</b>	<input type="checkbox"/> Base metals smelting (including copper, lead, nickel and zinc)
<b>f)</b>	<input type="checkbox"/> Smelting of secondary lead
<b>g)</b>	<input type="checkbox"/> Smelting of secondary aluminum
<b>h)</b>	<input type="checkbox"/> Manufacturing of iron using a sintering process
<b>i)</b>	<input type="checkbox"/> Operation of electric arc furnaces in steel manufacturing
<b>j)</b>	<input type="checkbox"/> Operation of electric arc furnaces in steel foundries
<b>k)</b>	<input type="checkbox"/> Production of magnesium
<b>l)</b>	<input type="checkbox"/> Manufacturing of portland cement
<b>m)</b>	<input type="checkbox"/> Production of chlorinated organic solvents or chlorinated monomers
<b>n)</b>	<input type="checkbox"/> Combustion of fossil fuel in a boiler unit to produce electricity ( $\Delta 25$ MW)
<b>o)</b>	<input type="checkbox"/> Combustion of salt-laden logs in pulp and paper sector
<b>p)</b>	<input type="checkbox"/> Combustion of fuel in kraft liquor boilers in pulp and paper sector
<b>q)</b>	<input type="checkbox"/> None of the above
<b>A12.2</b>	<b>Was the facility used for wood preservation using pentachlorophenol? ( ) Y ( ) N</b>

**Note:** If you have checked off any choices in **12.1a** to **12.1p**, or if you have answered **YES** to question **A12.2**, then you **must** use the *Dioxin/Furan and Hexachlorobenzene* declaration form.

<b>A13.0</b>	<b>ACTIVITIES RELEVANT TO THE REPORTING OF PAHS</b>
<b>A13.1</b>	<b>Was the facility used for wood preservation using creosote? ( ) Y ( ) N</b>
<b>A14.0</b>	<b>OTHER ENVIRONMENTAL REGULATIONS AND PERMITS (Optional)</b>
<b>A14.1</b>	<b>Do you report under other environmental regulations or permits? ( ) Y ( ) N</b> If YES, please use Appendix B.



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## 2001 National Pollutant Release Inventory

### Statement of Certification

I hereby certify that I have reviewed the attached documents, and that I exercised due diligence to ensure that the submitted information is true and complete and that the amounts and values are accurate, based on reasonable estimates using available data.

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-----  
-----  
-----  
-----

**NPRI ID Numbers, Facility / Company Name(s)**  
(Please type or print)

-----  
**Name of Executive Contact**  
(as identified in field A16.0 on the reporting form)

-----  
**Title**

(Please type or print)

-----  
**Signature**

-----  
**Date**

(must be on or before June 1, 2002)

-----  
**Telephone**

(Please include area code)

-----  
**Facsimile**



# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHS

Please photocopy Part B of the form for each reportable NPRI substance.  
All fields are mandatory unless otherwise noted.  
PLEASE PRINT

For additional information, refer to the 2001 *Guide for Reporting to the National Pollutant Release Inventory* and the *Supplementary Guide for Reporting to the National Pollutant Release Inventory*.

SUBSTANCE IDENTITY			
B1.0			
B1.1	CAS Registry Number:		
B1.2	Substance Name:		
B1.3	NPRI substance category declared on this form (check one):		
a)	<input type="checkbox"/> Schedule 1, Part 1 Substance	UNITS:	tonnes (t)
b)	<input type="checkbox"/> PAHs	UNITS:	kilograms (kg)
c)	<input type="checkbox"/> Mercury (and its compounds)	UNITS:	kilograms (kg)

**Note:** The UNITS with the chosen substance category in the above table will be consistent throughout this form.

B2.0	NATURE OF ACTIVITIES (Select at least one activity)	
B2.1	MANUFACTURE THE SUBSTANCE	
a)	<input type="checkbox"/>	For On-Site Use / Processing
b)	<input type="checkbox"/>	For Sale / Distribution
c)	<input type="checkbox"/>	As a By-product
d)	<input type="checkbox"/>	As an Impurity
B2.2	PROCESS THE SUBSTANCE	
a)	<input type="checkbox"/>	As a Reactant
b)	<input type="checkbox"/>	As a Formulation Component
c)	<input type="checkbox"/>	As an Article Component
d)	<input type="checkbox"/>	Repackaging Only
e)	<input type="checkbox"/>	As a By-product
B2.3	OTHERWISE USE THE SUBSTANCE	
a)	<input type="checkbox"/>	As a Physical or Chemical Processing Aid
b)	<input type="checkbox"/>	As a Manufacturing Aid
c)	<input type="checkbox"/>	Ancillary / Other Use
d)	<input type="checkbox"/>	As a By-product

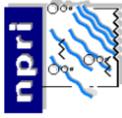
B10.0	ON-SITE RELEASES TO THE ENVIRONMENT	
B10.1	Do you release this substance on-site?	<input type="checkbox"/> Y <input type="checkbox"/> N If NO, go directly to section B14.0

B11.0	ON-SITE RELEASES OF LESS THAN ONE TONNE PART 1 SUBSTANCES ONLY	
B11.1	If the total on-site releases are less than 1 tonne, are you reporting this amount as a sum for all media?	<input type="checkbox"/> Y <input type="checkbox"/> N If YES, go directly to section B12.5



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# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHS

B12.0	ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT	RELEASES (Units* / Year)
B12.1	AIR RELEASES	RELEASES (Units* / Year)
	BASIS OF ESTIMATE (Select one method)	
a	Stack or Point Releases	C/E/M/O
b	Storage or Handling Releases	C/E/M/O
c	Fugitive Releases	C/E/M/O
d	Spills	C/E/M/O
e	Other Non-Point Releases	C/E/M/O
B12.2	UNDERGROUND INJECTION	C/E/M/O
B12.3	RELEASES TO SURFACE WATERS	RELEASES (Units* / Year)
	BASIS OF ESTIMATE (Select one method)	
a	Direct Discharges	C/E/M/O
b	Spills	C/E/M/O
c	Leaks	C/E/M/O
B12.4	RELEASES TO LAND	RELEASES (Units* / Year)
	BASIS OF ESTIMATE (Select one method)	
a	Landfill	C/E/M/O
b	Land Treatment	C/E/M/O
c	Spills	C/E/M/O
d	Leaks	C/E/M/O
e	Other	C/E/M/O
B12.5	TOTAL QUANTITY RELEASED	

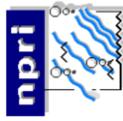
B13.0	YEARLY BREAKDOWN OF RELEASES BY PERCENTAGE IN EACH QUARTER (Total must be 100 %)			
B13.1	(Jan.-March)	(April-June)	(July-Sept.)	(Oct.-Dec.)
	a)	b)	c)	d)
	%	%	%	%

\* As specified in field B1.3



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## NPRI - The National Pollutant Release Inventory

### PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHS

B14.0		REASONS FOR CHANGES IN QUANTITIES RELEASED FROM PREVIOUS YEAR (Select at least one reason)
B14.1	a	<input type="checkbox"/> Changes in Production Levels
	b	<input type="checkbox"/> Changes in Estimation Methods
	c	<input type="checkbox"/> Pollution Prevention Activities
	d	<input type="checkbox"/> Changes in On-site Treatment
	e	<input type="checkbox"/> Changes in Off-site Transfers for Disposal
	f	<input type="checkbox"/> Changes in Off-site Transfers for Recycling
	g	<input type="checkbox"/> Other (specify in comments field B14.2)
	h	<input type="checkbox"/> No Significant Change (i.e. < 10%) or No Change
	i	<input type="checkbox"/> Not Applicable (first year reporting this substance)
B14.2	COMMENTS ON RELEASES (Optional):	

