TAKING STOCK 2000

North American Pollutant Releases and Transfers

SOURCEBOOK

COMMISSION FOR ENVIRONMENTAL COOPERATION OF NORTH AMERICA

2003

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 May 2002 and the NPRI data set of January 2002 were used. The CEC is aware that changes have occurred to both data sets for the reporting year 2000 since this time that are not reflected in this report. These changes will be reflected in the next report, which will summarize the 2001 data and make year-to-year comparisons with previous years' data.

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TAKING STOCK

Preface

Each year, thousands of facilities across North America publicly report on the amounts of certain hazardous chemicals that they release to the air, water and land, or transfer off-site for further management. This information is compiled in what are internationally known as pollutant release and transfer registers (PRTRs)—databases managed by governments as a means of ensuring that the public has access to information on chemicals being released and transferred into and through their communities.

Sometimes we hear about these facilities in the news, and through reports such as *Taking Stock,* the CEC's annual assessment of comparable North American PRTR data. The facilities that are releasing the greatest quantities are usually the ones that catch our attention. In response to this public attention, and through a variety of corporate stewardship initiatives, many of these top polluters are gradually improving their performance. This year's *Taking Stock* shows that the top-ranking facilities, as a group, are making progress in reducing their releases and transfers of the some 200 chemicals for which comparable data exist between the Canadian and US reporting systems (comparable Mexican data are not yet available). While these top-ranked facilities still dominate the numbers in terms of amounts of pollutants released and transferred, their total releases have dropped by six percent from 1998–2000.

This report also shows, however, that the majority of facilities—the "small p" polluters that are scattered throughout communities across North America—are not making similar progress. In fact, the roughly 80 percent of reporting facilities that are not at the top of the list actually have *increased*, by 15 percent, the amounts of such substances that they released to air, water and land for the time period 1998–2000. For most citizens, this means that the facility down the street or in a given local community is more likely to be doing worse—not better—when it comes to toxic pollutants. This disturbing trend suggests that we as concerned citizens need to be thinking of ways to better address these "small p" polluters. This report enables us to take the initial step of recognizing that the problem exists. It is now time to figure out what can be done about it. We have a range of options at our disposal, from improving governmental policies and stepping up enforcement, to creating incentives for pollution prevention, to taking local action—as citizens and neighbors—to raise our concerns with industrial managers and CEOs. Within industry, good environmental stewardship should mean not only improving the performance of one's own company, but also working to ensure that the entire sector is moving in a more sustainable direction and that environmental sustainability is built into all steps along the supply chain. The larger companies, with their greater resources and capacities, are well placed to take a leadership role in this regard.

This year's *Taking Stock* report highlights a number of other issues and questions deserving of our attention, including the differences we are seeing between the trends exhibited by Canadian and US facilities, respectively. Why is it, for example, that air releases among Canadian facilities have increased (up seven percent from 1998–2000) while their counterparts in the United States have achieved reductions of eight percent for the same time period? What is to account for the fact that off-site releases, substances sent off-site for disposal, are increasing in the United States (up seven percent from 1998–2000) while the opposite is occurring among Canadian facilities, with an average reduction in Canada of nearly 40 percent?

We at the CEC hope that this report will stimulate not only a productive debate on such questions, but a pragmatic search for solutions. Our environment and our health—including the health of our children and future generations—depend on our succeeding in our individual and collective efforts to reduce and prevent toxic pollution in North America.

Whether you are an environmental advocate or corporate manager, an academic researcher or public servant, an educator or a local entrepreneur, we hope that this report provides you with the type of information and analyses you need to draw conclusions and take action. As always, we welcome your suggestions on ways in which *Taking Stock* can better meet your interests and needs.

Victor Shantora

CEC Acting 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 Michelle Raizenne; Mexico—Sergio Sanchez Martinéz, Maricruz Rodríguez Gallego, Juan David Reyes Vázquez and Floreida Paz; and the United States—Maria Doa, John Dombrowski and John Harman.

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

A number of CEC Secretariat staff members have been involved in the development and launching of this report and the companion web site. Erica Phipps, program manager for CEC's PRTR project, is responsible for guiding the development of the *Taking Stock* series, including coordinating the public consultations. Marilou Nichols, program assistant, provided continuing assistance throughout this process. The CEC's publications staff—Jeffrey Stoub, Douglas Kirk, Raymonde Lanthier, Miguel López and Carol Smith—have handled the tremendous task of coordinating the editing, translation and publication of the document in the three languages. Evan Lloyd and Spencer Ferron-Tripp were instrumental in coordinating the public release of the document.

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

Acronym	Meaning
BAF/BCF	Bioaccumulation/bioconcentration factor
CAS	Chemical Abstract Service
CEC	Commission for Environmental Cooperation
CEPA	Canadian Environmental Protection Act
CFC	Chlorofluorocarbon
C.I.	Color index
CMAP	*Clasificación Mexicana de Actividades y Productos* (Mexican Activities and Products Classification)
COA	*Cédula de Operación Anual* (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	*Instituto Nacional de Ecología* (Mexican National Institute of Ecology)
INEGI	*Instituto Nacional de Estadística, Geografía e Informática* (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	*Ley General del Equilibrio Ecológico y la Protección al Ambiente* (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
NOM	*Norma Oficial Mexicana* (Mexican Official Standard)
NMX	*Norma Mexicana* (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	*Programa de Desarrollo Institucional Ambiental* (Program of Institutional Environmental Development)
POTWs	US publicly owned treatment works
PRTR	Pollutant release and transfer register
PM	Particulate matter
RETC	*Registro de Emisiones y Transferencia de Contaminantes* (PRTR for Mexico)
Semarnat	*Secretaría de Medio Ambiente y Recursos Naturales* (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
US	United States
VOC	Volatile organic compound
WHO	World Health Organization

Carcinogens
The International Agency for Research on Cancer <http://www.iarc.fr> and the US National Toxicological Program <http://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 of emissions such as 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 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 reducing 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 goups of activities or operations (and, therefore, the codes) differ from country to country. The North America 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 1,102.3 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.

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- **Chapter 2** offers ***guidance*** on using the North American PRTR data, explains how the data from the Canadian National Pollutant Release Inventory (NPRI) and United States Toxics Release Inventory (TRI), are compiled for this report (comparable data for Mexican facilities for 2000 are not available), and provides context for understanding the data and their limitations.
- **Chapter 3** presents data on **total releases and transfers** in 2000. These data show the total amount of chemicals that were reported for the 2000 reporting year, based on the matched North American data set. The data include amounts released on- or off-site, transferred for recycling, and transferred for further management for 206 chemicals, including chemicals newly added to NPRI for the 1999 reporting year.
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1.1 Introduction

North Americans are concerned about the effect 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 seventh in the annual *Taking Stock* series prepared by the Commission for Environmental Cooperation (CEC) of North America. 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). It contains several analyses on groups of chemicals, including carcinogens, CEPA toxics, California Proposition 65 chemicals and metals.

Taking Stock 2000 is composed of two volumes. The *Summary* volume provides highlights of the 2000 matched data set and trends from 1995–2000. This *Sourcebook* volume provides the detailed analyses of the same data. Both volumes are available from the CEC in hard copy or for download on the CEC web site at <www.cec.org>. Also, the databases used for this report are available and can be for queried at *Taking Stock Online* <http://www.cec.org/takingstock/>.

Through publication of its annual *Taking Stock* report, 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 is a Pollutant Release and Transfer Register?

Pollutant release and transfer registers generally provide detailed data on types, locations and amounts of chemicals released on-site and transferred off-site by industrial and other facilities. The register provides data on the amounts of listed chemicals released by the facilities to all environmental media, including air, water and land. The facilities also report on transfers of these chemicals sent to other sites for recycling, treatment or disposal. PRTRs are recognized as an important tool for fulfilling the public's "right-to-know." Governments compile annual reports based on PRTR data that are made available to the public; the databases are also made publicly accessible.

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 prevent pollution, reduce waste generation, decrease releases and transfers and increase responsibility for chemical use. 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, CEC Council Resolution 00-07 identified as a set of basic elements central to the effectiveness of a PRTR that it:

- report on individual substances,
- report by individual facilities,
- cover all environmental media (i.e., releases to air, water, land and underground injections, and transfers off-site for further management),

The CEC's Consultative Process for the PRTR Program

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

- Dissemination 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 the CEC plans to incorporate the comments into the report.

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

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- require mandatory, periodic reporting (i.e., annually),
- allow public disclosure of reported data on a facility- and chemical-specific basis,
- feature standardized reporting using computerized data management,
- limits claims of data confidentiality and indicate what is being held confidential,
- be comprehensive in scope, and
- include a mechanism for public feedback to improve the system.

PRTRs collect data on **individual chemicals**, rather than on the volume of waste-streams 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. This allows interested persons and groups to identify local industrial sources for releases of chemicals. It also supports regional and other geographically based analyses of the data. Facility-specific information may be supplemented with data about more diffused sources of such releases.

Concerns about pollutants may arise in connection with any environmental medium. In addition, releases to one environmental medium may be transported to others. Volatile chemicals in releases to water, for example, may vaporize into the air. Therefore, the **reporting of releases and transfers to all environmental media** is important.

To determine the current status and time trends in releases and transfers, reports must be made **periodically**, cover the same period of time for all facilities reporting, and cover a comprehensive set of facilities and chemicals. Without these, data from one facility cannot be compared to another or with previous reports from the same facility.

The ability to compile, sort, rank, and otherwise analyze the data depends upon their structure. In turn, the ability to analyze quickly and easily a large number of reports on chemical releases and transfers depends upon the submissions being managed in a clearly defined, **computerized database**, which can then enable a wide range of analyses to be performed. While the data may be collected on paper, the design and structure of the reports are standardized so that computer management and analysis can reduce costs and errors and provide standardized analyses over time.

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. Impediments to public availability of facility-specific information should be limited. This is achieved by **limiting the data confidentiality claims** allowable under the system. In cases where information is held as confidential, users of the PRTR must know what types of data are being held back from disclosure (for instance, if a facility substituted a generic name for a substance in order to conceal the identity of the specific chemical.)

PRTRs Globally

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 and published a Guidance Manual for Governments which addressed the key factors countries should consider when developing a PRTR. OECD has amended the 1996 Council Act on Implementing PRTRs to include a set of core elements for PRTRs including list of chemicals, multi-media reporting, identification of sources, periodic reporting (preferably annual), and public availability of the data. The Council Recommendation also promotes comparability among national PRTRs and sharing of PRTR data between neighboring countries. OECD has undertaken a project to compile available guidance for reporting industries on techniques for estimating releases and transfers of pollutants and to make this information widely available through an online clearinghouse <http://www.oecd.org/EN/home/0,,EN-home-540-14-no-no-no-0,00.html>.
- Recognizing the growing interest in establishing national PRTRs, not only among industrialized nations but also among industrializing countries and countries with economies in transition, the Intergovernmental Forum on Chemical Safety (IFCS) had a special session on PRTRs during its Forum III meeting in Salvador, Brazil, in October 2000. The 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>.
- A Working Group on PRTRs was established under the United Nations Economic Commission for Europe (UN/ECE) 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 with the signatures of 16 countries. The Working Group is charged with the task of developing a proposed protocol on PRTRs. The Convention requires signatory parties to take steps to establish pollution inventories or registers <www.unece.org/env/pp/>.
- 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/>.
- The G-8 Environment Ministers meeting in March 2001 included support for the development of PRTRs as a means to increase access to information and recognizing that communities have a right-to-know about chemicals in the environment. Also, 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>).
- 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.

PRTRs: A Priority Focus for the 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, Mexico and the United States. 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 Annual Regular Session of the CEC in 1995, the Environment Ministers of the three North American countries (the Council) noted in the Communiqué their intention to "create a North American Pollutant Release Inventory which will bring together, for the first time, existing national public information about emissions and long-range transportation of pollutants."

At the Third Annual Regular Session in August 1996 the Ministers "announced the intention to produce the first annual North American Pollutant Release Inventory (NAPRI), to bring together 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 the Fourth Annual Regular Session of the CEC in June 1997 the Ministers passed Council 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 the Sixth Annual Regular Session of the CEC in June 1999, the Council reaffirmed its commitment to assure that the peoples of North America have access to accurate information about the release and transfer of toxic chemicals from specific facilities into and through their communities.

At the Seventh Annual Regular Session of the CEC in June 2000, the Council passed Council 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.

At the Eighth Annual Regular Session of the CEC in June 2001, the Ministers stressed the importance of environmental information in their Communiqué, noting that "(t)imely and accurate environmental information is essential for rational decision making and the development of sound environmental policies," and that "strengthening our capacity to acquire and share knowledge among all sectors of society is fundamental to the ability of citizens to take informed action."

The Ninth Annual Regular Session of the CEC in June 2002 adopted Council Resolution 02-05, 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 under the three national PRTR programs, while taking into account technical, economical, and regulatory capacities of each country; exploring the adoption, where appropriate and in light of national priority substances, of activity-based thresholds under the Mexican RETC…; and supporting Mexico in its efforts to achieve a mandatory PRTR reporting system.

1.2 Overview of Existing PRTR Programs in North America

The first of the North American databases to be established was the Toxics Release Inventory (TRI) in the United States, which began collecting information for the year 1987. Canada's facilities first reported their releases and transfers to the National Pollutant Release Inventory (NPRI) for the year 1993. Mexico, in 1996, completed a successful case study demonstrating its proposed inventory. National implementation of this inventory, the *Registro de Emisiones y Transferencia de Contaminantes* (RETC), started in 1998 with the collection of data reported by facilities on a voluntary basis for 1997. In December 2001, the Mexican Congress passed legislation to establish reporting on a mandatory basis.

Only the data from Canada and the US are currently comparable. The two inventories in Canada and the United States 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. 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.

Chapter 2, which focuses on using and interpreting the information presented in *Taking Stock 2000,* examines the similarities and differences among the three national programs in greater depth. The forms that are filled out by facilities in each country are reproduced in Appendices to this report. **Appendix F** contains the US TRI form, **Appendix G** the Canadian NPRI form, and **Appendix H** the Mexican COA, which includes the reporting on pollutant releases and transfers as Section V.

1.2.1 The US TRI

The 2000 reporting year is the fourteenth year of the US TRI. The 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 industry and the public 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 the1995 reporting year. There are now more than 650 chemicals on the TRI list.

Section 313 of EPCRA, the law that created TRI, identified the manufacturing sector as the original set of industries required to submit TRI reports. Beginning with the1998 reporting year, several new industries were added to TRI to capture information in industries closely related to the manufacturing sector, providing energy or services or further managing products or waste from the manufacturing sector. The seven new industrial 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. Those new TRI industries that have similar reporting requirements under NPRI (coal mining, electric generation, chemical wholesalers and hazardous waste management and solvent recovery facilities) are included in *Taking Stock* for the 1998 and 1999 data analyses.

Addition of PBT chemicals and new reporting thresholds for 2000

The most recent changes for TRI include a focus on chemicals that are persistent, bioaccumulative and toxic (PBT). EPA issued a rule on 29 October 1999 on PBT chemicals. This rule takes three actions regarding certain PBT chemicals: (1) the addition of seven PBT chemicals and one chemical category to the TRI chemical list; (2) a reporting threshold for these chemicals below the present levels; and (3) a lower threshold for certain chemicals and chemical categories already on the TRI chemicals list. The first reporting year at the lower reporting thresholds is 2000. In addition, a rule, published on 17 January 2001, identified lead and lead compounds as PBT chemicals and lowered the reporting threshold for these chemicals. Reporting for lead and lead compounds at the lower threshold starts with the 2001 reporting year.

There are three distinct new reporting thresholds. For dioxin and dioxin-like compounds, the threshold is 0.1 grams. For chemicals that persist in the environment with a half-life greater than six months and have a bioaccumulation/bioconcentration factor (BAF/BCF) of greater than 5000 (a BCF of 5000, for example, indicates a concentration of the targeted substance in an organism, such as a fish, at 5000 times the level in the surrounding medium, i.e., water), the threshold is 10 pounds (4.5 kg) per year. For chemicals that persist in the environment with a half-life between two and six months and that have a BAF/BCF between 1000 and 5000 and/or human bioaccumulative data, the threshold is 100 pounds (45 kg) per year. The rule can be found on the Internet at <www.epa.gov/tri/lawsandregs/pbt/pbtrule.htm>.

Future changes for TRI

TRI is reviewing exemptions for "otherwise use" of TRI chemicals, including the motor vehicle exemption. These modifications will establish more limited interpretations of the exemptions that facilities can claim for "otherwise use." The goal is to ensure the public's access to information on the on-site release, off-site transfer to disposal, and other waste management options for toxic chemicals in greater than *de minimis* amounts. Other future changes to TRI include the possible addition of airports. Action on a petition EPA received from environmental groups, requesting the addition of airports, will follow the review of the "otherwise use" exemptions. Under present guidance, the motor vehicle exemption would limit the amount of information TRI would collect from airports. Action is expected before the 2002 reporting year.

The TRI program will be proposing to switch from collecting information based on the Standard Industrial Classification (SIC) codes to the North American Industrial Classification System (NAICS) codes. In addition, the TRI program will be proposing to collect information on the release and other waste management activities for dioxin and dioxin-like compounds in toxic equivalents (TEQs), in addition to mass quantities.

Ongoing program to improve public access to chemical toxicity data

TRI also will benefit from a related program on chemicals testing. EPA is presently working on a program in cooperation with industry and environmental groups to collect more complete toxicity information on high production volume (HPV) chemicals. These are substances that are produced or imported in excess of 1 million pounds (454 tonnes) per year.

Of the nearly 3,000 HPV chemicals in the United States, 203 are TRI chemicals. A primary objective of this program is to make the toxicity information available to the public, especially through the Internet. Further information on the program can be found on the Internet at <www.epa.gov/chemrtk/volchall.htm>. OECD has also initiated a cooperative action program among member countries (including Canada, Mexico and the US) to investigate these HPV chemicals <www.oecd.org/EN/document/0,,EN-document-525-14-no-1-9998-0,00.html>.

1.2.2 Canada's NPRI

The 2000 data comprise the eighth set reported to NPRI. The 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. In the 1999 renewal of the Canadian Environmental Protection Act (CEPA) were provisions that enshrine mandatory NPRI reporting and the annual publication of a summary report.

Ongoing stakeholder consultations have modified reporting requirements since the first reporting year 1993. NPRI requires 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 a picture of the types of activities 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.

Major changes to NPRI for 2000

Several important changes were made to NPRI for the 2000 reporting year. For the first time, reporting on many persistent bioccumulative toxics such as dioxins/ furans and hexachlorobenzene was required. Dioxins/ furans and hexachlorobenzene are reported from specified activities, with no activity threshold and some with no employee threshold. Four new substances (acrolein, polymeric diphenylmethane diisocyanate and two nonylphenols) were also added at the existing 10 tonne threshold. Polycyclic aromatic hydrocarbons (PAHs) generally have a 50 kg reporting threshold, based on incidental manufacture and the total quantity of chemicals released and transferred. The reporting threshold for mercury and its compounds has been lowered to 5 kg per year for manufacture, process or otherwise used. This brings the total number of substances to 268 for the 2000 reporting year.

Addition of criteria air contaminants and other future changes

NPRI has established a permanent process for modifying the NPRI and is now working on several proposed changes for the 2003 to 2005 reporting years. Four small changes have been made for the 2001 reporting year (the addition of *N,N*-dimethylformamide, amalgamation of cresol isomers, changed qualifier for vanadium and delisting of phosphoric acid).

For 2002, for the first time, NPRI will require reporting of criteria air contaminants (nitrogen oxides, sulfur oxides, particulate matter, carbon monoxide, and volatile organic compounds). This major change will greatly increase 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 waste water 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, from 100 tonnes to 26 tonnes per year.

Proposed changes for the 2003 reporting year include the addition of greenhouse gases (e.g., carbon dioxide, methane, hydrofluorocarbons), addition of the upstream oil and gas sector, changed reporting for nonylphenol and their ethoxylates, volatile organic compounds and addition of several new substances including carbonyl sulphide and phosphates.

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>.

1.2.3 The RETC in Mexico

Industrial facilities in Mexico under federal jurisdiction report their annual releases and transfers of pollutants in Section V of the Annual Certificate of Operation (*Cédula de Operación Anual*—COA). The Secretariat of Environment and Natural Resources (*Secretaría de Medio Ambiente y Recursos Naturales*—Semarnat) is the federal environmental authority in charge of the collection, management and analysis of COA data. The first reporting cycle covered the reporting year 1997. 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 is most comparable to the PRTR data from Canada and the US. Section V was optional for the 2000 reporting year.

During 2001, there were important advances in the Mexican RETC, including the establishment a legal framework and collaboration with state authorities.

Legal framework for PRTR reporting established

There has been a major step forward in the legal framework for RETC, with the passage of enabling legislation by the Mexican Congress on 31 December 2001**.** Article 109 of the federal environmental law, *Ley General del Equilibrio Ecológico y la Protección Ambiental* (LGEEPA) was modified. Semarnat, the states, the Federal District and municipalities are now required to integrate an RETC based on the data and documents contained in the environmental authorizations, licenses, reports, permits and concessions received by the different authorities. The physical and moral persons responsible for the contaminant sources are obliged to submit to the authorities all information, data, and documents necessary to integrate the RETC. The reported information will be public and will function as a declaration. Access to this information is given by the Ministry and will be actively disseminated. Semarnat is currently in the process of developing the regulations for the required reporting.

States are establishing PRTRs

Mexico has established a program, the Program of Institutional Environmental Development (*Programa de Desarrollo Institucional Ambiental*—PDIA), to decentralize environmental responsibilities. As of 2001, 14 states were participating in this program and will establish their own state RETC. Aguascalientes is the most advanced; it has collected data for 2002. The Federal District has published their format and will collect data for 2003 and the State of Mexico has recently published their format and will begin collecting data soon. Quintana Roo and Tamaulipas are in a trial phase and have not yet published their formats. 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 drycleaners, bakeries, hospitals and doctors offices, restaurants and tortillerias and flour mills.

Reporting for 2000

The voluntary reporting to the RETC is done through the Mexican norm (NMX-AA-118-SCFI-2001), which came into effect in June 2001. This norm establishes the list of substances for RETC, the procedures to modify the substance lists, the reporting format and reporting procedures.

For the 2000 reporting year, 1,775 COA forms were received, of which 39 facilities filled in amounts of air, land, water releases and transfers to sewage in Section V (the RETC), which is the voluntary reporting of releases and transfers. Facilities covered by the COA are those under federal jurisdiction and include facilities in 11 industrial sectors: petroleum, chemical and petrochemical, paints and dyes, metallurgy (includes the iron and steel industry), automobile manufacture, cellulose and paper, cement and limestone, asbestos, glass, electric power generation, and hazardous waste management. These industry sectors were chosen based on their use of processes that may emit to the atmosphere gases or solid or liquid particles and that involve chemical reactions, thermal operations, foundry or metal tempering. Required reporting (Sections I and II of the COA) covers air emissions of sulfur dioxide, nitrogen oxide, particulates and VOCs. Other criteria air contaminants covered by the COA (but whose reporting is voluntary) include unburned hydrocarbons, carbon monoxide, and carbon dioxide.

The COA reporting software is available from Semarnat (for an example of the COA form, see Appendix H). This electronic program helps users avoid the most common errors, such as reporting using incorrect units and problems in the conversion of units. Guidelines for completing the COA are also available in print and electronic versions.

Table 1–1. 2000 Reporting Under the Mexican *Registro de Emisiones y Transferencias de Contaminantes* (RETC)

Section 5 of the COA covers annual releases and transfers of listed pollutants. Currently, reporting on this section is voluntary. The following 172 facilities voluntarily reported data under Sections 5.2 (Listed Pollutant Releases) and/or 5.3 (Listed Pollutant Transfers) for 2000.

The CEC would like to acknowledge and congratulate these companies for their leadership in reporting RETC data under the currently voluntary program.

NAME OF FACILITY, CITY/STATE

ACABADOS QUIMICOS MEXICANOS, S.A. DE C.V., TLAQUEPAQUE, JALISCO
ADHESIVOS, S. DE R. L., CUERNAVACA, MORELOS
AGRICULTURA NACIONAL SA. DE CV., IZUCAR DE MATAMOROS, PUEBLA
ALKEMIN, S. DE R.L. DE C.V., MORELIA, MICHOACAN
ARTEVA SPECIALTIES S. DE R.L. DE CV., QUERETARO, QUERETARO
BARNICES MEXICANOS S.A. DE C.V., TLAQUEPAQUE, JALISCO
BENEFICIADORA E INDUSTRIALIZADORA S.A. DE C.V., ECATEPEC, MEXICO
BICILEYCA S.A. DE C.V., YAUHQUEMEHCAN, TLAXCALA
CARTONAJES ESTRELLA S.A. DE C.V., AZCAPOTZALCO, DISTRITO FEDERAL
CELANESE MEXICANA S.A. DE C.V., CELAYA, GUANAJUATO
CELANESE MEXICANA, S.A. DE C.V. , PONCITLAN, JALISCO
CELULOSA Y DERIVADOS, S.A. DE C.V. PLANTA CRYSEL, EL SALTO, JALISCO
CEMENTOS APASCO, SA DE CV , APAXCO, MEXICO
CFE.CENTRAL TERMOELECTRICA CICLO COMBINADO TULA, TULA DE ALLENDE, HIDALGO
CIA HULERA TORNEL, PLANTA 4, TULTITLAN, MEXICO
CIA HULERA TORNEL, S.A. DE C.V. PLANTA 1, AZCAPOTZALCO, DISTRITO FEDERAL
CIA. HULERA TORNEL, S.A. DE C.V. PLANTA 2, AZCAPOTZALCO, DISTRITO FEDERAL
CLARIANT PRODUCTOS QUIMICOS S.A. DE C.V., ECATEPEC, MEXICO
CLOROBENCENOS, S.A. DE C.V., EL CARMEN TEQUEXQUITLA, TLAXCALA
COMISION FEDERAL DE ELECTRICIDAD CENTRAL TURBOGAS LAS CRUCES, ACAPULCO DE JUAREZ, GUERRERO
COMPAÑIA DE NITROGENO DE CANTARELL S.A. DE C.V., CARMEN, CAMPECHE
COMPAÑIA MINERA BASIS, S.A. DE C.V., OTAEZ, DURANGO
CROMADOS TOVAR, GUADALAJARA, JALISCO
DERIVADOS MACROQUIMICOS S.A. DE C.V., ZACAPU, MICHOACAN
DOW AGROSCIENCES DE MEXICO, S.A. DE C.V., TETLA, TLAXCALA
DOW QUIMICA MEXICANA, S.A. DE C.V., TETLA, TLAXCALA
DUPONT, S.A. DE C.V., LERMA, MEXICO
DURAMAX SA. DE CV., TLALNEPANTLA, MEXICO
EJES TRACTIVOS, S.A. DE C.V., TLALNEPANTLA, MEXICO
EL BRONCO AUTOPARTES S.A. DE C.V., GUADALAJARA, JALISCO
EMPAQUES DE CARTON UNITED, S.A. DE C.V. PTA. DE PAPEL, VENUSTIANO CARRANZA, DISTRITO FEDERAL
EMPRESAS CALE DE TLAXCALA, S.A. DE C.V., TETLA, TLAXCALA
ENERTEC MEXICO, S. DE R.L. DE C.V., TORREON, COAHUILA
EXPORTACIONES DE MINERALES DE TOPIA, S.A. DE C.V., CANELAS, DURANGO
FABRICA DE PAPEL SANTA CLARA S.A. DE C.V., ECATEPEC, MEXICO
FENOQUIMIA S. A. DE C. V. , COSOLEACAQUE, VERACRUZ
FERSINSA GIST BROCADES, S.A. DE C.V. PLANTA SINTESIS, RAMOS ARIZPE, COAHUILA
FIBRAS PARA EL ASEO, S.A. DE C.V., TETLA, TLAXCALA
FORD MOTOR COMPANY S.A. DE C.V., CUAUTITLAN IZCALLI, MEXICO
FORMULABS DE MEXICO S.A. DE C.V., IZTAPALAPA, DISTRITO FEDERAL
GALVANIZADO INDUSTRIAL JESUS ALVARADO GARCIA, GUADALAJARA, JALISCO
GOLDSCHMIDT QUIMICA DE MEXICO, S.A. DE C.V., SAN LUIS POTOSI, SAN LUIS POTOSI
GRUPO INDUSTRIAL C AND F, S.A. DE C.V., SAN LUIS POTOSI, SAN LUIS POTOSI
GUANTES VITEX S.A. DE C.V., CALPULALPAN, TLAXCALA

NAME OF FACILITY, CITY/STATE

HULES BANDA S.A. DE C.V., CUAUTITILAN, MEXICO
IDASA INTERNACIONAL DE ACEROS, S.A. DE C.V., LA CANADA, QUERETARO
INDUSTRIA DE ACUMULADORES DE JALISCO, S.A. DE C.V., TLAQUEPAQUE, JALISCO
INDUSTRIA QUIMICA DEL ISTMO, S.A. DE C.V., XALOZTOC, TLAXCALA
INDUSTRIAS CIDSA BAYER, S.A. DE C.V., COATZACOALCOS, VERACRUZ
INDUSTRIAS OKEN, S.A. DE C.V., MORELIA, MICHOACAN
INDUSTRIAS POLYREY, S.A. DE C.V., GUADALAJARA, JALISCO
INSECTICIDAS DEL PACIFICO, S.A. DE C.V., CIUDAD OBREGON, SONORA
INVESTIGACION APLICADA SA. DE CV., TEHUACAN, PUEBLA
JOHNSON MATTHEY DE MEXICO SA. DE CV., LA CANADA, QUERETARO
KENDALL DE MEXICO, AZCAPOTZALCO, DISTRITO FEDERAL
KENWORTH MEXICANA S.A. DE C.V., MEXICALI, BAJA CALIFORNIA
KIMBERLY CLARK DE MEXICO, S.A. DE C.V., RAMOS ARIZPE, COAHUILA
LABORATORIO AGROENZIMAS, S.A. DE C.V., TETLA, TLAXCALA
LABORATORIOS FUSTERY S.A. DE C.V., TLALPAN, DISTRITO FEDERAL
LEAR CORPORATION MEXICO, S.A. DE C.V., HERMOSILLO, SONORA
MAQUILADORA DE TERMOPLASTICOS, SA. DE C.V., ARENAL, JALISCO
METALES KENDAL, S.A. DE C.V., PAPALOTLA, TLAXCALA
MEXALIT INDUSTRIAL S.A. DE C.V. DIVISION NORTE, CHIHUAHUA, CHIHUAHUA
MINERA SANTA MARIA, S.A. DE C.V., NOMBRE DE DIOS, DURANGO
NUTRIMENTOS MINERALES, S.A. DE C.V. (PLANTA II), TIZAYUCA, HIDALGO
OPERADORA DE TERMINALES MARITIMAS, SA DE CV, ALTAMIRA, TAMAULIPAS
PEMEX EXPLOR. Y PROD. ESTAC. DE RECOLECC. DE GAS TEPETITAN, MACUSPANA, TABASCO
PEMEX EX. Y PROD. BATERIA SEP. PAREDON, HUIMANGUILLO, TABASCO
PEMEX EXP. Y PROD. BATERIA SEPARACION SANTUARIO PEP REGIONS, CARDENAS, TABASCO
PEMEX EXPLOR Y PROD BAT DE SEPARACION RODADOR, HUIMANGUILLO, TABASCO
PEMEX EXPLOR Y PROD BATER. DE SEP. SANCHEZ MAGALLANES NO. 3, CARDENAS, TABASCO
PEMEX EXPLOR Y PROD ESTAC COMPRES CUNDUACAN ACTIVO SAMARIAS, CUNDUACAN, TABASCO
PEMEX EXPLOR Y PROD ESTAC DE COMPRES 5 PRESIDENTES NO. 1, CARDENAS, TABASCO
PEMEX EXPLOR Y PROD ESTAC DE COMPRES 5 PRESIDENTES NO. 2, CARDENAS, TABASCO
PEMEX EXPLOR Y PRODUCCION ESTACION DE COMPRESION OGARRIO, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. PROD BATERIA DE SEPARACION BELLOTA MODULAR, CUNDUACAN, TABASCO
PEMEX EXPLOR. PROD BATERIA DE SEPARACION BELLOTA, CUNDUACAN, TABASCO
PEMEX EXPLOR. PROD ESTAC DE COMPRES AGAVE ACTVO PROD MUSPAC, TEAPA, TABASCO
PEMEX EXPLOR. PROD ESTACION DE COMPRESION CATASRRICAL, COMALCALCO, TABASCO
PEMEX EXPLOR. PROD ESTACION DE COMPRESION CHILAPILLA, MACUSPANA, TABASCO
PEMEX EXPLOR. PROD ESTACION DE RECOLECCION USUMACINTA, JONUTA, TABASCO
PEMEX EXPLOR. PROD. BATERIA DE SEPAR. GOLPE I, COMALCALCO, TABASCO
PEMEX EXPLOR. PROD. EST. COMPRESION CATASRRICAL, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD BAT SEPAR. 5 PRESIDENTES, CARDENAS, TABASCO
PEMEX EXPLOR. Y PROD BAT SEPAR. 5 PRESIDENTES NO 1, CARDENAS, TABASCO
PEMEX EXPLOR. Y PROD BAT SEPAR. SANCHEZ MAGALLANES 7 REGS, CARDENAS, TABASCO

Note: Names of facilities appear as provided by Semarnat in January 2003, from the 2000 RETC database. We apologize if any facilities have been omitted or if there are other errors in the list.