B15.0				ANTICIPATED RELEASES (Units* / Year)
B15.1		2002	2003	2004
	a)		b)	c)
		2005 (Optional)	2006 (Optional)	
	d)		e)	

B20.0		DO YOU TRANSFER THIS SUBSTANCE TO OFF-SITE LOCATIONS
B20.1	For Disposal?	<input type="checkbox"/> Y <input type="checkbox"/> N
B20.2	For Recycling?	<input type="checkbox"/> Y <input type="checkbox"/> N

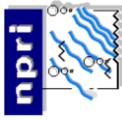
B21.0		REASONS WHY SUBSTANCE WAS TRANSFERRED OFF-SITE FOR DISPOSAL or RECYCLING (Select at least one reason). Fill in this section if you answered YES at B20.1 and/or B20.2
a	<input type="checkbox"/>	Production Residues
b	<input type="checkbox"/>	Off-specification Products
c	<input type="checkbox"/>	Expiration Date Passed
d	<input type="checkbox"/>	Contaminated Materials
e	<input type="checkbox"/>	Unusable Parts or Discards
f	<input type="checkbox"/>	Pollution Abatement Residues
g	<input type="checkbox"/>	Machining or Finishing Residues
h	<input type="checkbox"/>	Site Remediation Residues
i	<input type="checkbox"/>	Other

\* As specified in field B1.3



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# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHS

<b>B22.0 OFF-SITE TRANSFERS FOR DISPOSAL</b> Fill in this section if you answered YES at question B20.1			
<b>B22.1</b>	<b>DISPOSAL METHOD</b>	<b>BASIS OF ESTIMATE</b> (Select one method)	<b>AMOUNT</b> (Units* / Year)
a	Physical Treatment	C / E / M / O	
b	Chemical Treatment	C / E / M / O	
c	Biological Treatment	C / E / M / O	
d	Incineration / Thermal	C / E / M / O	
e i	Containment: Landfill	C / E / M / O	
e ii	Containment: Other Storage	C / E / M / O	
f	Municipal Sewage Treatment Plant	C / E / M / O	
g	Underground Injection	C / E / M / O	
h	Land Treatment	C / E / M / O	
<b>B22.2</b>	<b>TOTAL QUANTITY DISPOSED</b>		

<b>B23.0</b>	<b>REASONS FOR CHANGES IN QUANTITIES DISPOSED FROM PREVIOUS YEAR</b> (Select at least one reason)
<b>B23.1</b>	<b>Changes in Production Levels</b>
a	( )
b	( )
<b>B23.2</b>	<b>Changes in Estimation Methods</b>
c	( )
d	( )
e	( )
f	( )
g	( )
h	( )
i	( )
<b>B23.3</b>	<b>Comments on Disposals (Optional)</b>

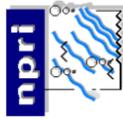
<b>B24.0</b>	<b>ANTICIPATED DISPOSALS (Units* / Year)</b>		
<b>B24.1</b>	2002	2003	2004
a)	b)	c)	
d)	e)		
	2005 (Optional)	2006 (Optional)	

\* As specified in field B1.3



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# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHS

B25.0 OFF-SITE TRANSFERS FOR RECYCLING				
Fill in this section if you answered YES at question B20.2				
B25.1	RECYCLING ACTIVITY	BASIS OF ESTIMATE (Select one method)	RECYCLING (Units* / Year)	OFF-SITE CODES (see Appendix C)
a	Energy Recovery	C / E / M / O		
b	Recovery of Solvents	C / E / M / O		
c	Recovery of Organic Substances (not Solvents)	C / E / M / O		
d	Recovery of Metals and Metal Compounds	C / E / M / O		
e	Recovery of Inorganic Materials (not Metals)	C / E / M / O		
f	Recovery of Acids and Bases	C / E / M / O		
g	Recovery of Catalysts	C / E / M / O		
h	Recovery of Pollution Abatement Residues	C / E / M / O		
i	Refining or Re-use of Used Oil	C / E / M / O		
j	Other	C / E / M / O		
B25.2	TOTAL QUANTITY REC.			

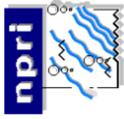
B26.0 REASONS FOR CHANGES IN QUANTITIES RECYCLED FROM PREVIOUS YEAR	
(Select at least one reason)	
B26.1	a ( ) Changes in Production Levels
	b ( ) Changes in Estimation Methods
	c ( ) Pollution Prevention Activities
	d ( ) Changes in On-site Treatment
	e ( ) Changes in Off-site Transfers for Disposal
	g ( ) Other (specify in comments field B26.2)
	h ( ) No Significant Change (< 10 %) or No Change
	i ( ) Not Applicable (first year reporting this substance)
B26.2	COMMENTS ON RECYCLING (Optional)

\* As specified in field B1.3



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# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHS

B27.0					ANTICIPATED RECYCLING (Units / Year)				
B27.1		2002		2003		2004		2004	
a)		b)		c)					
2005 (Optional)		2006 (Optional)							
e)		d)							

B30.0		POLLUTION PREVENTION ACTIVITIES (P2) (Select at least one activity)	
B30.1 a	( )	Materials or Feedstock Substitution	
b	( )	Product Design or Reformulation	
c	( )	Equipment or Process Modifications	
d	( )	Spill or Leak Prevention	
e	( )	On-site Re-use, Recycling or Recovery	
f	( )	Improved Inventory Management or Purchasing Techniques	
g	( )	Good Operating Practices or Training	
h	( )	Other (specify in comments field B30.2)	
i	( )	No Pollution Prevention Activities	
B30.2		COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)	

B40.0	PRODUCTION RATIO / ACTIVITY INDEX (Optional)
B40.1	

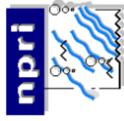
End of Form

\* As specified in field B1.3



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# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

Please photocopy Part B of the form for each reportable NPRI substance.

All fields are mandatory unless otherwise noted.

PLEASE PRINT

For additional information, refer to the 2001 *Guide for Reporting to the National Pollutant Release Inventory* and the 2001 *Supplementary Guide for Reporting to the National Pollutant Release Inventory*.

<b>B1.0</b>	SUBSTANCE IDENTITY	
<b>B1.1</b>	CAS Registry Number:	
<b>B1.2</b>	Substance Name:	
<b>B1.3</b>	NPRI substance category declared on this form (check one):	
d)	<input type="checkbox"/> Dioxins/Furans	UNITS: grams TEQ (g TEQ)
e)	<input type="checkbox"/> Hexachlorobenzene (HCB)	UNITS: grams (g)

Note: The UNITS with the chosen substance category in the above table will be consistent throughout this form.