Table 1–1. (*continued*)

NAME OF FACILITY, CITY/STATE
PEMEX EXPLOR. Y PROD BAT SEPAR. SANCHEZ MAGALLANES NO.1, CARDENAS, TABASCO
PEMEX EXPLOR. Y PROD BAT DE SEPAR OXIACAQUE ACTIVO PROD SAMA, JALPA DE MENDEZ, TABASCO
PEMEX EXPLOR. Y PROD BATERIA DE SEPARAC. 5 PRESIDENTES NO 2, CARDENAS, TABASCO
PEMEX EXPLOR. Y PROD CENTRAL DE ALMACENAM Y BOMBEO CUNDUACAN, CUNDUACAN, TABASCO
PEMEX EXPLOR. Y PROD ESTACION DE COMPRESION SAN RAMON, CARDENAS, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPAR. CARDENAS NORTE, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPARACION AGAVE ACTI MUSP, TEAPA, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPARACION TUPILCO II, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. BLASILLO, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. CARRIZO, CENTRO, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. LUNA, CENTLA, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. OGARRIO NO. 2, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. SAMARIA III, CENTRO, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. SANCHEZ MAGALLANES NO 5, CARDENAS, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. SANCHEZ MAGALLANES NO. 4, CARDENAS, TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEPARACION. OGARRIO NO. 5, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION BELLOTA, CUNDUACAN, TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION CARDENAS NORTE, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION SAMARIA II, CUNDUACAN, TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION TECOMINOACAN, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION TUPILCO, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESORA LA VENTA, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. ESTAC. DE COMPRESORAS BACAL, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. ESTACION COMPRESION PAREDON, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION GOLPE, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION JOSE COLOMO, MACUSPANA, TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION JUJO, HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION SANTUARIO, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD. PLANTA DESHIDRATADORA EL GOLPE, COMALCALCO, TABASCO
PEMEX EXPLOR. Y PROD. PTA. INYECCION DE AGUA 5 PRESIDENTES P HUIMANGUILLO, TABASCO
PEMEX EXPLOR. Y PROD. PTA. INYECCION DE AGUA OGARRIO, HUIMANGUILLO, TABASCO
PEMEX EXPLOR.Y PROD. BATERIA DE SEPAR. TUPILCO I, COMALCALCO, TABASCO
PEMEX EXPLOR.Y PROD. BATERIA PROVICIONAL SEN, CUNDUACAN, TABASCO
PEMEX EXPLORACION Y PROD. BAT. DE SEPARACION TINTAL, CARDENAS, TABASCO
PEMEX EXPLORACION Y PROD. BATERIA DE SEP. BACAL, HUIMANGUILLO, TABASCO
PEMEX EXPLORACION Y PROD. BATERIA DE SEP. VERNET, MACUSPANA, TABASCO
PEMEX EXPLORACION Y PROD. BATERIA DE SEPARACION JUJO, HUIMANGUILLO, TABASCO
PEMEX EXPLORACION Y PROD. BATERIA SEP. MODULAR MORA, CUNDUACAN, TABASCO
PEMEX EXPLORACION Y PROD. BATERIA Y SEPARACION CUNDUCACAN, CUNDUACAN, TABASCO
PEMEX EXPLORACION Y PRODUCCION BATERIA DE SEPARACION IRIDE, CUNDUACAN, TABASCO
PEMEX EXPLORACION Y PRODUCCION BATERIA DE SEPARACION PIJIJE, CENTLA, TABASCO

NAME OF FACILITY, CITY/STATE
PEMEX EXPLORACION Y PRODUCCION ESTACION DE COMPRESION OTATES, HUIMANGUILLO, TABASCO
PEMEX REFINACION, MEXICALI, BAJA CALIFORNIA
PEMEX REFINACION, MEXICALI, BAJA CALIFORNIA
PEMEX REFINACION (TERMINAL SATELITE), MANZANILLO, COLIMA
PEMEX REFINACION TERMINAL DE ALMACENAM Y DISTRIBUCION COLIMA, COLIMA, COLIMA
PETROQUIMICA PENNWALT, S.A. DE C.V., IXHUATLAN DEL SURESTE, VERACRUZ
PINTURA ESTAMPADO Y MONTAJE S.A. DE C.V., CELAYA, GUANAJUATO
PIVIDE, S..A. DE C.V., CALPULALPAN, TLAXCALA
PLATINADORA BAJA, S.A. DE C.V., TIJUANA, BAJA CALIFORNIA
POLAQUIMIA DE TLAXCALA, S.A. DE C.V, XALOZTOC, TLAXCALA
POLICYD, S.A. DE C.V., ALTAMIRA, TAMAULIPAS
POLIMEROS DE MEXICO, S.A. DE C.V., XICOTZINGO, TLAXCALA
POLY FORM DE MEXICO, S.A. DE C.V., IZTAPALAPA, DISTRITO FEDERAL
POWER SONIC S.A. DE C.V.,, TIJUANA, BAJA CALIFORNIA
PPG INDUSTRIES DE MEXICO, SA. DE CV., SAN JUAN DEL RIO, QUERETARO
PRAXAIR MEXICO SA. DE CV., TULTITLAN, MEXICO
PRODUCTOS FARMACÉUTICOS S.A. DE C.V., MIGUEL HIDALGO, DISTRITO FEDERAL
PRODUCTOS QUIMICOS Y PINTURAS, S.A. DE C.V., TEXCOCO, MEXICO
PROTERM DE MEXICO, S.A. DE C.V., CUAUTITLAN IZCALLI, MEXICO
QUEST INTERNATIONAL DE MEXICO SA. DE CV., PEDRO ESCOBEDO, QUERETARO
QUIMICA CENTRAL DE MEXICO .S.A DE C.V., SAN FRANCISCO DEL RINCON, GUANAJUATO
QUIMICAL, S.A. DE C.V., MEXICALI, BAJA CALIFORNIA
REBECA OCAMPO GONZALEZ, NEZAHUALCOYOTL, MEXICO
RESIRENE, S.A. DE C.V., XICOTZINGO, TLAXCALA
ROHM AND SAAS MEXICO, S.A. DE C.V., ATLANGATEPEC, TLAXCALA
RUST INTERNATIONAL, S.A. DE C.V., QUERETARO, QUERETARO
SCHENECTADY MEXICO S.A. DE C.V., ECATEPEC, MEXICO
SCHNEIDER ELECTRIC MEXICO S.A. DE C.V., ACUAMANALA, TLAXCALA
SEALED POWER MEXICANA, S.A. DE C.V., JESUS MARIA, AGUASCALIENTES
SMITHKLINE & FRENCH, S.A. DE C.V. (PTA. 2), ALVARO OBREGON, DISTRITO FEDERAL
SMITHKLINE BEECHAM MEXICO, S.A. DE C.V. (PTA. 1), COYOACAN, DISTRITO FEDERAL
SUELAS PUSA S.A. DE C.V., GUADALAJARA, JALISCO
SUELAS PUSA, S.A. DE C.V., GUADALAJARA, JALISCO
TAUROS MEXICANA S.A. DE C.V., TEOLOCHOLCO, TLAXCALA
TECSIQUIM, S.A. DE C.V., IZTACALCO, DISTRITO FEDERAL
TEKCHEM S.A. DE C.V., SALAMANCA, GUANAJUATO
TEMINAL DE PRODUCTOS ESPECIALIZADOS, S.A. DE C.V., ALTAMIRA, TAMAULIPAS
TETRA PAK QUERETARO, S.A. DE C.V., CORREGIDORA, QUERETARO
TEXTILES TECNICOS, S.A. DE C.V., ACATLAN, HIDALGO
TRATAMIENTOS DE DESECHOS MEDICOS, S.A. DE C.V., LERMA, MEXICO
UQUIFA MEXICO, S.A. DE C.V., JIUTEPEC, MORELOS
URATO INDUSTRIAL S.A. DE C.V., CARMEN, NUEVO LEON
USEM DE MEXICO, S.A. DE C.V., APODACA, NUEVO LEON
VALEO MATERIALES DE FRICCION DE MEXICO, S.A. DE C.V., QUERETARO, QUERETARO
VIDRIO PLANO DE MEXICO, S.A. DE C.V., TLALNEPANTLA, MEXICO

The CEC's Air quality Program

The CEC Air Quality Program, pursuant to CR 01-05, is working to compile existing information and enhance comparability of data on criteria air contaminants in the three countries. Contaminants potentially to be covered include are sulfur dioxide, nitrogen oxides, VOCs, particulate matter ($PM_{2.5}$ and PM_{10}), total suspended particulates and carbon monoxide. The project aims to assist with atmospheric modeling and track trends, support reciprocity in data exchange among the countries, and give public access to environmental information. For more information, contact Paul Miller at CEC at (514) 350-4326 or <pmiller@ccemtl.org>, or visit <www.cec.org>.

1.3 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>

NPRI data on the Internet, in English: <www.ec.gc.ca/pdb/npri>

NPRI data on the Internet, in French: <www.ec.gc.ca/pdb/inrp>

e-mail: npri@ec.gc.ca

Additional Information on 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>

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

RETC documents on the Internet, in English: <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>

TRI information and selected data on the Internet: <www.epa.gov/tri>

Online Data Access

TRI Explorer: <www.epa.gov/triexplorer>

EPA's Envirofacts: <www.epa.gov/enviro/html/toxic_releases.html>

RTK-NET: <www.rtk.net> for Internet access

202-234-8570 for free on-line access to TRI data, or

202-234-8494 for information.

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

Environmental Defense Scorecard home page:

<www.scorecard.org/>

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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 1995–2000 reporting years.
- Over half of the chemical reports under NPRI and over three-quarters under TRI are included in the *Taking Stock* matched data set for 2000. These comparable reports represent approximately 20 percent of NPRI total reported amounts and 62 percent of TRI amounts. One chemical, hydrogen sulfide, is not on the current TRI list but is on the NPRI list and represents 68 percent of the amounts reported to NPRI for 2000. Excluding hydrogen sulfide, the matched data set represents 66 percent of the total reported amounts in NPRI.
- The North American matched data set has changed for the reporting year 2000. Both NPRI and TRI lowered reporting thresholds for and added certain persistent, bioaccumulative toxic chemicals. These chemicals are analyzed separately since the new chemicals and reporting thresholds differ.
- Data for previous years (1995 to 1999) are also included in this *Taking Stock* report. There are three different matched data sets: (1) the 2000 matched set of chemicals and industries, (2) the 1998–2000 matched data set, which is used to look at changes from 1998 to 2000, and (3) the 1995–2000 matched data set, which is used for analyses of six-year trends from 1995 to 2000. The 1998–2000 matched data set excludes chemicals added to NPRI for 2000 and the chemical mercury and its compounds, whose reporting threshold was changed for 2000. The 1995–2000 matched data set excludes industry sectors added to TRI for 1998, NPRI chemicals added for 2000, mercury and its compounds, and transfers to recycling and energy recovery. These exclusions make it possible to compare across years during which reporting requirements have changed.
- PRTR data show the amounts of listed chemicals released or transferred from a facility. However, PRTR data are limited in what information they can provide. For example, information is not included on releases from other sources such as smaller facilities (e.g., dry-cleaning establishments and service stations), from agricultural and transportation operations, or from natural sources. They also do not provide information on all chemicals of concern.
- An important point to remember in interpreting the analyses in this report is that PRTR data cannot themselves be used to measure risk to humans or ecological populations from the releases and transfers of these chemicals. Additional data on exposure levels and the toxicological or hazardous nature of the chemicals are needed to begin to assess the potential impacts on human health and the environment of the releases and transfers.

2.1 Introduction

This chapter offers guidance on using the North American data, with specific references to the data from Canada and the United States. *Taking Stock 2000* summarizes PRTR data from reports that industrial facilities filed for the reporting year 2000, the most recent public data available at the time this report was written.

Chapter 2 contains sections on:

- Understanding PRTR data (what types of data are in PRTRs)
- Putting PRTR data to work (how can PRTR data be used, limitations of PRTR data)
- Putting PRTR data in context (what other types of data help broaden the perspective of PRTR data and where to find them)
- There are three *Taking Stock* matched data sets: the **2000 data set**, the most comprehensive of the three, includes all matched chemicals, the industrial sectors added for the 1998 reporting year to TRI, and transfers to recycling and energy recovery; the **1998–2000 data set**, which includes the new industries and new transfer types but excludes chemicals added to NPRI for 1999 and mercury and its compounds; and the **1995–2000 data set**, which is used to track trends from 1995 to 2000 and which covers only those chemicals, sectors and data categories that were comparable in 1995. When reading the tables, take note of which of these three data sets is being used. This will tell you what information is covered and what has been excluded. **Table 2–4**, below, provides a useful reference as to what is covered in each of the matched data sets.

2.2 Understanding PRTR Data

Simply put, facilities report to PRTRs the amounts of listed chemicals that they release to the environment on-site and that they transfer off-site to other locations for recycling, energy recovery, treatment, or disposal. However, for each PRTR, these basic rules differ in the details. Thus, to use data from different PRTRs effectively, it is important to understand how they differ and how they are the same. **Table 2–1** summarizes the basic data elements of each country's PRTR.

2.2.1 Facilities/Companies

Each PRTR system covers specified types of business activities. Canada's NPRI covers all business activities, with very few exceptions. Canada exempts those involved with the distribution, storage or retail sale of fuels; agriculture, mining and oil and gas well drilling, if these facilities do not process or otherwise use the substances; research and training institutions; and transportation 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 also have to report to TRI.

Mexico's reporting scheme 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 generation, and hazardous waste management. Federal jurisdiction is further limited to those facilities with thermal treatment processes or a foundry. The recently passed legislation in Mexico that calls for a mandatory PRTR system also applies to the state and municipal levels.

Note that "companies" do not report to PRTRs. Instead, each individual facility submits reports. 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. Although this information can be used to analyze PRTR reporting at the corporate level, painstaking care is needed to identify all versions of a corporate name (for example: GMC, General Motors, Delco Div. of General Motors, etc.).

2.2.2 Industrial Classification System

Facilities are classified according to the type of industrial operations they carry out. This allows both the determination that they are required to report as well as comparisons among industrial sectors. All three countries require that facilities report using a type of industrial classification system, but these systems differ among the countries. 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 (*Clasificación Mexicana de Actividades y Productos*—CMAP code), which is different yet again.

Fortunately for comparison purposes, Canada supplies facilities with a table that correlates Canadian SIC codes to their US equivalents and requires each facility to report both the Canadian and the US SIC code that characterizes the majority of its operations. This is essential to comparing the NPRI and TRI data, because there is no direct correspondence between the two SIC code systems.

The United States, Canada and Mexico are working together to develop a common North American Industry Classification System (NAICS) that, if used, will allow more far-reaching comparisons in the future. In reporting year 1998, NPRI facilities began reporting their NAICS code, along with the Canadian and US SIC codes. The US TRI and the Mexican RETC are expected to implement the NAICS sometime in the future. Information on NAICS is available from Statistics Canada on the Internet at <www.statcan.ca/english/Subjects/Standard/index.htm>. The US government has information on NAICS at: <www.census.gov/epcd/naics02/>. For information on NAICS in Spanish, see the INEGI web site <www.inegi.gob.mx/estadistica/espanol/scian/scian.html>. (The English site is <www.inegi.gob.mx/estadistica/ingles/scian/scian.html>.)

2.2.3 Chemicals

Each PRTR system covers a specific list of chemicals. These include both individual chemicals, such as toluene and 1,1,1-trichloroethane, and certain chemical groups, such as polycyclic aromatic compounds or zinc and zinc compounds.

Chemicals often have more than one name (synonyms). Methyl bromide and bromomethane, for example, are names for the same substance, an ozone-depleting chemical whose production and use have been limited under the Montreal Protocol. 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; which is a service of the American Chemical Society. The CAS number of bromomethane, for example, is 74-83-9. Tables in *Taking Stock* that present chemical-specific data include CAS numbers.

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>. Of this immense universe, NPRI covers over 250 chemical substances and TRI approximately 650. (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.) Seven pollutants are listed in the section of the Mexican COA (Section II) that is 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 NPRI or TRI lists, however NPRI plans to add the criteria air contaminants sulfur oxides, nitrogen oxides, particulate matter, carbon monoxide, and volatile organic compounds for the reporting year 2002. There are 104 chemicals in the list for the RETC, the voluntary Section V of the Mexican COA, which is the section of the COA that corresponds to the TRI and NPRI PRTR reporting. As explained below in **Section 2.5**, NPRI and TRI listed 206 substances in common in 2000. For a detailed comparison of the chemical lists in the three countries, see **Appendix A**.

2.2.4 Reporting Thresholds

One other central criterion determines who must report what data to a PRTR: a reporting threshold. PRTRs set parameters for minimum amounts of a reportable substance involved in certain activities—a facility's first responsibility under a PRTR is to determine whether it meets this reporting threshold. Typically, the reporting threshold involves manufacturing a listed substance, using a listed substance in a process (for example, as a reagent or catalyst), or otherwise using a listed substance (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, eliminating one difference that had existed between the two systems. For this reason, the base year used in this report for analyzing changes over time is 1995.

Another difference in threshold requirements between TRI and NPRI is the amount of the substance in a mixture. Both countries require reporting if this amount 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 (OSHA) standard must be reported at levels of 0.1 percent.

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

The Mexican RETC type of threshold differs from the standard threshold used by NPRI and TRI. The RETC has thresholds based on on-site releases whereas the standard threshold in NPRI and TRI is based on the amount manufactured or processed or otherwise used. Also, the RETC reporting thresholds vary by type of substance. For example, the threshold for organohalogens, including ozone depleters, is 1,000 kg/year whereas the threshold for metals, such as lead or mercury is 1 kg/year. A further difference is that RETC reporting thresholds are based on the amount of on-site releases only. 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, which is limited to those facilities with thermal treatment processes or a foundry, 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.

2.2.5 Alternate Reporting Thresholds

With the 2000 reporting year, both NPRI and TRI have established new reporting thresholds for certain chemicals. These alternate reporting thresholds apply to persistent bioaccumulative toxics (PBTs) and differ for NPRI and TRI and by chemical. For these chemicals, the reporting thresholds have been lowered—in some cases to different levels; certain thresholds have different bases (amounts of releases and transfers as opposed to amounts manufactured, processed or otherwise used); the sources required to report differ in some cases; and the definition for reporting of dioxins/furans is not the same. NPRI limits reporting of dioxins/furans to specific activities or processes and reports the toxic equivalent while TRI does not limit reporting to specific activities and reports the amount. RETC reporting on dioxins/furans is similar to TRI. Except for mercury and its compounds, these chemicals are not in the matched database because their threshold and/or reporting definition are different. See **Chapter 10** for a discussion of the PBTs.

2.2.6 Reporting Forms

Facilities submit one reporting form for each listed substance for which they must report. A facility reporting on 10 chemicals files 10 forms (electronically in Canada and electronically or on hard copy in the United States). Thus, the individual, chemical-specific forms are the critical source of data for reports such as NPRI's annual Summary Report, TRI's annual Public Data Release, and the annual *Taking Stock* reports. Mexican facilities submit one form per facility listing all chemicals used on the one form.

Table 2–1. Comparison of Reporting in North American PRTRs for 2000 Reporting Year

Major Data Elements	US Toxics Release Inventory (TRI)	Canadian National Pollutant Release Inventory (NPRI)	*Mexican Registro de Emisiones y Transferencia de Contaminantes* (RETC)
Identification			
Type of facilities reporting	Manufacturing and federal facilities. Electric utilities, mining, hazardous waste treatment, solvent recovery, chemical wholesalers, petroleum bulk terminals, beginning in 1998.	Any facility manufacturing or using a listed chemical, except research, repair and retail sales. agriculture, mining, well drilling also exempt, except if processing or otherwise using the substance.	All facilities under federal jurisdiction.
Industry classification	All US SIC codes applicable to facility operations.	One primary SIC code per facility. Facility reports both Canadian and US SIC code.	One CMAP code per facility.
List of chemicals	Chemicals manufactured or processed or used in manufacturing (648 substances with 30 chemical categories).	Chemicals used or manufactured in sufficient quantities (267 substances with 17 categories).	104 substances. Not mandatory. On-site air releases of 7 criteria air pollutants for which a facility has a permit reportable in Sec. II of COA. Reporting on 4 of the 7 is mandatory.
Reporting Threshold			
Number of employees	10 or more	10 or more (no threshold for certain activities for substances with lower reporting thresholds).	No threshold.
Activity/use of chemicals	Manufacture/process more than 25,000 pounds (11,338 kg) or use more than 10,000 pounds (4,535 kg). 18 substances have lower reporting thresholds.	Manufacture, process or use10 tonnes (10,000 kg) or more; 19 substances have lower reporting thresholds.	No threshold. For criteria air pollutants (COA, Sec. II), a facility must report on substance for which it has a permit.
Concentration of chemicals in mixtures	Concentrations equal to or greater than 1 percent (0.1 percent for carcinogens) count toward activity/use threshold.	Concentrations equal to or greater than 1 percent plus total weight of by-products count toward activity/use threshold.	Thresholds vary by pollutant group.
Type of Data Reported			
Units	Pounds reported; based on estimates.	Tonnes reported; based on estimates.	Facilities may report in their own units. RETC will convert to tonnes.
Small quantity reporting	Amounts for releases/transfers less than 1,000 pounds (502 kg) may be reported by range code; no amounts need be reported if total production-related waste does not exceed 500 pounds (227 kg) and manufacture, process or use does not exceed 1 million (502 tonnes).	Total releases less than 1 tonne (1,000 kg) reported as total releases only. Releases to each medium less than 1 tonne (1,000 kg) reported by range code.	No different provisions for small quantity reporting.
On-site Releases			
Air emissions	Fugitive and point source emissions reported separately; includes spills and leaks.	Fugitive, point source, storage/ handling, spills, other reported separately.	Air emissions from production processes and from non-production-related processes reported separately by emission point. Amount from spills not included. Only air emissions permit substances reporting mandatory.
Surface water discharges	Amount to each water body reported (includes spills and leaks in amount). Percentage due to stormwater reported.	Amount of discharge, spills, and leaks to each water body. (Reporting of amounts separately for each water body began with 1996 reporting year.)	Amount discharged to water body. Not mandatory.

Table 2–1. (*continued*)

Major Data Elements	US Toxics Release Inventory (TRI)	Canadian National Pollutant Release Inventory (NPRI)	Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC)
On-site Releases (continued)			
On-site land releases	Amount to hazardous waste landfills, other on-site landfills, land treatment/application, surface Impoundments reported separately. Spills and leaks included. (Reporting of categories for landfills—hazardous waste and all other—began with 1996 reporting year.)	Amount to landfills, land treatment/application, spills, leaks, other reported separately.	Amount to land, includes wastewater infiltration and injection. Not mandatory.
Underground injection	Amount to on-site Class I wells and all other wells. Amount from spills included. (Amount to Class I wells reported separately from amount to all other wells began with 1996 reporting year.)	Amount to on-site wells. Amount from spills included.	Underground injection not practiced in Mexico.
Accidental spills	Included in release and transfer amounts. In different section of form reported as one amount.	Reported separately under air, water and on-site land releases. Included in underground injection and transfer amounts.	Reported as total amount. Not mandatory.
Off-site Transfers			
Transfers to municipal sewage	Total amount reported. List name/address of each municipal sewage treatment plant.	Total amount reported to each sewage treatment plant. List name/address of each municipal sewage treatment plant. (Reporting of separate amounts to each sewage plant began with 1996 reporting year.)	Reported as total amount. Not mandatory.
Transfers to treatment/disposal	Amount reported by method of treatment/disposal; amount reported for each transfer location with name/address.	Amount reported by method of treatment/disposal; amount reported for each transfer location with name/address. (Reporting of separate amounts to each transfer location began with 1996 reporting year.)	Amount reported by method of treatment/disposal; amount reported for each transfer location with name/address. Not mandatory.
Transfers to recycling/energy recovery	Amount reported by method of recycling/energy recovery; amount reported for each transfer location with name/address.	Amount reported by method of recycling/energy recovery; amount reported for each transfer location with name/address. Mandatory reporting began with 1998 reporting year.	Not reported.
Management of Chemicals			
Use of chemicals	Not reported.	Not reported.	Amount of chemical used by facility. Not mandatory.
Hazardous waste received	Not mandatory.	Not reported.	Amount of chemical received by facility in hazardous waste or wastewaters. Not mandatory.
Management by treatment, disposal	Amount managed on- and off-site by type of management.	Off-site transfers only.	Amount managed on- and off-site by type of management. Not mandatory.
Recycling/Energy recovery	Amount managed on- and off-site by type of management.	Off-site transfers only. Mandatory reporting began with 1998 reporting year	Not reported.
Other Data Elements			
Type of on-site waste treatment	Type for each method used by type of wastestream (separate amounts not reported).	Not reported.	Annual generation and method used by type of waste. Not mandatory.
Projections	Two years following, amounts for on- and off-site waste management.	Three years following, additional 2 years optional, for total releases and total transfers.	One year following for total of on-site releases. Not mandatory.
Pollution prevention/Source reduction	Type of source reduction activities (21 categories).	Type of pollution prevention activity (8 categories).	Type of pollution prevention activity (7 categories). Not mandatory.

This point is important for understanding certain analyses of PRTR data, especially analyses of US data by industry sector. Using up to six SIC codes, TRI facilities identify the business activities or industry sectors associated with manufacture or use of each chemical on which they report. 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 petroleum refining and the second in chemical manufacturing. 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 industry-based analyses of TRI data. In the analyses in *Taking Stock*, such facilities will appear in the industry category called "multiple SIC codes." (See Box on page 27 below, for a list of US SIC codes included in the matched data sets.)

2.2.7 Amounts Reported

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. Although the numbers represent estimates, NPRI and TRI require facilities to report releases and transfers to the tonne or pound, respectively. (For production-related waste management, in a separate section of the TRI form, facilities may report quantities rounded to two significant digits—for example, 2,100,000 pounds rather than 2,145,678 pounds.)

For releases of a substance that total less than one tonne, NPRI allows facilities to report just the total amount released and not the amounts in individual release categories by environmental medium. 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.

2.2.8 Confidentiality Claims/Trade Secrecy

The purpose of the Canadian and US databases is to provide the public with data about chemicals arising from industrial activities, so in general, both databases 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 three TRI forms out of 91,513 submitted for 2000 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 summary report, six facilities and 46 forms out of the national total of 8,595 forms were given confidential status for the 1999 NPRI reporting year. This represented 4,273 tonnes of releases and transfers.

2.2.9 Releases and Transfers

PRTRs collect data on two basic types of releases and transfers: those resulting from normal business activities—these represent the greatest potential for pollution prevention efforts—and those arising from accidents, from clean-up activities to remedy earlier releases, or from other one-time events. This section gives general descriptions of the types of releases and transfers. Both the NPRI and TRI databases contain much greater detail than is presented in these descriptions or in summary tables throughout *Taking Stock*.

Reporting instructions for NPRI and TRI give detailed information on the releases and transfers that facilities must report, and both systems supply guidance to specific industries in published manuals and/or training sessions. Reporting instructions are available on the NPRI and TRI web sites, respectively, at <www.ec.gc.ca/pdb/npri/npri_gdocs_e.cfm> for NPRI guidance documents and <www.epa.gov/triinter/report.htm> for TRI reporting materials and guidance. Reporting instructions for RETC can be found at <sat.semarnat.gob.mx/dggia/retc/>.

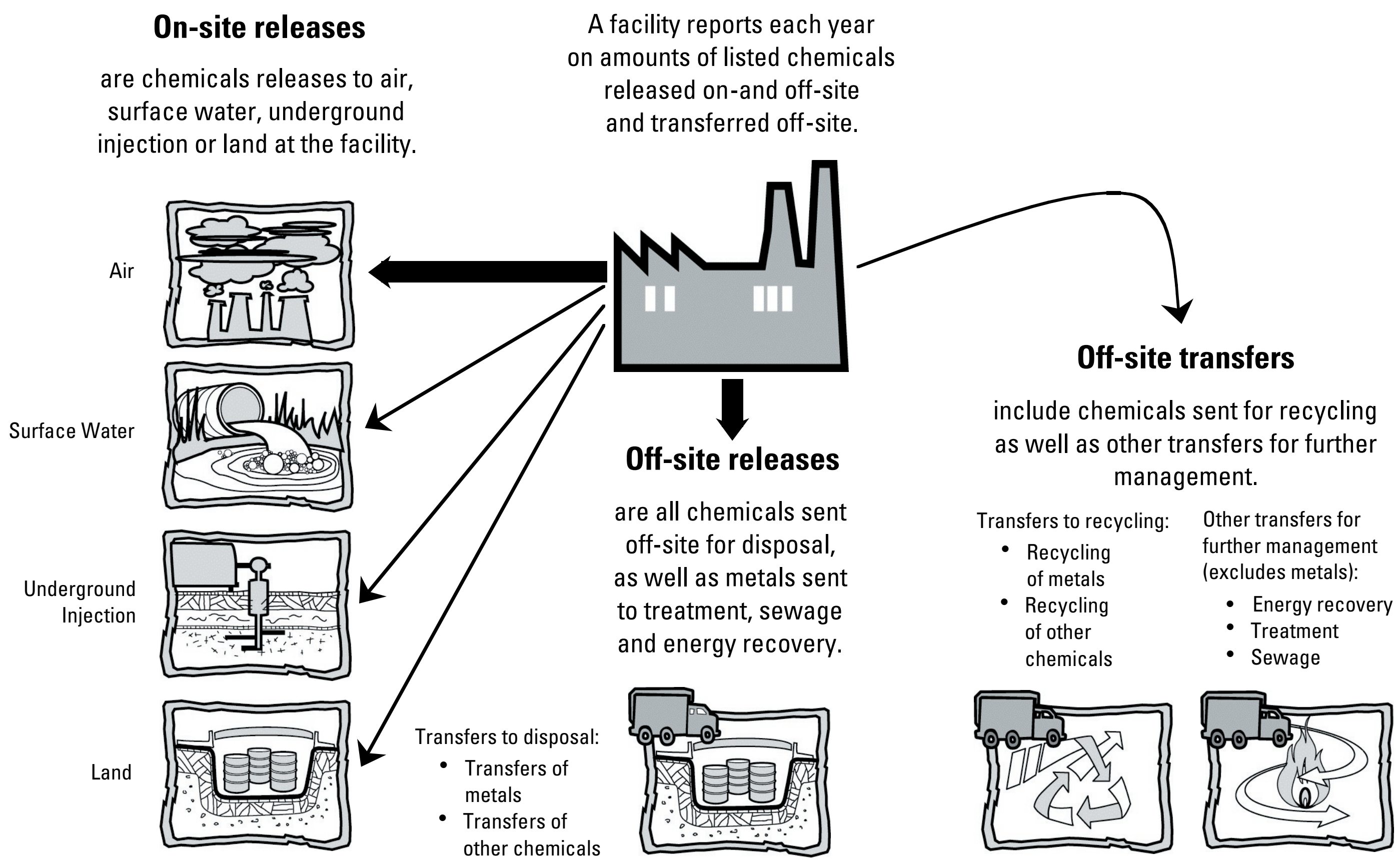
Figure 2–1 illustrates the releases and transfers classification scheme used in this report.

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 are labeled "fugitive" or "nonpoint" emissions. Generally, facilities apply pollution-control devices or technologies to limit stack emissions of listed chemicals. Some facilities have found PRTR reporting beneficial in helping to identify unexpected emissions sources, such as leaking ducts or pipes, which can then be corrected.
- **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.

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



- **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 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

Facilities report amounts of the listed chemicals they have sent to other locations for further management. In PRTRs, the amount of the chemical in the material transferred is reported and not the total volume of the material. Both NPRI and TRI have collected data on off-site transfers for treatment and for disposal since the respective inventories began (1993 for NPRI and 1987 for TRI). In 1991, TRI began requiring facilities to report transfers for recycling and energy recovery. Reporting of these transfer types had been optional in NPRI until the 1998 reporting year.

- **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. They can also include materials that are sent back to suppliers for credit or payment.
- **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 alternate for fossil fuel 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.

It should be noted that PRTRs do not measure all environmental releases occurring from off-site transfers. Transfers sent for disposal and transfers of metals to energy recovery/treatment/sewage/disposal indicate off-site releases at the receiving site, but other types of transfers may also result in releases. Residues from recycling operations must be disposed of. Energy recovery and treatment processes are seldom 100 percent effective, and some releases to the environment may occur.

2.3 Putting PRTR Data to Work

2.3.1 Public Dissemination

As one of the purposes of the databases is to provide the PRTR information to the public, both TRI and NPRI are available in a variety of formats: annual summary reports, detailed data in hard and electronic form, and over the Internet (see contact information in **Chapter 1**). The Mexican RETC data are aggregated by municipality and by state in annual reports.

While governments have the responsibility of publishing the data and making it readily available to the public, public interest groups and others are playing an increasingly active role in North America in enabling citizens—including those without expertise or experience working with data sets—to access, use and understand the data. The NPRI and TRI data are available on web sites maintained by some of these groups along with access to other environmental data as well. (See below for more information on these web sites.) Some industry associations are also helping to get PRTR numbers out into the public domain. They publish their own PRTR numbers annually, and some companies hold regular meetings for neighborhood communities to discuss their PRTR data as well other local issues.

2.3.2 Using PRTR Data Alone

PRTR data have a wealth of potential uses beyond the needs and resources of government. Companies and individual facilities use PRTR data to report on their waste management activities and environmental performances. Publicly available PRTR data also provide a basis for local citizens and industries to track progress in reducing pollutant releases and transfers. The data can also be used to build a regional picture of releases and transfers, and to encourage companies to expand their environmental management programs.

PRTR data are valuable for what they reveal. Using PRTR data alone, releases and transfers can be analyzed by chemical, by facility, by business sector, or for a geographical area—and over time. What chemical is released in the largest amount in a given community? Where are transfers of chemicals in waste into a particular province or state coming from? What chemicals are reported in surface water discharges to tributaries throughout a watershed? How does one facility compare with another in the same business? Such analyses can also show overall progress or lack thereof. Are local facilities reducing the releases they report? Are reductions in on-site releases accompanied by increases in transfers of listed substances off-site? What industry-wide trends are evident?

PRTR data can answer these questions. In turn, many answers point to new questions that require more information than PRTRs typically supply. For example, how have facilities reduced their releases? Although facilities indicate what pollution prevention activities they have undertaken during the year (beginning with the 1997 reporting year in NPRI and the 1991 reporting year in TRI), specific reductions in releases and transfers cannot be linked directly to any such activity reported in the PRTR data. TRI facilities also report a production index, showing how much production levels have increased or declined since the previous year; reporting a production index to NPRI is voluntary. Again, specific reductions cannot be linked to this index since it reflects changes due to all factors, including, for example, variations in production levels or changes in pollution control equipment.

2.3.3 Finding Information "behind the numbers"

While PRTR data alone can provide much information of potential interest, some questions can only be answered by finding out more about what is "behind the numbers." For example, how have facilities reduced their releases? Did facilities take specific actions to bring about these reductions? Have facilities eliminated or reduced releases of one chemical by switching to processes that use another? If so, is that substance less potentially harmful—or not? To be able to answer such questions, it is necessary to find out more about the facilities. NPRI facilities have the opportunity to comment on their releases and on their transfers, and a facility's comments—included in the NPRI database—may explain its increases or decreases in reported amounts from previous years. The TRI database does not contain such comments. Most often, however, calling a facility is the only way to obtain an explanation of its releases and transfers and their year-to-year changes. Contact points are provided by facilities as part of their PRTR reporting forms.

2.3.4 Recognizing the Limitations

A principal factor in making good use of PRTR data is to know their limitations. PRTR data do not:

- encompass all potentially harmful substances,
- address all sources from which chemicals of concern move into the environment,
- identify all on-site releases and off-site transfers from a facility,
- measure releases and transfers—they estimate them,
- supply a direct perspective on the ultimate environmental fate of chemical substances that reporting facilities release or ship off-site for disposal or other disposition,
- provide information on the toxicity or potential health effects of substances released or transferred by reporting facilities,
- indicate risks from substances released or transferred by reporting facilities, or
- identify exposures of human or ecological populations to substances released or transferred by reporting facilities.

Other important information also lies beyond the bounds of PRTR data. For example, information about local/regional geography, demographics, and economics may be needed to interpret PRTR data appropriately in community and ecological contexts.

2.4 Putting PRTR Data in Context

Releases and transfers reported to PRTRs do not happen in a vacuum. They occur in many contexts—physical and chemical, economic and regulatory, geographic and ecological.

Substances that are released on-site or transferred off-site have physical and chemical characteristics that influence their ultimate disposition and their potential consequences for human and ecological life. Some of these substances are used or produced for particular aims—to induce a necessary reaction during manufacture of a desired product; to give a product improved performance, a longer life or a better appearance; to clean a surface; or to meet a certain demand in the commercial or industrial marketplace. Other substances enter the environment through spills or leaks, as manufacturing by-products, or in the delivery of services (such as waste generated from production of electricity). Facilities that report to NPRI or TRI may expand, cut back, or change product lines, bringing about change in their releases and transfers. Some have actively sought ways to reduce the amounts of toxic chemicals they use, to reduce their contributions to pollution—and their costs. Regulations focused on protecting air and water have fostered such improvements at many facilities.

Reportable substances are released to air, water, or land, or they are injected underground at known locations under specific conditions. Prevailing winds, for example, can shape the plume emitted from a stack and influence the distance and direction that pollutants travel, potentially affecting populations both near and far. Reportable substances may also be shipped across town or out of the country for recycling, energy recovery, treatment, or disposal.

There are many different methods of disposal and treatment. Chemicals can be treated physically, chemically, or biologically; they can also be incinerated, landfilled, stored, sent to a sewage treatment plant, injected underground, or incorporated into the land. The method chosen will depend on many factors including the chemical and physical nature of the substance, the availability of facilities, and the cost. Ecological and health impacts will vary with the substance, the type and effectiveness of treatment, and the nature of the surrounding environment. Chemicals of concern released to the environment or transferred off-site for disposal by PRTR facilities join those that originate from other sources—from agriculture and transportation, from sectors not required to report to the PRTR, and from small sources such as service stations and dry-cleaning establishments.

2.4.1 Chemicals of Concern

Some questions require external information from the start. How effective has the Montreal Protocol been in reducing releases of ozone-depleting chemicals? PRTRs collect data on ozone-depleters, but the databases do not explicitly identify these chemicals. Users will need the list of substances covered by the Montreal Protocol (found online at <www.unep.org/ozone/montreal.shtml>) to begin investigating releases of those substances reported to NPRI and TRI.

Another question might relate to releases of substances that are listed as toxic under the Canadian Environmental Protection Act (CEPA) (found online at <www.ec.gc.ca/CEPARegistry/subs_list/>) or the California Proposition 65 list of chemicals known to the state of California to cause cancer, birth defects or other reproductive harm (found online at <www.oehha.org/prop65.html>). Subsets of these groups of chemicals are in the matched data set. Where to find the lists is discussed later in this chapter. Data on releases of these categories of chemicals for 2000 are presented in **Chapter 9** of this report.

Other categories such as carcinogens, endocrine disruptors, persistent bioaccumulating toxic pollutants, or other chemical groups may also be of interest. Resources for identifying these groups include:

- Carcinogens—International Agency for Research on Cancer (IARC) <www.iarc.fr/> and US National Toxicological Program (NTP) <ntp-server.niehs.nih.gov/>. (Note: releases and transfers of known and suspected carcinogens reported to both NPRI and TRI are analyzed in **Chapter 9** of this report.)
- Endocrine disrupters—OECD (discusses research but does not list substances) <www.oecd.org/EN/document/0,,EN-document-524-14-no-24-6685-0,00.html>.
- PBTs—US EPA's TRI regulations and related developments. (Those PBTs on the NPRI and TRI lists are discussed in **Chapter 10** of this report.) <www.epa.gov/tri/lawsandregs/pbt/pbtrule.htm>.

2.4.2 Chemical Uses and Industry Processes

Releases and transfers arise from particular industrial processes or activities. Assessing the significance of the chemicals and amounts reported to PRTRs involves understanding their use.

Many general sources summarize the industrial and commercial uses of specific chemicals. Trichloroethylene (TCE), for example, is used in degreasing fabricated metal parts and as a chemical intermediary in fluorocarbon production. Patterns of releases from these two principal uses differ substantially. TCE has replaced an ozone-depleting chemical, 1,1,1-trichloroethane, in metal degreasing, an application likely to generate air emissions. However, the predominant—and growing—use of TCE is in producing the hydrofluorocarbon HFC-134a, a use less likely to yield TCE emissions to air. Fact sheets and other reference materials that supply toxicity data often summarize uses as well, and the Environmental Defense Scorecard also offers such information. **Appendix E** provides basic information on uses for the 25 chemicals with the largest releases and/or total reported amounts of releases and transfers.

Other resources include:

- US National Safety Council's Environment Writer Chemical Backgrounder Index <www.nsc.org/ehc/ew/chemical.htm>,
- Environmental Chemicals Data and Information Network <agnic.nal.usda.gov/agdb/env_chem.html>,
- New Jersey's Right-to-Know Hazardous Substance Fact Sheets <www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm>, and
- ChemExpo <www.chemexpo.com>.

Some PRTRs—the states of New Jersey and Massachusetts are examples—collect additional data on facilities' use of toxic chemicals. Known in various contexts as throughput data, materials accounting, or chemical use data, this information allows a more complete accounting of a facility's use of a toxic chemical—how much is brought on-site, produced, held in inventory, shipped in product, transferred as waste to other locations, and released to the environment. Such data support a much more extensive range of analyses than the limited release and transfer data available in NPRI and TRI. One example would be assessments of the relative efficiency of facilities that manufacture the same product.

2.4.3 Toxicity and Human Health Effects

"How dangerous are these chemical releases and transfers to my health?" Newcomers to PRTR-type information are likely to ask this question early on, especially if they are examining data from nearby facilities. This question also underlies many more sophisticated analyses of PRTR data. There are no simple answers.

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> directs users to:

- the US Agency for Toxic Substances and Disease Registry for ToxFAQs summaries about hazardous substances <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>;
- the International Agency for Research on Cancer <www.iarc.fr/>; and Toxicology Excellence for Risk Assessment <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/> and
- the ToxFAQs summaries mentioned above <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/>
- State of New Jersey, Department of Health, Right-to-Know Hazardous Substances Fact Sheets—<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/xroads/chem.htm>

In its Scorecard <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.

Scorecard also supplies hazard rankings for each chemical. These indicate whether a chemical has been found to be more or less hazardous in particular respects than other chemicals in the database. Existing ranking systems weigh toxicity alone or in combination with the persistence of a chemical in an environmental medium, and such ranking systems have addressed both human health effects and ecological effects.

Three environmental organizations have developed PollutionWatch, a web-based Scorecard for NPRI data: the Canadian Institute for Environmental Law and Policy, the Canadian Environmental Law Association, and the Canadian Environmental Defence Fund. PollutionWatch can be found at <www.pollutionwatch.org> or through a link from the Scorecard site.

These sources can help PRTR data users begin to weigh the risks posed by releases of specific substances and set priorities for prevention and protection. As noted in the Scorecard web site <www.scorecard.org/env-releases/us-map.tcl>: "Scorecard cannot tell you whether the amount of pollution in your own area is safe or unsafe, and it does not calculate the amount of health risk that reported pollution in your area poses. Scorecard tells you which chemical releases in your area might be of potential health concern, based on available data, and helps you identify the highest priorities among those chemical releases."

Beyond PRTR Data: Risk and Exposure Assessment

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.

A substance is released to a specific medium (air, water, land)—does it remain in that medium or does it move from one to another? How long does it remain in the environment—in which medium—and in what form? How far does it travel? If deposited from air to land in agricultural communities, will it be taken up by crops? How much of such a crop will people eat? What is the physical relationship of the releases to human populations—are the pollutants discharged to surface waters in which people swim or upstream of drinking water intakes? Do prevailing winds carry air emissions toward or away from human populations? Are susceptible populations—school children, the elderly—likely to be exposed to these pollutants?

Answering these questions—and many more—constitutes a risk and exposure assessment. Such assessments should make clear their assumptions and the scientific uncertainties involved in their results.

2.4.4 Geographic Information

Every release originates in a particular place. What happens next depends on landforms, stream flow, and air currents—as well as on the physico-chemical properties of the substances of concern. PRTR data can be aggregated by geographic location—postal code, municipality, county or census division, province or state. Data can be mapped. (Environmental Defense's Scorecard <www.scorecard.org> and US EPA's Envirofacts <www.epa.gov/enviro> map TRI data on the Internet. Canada's NPRI web site <www.ec.gc.ca/pdb/npri> and the PollutionWatch site <www.pollutionwatch.org> offer mapping capability for NPRI data. Maps can correlate releases and transfers with demographic data, sensitive ecological populations, locations of non-PRTR sources of pollution, and other geographic information. Watershed and airshed maps are especially valuable for assessing the cumulative impacts of pollutant sources.

2.4.5 Other Sources of Environmental Releases

Facilities that report to PRTRs are not the only sources of pollutant releases to the environment. For example, neither NPRI nor TRI capture release and transfer data for small factories and businesses that do not meet the reporting thresholds. Thus, because of reporting thresholds and/or industry classification, entities such as dry-cleaning establishments and automobile service stations do not report to the North American PRTRs. Nor do NPRI or TRI capture releases from mobile sources (that is, motor vehicles and other forms of transportation) or from agriculture.

Moreover, the lists of substances covered by the North American PRTRs do not include all chemicals or classes of chemicals for which environmental releases may cause concern. Releases of PRTR-listed substances, and the burdens they impose on the environment, need to be considered in the context of other (similar or different) environmental burdens posed by non-listed pollutants from many sources, large and small.

Information about these other releases may be gathered from various sources. For example, air and water permitting systems may require regular reporting of emissions. In other cases, governments may estimate the contribution of other sources of environmental releases, as in annual inventories of emissions of "criteria air pollutants." Motor vehicle emissions, for example, may be estimated from such data as gasoline consumption (and its chemical composition), national or regional estimates of mileage driven under urban or highway conditions, etc. All three North American countries have estimated their national greenhouse gas emissions in response to the United Nations' Framework Convention on Climate Change.

NPRI Summary Reports supply national summaries of such information, when available. The 1996 report, for example, reviewed available data on architectural surface coatings (paints), commercial and consumer solvents, dry cleaning, and solvent degreasing. The 1997 NPRI report included national estimates of releases of NPRI substances due to fuel distribution and mobile sources and estimates of criteria air contaminants. For the 1998 and 1999 reports, estimates of greenhouse gas emissions were included. In the United States, the *1996 TRI Public Data Release* compared TRI reporting of selected chemicals with fertilizer and pesticide uses and with estimated total emissions of volatile organic compounds (VOCs).

The CEC has taken steps to identify existing data sources in the three countries that address nonpoint sources of pollutants. Including data on emissions of PRTR pollutants from nonpoint sources in the *Taking Stock* reports would provide a more complete understanding of the relative importance of facility-specific releases and transfers. Discussion of releases of other pollutants (such as criteria pollutants) from both point and nonpoint sources would provide an additional perspective on the role played by PRTR releases in the broader context of environmental protection. In general, however, the amount of nonpoint-source data identified in the survey as comparable to the PRTR data was very limited. A survey conducted for the CEC in 1999 found that a significant amount of activity is underway in all three countries to develop improved estimates of nonpoint-source air emissions but that currently available data are limited for cross-country PRTR comparison purposes. The report also addressed several issues that affect the ability to produce meaningful comparisons to PRTR data. These include variable definitions of nonpoint sources, varying degrees of accuracy and consistency across countries in methods for making estimates, and the need for data management systems to facilitate data exchange. Efforts to address these issues in each country will make the data in these inventories more useful from a North American perspective.

Building on this report and in response to a suggestion from the PRTR Consultative Group, the CEC is initiating a project to compile existing sources of comparable data on air pollutants. The CEC will work with the three countries to develop annual reports of emissions of common air pollutants and greenhouse gases. The aim of the project is to foster further cooperation among the three countries in presenting emissions data already collected within each country and to promote public dissemination and understanding of air pollutant emissions and trends in North America.

2.5 Creating the *Taking Stock* 2000 Matched Data Set

To compare data from PRTRs with different reporting requirements, *Taking Stock* selects the elements they have in common. The data are from Canada and the United States. Data comparable to those generated by the US and Canadian PRTRs are not yet available under the voluntary Mexican PRTR program.

These PRTR reports were submitted by facilities during the summer of 2001. The US EPA released the TRI data to the public in May 2002. The NPRI data used in this report were obtained from the Environment Canada web site in January 2002. At the same time, updated versions of previous years PRTR data were also made available. *Taking Stock 2000* uses the updated versions of the databases for analyses that include 1995 through 1999.

Not all data submitted to the individual countries' PRTR systems can be used, however—only those common to both systems. The important principle is that the data compiled for *Taking Stock* represent the substances and the industries covered by both Canada's NPRI and the US TRI. 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 the two PRTRs.

2.5.1 Industry Sectors

As in previous years, all manufacturing industries are included in the matched data set. For 1998 and following, the US TRI included reporting from several additional industry sectors that are linked to manufacturing—those providing energy (coal mining and electric utilities), further managing products (metal mining, chemical wholesalers and petroleum bulk terminals) or wastes from the manufacturing sector (hazardous waste treatment and solvent recovery facilities).

These additional TRI industries have been reporting to NPRI since its inception, with the exception of petroleum bulk terminals. Also, 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 are reportable. Waste rock consists of barren or submarginal rock that is removed in order to gain access to the ore.

Because of these differences, *Taking Stock 2000* 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.

In the text, the latter four are often referred to collectively as the "new industries."

List of Industry Sectors Covered in the Matched Data Set of *Taking Stock* 2000

US SIC Code*	Industry
	Manufacturing Industry Sectors
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	Miscellaneous Manufacturing Industries
--	Multiple Codes 20–39**
	New TRI Industry Sectors that match NPRI reporting (added for 1998 TRI reporting)
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)
495/738	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 are reported only by TRI facilities.

2.5.2 Chemicals

In creating the matched data set, specific differences between the two systems must be taken into account. The matched data sets include only those substances on both lists.

However, 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 definition for these substances differs. 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 lead and lead compounds, counting them as two separate substances, while NPRI lists the single category, lead and its compounds. All the analyses in *Taking Stock 2000* add the TRI amount reported for the given chemical to the amount reported for its compounds, to correspond with NPRI practice.

There are three different matched chemical sets used in this report. The matched data set for 2000 includes data on 206 substances. New chemicals were added to NPRI reporting for the year 1999, and those new chemicals that are also on the TRI list are included in the matched data set for 1999 and subsequent years. The matched chemical set used for analyzing data that dates from 1995 and 1998 contains 159 substances, corresponding to chemicals on the NPRI and TRI lists before the NPRI additions for 1999. (See **Appendix B** for the list of 206 chemicals and the subset of 159 chemicals.)

CEPA Toxics

One group of chemicals that is the focus of special analyses in **Chapter 9** is that of the substances classified as toxic under the Canadian Environmental Protection Act (CEPA) of 1999. Thirty-two of the substances in the matched data set for 2000 are CEPA toxics.

In Canada, chemicals are assessed to identify which ones can pose a risk to the environment or human life and health. To be classified as "toxic" under CEPA, a chemical is entering or may enter the environment in a quantity or concentration or under conditions that:

1) have or may have an immediate or long-term harmful effect on the environment or biological diversity,

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, in the TRI US 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 thresholds: the different calculations used to determine reporting thresholds (whether or not a facility has to report) means that it is not possible to account for those facilities not reporting under TRI.
2) Differences in the amount of ammonia reported: the different calculations will result in different amounts being reported under the two systems.

An example may help to understand the effect of these two differences:

1) Differences in reporting threshold

If we 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

Now imagine 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.

As shown in **Table 2–3**, below, the amount of ammonia reported in 2000 was about 2 percent of total releases and transfers in both NPRI and TRI. Had those facilities reporting to TRI reported 100 percent of their aqueous ammonia, as reported under the NPRI system, the total releases and transfers of ammonia reported by the matched TRI industries would have been almost four times as much as that actually reported. Therefore, because of the differences in reporting, ammonia is not included in the matched list of chemicals in *Taking Stock*.

2) constitute or may constitute a danger to the environment on which life depends, or
3) constitute or may constitute a danger to human life or health.

Once a chemical has been classified as toxic, it is usually placed on Schedule 1, which then gives the federal government authority to regulate it. The federal government has two years to develop preventative or control measures for toxic chemicals and a further 18 months to finalize the measures.

As of 9 May 2001, 52 chemicals had been found to be toxic and listed on Schedule 1. (For the list of chemicals on Schedule 1, go to <www.ec.gc.ca/CEPARegistry/subs_list>). For the *Taking Stock* analyses, chemicals that have been assessed and proposed to be toxic were considered CEPA toxic. While hexavalent chromium is considered toxic under CEPA, the most common form of chromium is trivalent chromium. Hexavalent forms (Cr VI) are more toxic than trivalent (Cr III) forms. Inhalation effects include irritation/damage to nose, lungs, stomach, and intestines. Ingestion can lead to stomach upset and ulcers, convulsions, and damage to kidneys and liver. Under some conditions, trivalent chromium may be converted to hexavalent chromium. Because both TRI and NPRI require 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. Because of the toxicity of some chromium compounds and its ability to convert from one form to another, chromium and its compounds are included in the analysis of CEPA chemicals.

California Proposition 65 Chemicals

A second group of chemicals selected for special analysis in **Chapter 9** are those on the California Proposition 65 list. In 1986, California voters approved an initiative (Proposition 65 on the ballot) to address the growing concerns about exposures to toxic chemicals. The subsequent act (The Safe Drinking Water and Toxic Enforcement Act of 1986) requires the Governor of California to publish a list of chemicals that are known to the state of California to cause cancer, birth defects or other reproductive harm. The list is updated at least once a year. The list as of June 2002 contained almost 700 substances, of which 75 are in the matched data set for 2000. The full list can be found on the Internet at <www.oehha.org/prop65.html>.

Table 2–2. All Releases and Transfers Reported to NPRI and TRI, 2000

	NPRI* Number	TRI Number
Total Facilities	2,402	23,484
Total Forms	10,905	91,513
Releases On-site and Off-site	**kg**	**kg**
On-site Releases	367,292,852	2,982,189,302
Air	128,657,504	863,676,324
Surface Water	40,028,994	118,314,007
Underground Injection	163,588,292	126,547,232
Land	34,841,987	1,873,651,739
Off-site Releases	**45,199,406**	**283,506,207**
Transfers to Disposal (except metals)	18,294,844	42,556,198
Transfers of Metals**	26,904,562	240,950,009
Total Releases	**412,492,258**	**3,265,695,508**
Off-site Transfers for Further Management		
Off-site Transfers to Recycling	**1,115,329,615**	**950,173,296**
Transfers to Recycling of Metals	118,190,694	796,997,051
Transfers to Recycling (except metals)	997,138,921	153,176,245
Other Off-site Transfers for Further Management	**52,115,699**	**643,722,227**
Energy Recovery (except metals)	15,992,743	362,956,228
Treatment (except metals)	23,949,563	127,742,299
Sewage (except metals)	12,173,392	153,023,701
Total Reported Amounts of Releases and Transfers	**1,579,937,571**	**4,859,591,032**

Note: Canada and US data only. Mexico data not available for 2000.
* 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.

2.5.3 Matching Chemicals and Industries

In 2000, 2,402 Canadian facilities in all industries reported 1.58 billion kg of releases and transfers to NPRI, and the 23,484 United States facilities reported 4.86 billion kg of releases and transfers. However, not all of these reports match the reporting in the other country.

In 2000, Canadian facilities in the matched industry sectors reported 114.9 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 51.3 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 1.10 billion kg of total releases and transfers were also excluded.

In TRI, matching for common chemicals eliminated 324.2 million kg of releases and transfers. Matching for industries excluded a much larger amount—1.48 billion kg. The metal mining industry's reporting accounted for the vast majority of this amount. A total of 52.5 million kg was excluded because both the chemical and the industry were not comparable to NPRI.

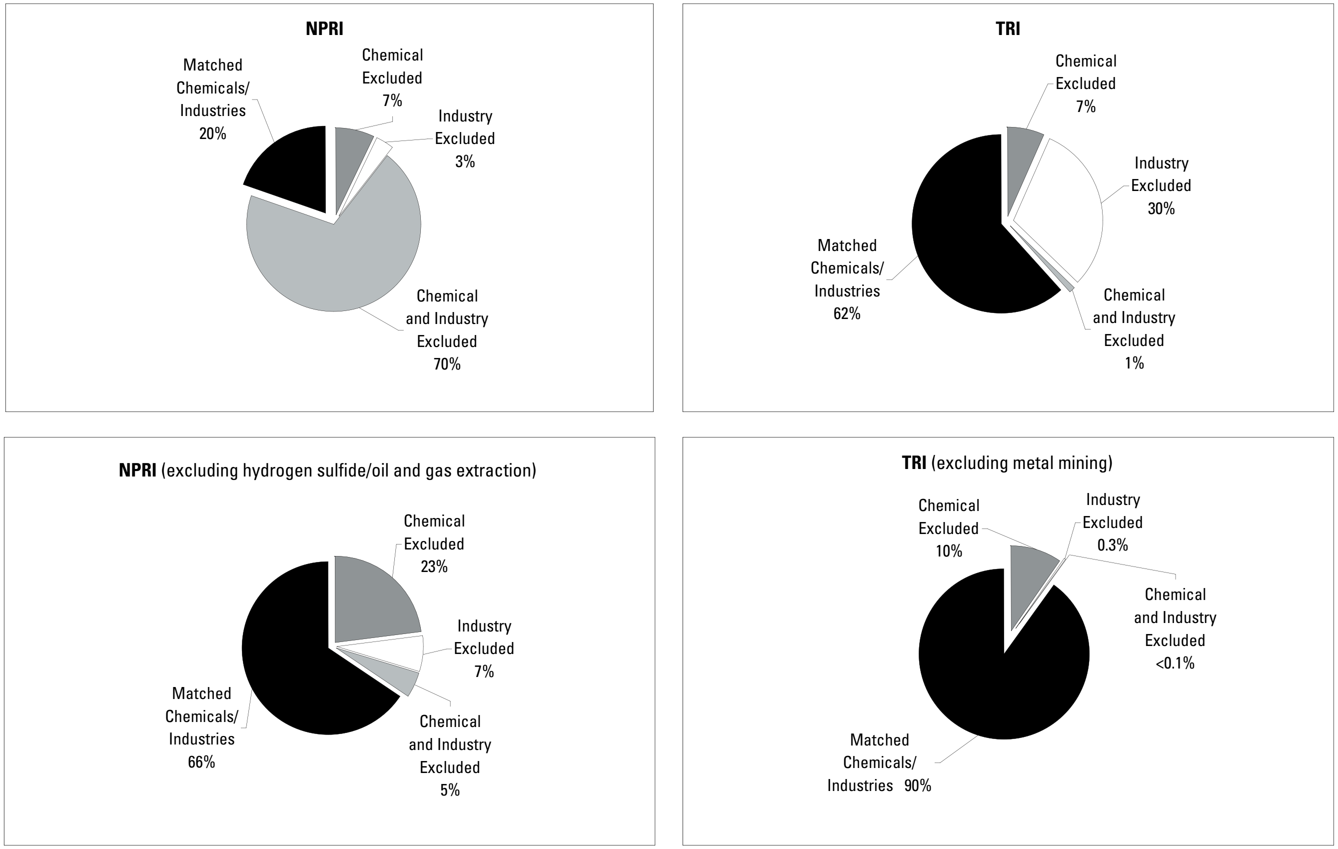
Over half (57 percent) of the chemical reports under NPRI and over three-quarters (77 percent) under TRI are included in the *Taking Stock* matched data set for 2000. These comparable reports represent 20 percent of NPRI total reported amounts and 62 percent of TRI amounts.

The greatest portion of releases and transfers excluded from the matched

Table 2–3. Creating the Matched Dataset for *Taking Stock 2000*: Effects of Matching NPRI and TRI for Chemicals and Industries, 2000

	NPRI				TRI			
	Forms		Total Reported Amounts of Releases and Transfers		Forms		Total Reported Amounts of Releases and Transfers	
	Number	%	kg	%	Number	%	kg	%
Total in individual database	**10,905**	**100**	**1,579,937,571**	**100**	**91,513**	**100**	**4,859,591,032**	**100**
Excluded due to chemical only	**3,013**	**28**	**114,929,215**	**7**	**15,691**	**17**	**324,247,294**	**7**
Chemicals with differences in reporting definition								
Hydrochloric and sulfuric acid: non-air releases	424	4	56,140,473	4	332	0.36	8,843,670	0.18
Isopropyl alcohol	214	2	4,144,597	0.26	43	0.05	753,382	0.02
Ammonia	289	3	28,740,433	2	2,782	3	93,721,227	2
Chemicals on one list but not on the other list	2,086	19	25,903,712	2	12,534	14	220,929,016	5
Excluded due to industry only	**1,370**	**13**	**51,309,162**	**3**	**4,559**	**5**	**1,480,787,263**	**30**
Metal Mining	225	2	6,047,665	0.4	615	1	1,471,870,092	30
Other Industries	1,145	10	45,261,497	3	3,944	4	8,917,171	0.2
Excluded due to both chemical and industry	**352**	**3**	**1,101,574,880**	**70**	**744**	**1**	**52,450,892**	**1**
Hydrogen sulfide/Oil and gas extraction	72	1	1,079,180,534	68	0	0	0	0
Other chemicals/industries	280	3	22,394,346	1	744	1	52,450,892	1
Excluded due to number of employees only	**8**	**0.07**	**590**		**NA**		**NA**	
Total for matched chemicals/industries	**6,162**	**57**	**312,123,724**	**20**	**70,519**	**77**	**3,002,105,582**	**62**

Figure 2–2. Percentage of Total Releases and Transfers Included/Excluded when Matching NPRI and TRI for Chemicals and Industries, 2000



data set for 2000 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 929.2 million kg of hydrogen sulfide. TRI includes neither the industry sector nor the chemical. These three reports accounted for 59 percent of the entire NPRI database for 2000.
- 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 2 percent all NPRI and 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 4 percent of the NPRI 2000 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 30 percent of all releases and transfers to TRI in 2000 (for chemicals in the matched data set).
- Only 10 percent of total aqueous ammonia is reported to TRI. The amount of releases and transfers of ammonia reported to TRI was 2 percent of all releases and transfers reported by industry sectors in the matched data set.

2.5.4 Three Matched Data Sets: 2000, 1998–2000 and 1995–2000

Because of the changes in NPRI and TRI over the years—including the addition of new chemicals to the NPRI list for 1999, the new industry sectors in TRI, transfers to recycling and energy recovery made mandatory in NPRI for 1998, and the lowered reporting thresholds for mercury and its compounds, this year's *Taking Stock* has three "matched" data sets.

- The *2000 matched chemicals and industries* data set includes all matched industries, chemicals and types of transfers now reported to both NPRI and TRI (**Chapters 3, 4, 5, 8** and **9**),
- The *1998–2000 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 mercury and its compounds (**Chapters 6, 8** and **9**). It is used for looking at changes from 1998 to 2000.
- The *1995–2000 matched chemicals and industries* data set includes only manufacturing industries, only transfers to disposal, treatment, and sewage, and only chemicals reportable 1995 through 2000. It does not include TRI industries added for 1998 reporting, transfers to recycling or energy recovery, NPRI chemicals added for 1999 reporting, or mercury and its compounds (**Chapters 7** and **9**). It is used for six-year trend analyses (1995–2000).

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.However, TRI has also

Table 2–4. Features of the Three Data Sets in *Taking Stock* 2000

Feature	2000 Matched Chemicals and Industries	1998–2000 Matched Chemicals and Industries	1995–2000 Matched Chemicals and Industries
Years	2000 only	1998–2000	1995–2000
Number of chemicals	206 chemicals	159 chemicals	159 chemicals
Industry Sectors			
Manufacturing facilities	X	X	X
Electric Utilities	X	X	
Hazardous Waste Management/Solvent recovery	X	X	
Chemical Wholesalers	X	X	
Coal Mines	X	X	
On-site releases to air, water, land, underground injection	X	X	X
Off-site releases (transfers to disposal)	X	X	X
Transfers to sewage and treatment	X	X	X
Transfers to recycling/energy recovery	X	X	
Use for	2000 analysis	Comparing year-to-year changes, from 1998 to 2000	Comparing trends over longer time period, from 1995 to 2000
Found in	Chapters 3, 4, 5, 8 and 9	Chapters 6, 8 and 9	Chapters 7 and 9

Table 2–5. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 2000

	North America Number	NPRI* Number	TRI Number
Total Facilities	22,036	1,698	20,338
Total Forms	76,681	6,162	70,519
Releases On- and Off-site	**kg**	**kg**	**kg**
On-site Releases	**1,358,445,770**	**121,822,927**	**1,236,622,843**
Air	858,240,898	91,891,686	766,349,212
Surface Water	119,754,045	6,643,683	113,110,362
Underground Injection	97,742,427	3,590,811	94,151,616
Land	282,595,481	19,583,829	263,011,652
Off-site Releases	**274,904,461**	**31,340,694**	**243,563,767**
Transfers to Disposal (except metals)	38,301,908	5,919,256	32,382,652
Transfers of Metals**	236,602,553	25,421,438	211,181,115
Total Reported Releases On- and Off-site	**1,633,350,231**	**153,163,621**	**1,480,186,610**
Off-site Transfers to Recycling	**1,055,985,045**	**125,372,072**	**930,612,973**
Transfers to Recycling of Metals	900,765,438	109,890,115	790,875,323
Transfers to Recycling (except metals)	155,219,607	15,481,957	139,737,650
Other Off-site Transfers for Further Management	**624,894,030**	**33,588,031**	**591,305,999**
Energy Recovery (except metals)	355,015,520	15,430,088	339,585,432
Treatment (except metals)	123,657,878	10,955,270	112,702,608
Sewage (except metals)	146,220,632	7,202,673	139,017,959
Total Reported Amounts of Releases and Transfers	**3,314,229,305**	**312,123,724**	**3,002,105,582**

Note: Canada and US data only. Mexico data not available for 2000. Data include 206 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.

adopted 1995 as an additional baseline for tracking progress because more than 250 substances were added to the TRI list for reporting that year.

The following sections present summary data to demonstrate the method used to select the matched data sets. Throughout *Taking Stock 2000*, 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.

2.5.5 2000 and 1998–2000 Matched Data Sets

The resulting matched data set for 2000 is shown in **Table 2–5**. These data are presented in **Chapters 3, 4, 5, 8** and **9** of this report.

Chapter 3 presents the sum of releases and transfers for recycling and other transfers for further management as the total reported amounts of releases and transfers. **Chapter 4** presents releases on- and off-site. **Chapter 5** presents transfers off-site for recycling and other transfers off-site for further management. **Chapter 8** compares transfers to disposal, treatment, energy recovery, and recycling sent from Canada to the US and from the US to Canada.

Data comparing the years 1998 to 2000 do not include reporting for the new chemicals added to the NPRI list for 1999. Seventy-three substances were required to be reported for the first time to NPRI in 1999. Forty-seven of them are on the TRI list. The data for the new chemicals are not included in the data set when 2000 data are compared to 1998 data. In addition, the reporting threshold for mercury and its compounds was changed in both NPRI and TRI for the 2000 reporting year. Therefore, mercury and its compounds is not included in the

1998–2000 matched data set. All other chemicals and industries and types of reporting are included.

These data are shown in **Table 2–6** and are presented in **Chapter 6** of this report. **Chapter 6** presents changes in releases and transfers from 1998 to 2000.

2.5.6 Adjustment of Total Releases in North America for Off-site Releases also Reported as On-site Releases in the 2000 Matched Data Set

Facilities transfer off-site chemicals to other facilities for disposal. These amounts are considered as off-site releases in *Taking Stock*. These other 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 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 only counted once.

The 2000 data were analyzed to determine how much ofthe off-site releases were also reported as on-site releases at another facility (see **Table 2–7** and **Figure 2–3**). In all, 8.9 million kg of off-site releases in NPRI (of the total reported off-site releases of 31.3 million kg) and 39.3 million kg of off-site releases in TRI (of the total reported off-site releases of 243.6 million kg) were

Table 2–6. Summary of Total Reported Amounts of Releases and Transfers in North America, 1998–2000

	North America		NPRI*		TRI	
	1998	2000	1998	2000	1998	2000
	Number	Number	Number	Number	Number	Number
Total Facilities	21,776	21,335	1,511	1,664	20,265	19,671
Total Forms	71,837	70,982	5,072	5,757	66,765	65,225
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**
On-site Releases	**1,380,913,770**	**1,304,676,143**	**105,129,143**	**117,420,502**	**1,275,784,627**	**1,187,255,641**
Air	872,134,495	814,925,491	81,622,545	87,591,134	790,511,950	727,334,357
Surface Water	111,340,253	118,963,678	4,841,318	6,605,002	106,498,935	112,358,676
Underground Injection	85,675,883	88,753,936	3,700,429	3,568,922	81,975,454	85,185,014
Land	311,637,870	281,926,319	14,839,582	19,548,725	296,798,288	262,377,594
Off-site Releases	**277,345,296**	**273,175,487**	**51,388,714**	**31,234,053**	**225,956,582**	**241,941,434**
Transfers to Disposal (except metals)	32,734,061	37,005,803	9,282,614	5,838,110	23,451,447	31,167,693
Transfers of Metals**	244,611,235	236,169,684	42,106,100	25,395,943	202,505,135	210,773,741
Total Reported Releases On- and Off-site	**1,658,259,066**	**1,577,851,630**	**156,517,857**	**148,654,555**	**1,501,741,209**	**1,429,197,075**
Transfers Omitted for Adjustment Analysis***	50,732,788	48,146,409	1,110,362	8,886,153	49,622,426	39,260,256
Total Releases On- and Off-site (adjusted)* **	**1,607,526,278**	**1,529,705,222**	**155,407,495**	**139,768,402**	**1,452,118,783**	**1,389,936,820**
Off-site Transfers to Recycling	**1,033,664,724**	**1,042,426,283**	**124,282,626**	**125,322,344**	**909,382,098**	**917,103,939**
Transfers to Recycling of Metals	892,378,826	900,651,822	109,460,828	109,859,569	782,917,998	790,792,253
Transfers to Recycling (except metals)	141,285,898	141,774,461	14,821,798	15,462,775	126,464,100	126,311,686
Other Off-site Transfers for Further Management	**652,016,025**	**590,923,070**	**28,112,703**	**33,002,301**	**623,903,322**	**557,920,769**
Energy Recovery (except metals)	386,752,406	330,498,998	12,023,812	15,339,319	374,728,594	315,159,679
Treatment (except metals)	128,975,573	116,609,162	10,726,089	10,574,333	118,249,484	106,034,829
Sewage (except metals)	136,288,045	143,814,911	5,362,802	7,088,649	130,925,243	136,726,262
Total Reported Amounts of Releases and Transfers******	**3,343,939,815**	**3,211,200,984**	**308,913,186**	**306,979,200**	**3,035,026,629**	**2,904,221,784**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 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.