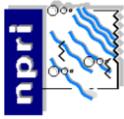
<b>B2.0</b>	NATURE OF ACTIVITIES (Select at least one activity)	
<b>B2.1</b>	MANUFACTURE THE SUBSTANCE	
a)	<input type="checkbox"/> For On-Site Use / Processing	
b)	<input type="checkbox"/> For Sale / Distribution	
c)	<input type="checkbox"/> As a By-product	
d)	<input type="checkbox"/> As an Impurity	
<b>B2.2</b>	PROCESS THE SUBSTANCE	
a)	<input type="checkbox"/> As a Reactant	
b)	<input type="checkbox"/> As a Formulation Component	
c)	<input type="checkbox"/> As an Article Component	
d)	<input type="checkbox"/> Repackaging Only	
e)	<input type="checkbox"/> As a By-product	
<b>B2.3</b>	OTHERWISE USE THE SUBSTANCE	
a)	<input type="checkbox"/> As a Physical or Chemical Processing Aid	
b)	<input type="checkbox"/> As a Manufacturing Aid	
c)	<input type="checkbox"/> Ancillary / Other Use	
d)	<input type="checkbox"/> As a By-product	

<b>B10.0</b>	ON-SITE RELEASES TO THE ENVIRONMENT	
<b>B10.1</b>	Do you release this substance on-site?	( ) Y ( ) N If NO, go directly to section B14.0



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# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B12.0	ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT				
B12.1	AIR RELEASES	BASIS OF ESTIMATE (Select one method)		DETAIL CODE**	RELEASES (Units* / Year)
a	Stack or Point Releases	C/E/M/O/NA/NI	AL/BL/BQ		
b	Storage or Handling Releases	C/E/M/O/NA/NI	AL/BL/BQ		
c	Fugitive Releases	C/E/M/O/NA/NI	AL/BL/BQ		
d	Spills	C/E/M/O/NA/NI	AL/BL/BQ		
e	Other Non-Point Releases	C/E/M/O/NA/NI	AL/BL/BQ		
B12.2	UNDERGROUND INJECTION	C/E/M/O/NA/NI	AL/BL/BQ		
B12.3	RELEASES TO SURFACE WATERS	BASIS OF ESTIMATE (Select one method)	DETAIL CODE**	SURFACE WATER BODY CODES (Appendix B)	RELEASES (Units* / Year)
a	Direct Discharges	C/E/M/O/NA/NI	AL/BL/BQ		
b	Spills	C/E/M/O/NA/NI	AL/BL/BQ		
c	Leaks	C/E/M/O/NA/NI	AL/BL/BQ		
B12.4	RELEASES TO LAND	BASIS OF ESTIMATE (Select one method)	DETAIL CODE**	DETAIL CODE**	RELEASES (Units* / Year)
a	Landfill	C/E/M/O/NA/NI	AL/BL/BQ	AL/BL/BQ	
b	Land Treatment	C/E/M/O/NA/NI	AL/BL/BQ	AL/BL/BQ	
c	Spills	C/E/M/O/NA/NI	AL/BL/BQ	AL/BL/BQ	
d	Leaks	C/E/M/O/NA/NI	AL/BL/BQ	AL/BL/BQ	
e	Other	C/E/M/O/NA/NI	AL/BL/BQ	AL/BL/BQ	
B12.5	TOTAL QUANTITY RELEASED				

B13.0	YEARLY BREAKDOWN OF RELEASES BY PERCENTAGE IN EACH QUARTER (Total must be 100 %)						
B13.1	(Jan.-March)	(April-June)	(July-Sept.)	(Oct.-Dec.)			
a)	%	b)	%	c)	%	d)	%

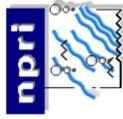
\* As specified in field B1.3

\*\* Select a Detail Code if M was chosen as basis of estimate, see the *Supplementary Guide* for more information



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## NPRI - The National Pollutant Release Inventory

### PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

<b>B14.0</b>	<b>REASONS FOR CHANGES IN QUANTITIES RELEASED FROM PREVIOUS YEAR</b> (Select at least one reason)	
<b>B14.1</b>	a) <input type="checkbox"/>	Changes in Production Levels
	b) <input type="checkbox"/>	Changes in Estimation Methods
	c) <input type="checkbox"/>	Pollution Prevention Activities
	d) <input type="checkbox"/>	Changes in On-site Treatment
	e) <input type="checkbox"/>	Changes in Off-site Transfers for Disposal
	f) <input type="checkbox"/>	Changes in Off-site Transfers for Recycling
	g) <input type="checkbox"/>	Other (specify in comments field B14.2)
	h) <input type="checkbox"/>	No Significant Change (i.e. < 10%) or No Change
	i) <input type="checkbox"/>	Not Applicable (first year reporting this substance)
<b>B14.2</b>	<b>COMMENTS ON RELEASES (Optional):</b>	

<b>B15.0</b>	<b>ANTICIPATED RELEASES (Units* / Year)</b>		
<b>B15.1</b>	2002	2003	2004
	a) <input type="checkbox"/>	b) <input type="checkbox"/>	c) <input type="checkbox"/>
	2005 (Optional) 2006 (Optional)		
	d) <input type="checkbox"/>	e) <input type="checkbox"/>	

<b>B20.0</b>	<b>DO YOU TRANSFER THIS SUBSTANCE TO OFF-SITE LOCATIONS</b>	
<b>B20.1</b>	For Disposal?	<input type="checkbox"/> Y <input type="checkbox"/> N
<b>B20.2</b>	For Recycling?	<input type="checkbox"/> Y <input type="checkbox"/> N

<b>B21.0</b>	<b>REASONS WHY SUBSTANCE WAS TRANSFERRED OFF-SITE FOR DISPOSAL or RECYCLING</b> (Select at least one reason). Fill in this section if you answered YES at B20.1 and/or B20.2	
a) <input type="checkbox"/>	Production Residues	
b) <input type="checkbox"/>	Off-specification Products	
c) <input type="checkbox"/>	Expiration Date Passed	
d) <input type="checkbox"/>	Contaminated Materials	
e) <input type="checkbox"/>	Unusable Parts or Discards	
f) <input type="checkbox"/>	Pollution Abatement Residues	
g) <input type="checkbox"/>	Machining or Finishing Residues	
h) <input type="checkbox"/>	Site Remediation Residues	
i) <input type="checkbox"/>	Other	

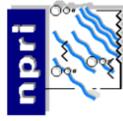
\* As specified in field B1.3



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## NPRI - The National Pollutant Release Inventory

### PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

<b>B24.1</b>	2002	2003	2004
a)	b)	c)	
	2005 (Optional)		
d)	e)		

<b>B25.0 OFF-SITE TRANSFERS FOR RECYCLING</b>					
Fill in this section if you answered YES at question B20.2					
<b>B25.1</b>	<b>RECYCLING ACTIVITY</b>	<b>BASIS OF ESTIMATE</b> (Select one method)	<b>DETAIL CODES**</b>	<b>RECYCLING</b> (Units* / Year)	<b>OFF-SITE CODES</b> (see Appendix C)
a	Energy Recovery	C/E/M/O/NA/NI	AL/BL/BQ		
b	Recovery of Solvents	C/E/M/O/NA/NI	AL/BL/BQ		
c	Recovery of Organic Substances (not Solvents)	C/E/M/O/NA/NI	AL/BL/BQ		
d	Recovery of Metals and Metal Compounds	C/E/M/O/NA/NI	AL/BL/BQ		
e	Recovery of Inorganic Materials (not Metals)	C/E/M/O/NA/NI	AL/BL/BQ		
f	Recovery of Acids and Bases	C/E/M/O/NA/NI	AL/BL/BQ		
g	Recovery of Catalysts	C/E/M/O/NA/NI	AL/BL/BQ		
h	Recovery of Pollution Abatement Residues	C/E/M/O/NA/NI	AL/BL/BQ		
i	Refining or Re-use of Used Oil	C/E/M/O/NA/NI	AL/BL/BQ		
j	Other	C/E/M/O/NA/NI	AL/BL/BQ		
<b>B25.2</b>	<b>TOTAL QUANTITY REC.</b>				

<b>B26.0 REASONS FOR CHANGES IN QUANTITIES RECYCLED FROM PREVIOUS YEAR</b>	
(Select at least one reason)	
<b>B26.1 a</b>	<input type="checkbox"/> Changes in Production Levels
b	<input type="checkbox"/> Changes in Estimation Methods
c	<input type="checkbox"/> Pollution Prevention Activities
d	<input type="checkbox"/> Changes in On-site Treatment
e	<input type="checkbox"/> Changes in Off-site Transfers for Disposal
g	<input type="checkbox"/> Other (specify in comments field B26.2)
h	<input type="checkbox"/> No Significant Change (< 10 %) or No Change
i	<input type="checkbox"/> Not Applicable (first year reporting this substance)

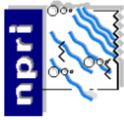
\* As specified in field B1.3

\*\* Select a Detail Code if M was chosen as basis of estimate, see the Supplementary Guide for more information



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# NPRI - The National Pollutant Release Inventory

## PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

<b>B26.2</b>	<b>COMMENTS ON RECYCLING (Optional)</b>			

<b>B27.0</b>	<b>ANTICIPATED RECYCLING (Units* / Year)</b>			
<b>B27.1</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	
a)		b)	c)	
	2005 (Optional)			
e)		d)		

<b>B30.0</b>	<b>POLLUTION PREVENTION ACTIVITIES (P2)</b> (Select at least one activity)			
<b>B30.1 a</b>	( )	Materials or Feedstock Substitution		
b	( )	Product Design or Reformulation		
c	( )	Equipment or Process Modifications		
d	( )	Spill or Leak Prevention		
e	( )	On-site Re-use, Recycling or Recovery		
f	( )	Improved Inventory Management or Purchasing Techniques		
g	( )	Good Operating Practices or Training		
h	( )	Other (specify in comments field B30.2)		
i	( )	No Pollution Prevention Activities		
<b>B30.2</b>	<b>COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)</b>			

<b>B40.0</b>	<b>PRODUCTION RATIO / ACTIVITY INDEX (Optional)</b>
<b>B40.1</b>	

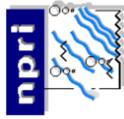
End of Form

\* As specified in field B1.3



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# NPRI - The National Pollutant Release Inventory

## APPENDIX A PARENT COMPANIES

NPRI ID: \_\_\_\_\_

If you answered Yes in section A3.0, please list parent company or companies below.

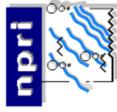
PARENT COMPANY	
P1.0	D&B D-U-N-S Number: _____ - _____ - _____ - _____ - _____ - _____ (Optional)
P1.1	Ownership percentage: _____ %
P1.2	Parent Company Name:
P1.3	Mailing Address:
P1.4	Mailing Address:
P1.5	City / District:
P1.6 - 7	Province / Territory: _____ Postal Code: _____
P1.8 - 9	State: _____ Zip Code / Other: _____
P1.10	Country: _____

PARENT COMPANY	
P1.0	D&B D-U-N-S Number: _____ - _____ - _____ - _____ - _____ - _____ (Optional)
P1.1	Ownership percentage: _____ %
P1.2	Parent Company Name:
P1.3	Mailing Address:
P1.4	Mailing Address:
P1.5	City / District:
P1.6 - 7	Province / Territory: _____ Postal Code: _____
P1.8 - 9	State: _____ Zip Code / Other: _____
P1.10	Country: _____

PARENT COMPANY	
P1.0	D&B D-U-N-S Number: _____ - _____ - _____ - _____ - _____ - _____ (Optional)
P1.1	Ownership percentage: _____ %
P1.2	Parent Company Name:
P1.3	Mailing Address:
P1.4	Mailing Address:
P1.5	City / District:
P1.6 - 7	Province / Territory: _____ Postal Code: _____
P1.8 - 9	State: _____ Zip Code / Other: _____
P1.10	Country: _____







# NPRI - The National Pollutant Release Inventory

## APPENDIX C OFF-SITE FACILITIES

NPRI ID:

S1.0	OFF-SITE FACILITY (Codes to be used in sections B22.1, B25.1)	
S1.1	Off-Site Code: 01	Use off-site codes (e.g. 01, 02, 03 ) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0
S1.2	Off-Site Name:	
S1.3	Physical Address of ...	
S1.4	... Site Location	
S1.5	City / District:	
S1.6 - 7	Province / Territory:	Postal Code:
S1.8 - 9	State:	Zip Code / Other:
S1.10	Country:	

S1.0	OFF-SITE FACILITY (Codes to be used in sections B22.1, B25.1)	
S1.1	Off-Site Code: 02	Use off-site codes (e.g. 01, 02, 03.) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0
S1.2	Facility or MSTP Name:	
S1.3	Physical Address of ...	
S1.4	... Site Location	
S1.5	City / District:	
S1.6 - 7	Province / Territory:	Postal Code:
S1.8 - 9	State:	Zip Code / Other:
S1.10	Country:	

S1.0	OFF-SITE FACILITY (Codes to be used in sections B22.1, B25.1)	
S1.1	Off-Site Code: 03	Use off-site codes (e.g. 01, 02, 03 ) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0
S1.2	Facility or MSTP Name:	
S1.3	Physical Address of ...	
S1.4	... Site Location	
S1.5	City / District:	
S1.6 - 7	Province / Territory:	Postal Code:
S1.8 - 9	State:	Zip Code / Other:
S1.10	Country:	

End of Form



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Appendix - C



# ANNUAL CERTIFICATE FOR THE OPERATION OF INDUSTRIAL FACILITIES UNDER FEDERAL JURISDICTION FOR THE YEAR 2001

To be completed by SEMARNAP	
<b>1) APPLICATION NUMBER:</b>	<b>2) ENVIRONMENTAL REGISTRATION NUMBER:</b>
<b>3) RECEIVED BY:</b>  <hr style="width: 80%; margin-left: 0;"/> <p style="text-align: center;">Name and signature</p>	    <p style="text-align: center;">(Signature with date received)</p>
<b>4) License Number:</b>	

In compliance with Articles 1, 4, 5, 11, 109 (BIS and BISm1), 111, 111BIS, 112, 113, 122, 139, 151, 157 y 159 (BIS, BIS 1, BIS 3, BIS 4 y BIS 6), of the General Law of Ecological Equilibrium and Environmental Protection (LGEEPA); Articles 3, 4, 9, 15, 29, 52, 85, 86, 87, 89 y 92 of the Law on National Waters; and pursuant to the Public Agreements of dates April 11, 1997 and April 9, 1998 through which the Secretariat of Environment, Natural Resources and Fisheries (SEMARNAP) shall establish the mechanisms and procedures to obtain the Single Environmental License through one single procedure, as well as the updating of the information about pollutant releases through an Annual Operation Certificate, the company I represent hereby provides the following information to the Institution regarding the annual facility operations.

TO BE COMPLETED BY THE INDUSTRIAL FACILITY	
<b>5) TRADE NAME OF THE FACILITY:</b>  <hr style="width: 80%; margin-left: 0;"/> <p>I declare that the information contained in this request and the appendices thereto is true. In case of any omissions or false declarations, SEMARNAP may cancel this application or apply appropriate administrative sanctions.</p>	<p style="text-align: center;">Name and signature of the legal representative</p> <hr style="width: 80%; margin-left: auto; margin-right: 0;"/>
<b>PLACE AND DATE:</b>  <hr style="width: 80%; margin-left: 0;"/>	<p style="text-align: center;">Name and signature of the technical officer</p> <hr style="width: 80%; margin-left: auto; margin-right: 0;"/>

**REGISTRATION DATA**

This data should be submitted when this information form is being used for the first time or any of the data has changed during the year of the report.