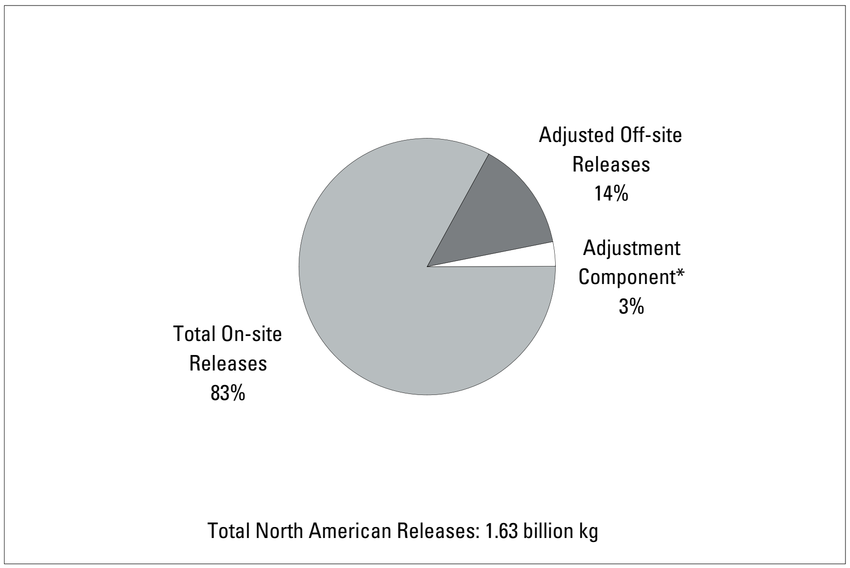
**** Sum of total reported releases on- and off-site, off-site transfers to recycling and other off-site transfers for further management.

Table 2–7. Effect of Adjustment in Off-site Releases on North American Total Releases, NPRI and TRI, 2000

	North America		NPRI		TRI	
	kg	%	kg	%	kg	%
Total On-site Releases	**1,358,445,770**	**86**	**121,822,927**	**84**	**1,236,622,843**	**86**
Total Reported Off-site Releases	**274,904,461**		**31,340,694**		**243,563,767**	
Adjustment component (Off-site transfers to disposal reported as on-site releases by other NPRI or TRI facilities)	-48,201,339	(18% of total reported off-site releases)	-8,887,889	(28% of total reported off-site releases)	-39,313,450	(16% of total reported off-site releases)
Adjusted Off-site Releases*	**226,703,122**	**14**	**22,452,805**	**16**	**204,250,317**	**14**
Total Adjusted Releases*	**1,585,148,892**	**100**	**144,275,732**	**100**	**1,440,873,160**	**100**

Note: Canada and US data only. Mexico data not available for 2000.
* 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, 2000



Note: Canada and US data only. Mexico data not available for 2000.
*Amount of off-site transfers to disposal reported as on-site releases by other NPRI or TRI facilities.

found to match up with on-site releases also reported for 2000 by facilities in North America.

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.

Adjusted releases on- and off-site are the focus of **Chapter 4** in this report. In addition, **Chapter 6** compares releases for 2000 with those for 1998 so the adjustment is also made for the 1998 numbers.

Releases are not adjusted when the analysis focuses on total reported releases and transfers because the purpose of such an analysis is to present the total amounts of the chemicals that are managed by the facilities. Other chapters do not include an adjustment analysis either because they deal with other types of transfers than transfers to disposal or they deal with data prior to 1998 and hazardous waste facilities are not included in such data.

2.5.7 1995–2000 Matched Data Set

The 1995–2000 matched data set includes 159 chemicals and the original manufacturing sectors. It does not include: the new chemicals added in 1999, as data on these chemicals are only available for 1999 and subsequent years; the new sectors added to TRI in 1998, as data on these sectors are only available for 1998 and later years; transfers to recycling and energy recovery, as reporting such transfer data were made mandatory under NPRI for 1998 and later years; or mercury and its compounds, as the reporting threshold was changed for the 2000 reporting year.

These data are shown in **Table 2–8** and are presented in **Chapter 7** of this report. **Chapter 7** presents trends in releases and transfers from 1995 to 2000.

2.5.8 Effects of Revisions in Data for Previous Years

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 earlier years' data 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.

Each year, some facilities miss the reporting deadline or certain quality-control issues affecting their submissions are unresolved at the time the database is used for preparation of the annual PRTR

Table 2–8. Summary of Total Releases and Transfers in North America, 1995–2000

	North America		NPRI*		TRI	
	1995	2000	1995	2000	1995	2000
	Number	Number	Number	Number	Number	Number
Total Facilities	20,805	19,982	1,250	1,585	19,555	18,398
Total Forms	63,746	62,302	4,004	5,321	59,742	56,982
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**
On-site Releases	**937,151,328**	**776,242,516**	**95,317,797**	**92,557,532**	**841,833,531**	**683,684,984**
Air	616,274,438	441,908,450	71,644,535	67,926,616	544,629,903	373,981,834
Surface Water	92,757,158	117,586,700	10,245,860	6,577,778	82,511,298	111,008,922
Underground Injection	94,701,044	73,938,697	3,556,927	3,568,922	91,144,117	70,369,775
Land	133,282,939	142,708,562	9,734,726	14,384,109	123,548,213	128,324,453
Off-site Releases	**167,086,535**	**236,319,907**	**25,653,288**	**23,793,507**	**141,433,247**	**212,526,400**
Transfers to Disposal (except metals)	21,589,840	30,974,885	3,768,158	2,536,468	17,821,682	28,438,417
Transfers of Metals**	145,496,696	205,345,023	21,885,130	21,257,039	123,611,566	184,087,984
Total Releases On- and Off-site	**1,104,237,863**	**1,012,562,423**	**120,971,085**	**116,351,039**	**983,266,778**	**896,211,384**
Off-site Transfers for Further Management	**209,651,847**	**240,232,564**	**10,099,154**	**15,064,971**	**199,552,693**	**225,167,593**
Treatment (except metals)	88,133,399	97,746,847	5,988,535	7,976,738	82,144,864	89,770,109
Sewage (except metals)	121,518,448	142,485,717	4,110,619	7,088,233	117,407,829	135,397,484
Total Releases and Transfers	**1,313,889,711**	**1,252,794,987**	**131,070,239**	**131,416,010**	**1,182,819,472**	**1,121,378,977**

Note: Canada and US data only. Mexico data not available for 1995–2000. Data include 159 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.

Table 2–9. Changes in Data as Result of Revisions Since *Taking Stock 1999*: NPRI and TRI, 1999

	1999 Data, Reported in *Taking Stock 1999**		1999 Data with Revisions Submitted since *Taking Stock 1999***	
	NPRI	TRI	NPRI	TRI
	Number	Number	Number	Number
Total Facilities	2,201	22,639	2,211	23,070
Total Forms	8,634	84,068	8,657	85,344
Releases On-site and Off-site	**kg**	**kg**	**kg**	**kg**
On-site Releases	**324,197,470**	**3,307,307,989**	**325,398,348**	**3,267,526,450**
Air	122,640,761	920,346,677	123,183,980	924,704,115
Surface Water	20,783,735	117,406,701	21,440,294	118,575,722
Underground Injection	136,643,057	116,845,870	136,643,057	117,415,579
Land	43,930,261	2,152,708,741	43,930,261	2,106,831,034
Off-site Releases	**54,755,970**	**264,806,507**	**100,718,756**	**259,757,537**
Transfers to Disposal (except metals)	19,654,470	37,917,263	19,630,300	37,151,431
Transfers of Metals	35,101,500	226,889,244	81,088,456	222,606,106
Total Releases	**378,953,440**	**3,572,114,496**	**426,117,104**	**3,527,283,987**
Off-site Transfers for Further Management				
Off-site Transfers to Recycling	**1,066,198,096**	**957,651,217**	**1,066,377,622**	**979,903,937**
Transfers to Recycling of Metals	101,607,352	145,399,890	101,629,150	828,459,920
Transfers to Recycling (except metals)	964,590,744	812,251,327	964,748,472	151,444,017
Other Off-site Transfers for Further Management	**45,714,596**	**629,816,144**	**45,836,296**	**632,232,422**
Energy Recovery (except metals)	14,697,952	352,542,859	14,697,952	354,387,456
Treatment (except metals)	20,992,433	131,712,932	21,150,481	129,709,776
Sewage (except metals)	10,024,211	145,560,352	9,987,863	148,135,190
Total Reported Amounts of Releases and Transfers	**1,490,866,132**	**5,159,581,857**	**1,538,331,022**	**5,139,420,346**

Note: Canada and US data only. Mexico data not available for 1999.
* All 1999 chemicals and industries reported in 1999 (in 1999 database).
** All 1999 chemicals and industries in 2000 database for 1999 (revised since 1999).

report. Facilities may also withdraw earlier submissions if they determine that they were not, in fact, required to report. A facility may have misinterpreted the threshold calculations, for example, or it may have misunderstood that only particular forms of a listed substance had to be reported. A facility that changes its estimation methods may also find that the revised calculations for a previous year leave it below the reporting threshold.

As a result, database totals for a given year change when revised reports, late reports, and withdrawals are received. *Taking Stock 1999* reported a total of 1.49 billion kg of NPRI and 5.16 billion kg of TRI releases and transfers, reflecting the complete NPRI and TRI databases for that year. Revisions received since the close of the 1999 reporting period raised the total to 1.54 billion kg in NPRI and lowered it to 5.14 billion kg in TRI.

Data for the previous years, 1995 to 1999, are presented in this report for comparison purposes. Some of the data in previous editions of *Taking Stock* may have been revised so that readers should use the current report or the current databases (available online at <www.cec.org/takingstock/>).

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Key Findings

- In 2000, total reported releases and transfers in North America were 3.31 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 41 percent, and off-site releases were 8 percent.
- Off-site transfers to recycling were 32 percent of total reported releases and transfers in North America, and other off-site transfers for further management were 19 percent.
- The pattern of releases and transfers differed somewhat between NPRI and TRI. While total releases were the same proportion of the total reported amounts in both countries, off-site releases represented a larger share of NPRI releases and transfers (10 percent) than those of TRI (8 percent). Off-site transfers to recycling were larger in NPRI than in TRI (40 percent versus 31 percent); however, other off-site transfers for further management (to energy recovery, treatment, and sewage) made up a smaller share of the total releases and transfers in NPRI (11 percent) than in TRI (20 percent).
- Three US states (Texas, Ohio, and Pennsylvania) and one Canadian province (Ontario) each reported more than 195 million kg. Together, these four jurisdictions accounted for about one-quarter (27 percent) of total reported releases and transfers in North America in 2000.
- Two manufacturing industries, primary metals and chemicals, reported more than 600 million kg in total releases and transfers, each representing over 20 percent of the North American total reported in 2000. The electric utilities and hazardous waste management/solvent recovery sectors had the third- and fourth-largest totals; electric utilities accounted for 13 percent of total North American releases and transfers, and hazardous waste management facilities made up 8 percent.
- Fifty North American facilities accounted for 17 percent of total reported releases and transfers. Three of the five facilities with the largest releases and transfers were in the primary metals sector. The other two were hazardous waste management facilities.
- The 25 chemicals with the largest total reported releases and transfers accounted for 89 percent of the North American total. The top two chemicals, ranked by amount of total releases and transfers, were copper and its compounds and zinc and its compounds.

3.1 Introduction

Chapter 3 examines total reported amounts of releases and transfers in North America for 2000. 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 2000 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 4**, releases are adjusted 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.

The 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, what portion of chemicals are being released on-site, or which states or provinces account for the largest share of the chemicals being managed can be answered when all types of releases and transfers are considered.

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. These transfers are discussed in **Chapter 5**.

3.2 Total Reported Amounts of Releases and Transfers, 2000

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 2000, reported releases and transfers in North America totaled 3.31 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 41 percent of total reported amounts of releases and transfers.
- TRI accounted for 92 percent of the facilities in North America, and NPRI accounted for 8 percent. TRI represented 91 percent of total North American reported releases and transfers, and NPRI represented 9 percent.
- The pattern of releases and transfers in NPRI differed somewhat from that in TRI. While total releases were the same proportion of the total reported amounts in both countries, off-site releases represented a larger share of releases and transfers in NPRI (10 percent) than in TRI (8 percent). Off-site transfers to recycling were also larger in NPRI than in TRI (40 percent versus 31 percent). However, other off-site transfers for further management made up a smaller share of total releases

Table 3–1. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 2000

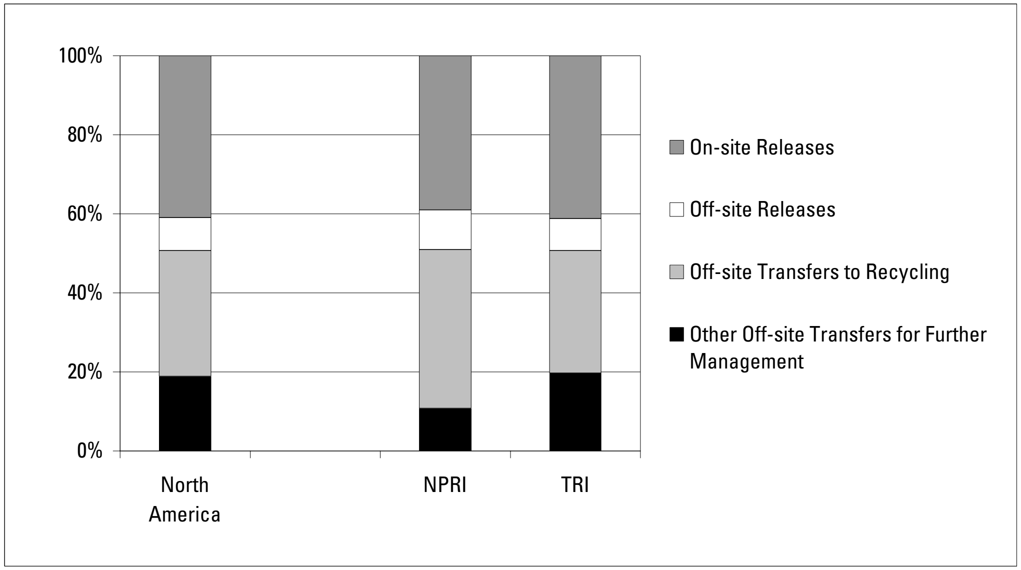
	North America Number		NPRI* Number		TRI Number		NPRI as % of North American Total	TRI as % of North American Total
Total Facilities	22,036		1,698		20,338		8	92
Total Forms	76,681		6,162		70,519		8	92
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**		
On-site Releases	**1,358,445,770**	**41**	**121,822,927**	**39**	**1,236,622,843**	**41**	**9**	**91**
Air	858,240,898	26	91,891,686	29	766,349,212	26	11	89
Surface Water	119,754,045	4	6,643,683	2	113,110,362	4	6	94
Underground Injection	97,742,427	3	3,590,811	1	94,151,616	3	4	96
Land	282,595,481	9	19,583,829	6	263,011,652	9	7	93
Off-site Releases	**274,904,461**	**8**	**31,340,694**	**10**	**243,563,767**	**8**	**11**	**89**
Transfers to Disposal (except metals)	38,301,908	1	5,919,256	2	32,382,652	1	15	85
Transfers of Metals**	236,602,553	7	25,421,438	8	211,181,115	7	11	89
Total Reported Releases On- and Off-site	**1,633,350,231**	**49**	**153,163,621**	**49**	**1,480,186,610**	**49**	**9**	**91**
Off-site Transfers to Recycling	**1,055,985,045**	**32**	**125,372,072**	**40**	**930,612,973**	**31**	**12**	**88**
Transfers to Recycling of Metals	900,765,438	27	109,890,115	35	790,875,323	26	12	88
Transfers to Recycling (except metals)	155,219,607	5	15,481,957	5	139,737,650	5	10	90
Other Off-site Transfers for Further Management	**624,894,030**	**19**	**33,588,031**	**11**	**591,305,999**	**20**	**5**	**95**
Energy Recovery (except metals)	355,015,520	11	15,430,088	5	339,585,432	11	4	96
Treatment (except metals)	123,657,878	4	10,955,270	4	112,702,608	4	9	91
Sewage (except metals)	146,220,632	4	7,202,673	2	139,017,959	5	5	95
Total Reported Amounts of Releases and Transfers	**3,314,229,305**	**100**	**312,123,724**	**100**	**3,002,105,582**	**100**	**9**	**91**

Note: Canada and US data only. Mexico data not available for 2000. Data include 206 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.

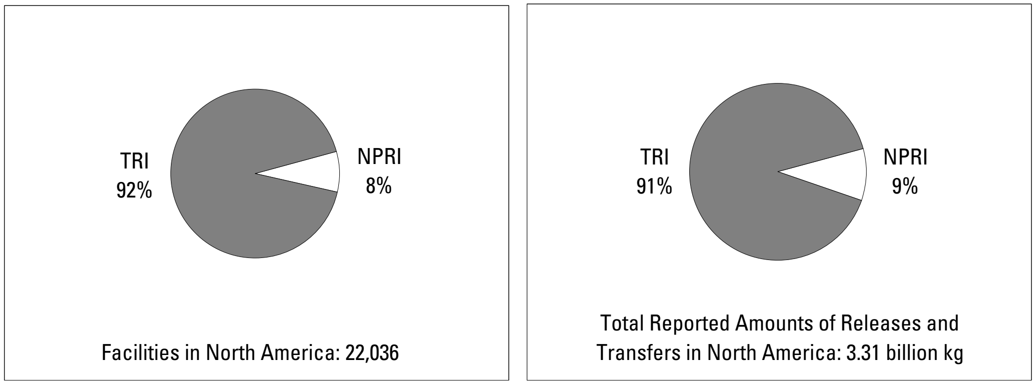
** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 3–1. Percentage of Total Reported Amounts of Releases and Transfers in North America by Type, NPRI and TRI, 2000



Note: Canada and US data only. Mexico data not available for 2000.

Figure 3–2. Contribution of NPRI and TRI to Total Reported Amounts of Releases and Transfers in North America, 2000



Note: Canada and US data only. Mexico data not available for 2000.

and transfers in NPRI (11 percent) than in TRI (20 percent).

- Because of the large size of the TRI data set, North American percentages were close to or the same as TRI percentages—8 percent for off-site releases, 32 percent for off-site transfers to recycling, and 19 percent for other off-site transfers for further management.

QueryBuilder

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

To generate a summary of total releases and transfers for NPRI and TRI using *Taking Stock* Online:

1. select **Country** report.
2. select the year **2000**.
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**

3.2.1 Total Reported Amounts of Releases and Transfers by State and Province, 2000

In 2000, three states and one province each reported more than 195 million kg. Together, these four jurisdictions reported about one-quarter (27 percent) of total reported releases and transfers in North America.

- Texas facilities reported the largest total releases and transfers—261.9 million kg—almost 8 percent of all releases and transfers reported in North America in 2000. Texas ranked second for total releases and first for other transfers for further management.
- Ohio facilities reported the second-largest releases and transfers, 232.8 million kg. Ohio ranked first in total releases.
- Facilities in Ontario had the third-largest releases and transfers, 200.5 million kg. Ontario ranked first in transfers to recycling.
- Pennsylvania facilities had the fourth-largest releases and transfers, 198.4 million kg. Pennsylvania ranked second in transfers to recycling and third in total releases.
- Six jurisdictions reported less than 500,000 kg in 2000: Hawaii, Prince Edward Island, Virgin Islands, Alaska, Guam and the District of Columbia.

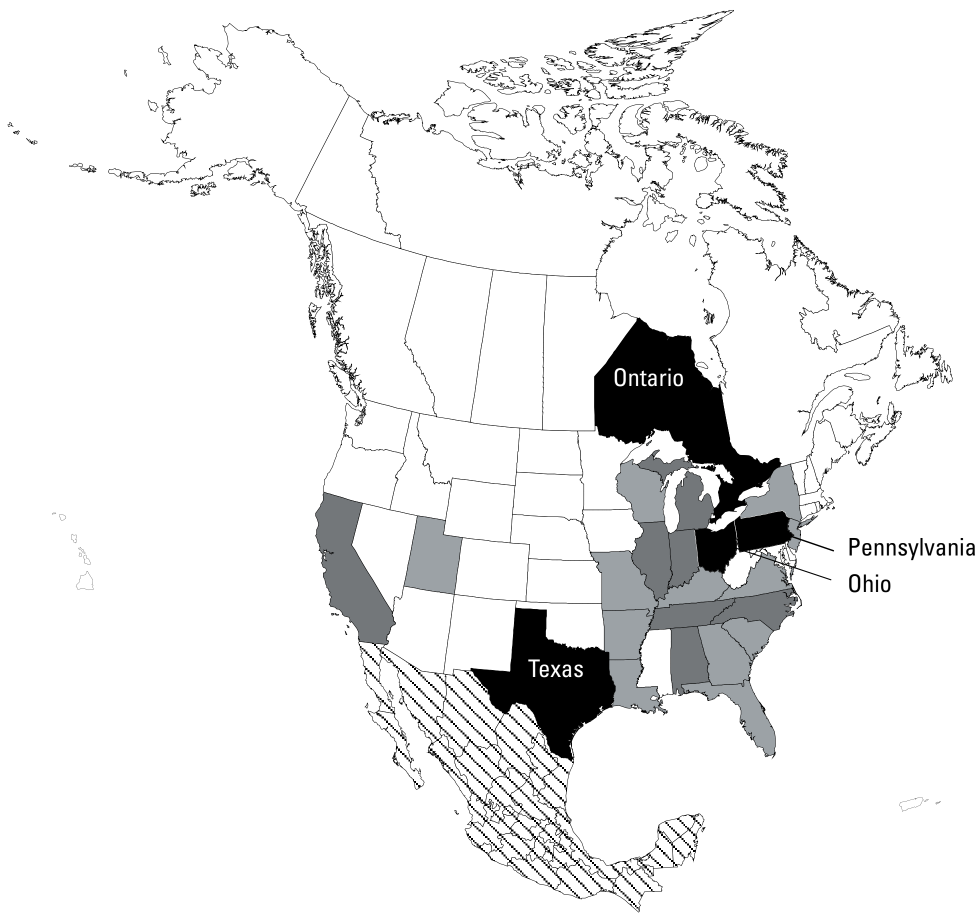
Table 3–2. Total Reported Amounts of Releases and Transfers in North America, by State and Province, 2000

		Releases On- and Off-site				Off-site Transfers for Further Management									
State/ Province	Number of Facilities	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site kg	Rank	Total Transfers to Recycling kg	Rank	Total Other Transfers for Further Management* kg	Rank	Total Reported Amounts of Releases and Transfers kg	Rank	2000 Population	Land Area (sq km)	2000 Gross Domestic Product US $ millions	Rank
Alabama	476	51,754,095	8,411,142	60,165,238	9	19,906,572	19	21,996,595	9	102,068,405	9	4,451,493	131,432	119,921	27
Alaska	8	127,281	341	127,622	62	5	62	1,350	60	128,978	62	627,601	1,477,155	27,747	50
Alberta	166	17,027,320	2,412,945	19,440,265	29	3,376,180	40	2,661,806	35	25,478,251	34	3,009,200	661,194	96,290	31
Arizona	191	18,849,335	1,192,898	20,042,233	27	16,019,937	22	2,286,878	37	38,349,048	29	5,165,274	294,310	156,303	24
Arkansas	348	12,170,185	11,940,700	24,110,885	25	25,639,262	13	24,654,723	7	74,404,870	16	2,678,030	134,864	67,724	38
British Columbia	105	10,971,935	500,704	11,472,639	36	1,402,259	46	746,935	42	13,621,833	43	4,058,800	947,806	85,876	34
California	1,207	21,877,519	4,833,051	26,710,570	22	35,520,945	9	26,746,801	5	88,978,316	11	34,000,446	403,939	1,344,623	1
Colorado	163	3,085,914	795,102	3,881,016	48	11,250,773	28	2,893,892	33	18,025,681	40	4,323,410	268,637	167,918	22
Connecticut	288	2,677,542	953,557	3,631,099	49	13,577,640	25	5,319,702	30	22,528,441	38	3,410,079	12,548	159,288	23
Delaware	60	3,750,751	1,622,922	5,373,673	43	3,717,031	39	2,130,775	38	11,221,479	44	786,234	5,063	36,336	48
District of Columbia	4	24,128	3	24,132	64	2,943	59	0	--	27,075	64	571,066	158	59,397	40
Florida	512	57,232,844	1,601,351	58,834,195	10	9,690,656	32	5,388,452	29	73,913,303	17	16,054,328	139,841	472,105	4
Georgia	634	44,156,200	3,640,089	47,796,289	14	21,483,504	17	9,502,969	20	78,782,763	15	8,229,823	149,999	296,142	10
Guam	2	92,698	0	92,698	63	0	--	0	--	92,698	63	154,805	544	--	--
Hawaii	15	403,849	70,371	474,220	57	2,793	61	1,307	61	478,320	59	1,212,281	16,634	42,364	44
Idaho	57	15,203,659	200,684	15,404,343	32	682,184	49	452,630	47	16,539,157	42	1,299,258	214,309	37,031	46
Illinois	1,201	49,399,657	17,500,149	66,899,807	6	48,829,689	7	25,380,944	6	141,110,440	7	12,435,970	143,975	467,284	5
Indiana	945	56,181,037	29,368,890	85,549,927	4	67,489,891	4	11,914,806	16	164,954,624	6	6,089,950	92,896	192,195	16
Iowa	384	12,137,112	5,990,142	18,127,254	31	18,587,409	21	5,680,514	27	42,395,177	28	2,927,509	144,705	89,600	33
Kansas	256	7,481,740	5,421,124	12,902,864	33	19,156,804	20	2,430,684	36	34,490,352	30	2,691,750	211,905	85,063	35
Kentucky	436	36,943,294	3,282,733	40,226,027	15	22,548,351	16	21,120,662	10	83,895,040	14	4,047,424	102,898	118,508	29
Louisiana	322	53,780,816	2,228,643	56,009,459	11	13,974,914	23	14,446,466	15	84,430,838	13	4,469,970	112,827	137,700	26
Maine	70	3,670,435	454,297	4,124,732	47	1,607,617	44	461,683	46	6,194,033	50	1,276,961	79,934	35,981	49
Manitoba	55	4,638,381	244,199	4,882,580	45	1,693,277	43	464,323	45	7,040,180	48	1,146,000	649,953	22,741	52
Maryland	164	18,534,617	380,631	18,915,248	30	2,411,019	42	4,735,141	32	26,061,408	33	5,310,908	25,315	186,108	17
Massachusetts	446	3,792,052	1,047,447	4,839,500	46	10,519,812	30	10,096,887	19	25,456,199	35	6,357,072	20,299	284,934	12
Michigan	820	38,793,050	11,479,683	50,272,732	13	50,470,330	6	67,839,663	2	168,582,726	5	9,952,006	147,124	325,384	9
Minnesota	431	7,611,586	2,316,044	9,927,630	38	9,381,552	33	10,620,707	18	29,929,888	32	4,931,093	206,192	184,766	18
Mississippi	281	31,500,787	637,801	32,138,588	19	11,200,144	29	4,774,967	31	48,113,699	27	2,849,100	121,498	67,315	39
Missouri	532	28,692,277	2,566,230	31,258,507	20	25,087,876	14	8,851,349	21	65,197,733	20	5,603,553	178,432	178,845	19
Montana	33	22,318,808	2,456,234	24,775,042	23	55,129	58	13,172	57	24,843,343	37	903,157	376,961	21,777	54
Nebraska	159	8,510,281	4,231,825	12,742,106	34	11,590,607	27	529,119	44	24,861,832	36	1,712,577	199,099	56,072	41
Nevada	54	1,308,369	1,079,460	2,387,828	52	888,424	48	50,415	55	3,326,667	53	2,018,723	284,376	74,745	36
New Brunswick	29	6,363,076	1,006,584	7,369,659	40	179,418	56	59,527	54	7,608,605	47	755,300	73,440	13,268	59
New Hampshire	103	2,350,345	178,610	2,528,955	51	6,647,089	34	1,095,132	39	10,271,176	45	1,239,881	23,228	47,708	43
New Jersey	503	9,473,022	2,480,599	11,953,621	35	13,750,547	24	44,230,237	3	69,934,405	19	8,429,007	19,214	363,089	8
New Mexico	47	1,382,623	563,017	1,945,640	54	1,010,348	47	359,209	48	3,315,197	54	1,821,282	314,311	54,364	42
New York	603	20,230,204	4,362,192	24,592,395	24	37,263,424	8	8,651,688	23	70,507,507	18	18,989,332	122,301	799,202	2
Newfoundland	8	522,490	11,580	534,070	56	2,900	60	0	--	536,970	58	537,200	405,721	9,479	60
North Carolina	720	61,007,285	3,855,912	64,863,197	7	34,016,153	11	7,981,227	24	106,860,577	8	8,077,367	126,170	281,741	13
North Dakota	39	2,250,712	978,530	3,229,242	50	326,979	52	177,619	51	3,733,840	52	640,919	178,681	18,283	57
Nova Scotia	28	4,694,937	240,980	4,935,917	44	363,312	51	34,338	56	5,333,567	51	941,200	55,491	16,198	58
Ohio	1,550	88,686,354	25,518,502	114,204,856	1	81,583,078	3	36,974,725	4	232,762,659	2	11,359,955	106,060	372,640	7
Oklahoma	298	8,884,389	1,638,893	10,523,282	37	9,833,508	31	1,034,388	41	21,391,179	39	3,453,250	177,865	91,773	32
Ontario	878	59,145,705	21,602,254	80,747,958	5	96,908,390	1	22,850,961	8	200,507,309	3	11,685,300	1,068,586	289,160	11
Oregon	230	32,363,525	4,891,036	37,254,561	17	6,215,932	35	5,639,459	28	49,109,953	26	3,429,293	248,629	118,637	28
Pennsylvania	1,237	66,227,883	30,560,491	96,788,374	3	85,969,660	2	15,615,332	14	198,373,365	4	12,282,591	116,075	403,985	6
Prince Edward Island	5	227,773	91	227,865	59	0	--	126,464	52	354,329	60	138,100	5,659	2,251	61
Puerto Rico	135	6,477,426	376,501	6,853,927	41	5,526,686	37	19,639,502	12	32,020,115	31	3,808,610	8,875	--	--
Quebec	392	16,768,558	5,300,631	22,069,189	26	21,154,504	18	6,584,112	25	49,807,804	25	7,377,700	1,540,689	150,447	25
Rhode Island	124	333,631	126,916	460,547	58	6,148,486	36	1,093,894	40	7,702,927	46	1,050,236	2,706	36,453	47
Saskatchewan	32	1,462,752	20,727	1,483,479	55	291,832	54	59,565	53	1,834,876	56	1,022,000	652,334	22,560	53
South Carolina	474	25,760,762	7,429,628	33,190,390	18	34,296,704	10	20,630,320	11	88,117,413	12	4,023,438	77,981	113,377	30
South Dakota	71	2,349,821	25,527	2,375,347	53	325,787	53	295,504	49	2,996,639	55	755,509	196,555	23,192	51
Tennessee	599	52,345,521	7,897,957	60,243,478	8	28,462,944	12	5,731,606	26	94,438,028	10	5,702,027	106,752	178,362	20
Texas	1,261	99,387,755	12,221,305	111,609,060	2	61,075,454	5	89,169,505	1	261,854,018	1	20,946,503	678,305	742,274	3
Utah	148	51,828,793	2,365,701	54,194,494	12	1,410,030	45	652,335	43	56,256,859	22	2,241,555	212,799	68,549	37
Vermont	30	109,891	34,672	144,563	61	610,468	50	284,347	50	1,039,379	57	609,709	23,953	18,411	56
Virgin Islands	4	207,263	6,418	213,681	60	57,267	57	7,325	58	278,273	61	108,612	347	--	--
Virginia	414	28,007,959	3,233,660	31,241,619	21	11,753,035	26	11,164,876	17	54,159,529	23	7,104,016	102,551	261,355	14
Washington	259	8,493,167	1,205,649	9,698,816	39	5,272,489	38	2,849,111	34	17,820,416	41	5,908,372	172,431	219,937	15
West Virginia	165	36,819,400	1,676,668	38,496,067	16	3,064,173	41	8,663,098	22	50,223,339	24	1,807,099	62,381	42,271	45
Wisconsin	790	14,041,925	5,751,250	19,793,176	28	24,514,606	15	19,040,031	13	63,347,813	21	5,372,243	140,662	173,478	21
Wyoming	35	5,541,267	480,590	6,021,857	42	184,313	55	2,276	59	6,208,445	49	494,001	251,483	19,294	55
Total	**22,036**	**1,358,445,770**	**274,904,461**	**1,633,350,231**		**1,055,985,045**		**624,894,030**		**3,314,229,305**					

Note: Canada and US data only. Mexico data not available for 2000. 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.

Map 3–1. Largest Sources of Total Reported Amounts of Releases and Transfers in North America, 2000: States and Provinces



Range in kilograms

- 180 to 262 million kg
- 88.5 to 180 million kg
- 52 to 88.5 million kg
- 0 to 52 million kg
- no data

Each shade = one-quarter of total releases and transfers

- 4 states/provinces
- 7 states/provinces
- 12 states/provinces
- 41 states/provinces
- 32 states/provinces

3.2.2 Total Reported Amounts of Releases and Transfers by Industry Sector, 2000

Facilities in five manufacturing industries each reported more than 250 million kg in total releases and transfers in 2000.