<b>1) NAME OR FACILITY NAME:</b>		<b>RFC:</b>						
<b>2) SIEM REGISTRATION NUMBER:</b>	<b>3) COMMERCE CHAMBER AND NUMBER:</b>							
<b>4) PRIMARY INDUSTRIAL ACTIVITY OF THE FACILITY<sup>2</sup>:</b>		<b>CMAP CODE<sup>3</sup>:</b>	<b>ENVIRONMENTAL CODE<sup>3</sup>:</b>					
<b>5) ADDRESS</b> (Append map according to General Instructions)								
Industrial Port _____	Specify: _____							
Town _____	Street: _____							
Outer/inner number: _____	Colonia: _____							
State: _____	Postal code: _____							
Municipality: _____	Federal entity: _____							
Telephone _____	E-mail: _____							
<b>6) Address to hear or receive notifications</b> (in case it is different from the one above):								
Street: _____	Outer/inner number: _____							
Colonia: _____	State (or town): _____							
Postal code: _____	Municipality or delegation: _____							
Federal entity: _____	Telephone: _____							
Fax: _____	E-mail: _____							
<b>7) DATE OF START OF OPERATIONS:</b> Day <input type="text"/> Month <input type="text"/> Year <input type="text"/>								
<b>8) EQUIVALENT NUMBER OF EMPLOYEES<sup>4</sup></b>								
Employees: _____	Workers: _____	Total: _____	h/d _____ h/wk _____					
<b>9) WORKING SHIFTS</b> (indicate worked hours)								
Monday to Friday _____	Saturday _____	Sunday _____	Total _____ h/d _____ h/wk _____					
<b>10) AVERAGE NUMBER of WORKERS, by DAY and WORKED SHIFT</b> (Consider a shift for every different schedule. DO NOT Leave blanks. If there is not information, write NA/ not applicable)								
<b>Average number of workers</b>								
Nr.	Schedule	M	T	W	T	F	S	S
<b>11) Is it a Maquiladora of temporary importation regime?</b>		<b>12) Is it part of a corporation?<sup>5</sup> Yes ( ) No ( )</b>						
Yes ( ) No ( )		Specify:						
<b>13) CAPITAL PARTICIPATION:</b> Only national ( ) Mostly national ( ) Mostly foreign ( ) Only foreign ( )				<b>RFC:</b>				

1. Mexican Managerial Information System  
 2. Present copy of proving document in which the main industrial activity is indicated, for example: state or municipal license, tax document, and land use license. This section is to be completed by SEMARNAP.  
 3. The Mexican Classification of Activities and Products Code (CMAP) is obtained along with the Environmental Code (CA). This section is to be completed by SEMARNAP.  
 4. To calculate the equivalent number of working people, divide the total number of worker-hours (the addition of worked hours in a year by all the employees at the facility) by 2000 hours. That is, if 19 employees work at a facility and each one works 48 hours a week during 50 weeks a year, then 45600 hours a year are worked (19x48x50) and you have 22.8 equivalent employee hours (45600/2000). To calculate the number of workers, you should proceed in the same way.  
 5. Indicate if the facility belongs to a national or international corporation.

## SECTION I. GENERAL TECHNICAL INFORMATION

As set forth in Articles 19 and 21 of the regulations of the LGE EPA under prevention and control of atmospheric pollution, the reporting of information contained in this section is obligatory.

**1.1 CHANGE of NAME or TRADE NAME**      Day         Month         Year

If this is the case, enter the date of the change of name or trade name of the facility. Changes in process and reductions and increases in production should be reported in the Operating License or Single Environmental License (LAU), giving prompt notification at the INE procession window or at the state delegations of Semarnap. In cases of change of domicile or industrial transfer, the facility must process a new License.

### 1.2 RISK and CONTINGENCIES

If applicable, write down the date on which the Environmental Impact Assessment was issued and/or the Accident Prevention Program or the Contingency Program was approved.

1.2.1 Date of submission of the last Risk Assessment:      Day         Month         Year

1.2.2 Date of the last update of the Accident Prevention Program or Contingency Program      Day         Month         Year

### 1.3 OPERATIONS AND PROCESS DESCRIPTION

If necessary due to changes in the facility or if using this form for the first time, prepare the *General Operating Diagram* and *The Table of Consumption, generation and/or release points* following the example included in the General Instructions Catalogue, section VI.3, that comes with this form. The diagram (annex 1.3b) and the Summary Table (annex 1.3.c) shall include all areas (production, wastewater treatment, waste management, services, etc.) where there are points of raw materials, water or energy use, or where pollutants are generated, stored or released, for example, when:

- there is an input, as direct or indirect consumption, of some of the substances listed in table number 12 in the code catalogue,
- caloric energy is used or produced,
- water is used, or
- any of the substances contained in the list is generated, stored, or emitted to the environment.

In case there are different production processes, the facility should report and present them. Their identification should follow a consecutive increasing numeric order, as shown in the instruction section. The emission points (machinery, processes, services, control equipments, etc.) identified in these diagrams will be used throughout the whole form, so they should be clearly defined following the criteria cited before.

**1.4 DIRECT and INDIRECT RAW MATERIALS** including raw materials that contain any of the substances listed in Table 12 of the General Code Catalogue.

Commercial	Name <sup>1</sup>		Consumption Point <sup>2</sup>	Physical state <sup>3</sup>	Type of storage <sup>4</sup>	Annual consumption	
	Chemical	CAS Number				Amount <sup>5</sup>	Unit <sup>6</sup>

<sup>1</sup> Indicate the commercial and chemical names of the raw materials consumed. When applicable, provide the information of the pure raw materials as well as the Chemical Abstracts Service identification number CAS.

<sup>2</sup> Indicate the number appearing in the General Operating Diagram and on the summary table corresponding to the equipment or process in which the raw material is consumed.

<sup>3</sup> Physical State Codes may be found in Table 1 of the General Code Catalogue.

<sup>4</sup> According to Table 2 of the General Code Catalogue.

<sup>5</sup> Indicate the amount consumed during the year reported.

<sup>6</sup> Units of mass (kgs), tons (metric tons), pounds or volume liters, gallons, barrels, square meters or square feet can be reported. If the units are unknown, the term pieces can be used.

**1.5 PRODUCTS**

Product Name	Physical State <sup>1</sup>	Type storage <sup>2</sup>	Annual production	
			Amount	Unit <sup>3</sup>

**1** The physical state codes can be found in Table 1 of the General Code Catalogue.

**2** According to Table 2 of the General Code Catalogue.

**3** Units of mass (kgs), tons (metric tons), pounds or volume liters, gallons, barrels, square meters or square feet can be reported. If the units are unknown, the term pieces can be used.

**1.6 ENERGY CONSUMPTION**

**1.6.1 Annual consumption of fossil fuel**

Fuel type <sup>1</sup>	Annual consumption	
	Amount	Unit <sup>2</sup>

**1** Indicate whether the employed fuels natural gas (NG), LP gas, fuel oil (FO), gasoline (GO), distillate (DF), diesel (DI), gasoline (GA), coal (CA), burned wastes (BW) or others. Low caloric power-fuels such as: sugar cane pulp, cellulose, wood or fuels coming from wastes where released heat is used in production processes, steam or electricity generation shall be considered as burned wastes and, therefore, be reported in this Table. Whenever the facility counts on service gasoline stations, diesel or LP gas for the use in vehicles or service lifts, such amount of consumption shall not be considered.