- The primary metals industry reported the largest total releases and transfers (706.8 million kg), primarily as total on- and off-site releases and as transfers to recycling. This amount represents 21 percent of all North American releases and transfers for 2000. The primary metals industry accounted for 23 percent of releases and transfers in NPRI and 21 percent in TRI.
- The chemical manufacturing industry reported the second-largest amount (671.4 million kg, or 20 percent of total releases and transfers), primarily as other off-site transfers for further management and as on-site releases. The chemicals industry accounted for 14 percent of releases and transfers in NPRI and 21 percent in TRI.
- The electric utility industry reported the third-largest amount, 438.6 million kg. This industry reported the largest amount of on-site releases and total on- and off-site releases. This industry's releases and transfers made up 13 percent of the North American total, 8 percent of the NPRI total, and 14 percent of the TRI total.
- Hazardous waste management and solvent recovery facilities reported the fourth-largest amount, with 277.9 million kg, primarily as on-site releases and other off-site transfers for further management. The sec-

Table 3–3. Total Reported Amounts of Releases and Transfers in North America by Industry, 2000

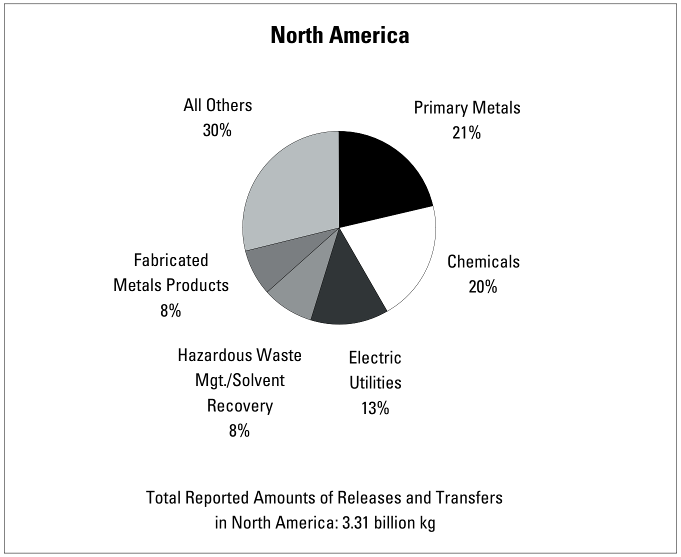
			Releases On- and Off-site			Off-site Transfers for Further Management				
Rank	US SIC Code	Industry	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)	Total Transfers to Recycling (kg)	Total Other Transfers for Further Management* (kg)	Total Reported Amounts of Releases and Transfers (kg)	NPRI as % of North American Total	TRI as % of North American Total
1	33	Primary Metals	178,407,610	143,527,600	321,935,210	372,823,585	12,046,742	706,805,538	10	90
2	28	Chemicals	233,565,426	32,947,797	266,513,223	76,678,509	328,161,534	671,353,266	6	94
3	491/493	Electric Utilities	422,975,920	13,687,048	436,662,968	1,888,220	22,638	438,573,826	6	94
4	495/738	Hazardous Waste Mgt./Solvent Recovery	103,493,398	23,519,576	127,012,973	11,023,307	139,825,489	277,861,770	9	91
5	34	Fabricated Metals Products	18,944,095	12,138,982	31,083,077	211,813,747	16,195,882	259,092,706	21	79
6	36	Electronic/Electrical Equipment	8,367,588	9,544,456	17,912,044	151,635,208	18,447,335	187,994,588	6	94
7	--	Multiple codes 20–39**	38,488,826	10,655,636	49,144,462	79,753,012	27,645,104	156,542,579	0	100
8	26	Paper Products	117,017,969	3,247,647	120,265,616	905,748	23,943,626	145,114,990	19	81
9	37	Transportation Equipment	40,363,120	6,553,470	46,916,590	60,656,458	10,207,148	117,780,196	14	86
10	30	Rubber and Plastics Products	47,999,715	6,775,218	54,774,933	8,937,324	5,978,769	69,691,027	17	83
11	20	Food Products	48,967,180	1,860,086	50,827,266	1,026,361	13,912,255	65,765,882	7	93
12	29	Petroleum and Coal Products	30,572,446	3,153,282	33,725,729	16,709,686	5,344,370	55,779,785	10	90
13	35	Industrial Machinery	5,349,492	2,921,998	8,271,490	39,076,648	2,406,583	49,754,721	4	96
14	32	Stone/Clay/Glass Products	13,678,170	2,018,751	15,696,921	2,433,203	3,690,026	21,820,150	6	94
15	24	Lumber and Wood Products	18,352,626	249,034	18,601,660	465,960	1,169,311	20,236,930	23	77
16	27	Printing and Publishing	9,719,352	83,876	9,803,228	3,587,832	2,581,897	15,972,957	17	83
17	39	Misc. Manufacturing Industries	4,226,830	530,258	4,757,089	7,935,989	2,456,938	15,150,016	24	76
18	25	Furniture and Fixtures	6,218,003	139,253	6,357,255	3,153,899	1,835,639	11,346,794	17	83
19	38	Measurement/Photographic Instruments	3,697,591	154,360	3,851,952	4,812,538	1,986,103	10,650,593	0.2	99.8
20	5169	Chemical Wholesalers	584,095	69,066	653,160	65,295	5,658,778	6,377,233	0.5	99.5
21	22	Textile Mill Products	3,560,343	352,702	3,913,046	454,982	1,294,954	5,662,981	7	93
22	12	Coal Mining	2,665,834	9	2,665,843	3,526	0	2,669,368	0	100
23	31	Leather Products	467,223	740,374	1,207,598	119,685	60,979	1,388,262	5	95
24	21	Tobacco Products	591,383	333	591,716	0	778	592,494	0	100
25	23	Apparel and Other Textile Products	171,534	33,647	205,181	24,321	21,150	250,652	0	100
		Total	**1,358,445,770**	**274,904,461**	**1,633,350,231**	**1,055,985,045**	**624,894,030**	**3,314,229,305**	**9**	**91**

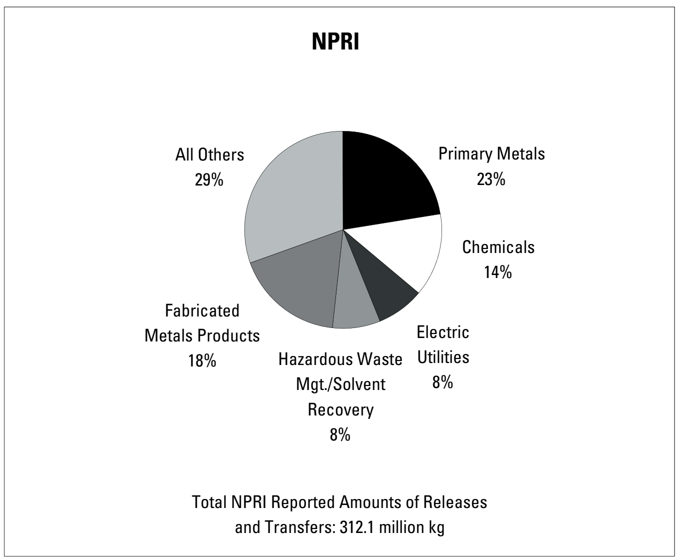
Note: Canada and US data only. Mexico data not available for 2000.

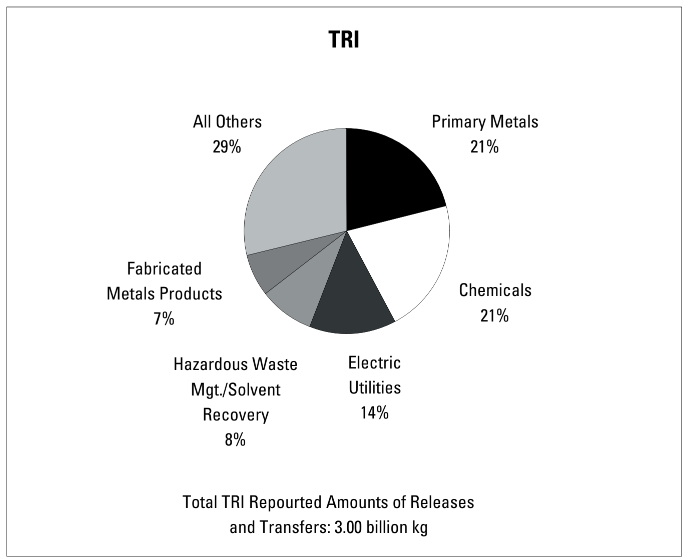
* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

** Multiple SIC codes reported only in TRI.

Figure 3–3. Percentage Contribution of Top Industry Sectors to Total Reported Amounts of Releases and Transfers, NPRI and TRI, 2000







Note: Canada and US data only. Mexico data not available for 2000.

tor accounted for 8 percent of total releases and transfers in North America as well as in NPRI and TRI.

- The fifth-ranked fabricated metals products sector reported 259.1 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 the quantities of releases and transfers for each industry sector under NPRI using *Taking Stock* Online:

1. select **Industry Sector** report and select **All** for the number of results to be displayed.
2. select the year **2000**.
3. select **Canada** 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**

3.2.3 Facilities with the Largest Total Reported Amounts of Releases and Transfers, 2000

The 50 facilities in North America with the largest total releases and transfers reported 548.7 million kg of releases and transfers, 17 percent of the total for the matched data set in 2000.

- The 50 facilities with the largest total releases and transfers in 2000 reported 20 percent of total releases, 7 percent of off-site transfers to recycling, and 22 percent of other off-site transfers for further management.
- The ten facilities (all located in the United States) with the largest amounts all reported more than 14 million kg each of total releases and transfers.
- Five of the top ten were primary metals facilities located in the western US (Arizona, Utah, and Montana) and in Pennsylvania. They reported mainly on-site releases, primarily to land (metals and metal compounds, by two facilities), to air (chlorine), and to surface water (nitric acid and nitrates).

Table 3–4. The 50 North American Facilities with the Largest Total Reported Amounts of Releases and Transfers, 2000

						Releases On- and Off-site		
		City, State/	SIC Codes		Number	Total On-site Releases	Total Off-site Releases	Total On- and Off-site Releases Reported
Rank	Facility	Province	Canada	US	of Forms	(kg)	(kg)	(kg)
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	24,470,780	35,919	24,506,699
2	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	55	24,369,891	474	24,370,365
3	ASARCO Inc.	East Helena, MT		33	11	18,838,422	2,435,849	21,274,271
4	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	2	19,923,810	0	19,923,810
5	Rineco	Benton, AR		495/738	38	1,204	31,192	32,396
6	Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo, MI		28	28	262,913	21,234	284,146
7	AK Steel Corp., Butler Works (Rte. 8 S)	Butler, PA		33	13	14,205,761	66,874	14,272,635
8	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico S.A. de C.V.	Hayden, AZ		33	12	16,094,049	156	16,094,206
9	Solutia Inc.	Cantonment, FL		28	22	15,650,319	2,012	15,652,331
10	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	21	294	0	294
11	Pfizer Inc., Parke-Davis Div.	Holland, MI		28	13	831,236	701	831,937
12	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13	421,465	13,119,194	13,540,659
13	Karmax Heavy Stamping, Cosma International Inc.	Milton, ON	32	34	3	300	0	300
14	Marisol Inc.	Middlesex, NJ		495/738	22	5,447	103,060	108,507
15	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	7	15,107	0	15,107
16	US Mint, US Department of the Treasury	Philadelphia, PA		34	4	47	522	569
17	Nucor Steel Arkansas, Nucor Corp.	Blytheville, AR		33	11	12,253	2,427,419	2,439,671
18	BASF Corp.	Freeport, TX		28	30	10,998,654	35,243	11,033,897
19	Philip Services Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	19	0	1,087,840	1,087,840
20	Celanese Ltd., Clear Lake Plant, Celanese Americas Corp.	Pasadena, TX		28	19	561,162	317,258	878,420
21	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	18	9,471,121	2,203	9,473,324
22	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	22	8,981,955	174,060	9,156,015
23	Steel Dynamics Inc.	Butler, IN		33	8	13,713	9,178,259	9,191,972
24	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	9,146,056	49	9,146,105
25	Reliant Energies Inc., Keystone Power Plant	Shelocta, PA		491/493	11	8,543,414	0	8,543,414
26	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	8,457,437	2	8,457,439
27	Olin Corp., Zone 17 Facility	East Alton, IL		33	9	36,526	509,427	545,953
28	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	13	8,386,580	7	8,386,587
29	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	13	8,159,014	0	8,159,014
30	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	8	8,044	8,312,461	8,320,505
31	Equistar Chemicals L.P., Victoria Facility	Victoria, TX		28	5	108,584	279	108,863
32	Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena, TX		28	11	1,353	23,528	24,881
33	Lenzing Fibers Corp.	Lowland, TN		28	9	8,024,656	0	8,024,656
34	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	9	4,976	7,948,510	7,953,485
35	North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta, OH		33	7	11,611	7,333	18,944
36	Safety-Kleen Envirosystems Co. of Puerto Rico Inc.	Manati, PR		495/738	5	5,606	24,666	30,272
37	USS Gary Works, USX Corp.	Gary, IN		33	40	6,298,355	289,488	6,587,842
38	Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment Co.	Sumter, SC		495/738	5	6,366	0	6,366
39	Doe Run Co., Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	10	7,768,675	774	7,769,449
40	Gulf Power Co., Plant Crist, Southern Co.	Pensacola, FL		491/493	12	7,754,802	0	7,754,802
41	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	19	247,107	5,736,844	5,983,951
42	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	17	7,560,880	21,800	7,582,680
43	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	10	7,562,860	3,526	7,566,387
44	J & L Specialty Steel Inc.	Louisville, OH		33	6	15,350	49,552	64,902
45	John E. Amos Power Plant, American Electric Power	Winfield, WV		491/493	13	6,811,853	334,278	7,146,131
46	Republic Techs. Intl., Canton Facility	Canton, OH		33	9	12,170	565,646	577,816
47	J. M. Stuart Station, Dayton Power & Light Co.	Manchester, OH		491/493	13	7,155,489	15	7,155,504
48	Mitsubishi Polyester Film L.L.C.	Greer, SC		Mult.	5	34,927	41	34,969
49	Duke Energy, Marshall Steam Station	Terrell, NC		491/493	13	7,030,830	21	7,030,851
50	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	16	7,009,358	0	7,009,358
	Subtotal				**719**	**281,292,780**	**52,867,713**	**334,160,494**
	% of Total				**1**	**21**	**19**	**20**
	Total				**76,679**	**1,358,445,770**	**274,904,461**	**1,633,350,231**

Note: Canada and US only. Mexico data not available for 2000. 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 3–4. (*continued*)

Rank	Off-site Transfers for Further Management: Total Transfers to Recycling (kg)	Off-site Transfers for Further Management: Total Other Transfers for Further Management* (kg)	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)
1	14	5	24,506,718	Copper/Arsenic/Zinc and compounds (land)
2	0	2,545	24,372,910	Aluminum oxide, Asbestos (land)
3	0	0	21,274,271	Zinc and compounds (land)
4	0	0	19,923,810	Chlorine (air)
5	0	18,037,462	18,069,858	Xylenes, Toluene, Methyl ethyl ketone, Methanol (transfers to energy recovery)
6	0	17,680,009	17,964,155	Methanol, Toluene (transfers to energy recovery), Dichloromethane (transfers to treatment)
7	3,007,721	107	17,280,463	Nitric acid and nitrate compounds (water)
8	969,285	0	17,063,491	Copper/Zinc and compounds (land)
9	50,746	0	15,703,077	Nitric acid and nitrate compounds (UIJ)
10	0	14,732,869	14,733,163	Toluene, Xylenes, Methanol, Methyl isobutyl ketone, Methyl ethyl ketone (transfers to energy recovery)
11	268,435	12,535,603	13,635,975	Methanol, Toluene (transfers to energy recovery)
12	0	0	13,540,659	Zinc and compounds (transfers of metals to disposal)
13	13,490,000	0	13,490,300	Zinc/Manganese and compounds (transfers to recycling)
14	0	11,905,410	12,013,916	Toluene, Xylenes, Methanol, Methyl ethyl ketone (transfers to energy recovery)
15	0	11,984,962	12,000,069	Cyclohexane, Xylenes, Toluene, Methyl ethyl ketone (transfers to energy recovery)
16	11,930,900	0	11,931,469	Copper and compounds (transfers to recycling)
17	8,719,140	0	11,158,811	Zinc and compounds (transfers to recycling)
18	79,213	40,274	11,153,384	Nitric acid and nitrate compounds (water)
19	25,400	8,763,030	9,876,270	Xylenes, Toluene (transfers to energy recovery)
20	0	8,697,592	9,576,012	Diethyl sulfate, Acrylic acid (transfers to energy recovery), Ethylene glycol (transfers to sewage)
21	805	1,199	9,475,328	Asbestos, Aluminum oxide, Lead/Zinc and compounds (land)
22	0	54,100	9,210,114	Copper/Zinc and compounds (land)
23	0	0	9,191,972	Zinc and compounds (transfers of metals to disposal)
24	0	0	9,146,105	Hydrochloric acid (air)
25	0	0	8,543,414	Hydrochloric acid (air)
26	0	0	8,457,439	Zinc and compounds (land)
27	7,907,093	0	8,453,045	Copper and compounds (transfers to recycling)
28	0	0	8,386,587	Hydrochloric acid (air)
29	205,524	0	8,364,538	Hydrochloric acid (air)
30	0	0	8,320,505	Zinc and compounds (transfers of metals to disposal)
31	0	8,034,400	8,143,262	Ethylene (transfers to energy recovery)
32	159,669	7,882,375	8,066,925	Nitric acid and nitrate compounds (transfers to sewage)
33	0	0	8,024,656	Carbon disulfide (air)
34	0	0	7,953,485	Zinc and compounds (transfers of metals to disposal)
35	7,905,690	0	7,924,634	Zinc and compounds (transfers to recycling)
36	212,218	7,668,063	7,910,552	Dichloromethane (transfers to treatment, energy recovery), Acetonitrile, Xylenes (transfers to energy recovery)
37	1,310,147	54	7,898,044	Zinc and compounds (land, transfers to recycling), Manganese and compounds (land)
38	0	7,833,967	7,840,333	Toluene, Methyl ethyl ketone (transfers to energy recovery)
39	0	0	7,769,449	Zinc and compounds, Aluminum (land)
40	0	0	7,754,802	Hydrochloric acid (air)
41	1,591,140	32,609	7,607,700	Zinc/Manganese and compounds (transfers of metals to disposal)
42	0	972	7,583,652	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
43	0	0	7,566,387	Zinc/Lead and compounds (land)
44	6,893,749	220,734	7,179,384	Chromium/Nickel and compounds (transfers to recycling)
45	30,834	0	7,176,965	Hydrochloric acid (air)
46	6,580,122	0	7,157,938	Zinc and compounds (transfers to recycling)
47	2	0	7,155,507	Hydrochloric acid (air)
48	7,061,385	37,371	7,133,725	Ethylene glycol (transfers to recycling)
49	0	0	7,030,851	Hydrochloric acid (air)
50	0	0	7,009,358	Zinc/Lead and compounds (land)
	78,399,233	**136,145,710**	**548,705,437**	
	7	**22**	**17**	
	1,055,985,045	**624,894,030**	**3,314,229,305**	

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

3.2.4 Chemicals with Largest Releases and Transfers, 2000

Of the 206 chemicals in the matched data set for 2000, the 25 chemicals with the largest amounts of releases and transfers accounted for almost 3 billion kg, or 89 percent of all releases and transfers reported in North America in 2000.

- Copper and its compounds had the largest total releases and transfers in 2000, with 455.9 million kg of releases and transfers, accounting for 14 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 2000, with 384.5 million kg, accounting for 12 percent of all North American releases and transfers. Zinc and its compounds ranked first in off-site releases.

Table 3–5. The 25 Chemicals with the Largest Total Reported Amounts of Releases and Transfers in North America, 2000

				Releases On- and Off-site					
				Total On-site Releases		Total Off-site Releases*		Total Reported Releases On- and Off-site	
CAS Number		Chemical	Number of Forms	kg	Rank	kg	Rank	kg	Rank
--	m	Copper (and its compounds)	5,111	43,586,267	7	16,463,181	5	60,049,448	7
--	m	Zinc (and its compounds)	4,160	87,825,137	4	116,870,572	1	204,695,710	2
7647-01-0		Hydrochloric acid	1,521	308,879,949	1	0	--	308,879,949	1
--		Nitric acid and nitrate compounds	3,996	150,255,424	2	14,699,018	6	164,954,442	3
67-56-1		Methanol	2,816	116,377,534	3	1,527,896	16	117,905,430	4
--	m,c,p,t	Lead (and its compounds)	2,066	22,540,032	13	22,673,961	3	45,213,993	8
--	m	Manganese (and its compounds)	3,998	61,150,524	6	37,912,242	2	99,062,766	5
108-88-3	p	Toluene	3,307	42,758,382	8	1,351,465	18	44,109,847	9
--		Xylenes	3,403	33,147,982	10	1,772,490	14	34,920,473	11
--	m,c,p,t	Chromium (and its compounds)	4,223	16,483,509	18	17,899,354	4	34,382,863	12
7664-93-9		Sulfuric acid	1,112	76,104,387	5	0	--	76,104,387	6
--	m,c,p,t	Nickel (and its compounds)	3,824	12,294,094	23	11,050,526	7	23,344,619	15
78-93-3		Methyl ethyl ketone	2,117	21,533,382	15	703,803	22	22,237,184	16
107-21-1		Ethylene glycol	1,778	3,538,120	41	3,141,297	9	6,679,417	30
110-54-3		n-Hexane	1,049	27,151,723	12	50,301	60	27,202,025	14
7664-39-3	t	Hydrogen fluoride	1,077	37,880,319	9	320,904	29	38,201,224	10
75-09-2	c,p,t	Dichloromethane	692	16,155,791	19	114,230	44	16,270,021	20
100-42-5	c	Styrene	1,793	27,799,853	11	1,006,674	19	28,806,527	13
108-10-1		Methyl isobutyl ketone	1,036	6,427,452	29	122,057	43	6,549,509	31
7429-90-5	m	Aluminum (fume or dust)	410	6,300,037	30	5,305,747	8	11,605,784	25
7782-50-5		Chlorine	1,280	21,825,636	14	23,976	71	21,849,613	17
71-36-3		n-Butyl alcohol	1,204	11,856,002	24	205,839	33	12,061,841	24
1344-28-1		Aluminum oxide (fibrous forms)	81	19,337,229	16	1,778,163	13	21,115,392	18
74-85-1		Ethylene	346	13,133,585	20	179	148	13,133,764	22
75-05-8		Acetonitrile	131	10,567,233	25	46,224	64	10,613,457	27
		Subtotal	**52,531**	**1,194,909,581**		**255,040,101**		**1,449,949,683**	
		% of Total	**69**	**88**		**93**		**89**	
		Total	**76,681**	**1,358,445,770**		**274,904,461**		**1,633,350,231**	

Note: Canada and US data only. Mexico data not available for 2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.
* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Table 3–5. (*continued*)

Off-site Transfers for Further Management: Total Transfers to Recycling kg	Rank	Total Other Transfers for Further Management kg	Rank	Total Reported Amounts of Releases and Transfers kg	Rank	NPRI as % of North American Total	TRI as % of North American Total
395,835,159	1	0	--	455,884,607	1	7	93
179,792,852	2	0	--	384,488,562	2	14	86
0	--	0	--	308,879,949	3	5	95
1,773,845	26	93,912,514	2	260,640,801	4	5	95
8,518,270	12	130,358,502	1	256,782,202	5	10	90
127,335,735	3	0	--	172,549,728	6	10	90
65,904,217	4	0	--	164,966,982	7	14	86
15,898,330	9	91,004,897	3	151,013,074	8	11	89
23,566,319	8	64,464,311	4	122,951,103	9	17	83
59,535,482	5	0	--	93,918,345	10	12	88
0	--	0	--	76,104,387	11	12	88
51,221,394	6	0	--	74,566,014	12	8	92
9,196,670	11	37,591,000	5	69,024,853	13	16	84
32,656,641	7	21,498,059	6	60,834,117	14	4	96
3,586,344	19	12,528,658	8	43,317,027	15	8	92
146,053	55	939,862	44	39,287,138	16	9	91
5,187,244	16	16,888,369	7	38,345,634	17	7	93
1,201,856	30	7,456,947	15	37,465,329	18	5	95
5,972,192	14	11,242,498	9	23,764,199	19	9	91
11,991,690	10	0	--	23,597,474	20	24	76
39,068	74	425,257	62	22,313,937	21	4	96
1,528,831	28	8,198,495	12	21,789,168	22	9	91
244,558	49	85,208	107	21,445,158	23	1	99
484	109	7,797,096	13	20,931,344	24	12	88
934,486	33	8,800,099	11	20,348,041	25	0.2	99.8
1,002,067,718		**513,191,772**		**2,965,209,172**		**10**	**90**
95		**82**		**89**			
1,055,985,045		**624,894,030**		**3,314,229,305**		**9**	**91**

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 **2000**.
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

Copper and its compounds

Copper and its compounds had the largest total releases and transfers (455.9 million kg), mainly because it had the largest transfers to recycling (395.8 million kg) of any chemical in the matched data set in 2000.

- The primary metals industry accounted for 41 percent of transfers to recycling of copper, and the fabricated metals industry accounted for 28 percent.
- TRI facilities in Indiana reported transferring to recycling 36.6 million kg of copper and its compounds, and those in Pennsylvania reported transferring 30.0 million kg.

Query Builder

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

To get total transfers to recycling of copper and its compounds for each state and province using *Taking Stock* Online:

1. select **State/Province** report and select **All** for the number of results to be displayed.
2. select the year **2000**.
3. select **Canada & USA** for the geographic area,
   select **Copper and its compounds** for the chemical,
   select **All industries** for the industrial sector.
4. select **Transfers to recycling**.

Then click on ✓Run the query

Figure 3–4. Transfers to Recycling of Copper (and its compounds) by Industry, 2000

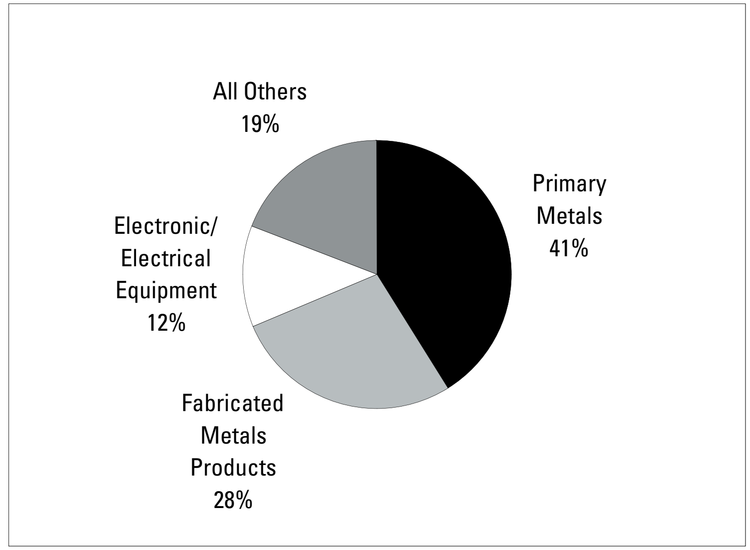


Figure 3–5. States/Provinces with Largest Transfers to Recycling of Copper (and its compounds), 2000

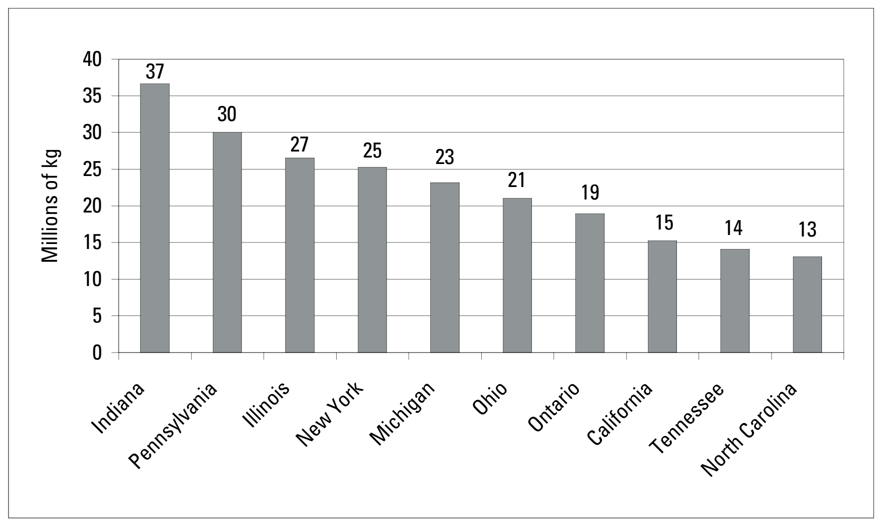


Figure 3–6. Off-site Releases of Zinc (and its compounds) by Industry, 2000

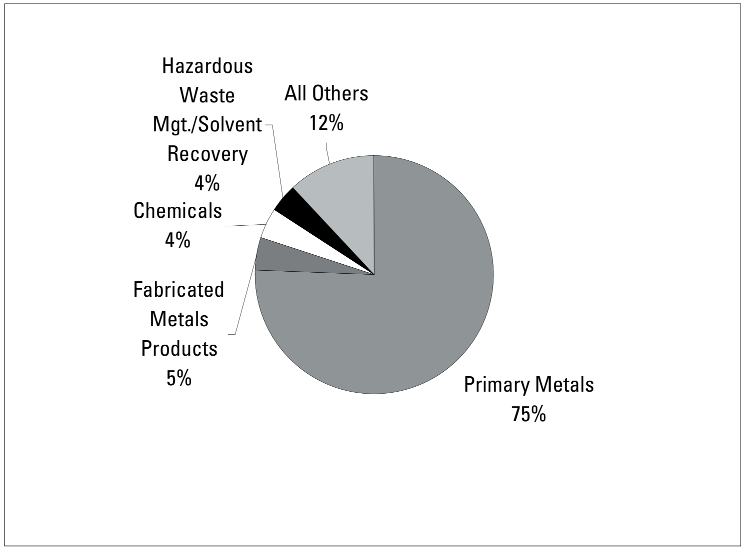
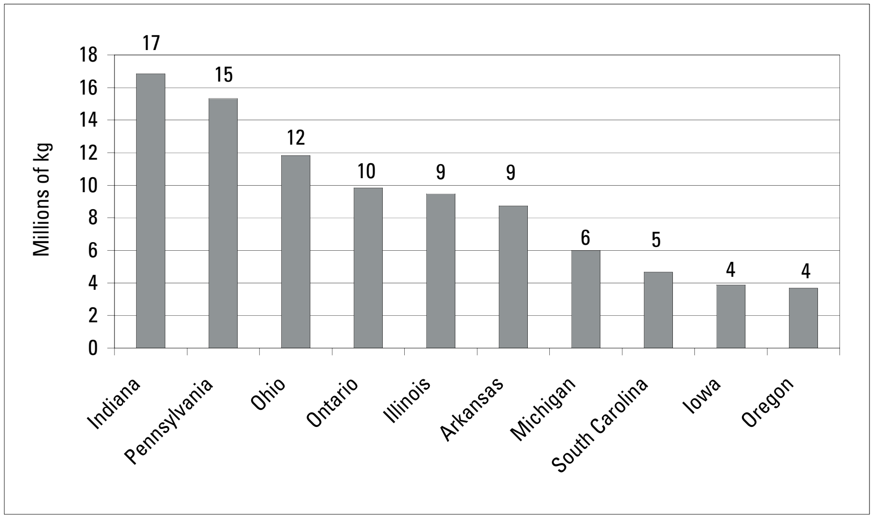


Figure 3–7. States/Provinces with Largest Off-site Releases of Zinc (and its compounds), 2000



Zinc and its compounds

Zinc and its compounds had the second-largest total releases and transfers (384.5 million kg) and the largest off-site releases (116.9 million kg) of any chemical in the matched data set in 2000.

- The primary metals industry accounted for 75 percent of off-site releases of zinc and its compounds in 2000.
- TRI facilities in Indiana reported off-site releases of 16.8 million kg of zinc and its compounds, and those in Pennsylvania reported of 15.3 million kg.

Query Builder
http://www.cec.org/takingstock/

To generate the list of 10 facilities with the largest off-site releases of zinc and its compounds using *Taking Stock* Online:

1. select **Facility** report.
2. select the year **2000**.
3. select **Canada & USA** for the geographic area,
   select **Zinc and its compuonds** for the chemical,
   select **All industries** for the industrial sector.
4. select **Off-site releases**.

Then click on ✓ Run the query

On the next screen, go to the right and click on the **arrow pointing down** in the column titled "Off-site Releases" to sort the list in descending order and get the top 10 facilities.

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Key Findings

- In 2000, North American facilities released on- and off-site 1.59 billion kg of listed substances, 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 86 percent and off-site releases for 14 percent of total releases in North America in 2000. Over half of total releases were on-site air emissions. On-site land releases made up 18 percent. Transfers of metals to disposal, sewage, treatment, or energy recovery accounted for 12 percent.
- TRI facilities accounted for 91 percent and NPRI facilities for 9 percent of total North American releases of the 206 chemicals in the matched data set.
- More than one-quarter of all releases originated in four states—Ohio, Texas, Pennsylvania, and Indiana. Ohio had the largest releases with 111.1 million kg, and Texas the second-largest with 110.1 million kg. Pennsylvania was third with 94.9 million kg and Indiana was fourth with 83.3 million kg.
- Ohio, Texas and Pennsylvania had the largest "loadings" of total releases within their states with more than 100 million kg each, followed by Indiana and Ontario with more than 73 million kg each. Releases within a state or province include on-site releases plus off-site releases transferred to sites within the state/province.
- Electric utilities reported the largest total releases of any listed industry sector in North America with 436.3 million kg. The primary metals and chemicals sectors accounted for the second- and third-largest total releases, with more than 260 million kg each.
- The 25 chemicals with the largest total reported releases on- and off-site accounted for 90 percent of the North American total. The top three chemicals, ranked by amount of total releases, were hydrochloric acid, zinc and its compounds, and nitric acid and nitrate compounds.

4.1 Introduction

This chapter examines reporting of North American releases on- and off-site of 206 chemicals in 2000. 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 industries and chemicals for which reports must be filed in both the United States and Canada (the matched data set). Mexican data are not available for the 2000 reporting year

The chapter begins with a summary of 2000 releases for North America and for the Canadian NPRI and the US TRI separately. The data are next broken down by state and province and by industry sector. Information is presented for on- and off-site releases separately and for the 50 facilities with the largest total releases.

4.2 Releases On- and Off-site in North America, 2000

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. The term **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 disposed of in an on-site landfill (reported as on-site land releases). Total releases in this chapter are adjusted so that the waste 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 2000, 22,036 North American facilities in industries covered by both the NPRI and the TRI filed 76,681 reports on the substances that are common to both PRTRs. Facilities reporting to Canada's NPRI represented 8 percent of all North American facilities and forms in the matched data set, while US TRI facilities and forms accounted for 92 percent.
- Total releases in North America were 1.59 billion kg in 2000 for the matched data set. Most of the North American reporting occurs in the United States, with its larger indus-

Table 4–1. Summary of Releases On- and Off-site in North America, NPRI and TRI, 2000

	North America Number	NPRI* Number	TRI Number	NPRI as % of North American Total	TRI as % of North American Total
Total Facilities	22,036	1,698	20,338	8	92
Total Forms	76,681	6,162	70,519	8	92
Releases On- and Off-site	**kg**	**kg**	**kg**		
On-site Releases	**1,358,445,770**	**121,822,927**	**1,236,622,843**	**9**	**91**
Air	858,240,898	91,891,686	766,349,212	11	89
Surface Water	119,754,045	6,643,683	113,110,362	6	94
Underground Injection	97,742,427	3,590,811	94,151,616	4	96
Land	282,595,481	19,583,829	263,011,652	7	93
Off-site Releases	**274,904,461**	**31,340,694**	**243,563,767**	**11**	**89**
Transfers to Disposal (except metals)	38,301,908	5,919,256	32,382,652	15	85
Transfers of Metals**	236,602,553	25,421,438	211,181,115	11	89
Total Reported Releases On- and Off-site	**1,633,350,231**	**153,163,621**	**1,480,186,610**	**9**	**91**
Off-site Releases Omitted for Adjustment Analysis***	48,201,339	8,887,889	39,313,450	18	82
Total Releases On- and Off-site (adjusted)**	**1,585,148,892**	**144,275,732**	**1,440,873,160**	**9**	**91**

Note: Canada and US data only. Mexico data not available for 2000. Data include 206 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.

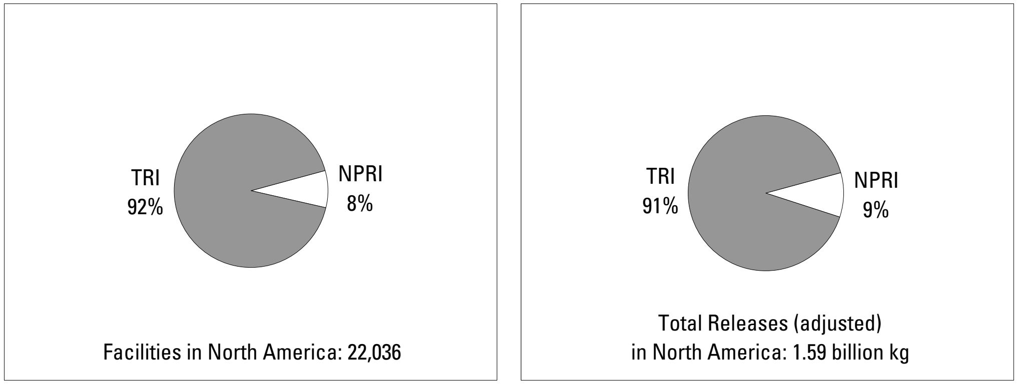
* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** 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).

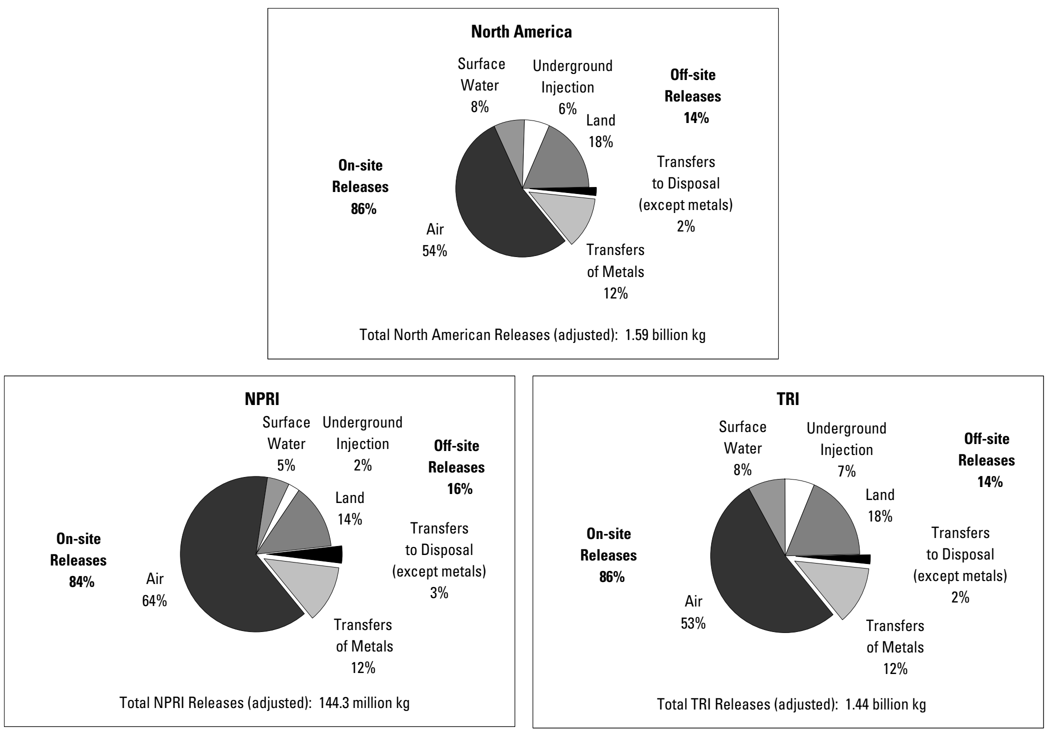
**** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 4–1. Contribution of NPRI and TRI to Total Releases in North America, 2000



Note: Canada and US data only. Mexico data not available for 2000. Off-site releases and total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 4–2. Percentage of Releases On-site and Off-site in North America by Type, NPRI and TRI, 2000



Note: Canada and US data only. Mexico data not available for 2000. Off-site releases and total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

trial base. NPRI facilities reported 9 percent of the North American releases—a slightly larger share of North American releases than the NPRI share of number of facilities.

- On-site releases were 1.36 billion kg, or 86 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 226.7 million kg, 14 percent of total releases.
- For both NPRI and TRI, on-site air releases accounted for over half of total releases—64 percent of the NPRI total releases, and 53 percent of the TRI total.
- Off-site releases in NPRI were 16 percent of NPRI total releases, while TRI off-site releases were 14 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 (7 percent for TRI and 2 percent for NPRI).

4.2.1 Releases On- and Off-site by State and Province, 2000

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

- Ohio reported the largest releases with 111.1 million kg, or 7 percent of the North American total. Ohio reported the largest on-site air emissions with several electric generating facilities contributing significantly to its total on-site air emissions. Ohio also had the second-largest on-site releases.
- Texas reported the second-largest total releases, 110.1 million kg (7 percent of the North American total). Texas also had the largest releases on-site to underground injection (32.6 million kg, one-third of the total in this category).
- Pennsylvania reported the third-largest total releases (94.9 million kg or 6 percent), including the largest on-site surface water discharges and the largest total off-site releases.
- Indiana reported the fourth-largest total releases (83.3 million kg or 5 percent) and the second-largest total off-site releases.

Table 4–2. Releases On- and Off-site in North America, by State and Province, 2000

		On-site Releases					
		Air	Surface Water	Underground Injection	Land	Total On-site Releases	
State/Province	Number of Facilities	(kg)	(kg)	(kg)	(kg)	kg	Rank
Alabama	476	34,028,539	2,881,816	25,408	14,818,332	51,754,095	11
Alaska	8	105,179	19,995	114	1,994	127,281	61
Alberta	166	8,263,339	798,602	3,581,533	4,370,452	17,027,320	27
Arizona	191	1,849,234	1,272	0	16,998,829	18,849,335	25
Arkansas	348	9,231,987	791,702	664,174	1,482,322	12,170,185	31
British Columbia	105	8,547,451	1,760,554	0	651,623	10,971,935	33
California	1,207	6,644,194	2,723,701	7,959	12,501,666	21,877,519	23
Colorado	163	1,317,954	1,404,195	0	363,765	3,085,914	48
Connecticut	288	2,285,993	369,145	0	22,405	2,677,542	49
Delaware	60	3,198,106	389,052	0	163,592	3,750,751	46
District of Columbia	4	24,040	88	0	0	24,128	64
Florida	512	37,058,093	745,174	15,602,989	3,826,588	57,232,844	6
Georgia	634	38,747,008	2,719,603	0	2,689,589	44,156,200	13
Guam	2	92,698	0	0	0	92,698	63
Hawaii	15	403,747	92	10	0	403,849	57
Idaho	57	1,165,257	2,806,996	0	11,231,406	15,203,659	29
Illinois	1,201	28,213,500	3,040,208	227	18,145,722	49,399,657	12
Indiana	945	37,418,511	8,074,802	94,240	10,593,485	56,181,037	7
Iowa	384	8,433,142	2,477,566	0	1,226,404	12,137,112	32
Kansas	256	5,705,321	526,855	211,096	1,038,468	7,481,740	39
Kentucky	436	29,617,330	1,427,366	1,402	5,897,196	36,943,294	15
Louisiana	322	22,644,956	5,273,489	21,202,065	4,660,306	53,780,816	8
Maine	70	2,354,315	951,499	0	364,621	3,670,435	47
Manitoba	55	3,318,964	58,256	0	1,252,531	4,638,381	44
Maryland	164	15,220,970	1,598,576	24,052	1,691,020	18,534,617	26
Massachusetts	446	3,638,617	63,571	0	89,864	3,792,052	45
Michigan	820	30,336,122	419,783	912,517	7,124,629	38,793,050	14
Minnesota	431	5,924,665	595,961	0	1,090,959	7,611,586	38
Mississippi	281	17,461,650	6,060,465	5,207,434	2,771,238	31,500,787	18
Missouri	532	16,143,517	648,004	1	11,900,755	28,692,277	19
Montana	33	2,410,677	15,645	0	19,892,486	22,318,808	22
Nebraska	159	3,276,341	4,816,183	0	417,756	8,510,281	36
Nevada	54	807,805	5,989	0	494,575	1,308,369	55
New Brunswick	29	5,018,157	1,064,844	0	279,682	6,363,076	41
New Hampshire	103	2,291,310	34,166	0	24,869	2,350,345	50
New Jersey	503	7,042,456	2,365,293	2	65,270	9,473,022	34
New Mexico	47	497,745	3,771	75	881,033	1,382,623	54
New York	603	13,563,407	3,934,385	0	2,732,411	20,230,204	24
Newfoundland	8	483,516	1,142	0	37,832	522,490	56
North Carolina	720	54,503,670	3,847,173	0	2,656,442	61,007,285	4
North Dakota	39	998,333	39,544	0	1,212,836	2,250,712	52
Nova Scotia	28	4,158,886	69,046	0	466,999	4,694,937	43
Ohio	1,550	55,323,846	3,261,447	12,399,463	17,701,597	88,686,354	2
Oklahoma	298	5,270,550	1,100,842	1,114,674	1,398,322	8,884,389	35
Ontario	878	48,316,504	1,373,983	0	9,401,935	59,145,705	5
Oregon	230	6,233,074	1,614,381	0	24,516,070	32,363,525	17
Pennsylvania	1,237	41,803,733	19,520,024	0	4,904,127	66,227,883	3
Prince Edward Island	5	20,843	206,930	0	0	227,773	59
Puerto Rico	135	6,451,131	20,926	1	5,367	6,477,426	40
Quebec	392	12,372,084	1,286,135	0	3,087,597	16,768,558	28
Rhode Island	124	333,093	530	0	8	333,631	58
Saskatchewan	32	1,391,940	24,191	9,278	35,178	1,462,752	53
South Carolina	474	23,077,894	1,224,916	0	1,457,952	25,760,762	21
South Dakota	71	825,645	940,234	0	583,942	2,349,821	51
Tennessee	599	43,154,599	1,132,829	2	8,058,091	52,345,521	9
Texas	1,261	42,646,561	14,650,339	32,583,979	9,506,876	99,387,755	1
Utah	148	21,984,004	445,118	0	29,399,672	51,828,793	10
Vermont	30	32,179	77,597	0	116	109,891	62
Virgin Islands	4	205,672	1,005	0	586	207,263	60
Virginia	414	22,767,994	3,625,709	0	1,614,256	28,007,959	20
Washington	259	6,848,426	1,123,201	0	521,540	8,493,167	37
West Virginia	165	32,126,982	1,727,146	5	2,965,268	36,819,400	16
Wisconsin	790	12,017,863	1,568,463	0	455,599	14,041,925	30
Wyoming	35	589,576	2,532	4,099,728	849,431	5,541,267	42
Total	**22,036**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**	

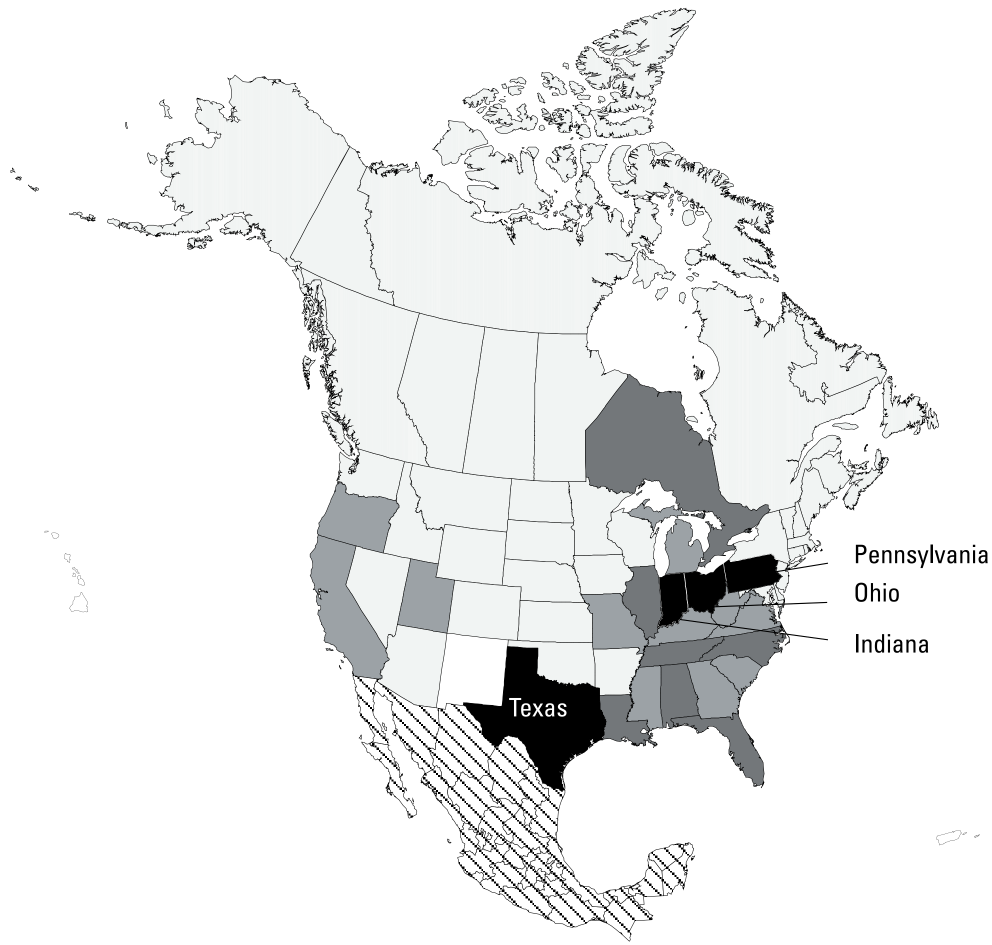
Note: Canada and US data only. Mexico data not available for 2000. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings are meant to imply that a facility, state or province is not meeting its legal requirements. The data do not predict levels of exposure of the public to those chemicals.

Table 4–2. (*continued*)

Off-site Releases				Total Releases								
Disposal (except metals) (kg)	Transfers 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	2000 Population	Land Area (sq km)	2000 Gross Domestic Product US $ millions	Rank
4,724,942	3,686,200	8,411,142	9	60,165,238	9	2,212,118	57,953,120	10	4,451,493	131,432	119,921	27
340	1	341	61	127,622	62	340	127,282	62	627,601	1,477,155	27,747	50
1,127,378	1,285,567	2,412,945	27	19,440,265	29	220,925	19,219,340	28	3,009,200	661,194	96,290	31
162,839	1,030,059	1,192,898	36	20,042,233	27	250,463	19,791,770	26	5,165,274	294,310	156,303	24
138,723	11,801,977	11,940,700	7	24,110,885	25	5,638,965	18,471,920	30	2,678,030	134,864	67,724	38
219,623	281,081	500,704	45	11,472,639	36	41	11,472,598	35	4,058,800	947,806	85,876	34
2,216,682	2,616,369	4,833,051	17	26,710,570	22	1,291,590	25,418,981	22	34,000,446	403,939	1,344,623	1
15,452	779,650	795,102	42	3,881,016	48	35,958	3,845,059	48	4,323,410	268,637	167,918	22
144,928	808,629	953,557	41	3,631,099	49	60,688	3,570,411	49	3,410,079	12,548	159,288	23
411	1,622,511	1,622,922	33	5,373,673	43	694	5,372,979	43	786,234	5,063	36,336	48
0	3	3	63	24,132	64	0	24,132	64	571,066	158	59,397	40
611,384	989,967	1,601,351	34	58,834,195	10	100,761	58,733,434	9	16,054,328	139,841	472,105	4
343,567	3,296,522	3,640,089	21	47,796,289	14	1,643,052	46,153,238	14	8,229,823	149,999	296,142	10
0	0	0	--	92,698	63	0	92,698	63	154,805	544	--	--
50,972	19,399	70,371	55	474,220	57	17,080	457,140	58	1,212,281	16,634	42,364	44
106,319	94,365	200,684	52	15,404,343	32	11,435	15,392,909	31	1,299,258	214,309	37,031	46
2,366,672	15,133,477	17,500,149	5	66,899,807	6	5,407,734	61,492,072	7	12,435,970	143,975	467,284	5
1,181,682	28,187,208	29,368,890	2	85,549,927	4	2,282,457	83,267,470	4	6,089,950	92,896	192,195	16
375,583	5,614,559	5,990,142	12	18,127,254	31	3,285,092	14,842,162	32	2,927,509	144,705	89,600	33
4,804,731	616,393	5,421,124	14	12,902,864	33	1,023,194	11,879,671	34	2,691,750	211,905	85,063	35
1,078,948	2,203,785	3,282,733	22	40,226,027	15	173,905	40,052,122	15	4,047,424	102,898	118,508	29
656,790	1,571,853	2,228,643	30	56,009,459	11	88,588	55,920,870	11	4,469,970	112,827	137,700	26
23,680	430,617	454,297	47	4,124,732	47	2,037	4,122,696	47	1,276,961	79,934	35,981	49
4,309	239,890	244,199	50	4,882,580	45	678	4,881,903	45	1,146,000	649,953	22,741	52
24,637	355,994	380,631	48	18,915,248	30	12,063	18,903,184	29	5,310,908	25,315	186,108	17
120,227	927,220	1,047,447	38	4,839,500	46	47,003	4,792,497	46	6,357,072	20,299	284,934	12
888,148	10,591,535	11,479,683	8	50,272,732	13	277,193	49,995,539	13	9,952,006	147,124	325,384	9
89,741	2,226,303	2,316,044	29	9,927,630	38	33,908	9,893,721	38	4,931,093	206,192	184,766	18
91,788	546,013	637,801	43	32,138,588	19	10,817	32,127,771	18	2,849,100	121,498	67,315	39
187,498	2,378,731	2,566,230	24	31,258,507	20	22,758	31,235,749	20	5,603,553	178,432	178,845	19
1,501	2,454,733	2,456,234	26	24,775,042	23	172,172	24,602,869	23	903,157	376,961	21,777	54
140,424	4,091,402	4,231,825	19	12,742,106	34	2,104,395	10,637,711	36	1,712,577	199,099	56,072	41
3,673	1,075,787	1,079,460	37	2,387,828	52	25,424	2,362,404	53	2,018,723	284,376	74,745	36
133,258	873,326	1,006,584	39	7,369,659	40	396,644	6,973,015	40	755,300	73,440	13,268	59
36,574	142,036	178,610	53	2,528,955	51	2,893	2,526,062	51	1,239,881	23,228	47,708	43
195,109	2,285,490	2,480,599	25	11,953,621	35	69,117	11,884,504	33	8,429,007	19,214	363,089	8
7,706	555,311	563,017	44	1,945,640	54	316,337	1,629,303	54	1,821,282	314,311	54,364	42
409,345	3,952,846	4,362,192	18	24,592,395	24	410,005	24,182,390	24	18,989,332	122,301	799,202	2
2,200	9,380	11,580	59	534,070	56	0	534,070	56	537,200	405,721	9,479	60
1,046,295	2,809,617	3,855,912	20	64,863,197	7	176,771	64,686,427	6	8,077,367	126,170	281,741	13
682	977,848	978,530	40	3,229,242	50	3	3,229,239	50	640,919	178,681	18,283	57
72,149	168,831	240,980	51	4,935,917	44	0	4,935,917	44	941,200	55,491	16,198	58
2,625,794	22,892,708	25,518,502	3	114,204,856	1	3,125,899	111,078,957	1	11,359,955	106,060	372,640	7
54,669	1,584,224	1,638,893	32	10,523,282	37	42,769	10,480,513	37	3,453,250	177,865	91,773	32
3,781,525	17,820,729	21,602,254	4	80,747,958	5	8,144,450	72,603,508	5	11,685,300	1,068,586	289,160	11
28,850	4,862,186	4,891,036	16	37,254,561	17	1,900,249	35,354,312	17	3,429,293	248,629	118,637	28
1,073,688	29,486,803	30,560,491	1	96,788,374	3	1,906,595	94,881,779	3	12,282,591	116,075	403,985	6
5	86	91	62	227,865	59	0	227,865	59	138,100	5,659	2,251	61
179,946	196,556	376,501	49	6,853,927	41	2,170	6,851,757	41	3,808,610	8,875	--	--
569,161	4,731,470	5,300,631	15	22,069,189	26	124,726	21,944,462	25	7,377,700	1,540,689	150,447	25
34,638	92,278	126,916	54	460,547	58	1,207	459,340	57	1,050,236	2,706	36,453	47
9,648	11,079	20,727	58	1,483,479	55	426	1,483,053	55	1,022,000	652,334	22,560	53
122,229	7,307,399	7,429,628	11	33,190,390	18	1,124,397	32,065,993	19	4,023,438	77,981	113,377	30
822	24,704	25,527	57	2,375,347	53	0	2,375,347	52	755,509	196,555	23,192	51
537,927	7,360,030	7,897,957	10	60,243,478	8	241,661	60,001,817	8	5,702,027	106,752	178,362	20
3,542,399	8,678,906	12,221,305	6	111,609,060	2	1,461,400	110,147,660	2	20,946,503	678,305	742,274	3
92,620	2,273,081	2,365,701	28	54,194,494	12	1,662,262	52,532,232	12	2,241,555	212,799	68,549	37
4,029	30,644	34,672	56	144,563	61	463	144,101	61	609,709	23,953	18,411	56
5,066	1,351	6,418	60	213,681	60	20	213,661	60	108,612	347	--	--
406,969	2,826,691	3,233,660	23	31,241,619	21	17,983	31,223,635	21	7,104,016	102,551	261,355	14
355,278	850,371	1,205,649	35	9,698,816	39	143,790	9,555,026	39	5,908,372	172,431	219,937	15
272,301	1,404,367	1,676,668	31	38,496,067	16	36,084	38,459,984	16	1,807,099	62,381	42,271	45
794,311	4,956,940	5,751,250	13	19,793,176	28	203,544	19,589,632	27	5,372,243	140,662	173,478	21
3,123	477,467	480,590	46	6,021,857	42	235,947	5,785,910	42	494,001	251,483	19,294	55
38,301,908	**236,602,553**	**274,904,461**		**1,633,350,231**		**48,201,339**	**1,585,148,892**					

* 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.

Map 4–1. Largest Sources of Total Releases On-site and Off-site (adjusted) in North America, 2000: States and Provinces



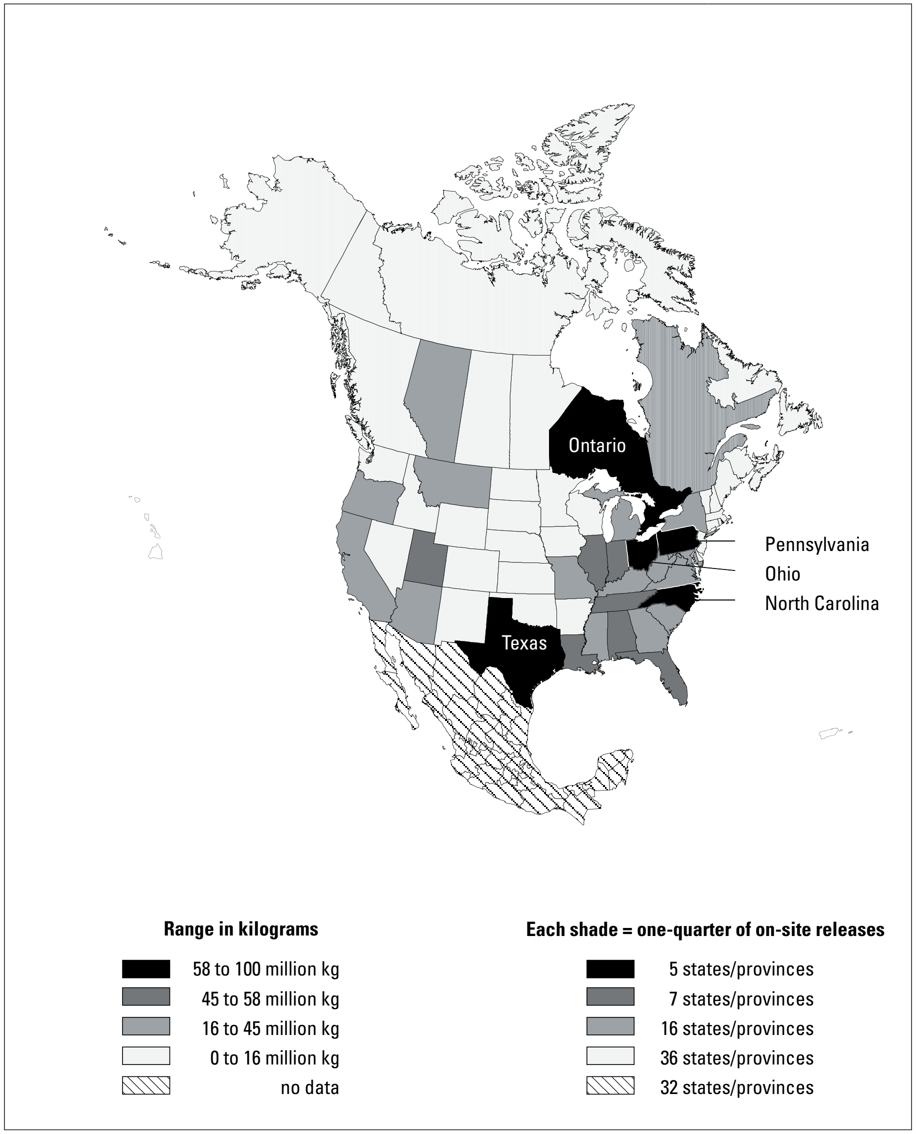
Range in kilograms

- 80 to 112 million kg
- 55 to 80 million kg
- 25 to 55 million kg
- 0 to 25 million kg
- no data

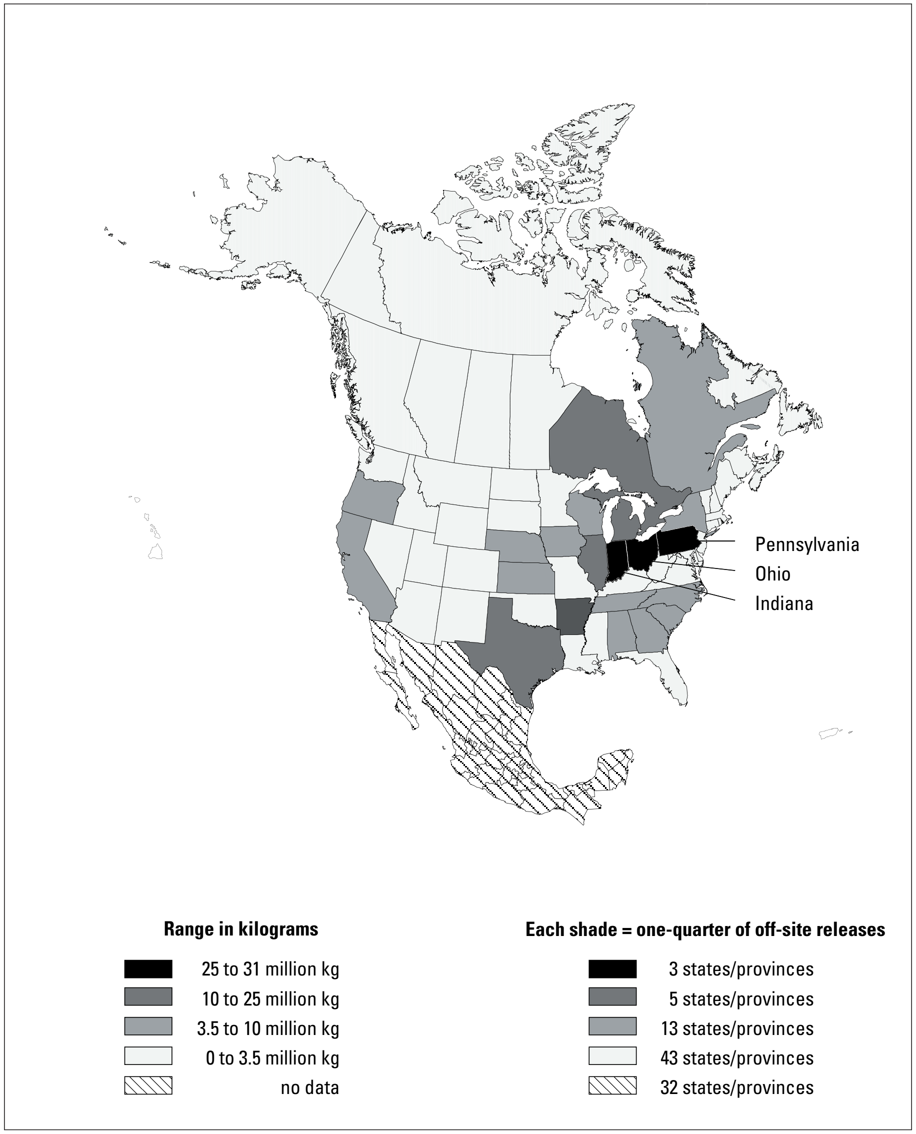
Each shade = one-quarter of total releases (ajusted

- 4 states/provinces
- 7 states/provinces
- 11 states/provinces
- 42 states/provinces
- 32 states/provinces

Map 4–2. Largest Sources of On-site Releases in North America, 2000: States and Provinces



Map 4–3. States and Provinces in North America Sending Largest Amounts of Off-site Releases (Off-site Transfers to Disposal), 2000



"Loadings"—Total Releases within a State/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 sent off-site for disposal (off-site releases) from facilities in the jurisdiction 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.

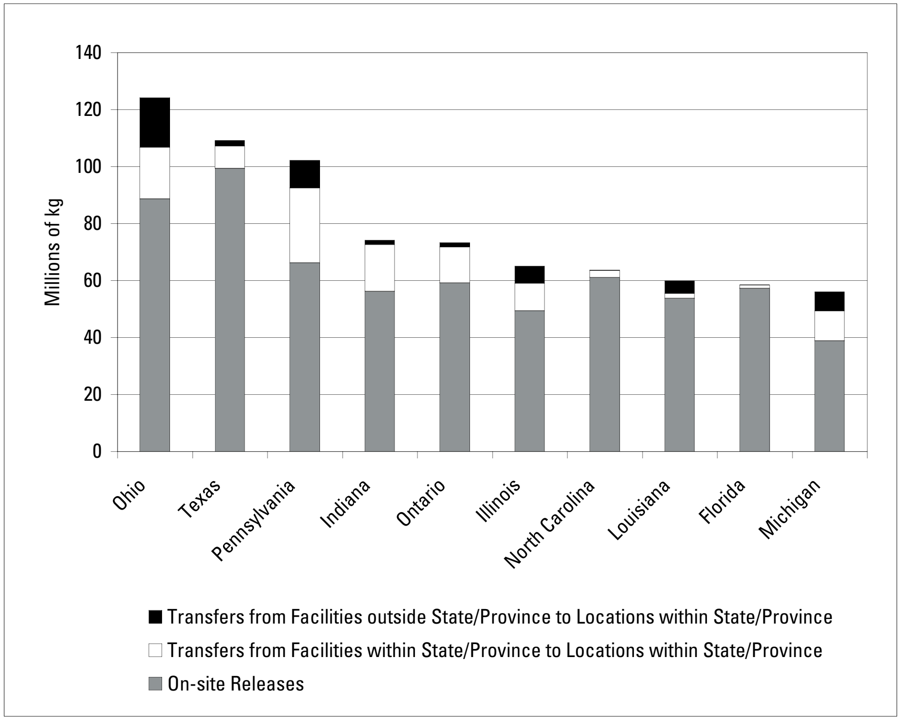
- Ohio facilities reported the largest total releases within a state with 124.2 million kg. Ohio received the largest transfers of metals from facilities outside the state to sites within the state (17.4 million kg).
- Texas facilities reported the second-largest releases within a state with 109.2 million kg. Texas had the largest on-site releases (99.4 million kg).
- Pennsylvania reported the largest transfers from facilities within a state to locations within the same state—25.3 million kg of metals transfers and over 960,000 kg of transfers of substances other than metals off-site to disposal.