**2** Units of mass (kgs), tons (metric tons), pounds or volume liters, gallons, barrels, square meters or square feet can be reported. If the units are unknown, the term pieces can be used.

**1.6.2 Annual consumption of electric energy**

Type of supply <sup>1</sup>	Annual consumption	
	Amount	Unit <sup>2</sup>

**1.** Indicate whether the consumed electric energy comes from external supplier (EE) or is generated at the facility site by burning fossil fuels (CF), burning cane sugar pulp, cellulose, wood, other wastes (CDR) or other alternative energy sources (OM).

**2.** Units such as: J/s (joules/second), MJ/hr (megajoules/hour), W (watts), KW (kilowatts) or MW (megawatts) can be used.





### 2.3.2 Nitrogen oxides

Release point <sup>1</sup>	Annual emission		Control equipment or method			
	Amount <sup>2</sup>	Unit <sup>3</sup>	Estimation method <sup>4</sup>	Code <sup>5</sup>	Efficiency (%) <sup>6</sup>	Estimation method <sup>7</sup>

- 1 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
- 2 Indicate the annual amount of the released pollutant.
- 3 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
- 4 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
- 5 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
- 6 Report the last measured efficiency value or estimate through an indirect method.
- 7 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

### 2.3.3 Particulates

Release point <sup>1</sup>	Annual emission		Control equipment or method			
	Amount <sup>2</sup>	Unit <sup>3</sup>	Estimation method <sup>4</sup>	Code <sup>5</sup>	Efficiency (%) <sup>6</sup>	Estimation method <sup>7</sup>

- 1 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
- 2 Indicate the annual amount of the released pollutant.
- 3 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
- 4 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
- 5 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
- 6 Report the last measured efficiency value or estimate through an indirect method.
- 7 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

### 2.3.4 Unburned hydrocarbons, HC<sup>1</sup>

Release points <sup>2</sup>	Annual emission		Control equipment or method			
	Amount <sup>3</sup>	Unit <sup>4</sup>	Estimation method <sup>5</sup>	Code <sup>6</sup>	Efficiency (%) <sup>7</sup>	Estimation method <sup>8</sup>

- 1 Report the total hydrocarbons (methanic and non-methanic) released to the atmosphere by combustion equipment. The release of hydrocarbons in processes that do not include combustion equipment are reported in Table 2.3.7 (volatile organic compounds).
- 2 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
- 3 Indicate the annual amount of the released pollutant.
- 4 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
- 5 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
- 6 Report the last measured efficiency value or estimate through an indirect method.
- 7 Report the last measured efficiency value or estimate through an indirect method.
- 8 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

### 2.3.5 Carbon monoxide

Release points <sup>1</sup>	Annual emission		Control equipment or method			
	Amount <sup>2</sup>	Unit <sup>3</sup>	Estimation method <sup>4</sup>	Code <sup>5</sup>	Efficiency (%) <sup>6</sup>	Estimation method <sup>7</sup>

- 1 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
- 2 Indicate the annual amount of the released pollutant.
- 3 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
- 4 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
- 5 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
- 6 Report the last measured efficiency value or estimate through an indirect method.
- 7 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

2.3.6 Carbon dioxide

Release points <sup>1</sup>	Annual emission		Control equipment or method	
	Amount <sup>2</sup>	Unit <sup>3</sup> Estimation method <sup>4</sup>	Code <sup>5</sup>	Efficiency (%) <sup>6</sup> Estimation method <sup>7</sup>

- 1 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
- 2 Indicate the annual amount of the released pollutant.
- 3 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
- 4 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
- 5 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
- 6 Report the last measured efficiency value or estimate through an indirect method.
- 7 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

2.3.7 Volatile organic compounds<sup>1</sup>

Release points <sup>2</sup>	Annual emission		Control equipment or method	
	Amount <sup>3</sup>	Unit <sup>4</sup> Estimation method <sup>5</sup>	Code <sup>6</sup>	Efficiency (%) <sup>7</sup> Estimation method <sup>8</sup>

- 1 If this is the case, the data in this table shall correspond to the conditioning factors related to the Action and Building Plan to reduce Volatile Organic Compound releases requested in the Operating License or the Single Environmental License. If the facility uses measurements or estimations of specific volatile organic compounds, they shall report them in Section V of this License (Annual Releases and Transfers of listed pollutants).
- 2 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
- 3 Indicate the annual amount of the released pollutant.
- 4 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
- 5 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
- 6 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
- 7 Report the last measured efficiency value or estimate through an indirect method.
- 8 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

SECTION III. WATER USE and DISCHARGE of WASTEWATERS

To report the information contained in this section is optional and will be used for statistical purposes. The omission of this section shall bring about no consequences at all.

3.1 WATER USE

Water extraction source <sup>1</sup>	Concession or assignment license number <sup>2</sup>	Concession entity <sup>3</sup>	Annual water used	
			Amount <sup>4</sup>	Unit <sup>5</sup>

- 1 Indicate the origin of every extracting or supplying source upon which the facility relies. Indicate also: network of potable water (PW), superficial (FS), underground (UG), salty (SO), treated or reused (TR) or of any other kind (OK) of source.
- 2 Indicate the corresponding number to the title or assignment, according to jurisdictional area of source used.
- 3 Indicate the name of administrative entity that granted concession or assignment.
- 4 Indicate the annual total amount of water used from each extracting source.
- 5 Volume units such as: lt. (liters), m<sup>3</sup> (cubic meters), ft<sup>3</sup> (cubic feet) or gal (gallons) shall be used.

## 3.2 DISCHARGE OF WASTEWATERS

### 3.2.1 General Discharge Data

Discharge type <sup>1</sup>	Release point <sup>2</sup>	Discharge number <sup>3</sup>	Hydrological region <sup>4</sup>	Modifications <sup>5</sup>		Discharge frequency <sup>7</sup>	Crop irrigation <sup>8</sup>	Annual <i>in situ</i> treatment		
				Permits and records	REPA <sup>6</sup>			Code <sup>9</sup>	Amount <sup>10</sup>	Unit <sup>11</sup>

<sup>1</sup> According to Table 5 of the General Code Catalogue.

<sup>2</sup> Number corresponding to the Operating Diagrams and Summary Table, as requested in section 1.3.

<sup>3</sup> When applicable, establish the relationship between the release points identified on the Operating Diagrams and Summary Table and the numbers of discharge that appear in the application done at the National Water Commission. When it is not the case, indicate NA (not applicable).

<sup>4</sup> According to Table 11 of the General Code Catalogue and the map of Hydrologic Regions.

<sup>5</sup> When applicable, indicate the modifications to the permits or registers of the authorized discharges.

<sup>6</sup> When applicable, indicate the certificate number of modification from the Public Registry of Water Rights (PRWR).

<sup>7</sup> Indicate if it is continuous (C), intermittent (I) or occasional (O).

<sup>8</sup> When it is used for watering crops, indicate if it is of restrictive (R) or non-restrictive type (N).

<sup>9</sup> According to Table 6 of the General Code catalogue.

<sup>10</sup> Report the annual total volume of treated water at the facility.

<sup>11</sup> Volume units such as: lt. (liters), m<sup>3</sup> (cubic meters), ft<sup>3</sup> (cubic feet) or gal (gallons) shall be used.