Table 4–3. Total Releases (adjusted) within State/Province, 2000

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			
			Transfers Off-site to Disposal (except metals)	Transfers of Metals	Transfers Off-site to Disposal (except metals)	Transfers of Metals		
	kg	Rank	(kg)	(kg)	(kg)	(kg)	kg	Rank
Alabama	51,754,095	11	325,284	1,922,975	51,650	354,584	54,408,587	12
Alaska	127,281	61	0	0	624	229	128,134	61
Alberta	17,027,320	27	1,106,528	1,085,021	37,126	153,332	19,409,326	29
Arizona	18,849,335	25	50,210	265,841	123,351	126,556	19,415,293	28
Arkansas	12,170,185	31	20,870	408,323	180,165	450,739	13,230,282	32
British Columbia	10,971,935	33	219,451	162,814	2,565	9	11,356,774	34
California	21,877,519	23	1,006,155	738,339	50,224	5,341	23,677,578	23
Colorado	3,085,914	48	11,988	288,068	94,143	10,385	3,490,498	48
Connecticut	2,677,542	49	29,203	206,925	20,964	150,086	3,084,720	50
Delaware	3,750,751	46	220	1,578,880	0	2,135	5,331,985	43
District of Columbia	24,128	64	0	0	0	205	24,333	64
Florida	57,232,844	6	574,650	602,368	92,370	40,546	58,542,778	9
Georgia	44,156,200	13	142,842	1,098,215	74,011	631,049	46,102,318	14
Guam	92,698	63	0	0	0	0	92,698	63
Hawaii	403,849	57	373	359	0	0	404,581	58
Idaho	15,203,659	29	105,493	5,697	560	7,393,829	22,709,238	24
Illinois	49,399,657	12	2,047,174	7,653,341	72,164	5,957,258	65,129,594	6
Indiana	56,181,037	7	418,359	15,987,396	260,210	1,356,249	74,203,252	4
Iowa	12,137,112	32	153,153	743,304	2,284	31,499	13,067,352	33
Kansas	7,481,740	39	39,273	438,868	10,740	94,993	8,065,614	39
Kentucky	36,943,294	15	1,056,564	993,289	747,498	513,876	40,254,522	15
Louisiana	53,780,816	8	409,411	1,228,026	1,719,690	2,736,514	59,874,458	8
Maine	3,670,435	47	13,816	397,613	11,854	32,853	4,126,572	47
Manitoba	4,638,381	44	4,309	219,108	179,073	728	5,041,599	44
Maryland	18,534,617	26	11,221	213,522	8,750	44,652	18,812,761	30
Massachusetts	3,792,052	45	56,975	545,724	70,220	61,025	4,525,997	46
Michigan	38,793,050	14	699,703	9,842,943	258,604	6,488,459	56,082,759	10
Minnesota	7,611,586	38	84,408	537,579	0	41,589	8,275,161	38
Mississippi	31,500,787	18	52,275	261,413	77,437	22,978	31,914,890	18
Missouri	28,692,277	19	111,205	1,905,222	14,929	159,981	30,883,615	20
Montana	22,318,808	22	167	16,626	0	0	22,335,601	25
Nebraska	8,510,281	36	135,171	253,584	21,962	832,340	9,753,336	36
Nevada	1,308,369	55	2,548	1,035,053	32,597	462,506	2,841,073	51
New Brunswick	6,363,076	41	21,098	474,982	0	534	6,859,690	40
New Hampshire	2,350,345	50	344	101,824	16,133	71,109	2,539,756	52
New Jersey	9,473,022	34	115,920	1,287,863	35,415	244,470	11,156,691	35
New Mexico	1,382,623	54	3,276	238,600	5,965	14,292	1,644,756	54
New York	20,230,204	24	191,628	1,673,467	116,503	-51,609	22,160,193	26
Newfoundland	522,490	56	0	0	0	0	522,490	56
North Carolina	61,007,285	4	891,734	1,547,882	41,714	173,862	63,662,478	7
North Dakota	2,250,712	52	0	975,833	0	11	3,226,557	49
Nova Scotia	4,694,937	43	72,149	147,197	53,320	286	4,967,889	45
Ohio	88,686,354	2	1,083,471	16,982,583	122,730	17,374,373	124,249,511	1
Oklahoma	8,884,389	35	42,672	661,635	3,822,524	286,831	13,698,051	31
Ontario	59,145,705	5	2,825,542	9,736,332	934,761	670,990	73,313,329	5
Oregon	32,363,525	17	22,422	436,458	77,991	103,836	33,004,233	17
Pennsylvania	66,227,883	3	960,263	25,344,606	186,804	9,542,454	102,262,011	3
Prince Edward Island	227,773	59	5	86	0	0	227,865	59
Puerto Rico	6,477,426	40	69,612	178,356	0	0	6,725,394	41
Quebec	16,768,558	28	293,353	4,600,519	232,830	2,002,869	23,898,128	22
Rhode Island	333,631	58	7,844	16,975	30,723	34,206	423,380	57
Saskatchewan	1,462,752	53	8,256	3,287	0	0	1,474,295	55
South Carolina	25,760,762	21	95,210	1,718,330	166,017	349,956	28,090,274	21
South Dakota	2,349,821	51	822	17,539	0	166	2,368,348	53
Tennessee	52,345,521	9	406,228	2,132,133	149,305	104,390	55,137,577	11
Texas	99,387,755	1	2,697,979	5,058,016	1,046,161	982,886	109,172,797	2
Utah	51,828,793	10	86,337	80,728	903,868	624,590	53,524,315	13
Vermont	109,891	62	0	3,892	3,238	656	117,677	62
Virgin Islands	207,263	60	0	0	0	0	207,263	60
Virginia	28,007,959	20	287,257	2,633,971	26,124	77,551	31,032,861	19
Washington	8,493,167	37	94,460	656,504	2,479	62,313	9,308,923	37
West Virginia	36,819,400	16	31,126	1,186,050	3,731	65,255	38,105,560	16
Wisconsin	14,041,925	30	773,887	3,322,738	118,316	1,640,961	19,897,826	27
Wyoming	5,541,267	42	2	53,160	0	7	5,594,435	42
Total	**1,358,445,770**		**19,971,896**	**131,907,984**	**12,312,414**	**62,785,687**	**1,585,171,834**	

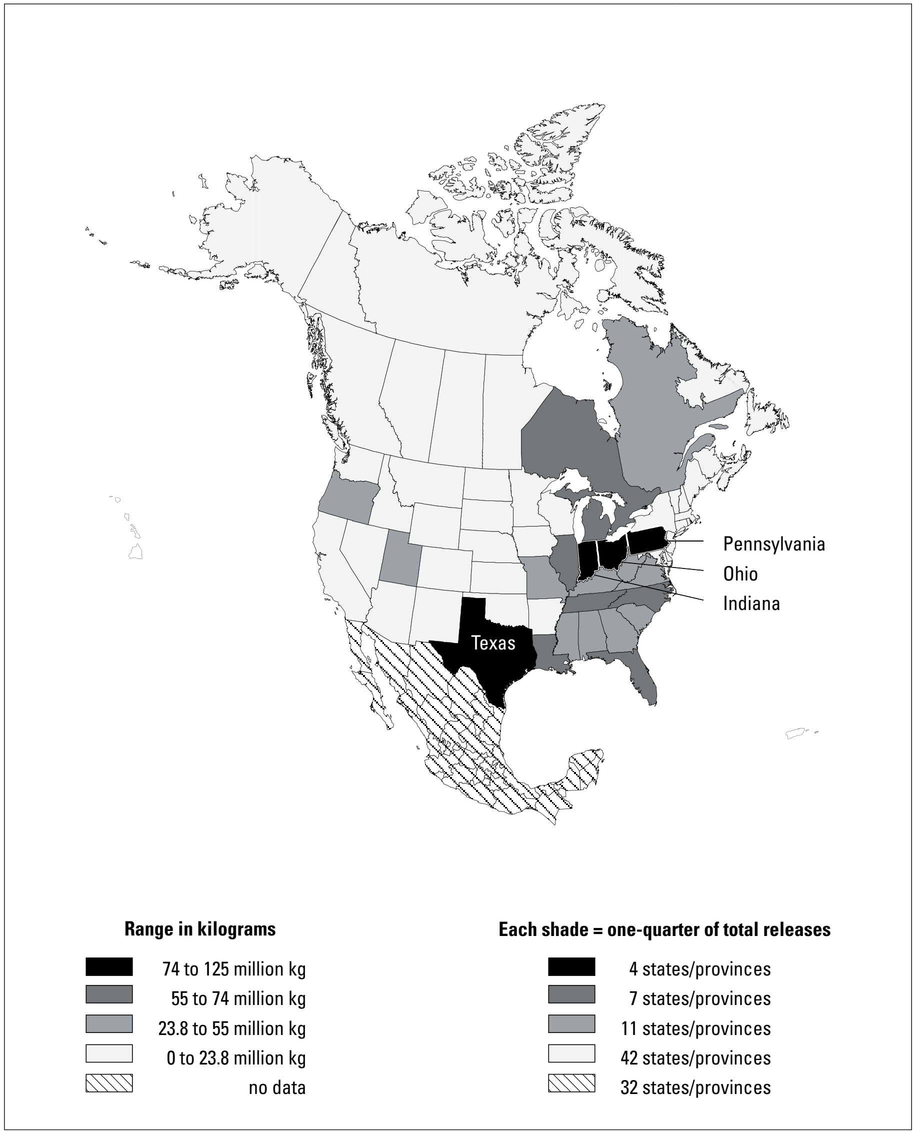
* Off-site releases are omitted (adjusted) if the amount of off-site releases is also reported as an on-site releases by another facility within the state/province.

Figure 4–3. States and Provinces with Largest Total Releases (adjusted) within the State/Province, 2000



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.

Map 4–4. States and Provinces in North America with Largest Total Releases within the State/Province, 2000



4.2.2 Releases On- and Off-site by Industry, 2000

Among industry sectors, electric utilities reported the largest total on- and off-site releases in 2000. Ranking next were the primary metals, chemicals manufacturing, hazardous waste management and solvent recovery, and paper products industries. These five sectors accounted for 78 percent of total releases in 2000.

- Electric utilities reported 436.3 million kg of total releases on- and off-site: the largest amount of any industry. Releases from electric utilities represented 28 percent of the North American total and 43 percent of all North American on-site air emissions in 2000.
- Primary metals facilities reported 288.7 million kg in total releases, 18 percent of the North American total. This included 103.1 million kg (36 percent) of all on-site land releases, the most of any industry. Primary metals also reported the most metals released off-site—140.7 million kg, or 59 percent of the total for all industry sectors.
- The chemical manufacturing sector reported 288.7 million kg of total releases in 2000, 16 percent of the North American total. This sector had by far the largest amount of underground injection, 81.8 million kg, or 84 percent of the total for the category.

Table 4–4. Releases On- and Off-site in North America, by Industry, 2000

		On-site Releases				
US SIC Code	Industry	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
491/493	Electric Utilities	372,409,633	1,350,086	0	49,216,200	422,975,920
33	Primary Metals	43,572,006	31,482,337	261,192	103,081,578	178,407,610
28	Chemicals	101,510,957	29,941,292	81,753,854	20,302,123	233,565,426
495/738	Hazardous Waste Mgt./Solvent Recovery	494,096	19,209	15,213,118	87,764,124	103,493,398
26	Paper Products	97,834,869	12,072,236	0	7,109,729	117,017,969
30	Rubber and Plastics Products	47,627,013	40,749	0	327,094	47,999,715
20	Food Products	20,716,923	26,034,212	47	2,215,998	48,967,180
--	Multiple codes 20–39*	26,737,404	6,624,883	229	5,126,310	38,488,826
37	Transportation Equipment	40,072,599	94,455	0	186,559	40,363,120
29	Petroleum and Coal Products	21,510,011	8,345,624	463,124	247,914	30,572,446
34	Fabricated Metals Products	17,746,844	844,635	0	344,803	18,944,095
24	Lumber and Wood Products	18,263,422	4,476	0	84,210	18,352,626
36	Electronic/Electrical Equipment	5,579,318	1,904,811	2	882,531	8,367,588
32	Stone/Clay/Glass Products	11,771,703	67,678	1,402	1,835,893	13,678,170
27	Printing and Publishing	9,706,816	168	0	12,358	9,719,352
35	Industrial Machinery	4,235,533	26,622	0	1,086,301	5,349,492
25	Furniture and Fixtures	6,213,311	13	0	3,651	6,218,003
39	Misc. Manufacturing Industries	4,158,611	17,328	0	46,843	4,226,830
22	Textile Mill Products	3,357,432	90,664	0	112,147	3,560,343
38	Measurement/Photographic Instruments	3,204,771	484,062	1	8,758	3,697,591
12	Coal Mining	32,078	7,980	49,457	2,576,318	2,665,834
31	Leather Products	420,296	45,107	0	1,820	467,223
5169	Chemical Wholesalers	556,484	1,268	0	22,220	584,095
21	Tobacco Products	337,232	254,151	0	0	591,383
23	Apparel and Other Textile Products	171,534	0	0	0	171,534
	Total	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**

Note: Canada and US data only. Mexico data not available for 2000.
* Multiple SIC codes reported only in TRI.

Table 4–4. (*continued*)

Off-site Releases			Total Releases				
Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site kg	Rank	Adjustment Component* (kg)	Total Releases (adjusted)** kg	Rank
521,504	13,165,544	13,687,048	436,662,968	1	349,127	436,313,841	1
2,854,717	140,672,883	143,527,600	321,935,210	2	33,282,457	288,652,753	2
17,231,378	15,716,419	32,947,797	266,513,223	3	5,890,144	260,623,079	3
5,508,322	18,011,253	23,519,576	127,012,973	4	3,820,262	123,192,711	4
707,812	2,539,835	3,247,647	120,265,616	5	1,468	120,264,148	5
2,017,792	4,757,426	6,775,218	54,774,933	6	44,668	54,730,265	6
1,461,417	398,669	1,860,086	50,827,266	7	585	50,826,681	7
1,106,912	9,548,724	10,655,636	49,144,462	8	1,866,458	47,278,004	8
1,574,726	4,978,744	6,553,470	46,916,590	9	253,137	46,663,454	9
2,217,538	935,745	3,153,282	33,725,729	10	520,314	33,205,414	10
1,351,781	10,787,201	12,138,982	31,083,077	11	937,422	30,145,655	11
71,734	177,300	249,034	18,601,660	12	26,403	18,575,257	12
900,373	8,644,084	9,544,456	17,912,044	13	702,500	17,209,545	13
129,197	1,889,554	2,018,751	15,696,921	14	433,567	15,263,354	14
60,548	23,328	83,876	9,803,228	15	424	9,802,804	15
74,713	2,847,285	2,921,998	8,271,490	16	43,957	8,227,533	16
81,945	57,308	139,253	6,357,255	17	10,766	6,346,490	17
187,135	343,123	530,258	4,757,089	18	13,278	4,743,811	18
120,127	232,575	352,702	3,913,046	19	306	3,912,740	19
27,068	127,292	154,360	3,851,952	20	3,363	3,848,589	20
0	9	9	2,665,843	21	0	2,665,843	21
4,788	735,586	740,374	1,207,598	22	0	1,207,598	22
65,537	3,529	69,066	653,160	23	732	652,428	23
263	70	333	591,716	24	0	591,716	24
24,580	9,067	33,647	205,181	25	0	205,181	25
38,301,908	**236,602,553**	**274,904,461**	**1,633,350,231**		**48,201,339**	**1,585,148,892**	

* 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 four industries—electric utilities, primary metals, chemicals, and hazardous waste—TRI facilities accounted for over 91 percent of total releases.
- Electric utilities in the US accounted for 95 percent of total releases from electric utilities in North America.
- NPRI facilities in the paper products industry accounted for 23 percent of total releases from this sector and TRI facilities for 77 percent, much lower than the TRI average.

Query Builder

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

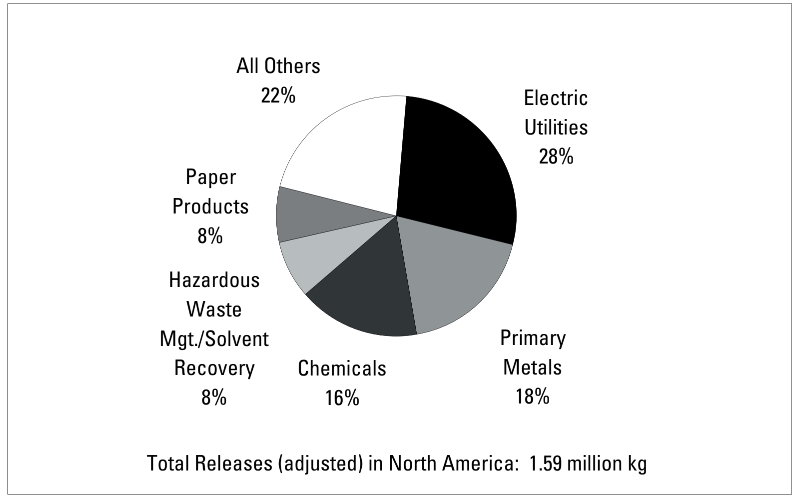
To find the chemicals with the largest releases on- and off-site for the electric utility sector using *Taking Stock* Online:

1. select **Chemical** report.
2. select the year **2000**.
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**

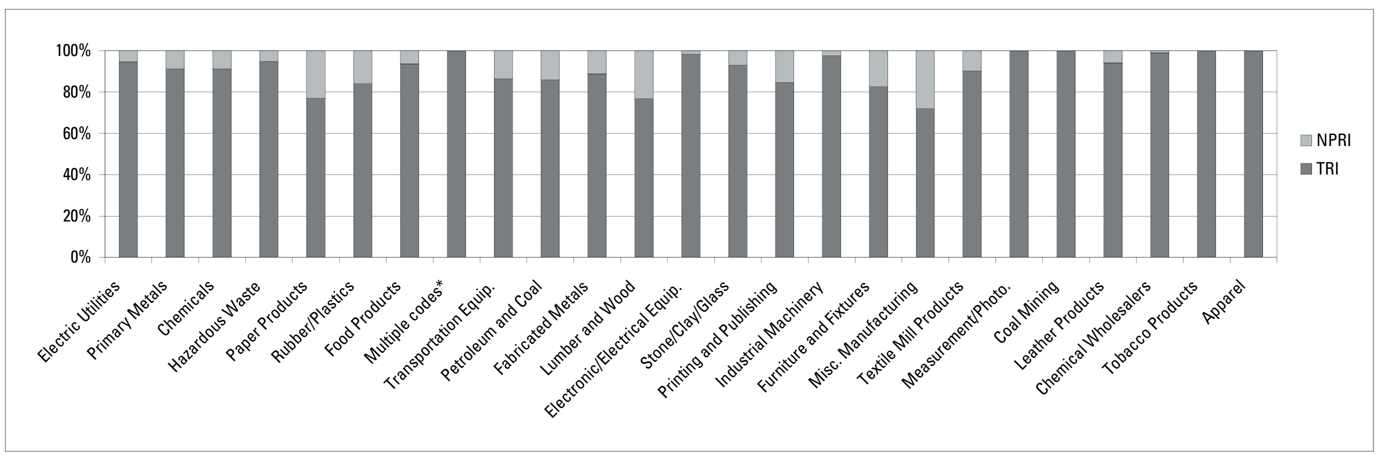
Once you have the report, go to the column titled "Total releases (on- and off-site)" and click on the **arrow pointing down** to sort the list in descending order and get the 10 chemicals with the largest total releases.

Figure 4–4. Contribution of Top Industry Sectors to Total Releases (adjusted) in North America, 2000



Note: Canada and US data only. Mexico data not available for 2000. Total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 4–5. NPRI and TRI as Percentage of North American Total Releases (adjusted), by Industry, 2000 (Ordered by Total North American Releases)



Note: Canada and US data only. Mexico data not available for 2000. 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 4–5. Average Releases per Facility, NPRI and TRI, 2000

	NPRI*		TRI		
	Number	**Forms/Facility**	**Number**	**Forms/Facility**	
Total Facilities	1,698		20,338		
Total Forms	6,162	3.6	70,519	3.5	
Releases On- and Off-site	**kg**	**kg/facility**	**kg**	**kg/facility**	**Ratio of Average per Facility (NPRI/TRI)**
On-site Releases	**121,822,927**	**71,745**	**1,236,622,843**	**60,804**	**1.2**
Air	91,891,686	54,118	766,349,212	37,681	1.4
Surface Water	6,643,683	3,913	113,110,362	5,562	0.7
Underground Injection	3,590,811	2,115	94,151,616	4,629	0.5
Land	19,583,829	11,533	263,011,652	12,932	0.9
Off-site Releases	**31,340,694**	**18,457**	**243,563,767**	**11,976**	**1.5**
Transfers to Disposal (except metals)	5,919,256	3,486	32,382,652	1,592	2.2
Transfers of Metals**	25,421,438	14,971	211,181,115	10,384	1.4
Total Reported Releases On- and Off-site	**153,163,621**	**90,202**	**1,480,186,610**	**72,779**	**1.2**
Off-site Releases Omitted for Adjustment Analysis***	8,887,889	5,234	39,313,450	1,933	2.7
Total Releases On- and Off-site (adjusted)**	**144,275,732**	**84,968**	**1,440,873,160**	**70,846**	**1.2**

* 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.

4.2.3 Releases On- and Off-site by Facility, 2000

Average Releases per Facility, NPRI and TRI

- Average on-site releases were about 20 percent higher for NPRI (71,745 kg per facility) than for TRI (60,804 kg per facility). Among on-site releases, the NPRI per-facility averages for surface water releases, underground injections, and land releases were lower than in TRI, but the average for air releases was higher.
- Average reported off-site releases were much higher in NPRI; the ratio of NPRI to TRI per-facility averages was 2.2 for transfers of substances other than metals and 1.4 for transfers of metals.
- Average total on- and off-site releases were 90,202 kg per facility for NPRI and 72,770 kg per facility for TRI—a ratio of 1.2.

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 27 percent of total reported releases on- and off-site in 2000.

- The 50 facilities with the largest total reported releases in North America reported 437.4 million kg in 2000. They accounted for 55 percent of all on-site land releases and 58 percent of all on-site underground injection.
- The electric utility industry, the sector with the largest total releases in North America for 2000, had 16 facilities among 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, had 14 facilities among the top 50 facilities, including six in the top 10. The facility with the largest total releases was a primary metals facility that reported large on-site land releases of copper, arsenic, zinc and their compounds. Most of these primary metals facilities reported zinc and its compounds as the main substance released.
- The third-ranked industry sector, chemical manufacturing, had 12 facilities in the top 50.
- The fourth-ranked industry sector, hazardous waste management and solvent recovery, had eight facilities in the top 50. Hazardous waste

Table 4–6. The 50 North American Facilities with the Largest Total Reported Amounts of Releases On- and Off-site, 2000

			SIC Codes		Number	On-site Releases				
Rank	Facility	City, State/Province	Canada	US	of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	105,084	2,383	0	24,363,313	24,470,780
2	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	55	580	0	0	24,369,311	24,369,891
3	ASARCO Inc.	East Helena, MT		33	11	27,359	455	0	18,810,607	18,838,422
4	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	2	19,923,810	0	0	0	19,923,810
5	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico S.A. de C.V.	Hayden, AZ		33	12	72,556	0	0	16,021,494	16,094,049
6	Solutia Inc.	Cantonment, FL		28	22	276,412	815	15,373,092	0	15,650,319
7	AK Steel Corp. Butler Works (Rte. 8 S)	Butler, PA		33	13	56,962	12,700,492	0	1,448,307	14,205,761
8	Zinc Corp. of America Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13	420,976	489	0	0	421,465
9	BASF Corp.	Freeport, TX		28	30	48,043	9,756,889	1,193,722	0	10,998,654
10	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	18	2,345	0	0	9,468,776	9,471,121
11	Steel Dynamics Inc.	Butler, IN		33	8	13,713	0	0	0	13,713
12	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	22	2,127	0	0	8,979,828	8,981,955
13	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	8,726,165	2,997	0	416,895	9,146,056
14	Reliant Energies Inc., Keystone Power Plant	Shelocta, PA		491/493	11	8,368,810	3,888	0	170,717	8,543,414
15	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	239	0	0	8,457,197	8,457,437
16	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	13	8,070,458	6,097	0	310,026	8,386,580
17	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	8	8,040	5	0	0	8,044
18	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	13	7,639,669	9,496	0	509,849	8,159,014
19	Lenzing Fibers Corp.	Lowland, TN		28	9	7,866,205	1,978	0	156,473	8,024,656
20	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	9	4,897	78	0	0	4,976
21	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	10	145,991	236	0	7,622,448	7,768,675
22	Gulf Power Co., Plant Crist, Southern Co.	Pensacola, FL		491/493	12	7,536,897	1,518	0	216,388	7,754,802
23	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	17	0	0	7,560,880	0	7,560,880
24	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	10	411	0	0	7,562,449	7,562,860
25	J. M. Stuart Station, Dayton Power & Light Co.	Manchester, OH		491/493	13	6,436,898	5,919	0	712,671	7,155,489
26	John E. Amos Power Plant, American Electric Power	Winfield, WV		491/493	13	6,598,108	1,587	0	212,158	6,811,853
27	Duke Energy Marshall Steam Station.	Terrell, NC		491/493	13	6,609,007	9,893	0	411,930	7,030,830
28	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	16	458	0	0	7,008,900	7,009,358
29	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	8	2,036	0	0	6,945,669	6,947,705
30	US TVA Johnsonville Fossil Plant, US Tennessee Valley Authority	New Johnsonville, TN		491/493	14	6,356,020	4,843	0	430,993	6,791,856
31	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI		495/738	26	4,141	0	0	5,358,962	5,363,103
32	DuPont Victoria Plant	Victoria, TX		28	33	185,021	605,645	5,830,813	6,130	6,627,609
33	USS Gary Works, USX Corp.	Gary, IN		33	40	314,627	1,478,899	0	4,504,829	6,298,355
34	Cytec Inds. Inc., Fortier Plant	Westwego, LA		28	26	56,031	3,489	6,310,009	0	6,369,529
35	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	19	246,254	851	0	2	247,107
36	AK Steel Corp.	Rockport, IN		33	7	817	5,536,531	0	0	5,537,347
37	Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore, MD		491/493	15	5,610,875	1,545	0	7,075	5,619,495
38	DuPont Delisle Plant	Pass Christian, MS		28	15	359,862	339	5,195,944	16,749	5,572,894
39	Detroit Edison, Monroe Power Plant, DTE Energy Co.	Monroe, MI		491/493	14	4,896,177	2,672	0	485,223	5,384,071
40	Duke Energy, Belews Creek Steam Station	Belews Creek, NC		491/493	13	5,158,231	1,984	0	150,571	5,310,786
41	BP Chemicals Inc., Green Lake Facility, BP America Inc.	Port Lavaca, TX		28	19	48,461	458	5,240,567	2,938	5,292,424
42	Acordis Cellulosic Fibers Inc., Acordis US Holding Inc.	Axis, AL		28	3	5,106,562	9,878	0	134,240	5,250,680
43	National Steel Corp., Greatlakes Ops.	Ecorse, MI		33	21	87,431	65,701	0	0	153,132
44	Monsanto Luling, Pharmacia Corp.	Luling, LA		28	13	57,027	95,651	4,796,009	145	4,948,832
45	BP Chemicals Inc., BP America	Lima, OH		28	31	103,431	0	4,838,524	0	4,941,955
46	Jayhawk Fine Chemicals Corp.	Galena, KS		28	19	6,257	431	0	0	6,688
47	Mississippi Power Co. Plant Watson, Southern Co.	Gulfport, MS		491/493	12	4,522,063	885	0	279,228	4,802,176
48	American Electric Power, Cardinal Plant, Cardinal Operating Co.	Brilliant, OH		491/493	14	4,354,377	6,423	0	410,973	4,771,773
49	American Electric Power, Mitchell Plant	Moundsville, WV		491/493	13	4,414,334	4,223	0	325,857	4,744,414
50	Alabama Power Co. Plant Greene County, Southern Co.	Forkland, AL		491/493	13	4,327,556	2,685	0	230,693	4,560,934
	Subtotal				**801**	**135,179,811**	**30,328,346**	**56,339,560**	**156,520,012**	**378,367,729**
	% of Total				**1**	**16**	**25**	**58**	**55**	**28**
	Total				**76,679**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**

Note: Canada and US data only. Mexico data not available for 2000. 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 4–6. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Reported On- and Off-site Releases (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported releases from the facility)
1	5	35,914	35,919	24,506,699	Copper/Arsenic/Zinc and compounds (land)
2	0	474	474	24,370,365	Aluminum oxide, Asbestos (land)
3	0	2,435,849	2,435,849	21,274,271	Zinc and compounds (land)
4	0	0	0	19,923,810	Chlorine (air)
5	0	156	156	16,094,206	Copper and compounds, Zinc and compounds (land)
6	891	1,121	2,012	15,652,331	Nitric acid and nitrate compounds (UIJ)
7	95	66,779	66,874	14,272,635	Nitric acid and nitrate compounds (water)
8	0	13,119,194	13,119,194	13,540,659	Zinc and compounds (transfers of metals)
9	23,732	11,511	35,243	11,033,897	Nitric acid and nitrate compounds (water)
10	0	2,203	2,203	9,473,324	Asbestos, Aluminum oxide, Lead/Zinc and compounds (land)
11	0	9,178,259	9,178,259	9,191,972	Zinc and compounds (transfers of metals)
12	146,306	27,754	174,060	9,156,015	Copper and compounds, Zinc and compounds (land)
13	0	49	49	9,146,105	Hydrochloric acid (air)
14	0	0	0	8,543,414	Hydrochloric acid (air)
15	0	2	2	8,457,439	Zinc and compounds (land)
16	0	7	7	8,386,587	Hydrochloric acid (air)
17	0	8,312,461	8,312,461	8,320,505	Zinc and compounds (transfers of metals)
18	0	0	0	8,159,014	Hydrochloric acid (air)
19	0	0	0	8,024,656	Carbon disulfide (air)
20	0	7,948,510	7,948,510	7,953,485	Zinc and compounds (transfers of metals)
21	0	774	774	7,769,449	Zinc and compounds, Aluminum (land)
22	0	0	0	7,754,802	Hydrochloric acid (air)
23	21,120	680	21,800	7,582,680	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
24	0	3,526	3,526	7,566,387	Zinc and compounds, Lead and compounds (land)
25	0	15	15	7,155,504	Hydrochloric acid (air)
26	0	334,278	334,278	7,146,131	Hydrochloric acid (air)
27	0	21	21	7,030,851	Hydrochloric acid (air)
28	0	0	0	7,009,358	Zinc and compounds, Lead and compounds (land)
29	0	0	0	6,947,705	Zinc/Lead and compounds (land)
30	0	6,205	6,205	6,798,061	Hydrochloric acid (air)
31	174,614	1,114,498	1,289,112	6,652,215	Nickel/Selenium/Arsenic and compounds (land)
32	24	3,100	3,124	6,630,733	Nitric acid and nitrate compounds (UIJ)
33	3,796	285,691	289,488	6,587,842	Zinc/Manganese and compounds (land), Nitric acid and nitrate compounds (water)
34	3,456	7,295	10,751	6,380,280	Acetonitrile, Acrylamide, Methanol (UIJ)
35	41	5,736,803	5,736,844	5,983,951	Zinc and compounds, Manganese and compounds (transfers of metals)
36	0	279,478	279,478	5,816,826	Nitric acid and nitrate compounds (water)
37	0	0	0	5,619,495	Hydrochloric acid (air)
38	0	12	12	5,572,906	Manganese and compounds (UIJ)
39	0	0	0	5,384,071	Hydrochloric acid (air)
40	0	45	45	5,310,831	Hydrochloric acid (air)
41	0	132	132	5,292,555	Acetonitrile, Acrylamide (UIJ)
42	0	0	0	5,250,680	Carbon disulfide (air)
43	1,303	4,835,722	4,837,025	4,990,157	Zinc and compounds (transfers of metals)
44	3,130	4,444	7,575	4,956,407	Formaldehyde (UIJ)
45	417	553	971	4,942,925	Acetonitrile, Acrylamide (UIJ)
46	4,751,891	162,658	4,914,548	4,921,236	Nitric acid and nitrate compounds (transfers to disposal)
47	0	0	0	4,802,176	Hydrochloric acid (air)
48	0	342	342	4,772,115	Hydrochloric acid (air)
49	0	2,300	2,300	4,746,714	Hydrochloric acid (air)
50	0	2	2	4,560,936	Hydrochloric acid (air)
	5,130,821	**53,918,817**	**59,049,639**	**437,417,368**	
	13	**23**	**21**	**27**	
	38,301,908	**236,602,553**	**274,904,461**	**1,633,350,231**	

UIJ=underground injection.

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.

Facilities with Largest On-site Releases

- The 50 facilities in North America with the largest on-site releases in the matched data set reported 407.6 million kg of on-site releases in 2000, or 30 percent of North American on-site releases.
- These 50 facilities reported 58 percent of North American on-site land releases and 62 percent of underground injection. They also contributed 26 percent of on-site releases to surface water and 18 percent of on-site releases to air.
- The top two facilities, a primary metals facilities and a hazardous waste management/solvent recovery facility, both located in the United States, each reported more than 24 million kg of on-site releases.
- Of the 50 facilities, 21 were electric generating facilities, 12 were in the chemicals sector, nine were primary metals sector, and eight were hazardous waste management facilities.