### 3.2.2 Wastewater discharge quality description<sup>1</sup>

Parameter <sup>3</sup>	Release point <sup>2</sup>	
Annual volume [cubic meters]		
Hydrogen potential (pH)		
Temperature [°C]		
Fats and oils [mg/l]		
Floating matter (present or absent)		
Sedimentable solids [ml/l]		
Total suspended solids [mg/l]		
Biochemical oxygen demand (DBO <sub>5</sub> ) [mg/l]		
Total arsenic [mg/l]		
Total cadmium [mg/l]		
Total cyanide [mg/l]		
Total copper [mg/l]		
Hexavalent chromium [mg/l]		
Total phosphorus [mg/l]		
Total mercury [mg/l]		
Total nickel [mg/l]		
Total nitrogen [mg/l]		
Total lead [mg/l]		
Total zinc [mg/l]		
Fecal coliform bacteria [NMP/100 ml]		
Helminth eggs [organisms/l]		

<sup>1</sup> Some discharge parameters, such as: heavy metals and cyanide compounds, are included in the list of substances subject to be reported (Table 12 of the General Code Catalogue) and shall be reported again in section V. However in this section, at this time, the concentration value shall not be reported, but the corresponding total annual release.

<sup>2</sup> Indicate the discharge point corresponding to the Operating Diagrams and Summary Table, as requested in section 1.3 and which also appears in the previous table (3.2.1).

<sup>3</sup> Annual average according to volume. Estimated value departing from the data presented to the authorities throughout the reporting year (for CNA, use the values contained in the declarations for water discharge rights, presented every three months).

### SECTION IV. HAZARDOUS WASTE GENERATION, TREATMENT and TRANSFER

Reporting the information contained in this section is optional for facilities that generate hazardous wastes, as well as for the ones responsible for providing hazardous waste treatment services. If the information is provided, it will be considered as fulfilling, for the time span in which the Operation Certificate is valid, the current legal requirement to present periodic information related to the generation or transfer of these wastes. Otherwise, the facilities should present the corresponding manifests in the time requested.

#### 4.1 HAZARDOUS WASTE GENERATION<sup>1</sup>

Generation point <sup>2</sup>	Waste identification		Annual generation		In situ treatment <sup>1</sup>		
	NOM-052-ECOL-93 <sup>3</sup>	Code <sup>4</sup>	Amount <sup>5</sup>	Unit <sup>6</sup>	Code <sup>8</sup>	Annual treated amount	Unit <sup>6</sup>

- 1 Hazardous waste treatment companies who, as a consequence of their operations, generate additional hazardous wastes, shall also provide the information requested in this table, reporting the hazardous wastes generated by the facility that is reporting.
- 2 Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.
- 3 Identification number of wastes according to NOM-052-ECOL-93.
- 4 Code of the hazardous waste according to Table 9 in the General Code Catalogue.
- 5 Annually generated amount, at the generating (process or activity) point, which is being reported.
- 6 Use volume units, such as: lt. (litres), m<sup>3</sup> (cubic meters), ft<sup>3</sup> (cubic feet) or gal. (gallons), or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal., etc.
- 7 Indicate the treatment code and volume of treated wastes at the facility that is reporting. This information corresponds only to the wastes generated by the facility itself; the treatment(s) provided by a hazardous waste treatment company shall be reported in Table 4.4. Whenever more than one treatment is provided, every treatment shall be indicated on a line; the generation point for each one of them shall be repeated.
- 8 According to Table 8 of the General Code Catalogue.

#### 4.2 HAZARDOUS WASTE STORAGE AT THE FACILITY SITE

Generation point <sup>1</sup>	Waste identification			Storage						
	NOM-052-ECOL-93 <sup>2</sup>	Code <sup>3</sup>	Form <sup>4</sup>	Annual amount <sup>5</sup>	Unit <sup>6</sup>	Time <sup>7</sup> (days)	Storage characteristics <sup>8</sup>			
							Local	Material	Ventilation	Lighting

- 1 Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.
- 2 Waste identification number according to NOM-052-ECOL-93.
- 3 Code of the hazardous waste according to Table 9 of the General Code Catalogue.
- 4 According to Table 2 of the General Code Catalogue.
- 5 Annual amount of waste that is stored. For example: if 22 kilograms of a waste are stored once for 3 days, 15 kilograms of the same waste are stored for two months and 32 kilograms remain there for 8 days on another time, then the amount to report will be: 22+15+32= 69 kilograms of the waste.
- 6 Use volume units, such as: lt. (litres), m<sup>3</sup> (cubic meters), ft<sup>3</sup> (cubic feet) or gal. (gallons), or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal., etc.
- 7 Maximum storage time of the waste, indicated in days.
- 8 According to Table 3 of the General Code Catalogue.

#### 4.3 HAZARDOUS WASTE TRANSFER<sup>1</sup>

Generation point <sup>2</sup>	Waste identification		Handling company <sup>5</sup>	Total annually transferred	
	NOM-052-ECOL-93 <sup>3</sup>	Code <sup>4</sup>		Amount <sup>6</sup>	Unit <sup>7</sup>

**1** The hazardous waste generator shall contract only the services of companies, authorized by INE, to handle such wastes. (Articles 151 BIS LGEEPA and 10 from the Hazardous Waste Regulation).

**2** Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.

**3** Waste identification number according to NOM-052-ECOL-93.

**4** Code of the hazardous waste according to Table 9 of the General Code Catalogue.

**5** Indicate the authorization number for the handling of hazardous wastes given by INE. If this datum is unknown, indicate name of the hazardous waste handling company.

**6** Indicate the total amount of the hazardous waste transferred during the year of report.

**7** Use volume units, such as: lt. (litres), m<sup>3</sup> (cubic meters), ft<sup>3</sup> (cubic feet) or gal (gallons) or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal. etc.

#### 4.4 HAZARDOUS WASTE TREATMENT. This section is to be completed only by companies providing hazardous waste treatment services.

Waste identification	Treatment or disposal method <sup>3</sup>	Annual total handled	
		Amount <sup>4</sup>	Unit <sup>5</sup>
NOM-052-ECOL-93 <sup>1</sup>	Code <sup>2</sup>		

**1** Waste identification number according to NOM-052-ECOL-93.

**2** Code of the hazardous waste according to Table 9 of the General Code Catalogue.

**3** According to table 8 of the General Code Catalogue.

**4** The hazardous waste handling company operating under this license shall indicate here the total amount of wastes annually received.

**5** Use volume units, such as: lt. (litres), m<sup>3</sup> (cubic meters), ft<sup>3</sup> (cubic feet) or gal (gallons) or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal. etc.

## SECTION V. ANNUAL RELEASE and TRANSFER of LISTED POLLUTANTS

It is optional to report the information contained in this section until the corresponding Mexican Official Norm (NOM) is issued. The referenced substances are the ones listed in Table 12, in the General Code Catalogue.

### 5.1 USE OF LISTED POLLUTANTS

#### 5.1.1 Use of listed pollutants at the facility site

Identification of listed pollutants		Use <sup>2</sup>	Annual amount <sup>3</sup>	Unit <sup>4</sup>
Name <sup>1</sup>	Code <sup>1</sup>			

- 1 Chemical name and code of the pollutant according to Table 12 of the General Code Catalogue.
- 2 Indicate whether it was used as direct raw material (ID), indirect one (II), remained in storage (IA) or was produced at the facility site (EG).
- 3 Total amount annually consumed (as direct or indirect raw material), stored or produced.
- 4 Use only units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).

#### 5.1.2 Listed pollutants received in hazardous wastes and/or wastewaters<sup>1</sup>

Identification of listed substance		Generator identification <sup>3</sup>	Annual received amount	
Name <sup>2</sup>	Code <sup>2</sup>		Amount <sup>4</sup>	Unit <sup>5</sup>

- 1 Information only requested for companies handling hazardous waste and wastewaters.
- 2 Chemical name and code of the pollutant according to Table 12 of the General Code Catalogue.
- 3 Indicate the Register Number issued by INE for the Hazardous Waste Generator whose waste is being reported. If more than one generator submits the same substance, it shall be reported on as many lines as there are different generators. The name of the substance shall be repeated on each line. If this datum is unknown, indicate the name of the facility that generated the submitted waste.
- 4 Total annual amount received for treatment. If the pollutant which is being reported is received in different deliveries and comes from one single generator you shall add all the deliveries and report the annual total. It shall be kept in mind that for each generator a different reporting line shall be used.
- 5 Only use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).

### 5.2 LISTED POLLUTANT RELEASES

#### 5.2.1 Air releases of listed pollutants

Identification of listed substances		Annual release			
Name <sup>1</sup>	Code <sup>1</sup>	Release point <sup>2</sup>	Amount <sup>3</sup>	Unit <sup>4</sup>	Estimation method <sup>5</sup>

- 1 Chemical name and code of the pollutant according to Table 12 of the General Code Catalogue.
- 2 Number corresponding to the Operating Diagram and Summary Table as requested in section 1.3.
- 3 Total annual release of pollutant that is reported.
- 4 Only use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).
- 5 According to Table 4 of the General Code Catalogue.

### 5.2.2 Listed pollutant releases to water bodies

Identification of listed substance		Annual discharge <sup>2</sup>			
Name <sup>1</sup>	Code <sup>1</sup>	Release point <sup>3</sup>	Amount <sup>4</sup>	Unit <sup>5</sup>	Estimation method <sup>6</sup>

- 1 Chemical name and code of the pollutant, according to Table 12 of the General Code Catalogue.
- 2 Indicate the requested data for the wastewater discharge to water bodies (do not include discharges to sewer systems).
- 3 Number corresponding to the Operating Diagram and Summary Table as requested in section 1.3.
- 4 Total annual release of pollutant that is reported.
- 5 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lbs (pounds). If concentration units are used (milligrams/liter or grams/cubic meter), the total release shall be estimated from the annual volume reported in section III (table 3.2.2).
- 6 According to Table 4 of the General Code Catalogue.

### 5.2.3 Listed pollutant releases to soil, including infiltration and injection of wastewaters

Identification of listed substance		Annual discharge <sup>2</sup>			
Name <sup>1</sup>	Code <sup>1</sup>	Release point <sup>2</sup>	Amount <sup>3</sup>	Unit <sup>4</sup>	Estimation method <sup>5</sup>

- 1 Chemical name and code of pollutant, according to Table 12 of the General Code Catalogue.
- 2 Indicate the place, at the facility, in which the pollutant is stored, treated or disposed of. It shall be clearly indicated in the Operating Diagram and Summary Table in the case of wastewater injections, the existence of the well(s) of the corresponding injection.
- 3 Total annual release of pollutant that is reported.
- 4 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lbs (pounds).
- 5 According to Table 4 of the General Code Catalogue.

### 5.2.4 Listed pollutant releases to any media derived from accidents, contingencies or uncontrolled releases

Identification of listed substances		Pollutant code <sup>2</sup>		Amount <sup>3</sup>		Unit <sup>4</sup>		Estimation method <sup>5</sup>	
Name <sup>1</sup>	Code <sup>1</sup>								

- 1 Chemical name and code of pollutant, according to Table 12 of the General Code Catalogue.
- 2 Indicate the Code for the event, according to Table 10 of the General Code Catalogue. A single line shall be used for each event occurring during the reporting year.
- 3 Total annual release of pollutant that is reported.
- 4 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lbs (pounds).
- 5 According to Table 4 of the General Code Catalogue.

## 5.3. LISTED POLLUTANT TRANSFERS

### 5.3.1 Transfers to hazardous waste treatment facilities or to wastewater treatment facilities

Identification of listed substances		Physical state <sup>2</sup>	Handling company <sup>3</sup>	Treatment or disposal method code <sup>4</sup>	Annual amount <sup>5</sup>	Unit <sup>6</sup>	Estimation method <sup>7</sup>
Name <sup>1</sup>	Code <sup>1</sup>						

- 1 Chemical name and code of pollutant, according to Table 12 of the General Code Catalogue.
- 2 See Table 1 of the General Code Catalogue.
- 3 Enter the Hazardous Waste Treatment Permit issued by the INE. If this datum is unknown, indicate the name of the hazardous waste handling company.
- 4 According to Table 8 of the General Code Catalogue.
- 5 Annual amount of the transferred pollutant (transported outside the reporting facility) for treatment or disposal.
- 6 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lbs (pounds).
- 7 According to Table 4 of the General Code Catalogue.

5.3.2 Transfers to the public sewage system

Identification of listed substances		Release point <sup>2</sup>	Annual amount <sup>3</sup>	Unit <sup>4</sup>	Estimation method <sup>5</sup>
Name <sup>1</sup>	Code <sup>1</sup>				

- 1 Chemical name and code of pollutant according to Table 12 of the General Code Catalogue.
- 2 Number corresponding to the Operating Diagram and Summary Table as requested in section 1.3.
- 3 Annual amount of transferred pollutant (transported outside the facility that is being reported), to the public sewage system.
- 4 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).
- 5 According to Table 4 of the General Code Catalogue.

5.4 POLLUTION PREVENTION AND CONTROL

5.4.1 Total releases and activity indicators

Identification of listed substances		Total releases (air + water + soil)						Activity indicators <sup>4</sup>	
		Previous year		Current Reporting year		Next year projection		Previous year	Reporting year
Name <sup>1</sup>	Code <sup>1</sup>	Amount <sup>2</sup>	Unit <sup>3</sup>	Amount <sup>2</sup>	Unit <sup>3</sup>	Amount <sup>2</sup>	Unit <sup>3</sup>		

- 1 Code of the pollutant, according to Table 12 of the General Code Catalogue.
- 2 Total annual release of the listed substance that is being reported (Tables 5.2.1, 5.2.2, 5.2.3 and 5.2.4).
- 3 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).
- 4 The reported activity index may be calculated based on the referenced raw material; indicate the number for the current reporting year and the one before. For example: 1997 information is being reported and the facility had 25,000 m<sup>3</sup> toluene consumption in this year, 37,000 cubic meters in 1996 and 35,000 in 1995; the activity index for the current reporting year is 0.67 (25,000/37,000), whereas for the previous year (1996) the index was 1.06 (37,000/35,000).

5.4.2 Pollution prevention and control activities

Identification of listed substances		Physical state <sup>2</sup>	Control activities <sup>3</sup>	In situ treatment		
Name <sup>1</sup>	Code <sup>1</sup>			Method's code(s) <sup>4</sup>	Estimated efficiency (%) <sup>5</sup>	Amount <sup>6</sup>

- 1 Code of the pollutant, according to Table 12 of the General Code Catalogue.
- 2 See Table 1 of the General Code Catalogue.
- 3 Indicate if there have been changes in: operating practices (CPO), in situ treatment (TS), inventory control (IC), spill and leak prevention (PDF), changes to inputs (CMP), product changes (PC), changes in the production process (CPP), changes in housekeeping practices (CCP), others (O).
- 4 According to Table 8 of the General Code Catalogue.
- 5 Indicate the global estimated efficiency of the methods used for treatment and/or control.
- 6 Annual amount of pollutant treated at the facility site.
- 7 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).