Table 4–7. The 50 North American Facilities with the Largest Total On-site Releases, 2000

			SIC Codes			On-site Releases				
Rank	Facility	City, State/Province	Canada	US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	105,084	2,383	0	24,363,313	24,470,780
2	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	55	580	0	0	24,369,311	24,369,891
3	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	2	19,923,810	0	0	0	19,923,810
4	ASARCO Inc.	East Helena, MT		33	11	27,359	455	0	18,810,607	18,838,422
5	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico S.A. de C.V.	Hayden, AZ		33	12	72,556	0	0	16,021,494	16,094,049
6	Solutia Inc.	Cantonment, FL		28	22	276,412	815	15,373,092	0	15,650,319
7	AK Steel Corp., Butler Works (Rte. 8 S)	Butler, PA		33	13	56,962	12,700,492	0	1,448,307	14,205,761
8	BASF Corp.	Freeport, TX		28	30	48,043	9,756,889	1,193,722	0	10,998,654
9	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	18	2,345	0	0	9,468,776	9,471,121
10	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	8,726,165	2,997	0	416,895	9,146,056
11	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	22	2,127	0	0	8,979,828	8,981,955
12	Reliant Energies Inc., Keystone Power Plant	Shelocta, PA		491/493	11	8,368,810	3,888	0	170,717	8,543,414
13	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	239	0	0	8,457,197	8,457,437
14	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	13	8,070,458	6,097	0	310,026	8,386,580
15	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	13	7,639,669	9,496	0	509,849	8,159,014
16	Lenzing Fibers Corp.	Lowland, TN		28	9	7,866,205	1,978	0	156,473	8,024,656
17	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	10	145,991	236	0	7,622,448	7,768,675
18	Gulf Power Co. Plant Crist, Southern Co.	Pensacola, FL		491/493	12	7,536,897	1,518	0	216,388	7,754,802
19	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	10	411	0	0	7,562,449	7,562,860
20	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	17	0	0	7,560,880	0	7,560,880
21	J. M. Stuart Station, Dayton Power & Light Co.	Manchester, OH		491/493	13	6,436,898	5,919	0	712,671	7,155,489
22	Duke Energy Marshall Steam Station.	Terrell, NC		491/493	13	6,609,007	9,893	0	411,930	7,030,830
23	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	16	458	0	0	7,008,900	7,009,358
24	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	8	2,036	0	0	6,945,669	6,947,705
25	John E. Amos Power Plant, American Electric Power	Winfield, WV		491/493	13	6,598,108	1,587	0	212,158	6,811,853
26	US TVA Johnsonville Fossil Plant, US Tennessee Valley Authority	New Johnsonville, TN		491/493	14	6,356,020	4,843	0	430,993	6,791,856
27	DuPont Victoria Plant	Victoria, TX		28	33	185,021	605,645	5,830,813	6,130	6,627,609
28	Cytec Inds. Inc. Fortier Plant	Westwego, LA		28	26	56,031	3,489	6,310,009	0	6,369,529
29	USS Gary Works, USX Corp.	Gary, IN		33	40	314,627	1,478,899	0	4,504,829	6,298,355
30	Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore, MD		491/493	15	5,610,875	1,545	0	7,075	5,619,495
31	DuPont Delisle Plant	Pass Christian, MS		28	15	359,862	339	5,195,944	16,749	5,572,894
32	AK Steel Corp.	Rockport, IN		33	7	817	5,536,531	0	0	5,537,347
33	Detroit Edison Monroe Power Plant, DTE Energy Co.	Monroe, MI		491/493	14	4,896,177	2,672	0	485,223	5,384,071
34	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI		495/738	26	4,141	0	0	5,358,962	5,363,103
35	Duke Energy Belews Creek Steam Station	Belews Creek, NC		491/493	13	5,158,231	1,984	0	150,571	5,310,786
36	BP Chemicals Inc., Green Lake Facility, BP America Inc.	Port Lavaca, TX		28	19	48,461	458	5,240,567	2,938	5,292,424
37	Acordis Cellulosic Fibers Inc., Acordis US Holding Inc.	Axis, AL		28	3	5,106,562	9,878	0	134,240	5,250,680
38	Monsanto Luling, Pharmacia Corp.	Luling, LA		28	13	57,027	95,651	4,796,009	145	4,948,832
39	BP Chemicals Inc., BP America	Lima, OH		28	31	103,431	0	4,838,524	0	4,941,955
40	Mississippi Power Co., Plant Watson, Southern Co.	Gulfport, MS		491/493	12	4,522,063	885	0	279,228	4,802,176
41	American Electric Power, Cardinal Plant, Cardinal Operating Co.	Brilliant, OH		491/493	14	4,354,377	6,423	0	410,973	4,771,773
42	American Electric Power, Mitchell Plant	Moundsville, WV		491/493	13	4,414,334	4,223	0	325,857	4,744,414
43	Alabama Power Co. Plant Greene County, Southern Co.	Forkland, AL		491/493	13	4,327,556	2,685	0	230,693	4,560,934
44	CP&L Mayo Electric Generating Plant, Progress Energy	Roxboro, NC		491/493	12	4,244,305	1,319	0	178,275	4,423,899
45	PSI Energy Gibson Generating Station, Cinergy Corp.	Princeton, IN		491/493	13	3,302,889	0	0	1,084,551	4,387,441
46	US TVA Paradise Fossil Plant, US Tennessee Valley Authority	Drakesboro, KY		491/493	17	3,651,435	241,097	0	485,338	4,377,870
47	Scherer Steam Electric Generating Plant	Juliette, GA		491/493	14	3,734,047	9,468	0	591,234	4,334,749
48	Allegheny Energy Inc., Hatfield Power Station	Masontown, PA		491/493	13	3,989,600	7	0	258,444	4,248,052
49	Eramet Marietta Inc., Eramet Manganese Alliage	Marietta, OH		33	7	207,702	95,556	0	3,908,151	4,211,409
50	Coastal Chem Inc., Coastal Corp.	Cheyenne, WY		28	11	11,358	0	4,099,728	0	4,111,086
	Subtotal				**791**	**153,533,579**	**30,608,238**	**60,439,288**	**163,026,004**	**407,607,109**
	% of Total				**1**	**18**	**26**	**62**	**58**	**30**
	Total				**76,679**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**

Note: Canada and US data only. Mexico data not available for 2000. 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 4–7. (*continued*)

Rank	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of on-site releases from the facility)	Total Off-site Releases (kg)	Total Reported On- and Off-site Releases (kg)
1	Copper/Arsenic/Zinc and compounds (land)	35,919	24,506,699
2	Aluminum oxide, Asbestos (land)	474	24,370,365
3	Chlorine (air)	0	19,923,810
4	Zinc and compounds (land)	2,435,849	21,274,271
5	Copper/Zinc and compounds (land)	156	16,094,206
6	Nitric acid and nitrate compounds (UIJ)	2,012	15,652,331
7	Nitric acid and nitrate compounds (water)	66,874	14,272,635
8	Nitric acid and nitrate compounds (water)	35,243	11,033,897
9	Asbestos, Aluminum oxide, Lead/Zinc and compounds (land)	2,203	9,473,324
10	Hydrochloric acid (air)	49	9,146,105
11	Copper/Zinc and compounds (land)	174,060	9,156,015
12	Hydrochloric acid (air)	0	8,543,414
13	Zinc and compounds (land)	2	8,457,439
14	Hydrochloric acid (air)	7	8,386,587
15	Hydrochloric acid (air)	0	8,159,014
16	Carbon disulfide (air)	0	8,024,656
17	Zinc and compounds, Aluminum (land)	774	7,769,449
18	Hydrochloric acid (air)	0	7,754,802
19	Zinc/Lead and compounds (land)	3,526	7,566,387
20	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)	21,800	7,582,680
21	Hydrochloric acid (air)	15	7,155,504
22	Hydrochloric acid (air)	21	7,030,851
23	Zinc/Lead and compounds (land)	0	7,009,358
24	Zinc/Lead and compounds (land)	0	6,947,705
25	Hydrochloric acid (air)	334,278	7,146,131
26	Hydrochloric acid (air)	6,205	6,798,061
27	Nitric acid and nitrate compounds (UIJ)	3,124	6,630,733
28	Acetonitrile, Acrylamide (UIJ)	10,751	6,380,280
29	Zinc/Manganese and compounds (land), Nitric acid and nitrate compounds (water)	289,488	6,587,842
30	Hydrochloric acid (air)	0	5,619,495
31	Manganese and compounds (UIJ)	12	5,572,906
32	Nitric acid and nitrate compounds (water)	279,478	5,816,826
33	Hydrochloric acid (air)	0	5,384,071
34	Nickel/Selenium/Arsenic and compounds (land)	1,289,112	6,652,215
35	Hydrochloric acid (air)	45	5,310,831
36	Acetonitrile, Acrylamide (UIJ)	132	5,292,555
37	Carbon disulfide (air)	0	5,250,680
38	Formaldehyde (UIJ)	7,575	4,956,407
39	Acetonitrile, Acrylamide (UIJ)	971	4,942,925
40	Hydrochloric acid (air)	0	4,802,176
41	Hydrochloric acid (air)	342	4,772,115
42	Hydrochloric acid (air)	2,300	4,746,714
43	Hydrochloric acid (air)	2	4,560,936
44	Hydrochloric acid (air)	10,818	4,434,717
45	Hydrochloric acid, Sulfuric acid (air), Zinc and compounds (land)	1	4,387,442
46	Sulfuric acid, Hydrochloric acid (air)	116	4,377,986
47	Hydrochloric acid (air)	0	4,334,749
48	Hydrochloric acid (air)	0	4,248,052
49	Manganese and compounds (land)	25,442	4,236,851
50	Nitric acid and nitrate compounds (UIJ)	0	4,111,086
		5,039,175	**412,646,284**
		2	**25**
		274,904,461	**1,633,350,231**

UIJ=underground injection

Facilities with Largest Off-site Releases

- The 50 facilities in North America with the largest off-site releases in the matched data set reported 140.0 million kg of off-site releases in 2000—51 percent of all North American off-site releases.
- These 50 facilities reported 53 percent the total transfers of metals. Such transfers are primarily to land disposal but also may include transfers to treatment, sewage and energy recovery facilities.
- Of the 50 facilities, 30 were in the primary metals sector, seven were hazardous waste management facilities, and seven were chemical manufacturing facilities. Seven of the top 10 facilities were in the primary metals sector.

Table 4–8. The 50 North American Facilities with the Largest Total Off-site Releases, 2000

			SIC Codes			Off-site Releases		
Rank	Facility	City, State/Province	Canada	US	Number of Forms	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)
1	Zinc Corp. of America Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13	0	13,119,194	13,119,194
2	Steel Dynamics Inc.	Butler, IN		33	8	0	9,178,259	9,178,259
3	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	8	0	8,312,461	8,312,461
4	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	9	0	7,948,510	7,948,510
5	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	19	41	5,736,803	5,736,844
6	Jayhawk Fine Chemicals Corp.	Galena, KS		28	19	4,751,891	162,658	4,914,548
7	National Steel Corp. Greatlakes Ops.	Ecorse, MI		33	21	1,303	4,835,722	4,837,025
8	Nucor Steel, Nucor Corp.	Huger, SC		33	8	0	4,421,537	4,421,537
9	Exide Corp.	Bristol, TN		36	3	0	4,273,991	4,273,991
10	UOP L.L.C.	Chickasaw, AL		28	5	3,666,434	544	3,666,978
11	Envirite of Ohio Inc., Envirite Corp.	Canton, OH		495/738	10	154,195	3,216,081	3,370,276
12	Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria, IL		33	6	0	3,311,156	3,311,156
13	Ipsco Steel Inc., Ipsco Inc.	Muscatine, IA		33	7	0	3,084,366	3,084,366
14	Timken Co. Faircrest Steel Plant	Canton, OH		33	7	0	2,877,460	2,877,460
15	USS Mon Valley Works Edgar Thomson Plant, USX Corp.	Braddock, PA		33	8	0	2,873,497	2,873,497
16	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR		33	6	0	2,867,628	2,867,628
17	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	13	0	2,724,442	2,724,442
18	Wheeling-Pittsburgh Steel Corp. Mingo Junction	Mingo Junction, OH		33	9	0	2,598,955	2,598,955
19	Waste Management Inc.	Port Arthur, TX		495/738	111	37,461	2,508,590	2,546,051
20	ASARCO Inc.	East Helena, MT		33	11	0	2,435,849	2,435,849
21	Nucor Steel Arkansas, Nucor Corp.	Blytheville, AR		33	11	0	2,427,419	2,427,419
22	Nucor Steel Nebraska	Norfolk, NE		33	7	0	2,426,585	2,426,585
23	Southwire Co.	Carrollton, GA		Mult.	32	4,245	2,109,997	2,114,243
24	Acme Steel Co. Riverdale Plant, Acme Metals Inc.	Riverdale, IL		Mult.	6	34,437	2,059,047	2,093,484
25	CSC Ltd., Reserve Group	Warren, OH		33	11	0	2,070,447	2,070,447
26	Ivaco Rolling Mills	L'Orignal, ON	29	33	8	0	2,005,008	2,005,008
27	Nucor Corp. Nucor Steel Div.	Plymouth, UT		33	7	0	1,900,817	1,900,817
28	Stelco McMaster Ltée	Contrecoeur, QC	29	33	5	0	1,596,050	1,596,050
29	Philip Services Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	7	707,030	874,112	1,581,142
30	Birmingham Steel Corp. Kankakee Illinois Steel Div.	Bourbonnais, IL		33	6	0	1,545,542	1,545,542
31	DuPont Edge Moor	Edgemoor, DE		28	12	0	1,536,929	1,536,929
32	Oregon Steel Mills Inc.	Portland, OR		33	7	0	1,495,013	1,495,013
33	Roanoke Electric Steel Corp.	Roanoke, VA		33	7	0	1,432,988	1,432,988
34	Corus Tuscaloosa, Corus Group PLC	Tuscaloosa, AL		33	12	0	1,419,966	1,419,966
35	Slater Stainless Corp., Aciers Inoxydables Atlas, Slater Steel Inc.	Sorel-Tracy, QC	29	33	13	0	1,414,380	1,414,380
36	Tetra Micronutrients Inc., Tetra Techs.	Fairbury, NE		28	6	0	1,324,376	1,324,376
37	Slater Steels Inc., Hamilton Specialty Bar Division	Hamilton, ON	29	33	10	222	1,296,593	1,296,815
38	Wayne Disposal Inc., EQ Holding Co.	Belleville, MI		495/738	26	174,614	1,114,498	1,289,112
39	CH Resources Niagara Falls, Central Hudson Enterprises Inc.	Niagara Falls, NY		491/493	11	5,119	1,266,050	1,271,169
40	Eveready Battery Co. Inc., Energizer Holdings Co. Inc.	Marietta, OH		28	1	0	1,270,778	1,270,778
41	DK Environmental Inc., Demenno Kerdoon	Vernon, CA		495/738	7	1,077,645	181,497	1,259,142
42	AK Steel Corp.	Zanesville, OH		33	7	1,223,583	29,235	1,252,818
43	Doe Run Co. Recycling Facility, Renco Group Inc.	Boss, MO		33	4	0	1,232,115	1,232,115
44	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1	0	1,209,410	1,209,410
45	Koppers Inds. Inc.	Cicero, IL		28	10	1,148,091	0	1,148,091
46	Union Electric Steel Corp., Ampco-Pittsburgh Corp.	Burgettstown, PA		35	3	0	1,124,340	1,124,340
47	Philip Services Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	19	596,770	491,070	1,087,840
48	Timken Co. Harrison Steel Plant	Canton, OH		33	7	0	1,063,020	1,063,020
49	North Star Recycling, Cargill Inc.	Saint Paul, MN		33	8	625	1,024,733	1,025,358
50	AES Beaver Valley Inc., AES Corp.	Monaca, PA		491/493	11	0	999,898	999,898
	Subtotal				**583**	**13,583,705**	**126,429,615**	**140,013,320**
	% of Total				**0.8**	**35**	**53**	**51**
	Total				**76,679**	**38,301,908**	**236,602,553**	**274,904,461**

Note: Canada and US data only. Mexico data not available for 2000. 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 4–8. (*continued*)

Rank	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of off-site releases from the facility)	Total On-site Releases (kg)	Total Reported On- and Off-site Releases (kg)
1	Zinc and compounds (transfers of metals)	421,465	13,540,659
2	Zinc and compounds (transfers of metals)	13,713	9,191,972
3	Zinc and compounds (transfers of metals)	8,044	8,320,505
4	Zinc and compounds (transfers of metals)	4,976	7,953,485
5	Zinc/Manganese and compounds (transfers of metals)	247,107	5,983,951
6	Nitric acid and nitrate compounds (transfers to disposal)	6,688	4,921,236
7	Zinc and compounds (transfers of metals)	153,132	4,990,157
8	Zinc and compounds (transfers of metals)	11,741	4,433,279
9	Lead and compounds (transfers of metals)	325	4,274,316
10	Nitric acid and nitrate compounds (transfers to disposal)	61,458	3,728,436
11	Zinc/Nickel/Chromium and compounds (transfers of metals)	1,045	3,371,321
12	Zinc and compounds (transfers of metals)	289,472	3,600,628
13	Zinc and compounds (transfers of metals)	1,968	3,086,334
14	Zinc and compounds (transfers of metals)	3,539	2,880,999
15	Zinc and compounds (transfers of metals)	4,533	2,878,029
16	Zinc and compounds (transfers of metals)	2,260	2,869,888
17	Nickel/Zinc/Copper and compounds (transfers of metals)	596	2,725,039
18	Zinc and compounds (transfers of metals)	24,896	2,623,851
19	Lead and compounds, Arsenic and compounds, Copper/Selenium/Mercury/Zinc and compounds (transfers of metals)	9,315	2,555,366
20	Lead/Zinc and compounds (transfers of metals)	18,838,422	21,274,271
21	Zinc and compounds (transfers of metals)	12,253	2,439,671
22	Zinc and compounds (transfers of metals)	14,649	2,441,234
23	Zinc/Copper and compounds (transfers of metals)	12,970	2,127,213
24	Zinc and compounds (transfers of metals)	27,268	2,120,751
25	Zinc and compounds (transfers of metals)	94,055	2,164,502
26	Zinc and compounds (transfers of metals)	8,883	2,013,890
27	Zinc/Manganese and compounds (transfers of metals)	24,505	1,925,322
28	Zinc and compounds (transfers of metals)	18,837	1,614,887
29	Nitric acid and nitrate compounds (transfers to disposal), Chromium and compounds (transfers of metals)	0	1,581,142
30	Zinc and compounds (transfers of metals)	3,209	1,548,751
31	Manganese and compounds (transfers of metals)	15,607	1,552,536
32	Zinc and compounds (transfers of metals)	9,912	1,504,925
33	Zinc and compounds (transfers of metals)	2,766	1,435,754
34	Zinc and compounds (transfers of metals)	5,048	1,425,015
35	Chromium/Nickel/Manganese and compounds (transfers of metals)	501,884	1,916,264
36	Zinc/Lead and compounds (transfers of metals)	38,789	1,363,166
37	Zinc/Manganese and compounds (transfers of metals)	17,601	1,314,417
38	Selenium/Arsenic/Zinc and compounds (transfers of metals)	5,363,103	6,652,215
39	Aluminum (transfers of metals)	23,869	1,295,038
40	Manganese and compounds (transfers of metals)	7,712	1,278,490
41	Ethylene glycol (transfers to disposal)	113	1,259,255
42	Nitric acid and nitrate compounds (transfers to disposal)	75,561	1,328,379
43	Lead and compounds (transfers of metals)	17,618	1,249,733
44	Chromium and compounds (transfers of metals)	297,705	1,507,116
45	Phthalic anhydride (transfers to disposal)	72,097	1,220,187
46	Chromium and compounds (transfers of metals)	1,932	1,126,272
47	Zinc and compounds (transfers of metals), Xylenes, Toluene (transfers to disposal)	0	1,087,840
48	Zinc and compounds (transfers of metals)	9,883	1,072,903
49	Copper/Zinc and compounds (transfers of metals)	81	1,025,439
50	Nickel/Manganese and compounds (transfers of metals)	57,440	1,057,338
		26,840,046	**166,853,366**
		2	**10**
		1,358,445,770	**1,633,350,231**

4.2.4 Chemicals with Largest Releases On- and Off-site, 2000

Of the 206 chemicals in the matched data set for 2000, the 25 chemicals with the largest amounts of total releases on- and off-site accounted for almost 1.5 billion kg, or 90 percent of all releases reported in North America in 2000. 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: 308.9 million kg, or 19 percent of total releases of all chemicals.
- Zinc and its compounds ranked second for total releases (adjusted), with 180.6 million kg (11 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 (160.5 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 4–9. The 25 Chemicals with the Largest Total Releases On- and Off-site in North America, 2000

				On-site Releases					
CAS Number		Chemical	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases kg	Rank
7647-01-0		Hydrochloric acid	1,521	308,879,949	0	0	0	308,879,949	1
--	m	Zinc (and its compounds)	4,160	5,450,307	700,199	263,817	81,406,879	87,825,137	4
--		Nitric acid and nitrate compounds	3,996	1,232,290	109,764,070	35,132,947	4,124,190	150,255,424	2
67-56-1		Methanol	2,816	103,120,676	2,696,449	9,870,251	679,414	116,377,534	3
--	m	Manganese (and its compounds)	3,998	1,473,148	3,529,411	4,366,960	51,770,267	61,150,524	6
7664-93-9		Sulfuric acid	1,112	76,104,387	0	0	0	76,104,387	5
--	m	Copper (and its compounds)	5,111	1,543,666	227,956	230,304	41,579,827	43,586,267	7
108-88-3	p	Toluene	3,307	42,415,775	18,553	248,615	63,974	42,758,382	8
7664-39-3	t	Hydrogen fluoride	1,077	35,691,786	11,999	2,131,519	44,751	37,880,319	9
--	m,c,p,t	Lead (and its compounds)	2,066	1,057,909	44,659	123,740	21,310,311	22,540,032	13
--		Xylenes	3,403	32,951,819	40,870	81,809	63,216	33,147,982	10
--	m,c,p,t	Chromium (and its compounds)	4,223	618,769	126,607	1,569,349	14,162,839	16,483,509	18
100-42-5	c	Styrene	1,793	27,554,300	1,524	118,261	122,121	27,799,853	11
110-54-3		n-Hexane	1,049	27,082,522	8,395	52,003	4,942	27,151,723	12
78-93-3		Methyl ethyl ketone	2,117	20,043,588	18,456	1,411,201	53,981	21,533,382	15
7782-50-5		Chlorine	1,280	21,494,380	119,717	75,883	134,542	21,825,636	14
--	m,c,p,t	Nickel (and its compounds)	3,824	1,062,487	137,331	321,104	10,769,719	12,294,094	23
1344-28-1		Aluminum oxide (fibrous forms)	81	62,708	253	3,832	19,270,336	19,337,229	16
75-15-0	p	Carbon disulfide	120	18,476,907	1,680	7,917	1,303	18,487,806	17
75-09-2	c,p,t	Dichloromethane	692	16,018,372	4,668	90,616	41,100	16,155,791	19
1332-21-4	c,p,t	Asbestos (friable)	123	1,150	0	0	12,325,137	12,326,287	22
74-85-1		Ethylene	346	13,125,991	403	14,262	76	13,133,585	20
50-00-0	c,p	Formaldehyde	992	7,028,062	213,605	5,555,628	49,593	12,848,438	21
71-36-3		n-Butyl alcohol	1,204	10,067,906	16,285	1,741,337	28,788	11,856,002	24
7429-90-5	m	Aluminum (fume or dust)	410	734,735	2,338	0	5,561,116	6,300,037	30
		Subtotal	**50,821**	**773,293,588**	**117,685,428**	**63,411,355**	**263,568,423**	**1,218,039,309**	
		% of Total	**66**	**90**	**98**	**65**	**93**	**90**	
		Total	**76,681**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**	

Note: Canada and US data only. Mexico data not available for 2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Table 4–9. (*continued*)

Off-site Releases: Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals* (kg)	Total Off-site Releases: kg	Total Off-site Releases: Rank	Total Releases: Total Reported Releases On- and Off-site: kg	Total Reported Releases On- and Off-site: Rank	Adjustment Component** (kg)	Total Releases (adjusted)***: kg	Total Releases (adjusted)***: Rank
0	0	0	--	308,879,949	1	0	308,879,949	1
0	116,870,572	116,870,572	1	204,695,710	2	24,074,453	180,621,257	2
14,699,018	0	14,699,018	6	164,954,442	3	4,494,868	160,459,574	3
1,527,896	0	1,527,896	16	117,905,430	4	772,841	117,132,589	4
0	37,912,242	37,912,242	2	99,062,766	5	3,694,841	95,367,925	5
0	0	0	--	76,104,387	6	0	76,104,387	6
0	16,463,181	16,463,181	5	60,049,448	7	1,741,788	58,307,660	7
1,351,465	0	1,351,465	18	44,109,847	9	59,290	44,050,557	8
320,904	0	320,904	29	38,201,224	10	246,737	37,954,487	9
0	22,673,961	22,673,961	3	45,213,993	8	7,647,181	37,566,812	10
1,772,490	0	1,772,490	14	34,920,473	11	6,601	34,913,872	11
0	17,899,354	17,899,354	4	34,382,863	12	2,129,460	32,253,403	12
1,006,674	0	1,006,674	19	28,806,527	13	340	28,806,187	13
50,301	0	50,301	60	27,202,025	14	635	27,201,390	14
703,803	0	703,803	22	22,237,184	16	12,537	22,224,647	15
23,976	0	23,976	71	21,849,613	17	0	21,849,613	16
0	11,050,526	11,050,526	7	23,344,619	15	1,719,269	21,625,351	17
1,778,163	0	1,778,163	13	21,115,392	18	26,380	21,089,012	18
2,015	0	2,015	115	18,489,822	19	0	18,489,822	19
114,230	0	114,230	44	16,270,021	20	3,943	16,266,078	20
3,105,826	0	3,105,826	10	15,432,114	21	20,600	15,411,514	21
179	0	179	148	13,133,764	22	0	13,133,764	22
223,103	0	223,103	31	13,071,541	23	41,122	13,030,419	23
205,839	0	205,839	33	12,061,841	24	23,322	12,038,519	24
0	5,305,747	5,305,747	8	11,605,784	25	160,913	11,444,872	25
26,885,885	**228,175,583**	**255,061,467**		**1,473,100,776**		**46,877,120**	**1,426,223,657**	
70	**96**	**93**		**90**		**97**	**90**	
38,301,908	**236,602,553**	**274,904,461**		**1,633,350,231**		**48,201,339**	**1,585,148,892**	

* 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.

Hydrochloric acid

Hydrochloric acid had the largest releases on- and off-site (308.9 million kg) of any chemical in the matched data set in 2000. Only on-site air releases of hydrochloric acid are included in the matched data set because only aerosol forms are reported to TRI.

- The electric utility sector industry accounted for 91 percent of on-site air releases of hydrochloric acid in 2000.
- TRI facilities in North Carolina reported on-site air releases of 36.2 million kg of hydrochloric acid, and those in Ohio reported on-site air releases of 31.7 million kg.

Zinc and its compounds had the second-largest total releases and total reported amounts of releases and transfers in North America (see **Chapter 3, Section 3.2.4**).

Figure 4–6. On-site Air Releases of Hydrochloric Acid by Industry, 2000

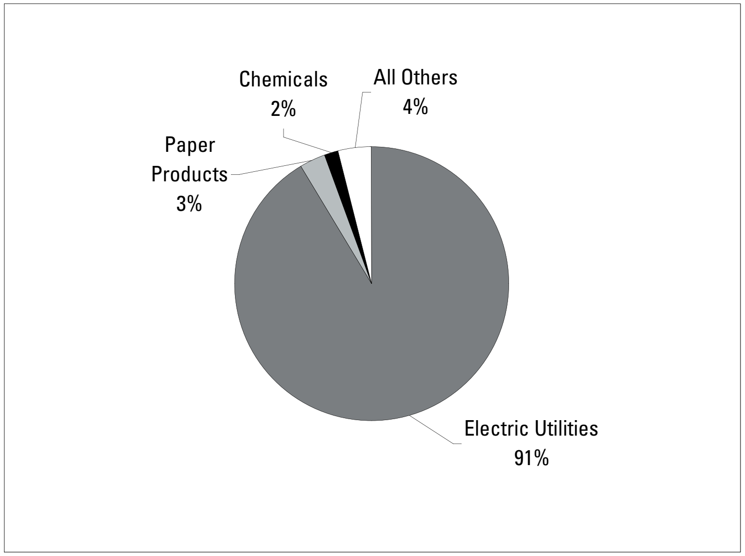


Figure 4–7. States/Provinces with Largest On-site Air Releases of Hydrochloric Acid, 2000

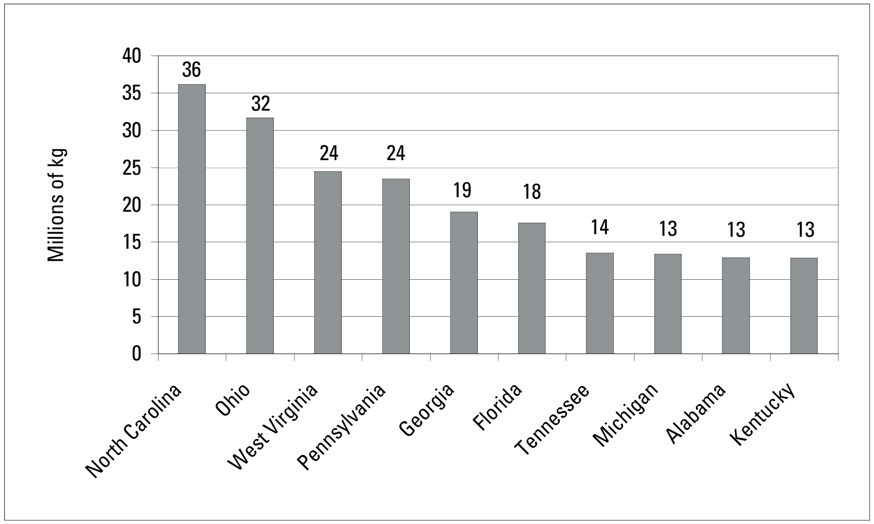


Figure 4–8. On-site Surface Water Releases of Nitric Acid and Nitrate Compounds by Industry, 2000

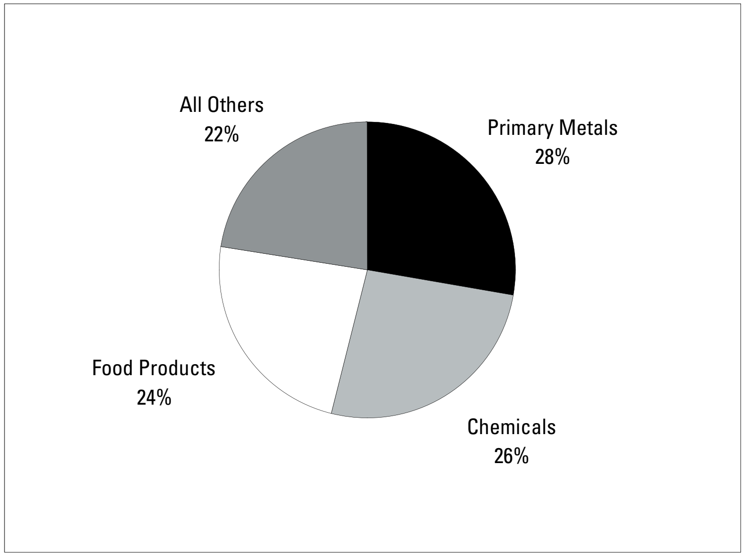
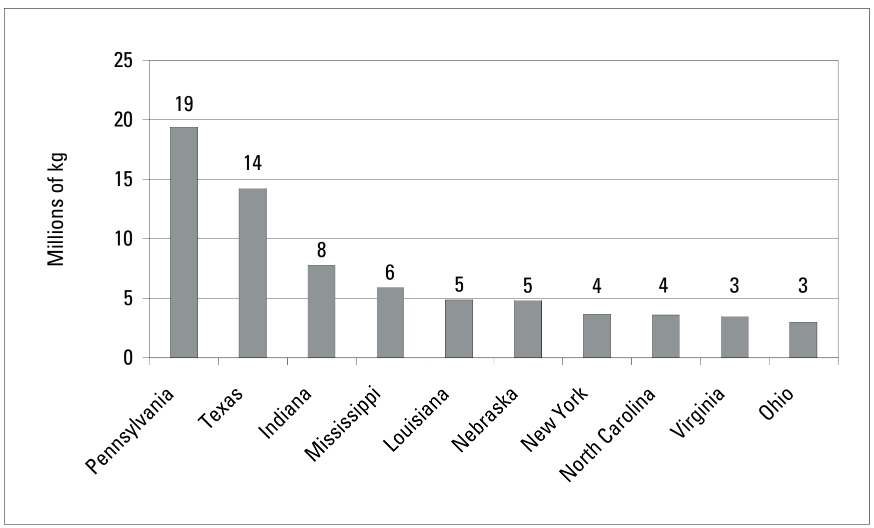


Figure 4–9. States/Provinces with Largest On-site Surface Water Releases of Nitric Acid and Nitrate Compounds, 2000



Nitric acid and nitrate compounds

Nitric acid and nitrate compounds, with the third-largest releases on- and off-site (160.5 million kg) of any chemical in the matched data set in 2000, had the largest on-site releases to surface waters (109.8 million kg) and on-site underground injection (35.1 million kg).

- The primary metals, chemicals, and food products sectors each accounted for about one-quarter of on-site surface water releases of nitric acid and nitrate compounds in 2000.
- TRI facilities in Pennsylvania reported on-site surface water releases of 19.4 million kg of nitric acid and nitrate compounds, and those in Texas reported on-site surface water releases of 14.2 million kg.

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Key Findings

Transfers to Recycling

- In 2000, North American facilities sent 1.06 billion kg of chemicals included in the matched data set to off-site locations for recycling. These are transfers from the industries in the 2000 matched data set.
- Transfers of metals and their compounds represented the bulk (85 percent) of all substances sent for recycling.
- Facilities in Ontario, Pennsylvania and Ohio transferred the largest amounts (more than 80 million kg each) to recycling, each reporting close to 8 percent of all such transfers in North America in 2000.
- The primary metals industry reported sending the largest amounts of chemicals for recycling (372.8 million kg, primarily as metals and their compounds), accounting for about 36 percent of total transfers to recycling in 2000.
- The fabricated metals industry reported the second-largest amount, 211.8 million kg, also primarily as metals and their compounds. NPRI facilities reported 24 percent of this amount.

Other Transfers for Further Management

- In 2000, North American facilities reported transferring 624.9 million kg off-site for other types of management, including transfers to energy recovery (355.0 million kg), treatment (123.7 million kg), and sewage (146.2 million kg). These transfers do not include metals and their compounds, which are included as off-site releases in the analysis in **Chapter 4**.
- Facilities in Texas reported transferring the largest amounts to treatment and to sewage (over 18 million kg each) and the second-largest amounts to energy recovery (50.8 million kg). Michigan reported the largest transfers to energy recovery (51.3 million kg).
- The chemical manufacturing sector reported the largest amount of other transfers for further management, 328.2 million kg. Chemicals facilities ranked first in transfers to energy recovery, treatment, and sewage. Hazardous waste management/solvent recovery facilities reported the second-largest other transfers for further management, 139.8 million kg.
- Methanol had the largest transfers to treatment and the second-largest transfers to both energy recovery and sewage. Toluene had the largest transfers to energy recovery, and nitric acid and nitrate compounds had the largest transfers to sewage.

5.1 Introduction

This chapter examines reporting of off-site transfers for further management of PRTR-listed substances in North America in 2000. As explained in **Chapter 2**, the analysis covers data for industries and chemicals that must be reported in both the United States and Canada (the matched data set). Mexican data are not available for the 2000 reporting year.

Off-site transfers for further management include transfers to recycling and other transfers to energy recovery, treatment, and sewage. Off-site transfers represent transfers from a facility to other locations—nearby, out of the state or province, or outside the country. This chapter examines the amounts of transfers and their places of origin; **Chapter 8** examines their destinations.

The category **transfers to recycling** includes all substances in the matched data set transferred off-site for recycling. **Other transfers for further management** refers to chemicals in the matched data set, except for metals and their compounds, that are transferred off-site to energy recovery, treatment, or sewage. Off-site transfers of metals and their compounds to energy recovery, treatment, and sewage are analyzed in **Chapter 4**. 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 are not destroyed by treatment or burned in energy recovery.

The data on recycling are presented first, followed by information on other transfers for further management.

5.2 Transfers to Recycling, 2000

Transfers to recycling are transfers of chemicals from a facility to other sites that recycle the chemicals. This section analyzes transfers to recycling for all chemicals in the 2000 matched data set.

- The matched North American industries sent 1.06 billion kg of matched chemicals off-site for recycling in 2000.
- Most chemicals sent for recycling were metals and their compounds. Overall, metals accounted for 85 percent of all transfers to recycling in North America in 2000. Metals accounted for 88 percent of NPRI transfers to recycling, slightly higher than the TRI total, 85 percent.
- NPRI facilities reported higher average amounts of transfers to recycling than TRI facilities. Total transfers to recycling per facility for NPRI facilities were 1.6 times the average for TRI facilities. For metals, the average quantity per NPRI facility was 1.7 times the average for TRI. For other chemicals, the average amount of transfers per NPRI facility was about 1.3 times the TRI average.
- There are several possible reasons for differences in average transfers per facility. The set of facilities with higher average amounts may have a different mix of industries or processes, the set may contain a higher proportion of facilities that generate larger amounts of chemicals requiring further management, or the facilities in the set may have chosen recycling or other off-site management activities over disposal or on-site releases. Studies in past *Taking Stock* reports have found no indications that the mix of industries in NPRI

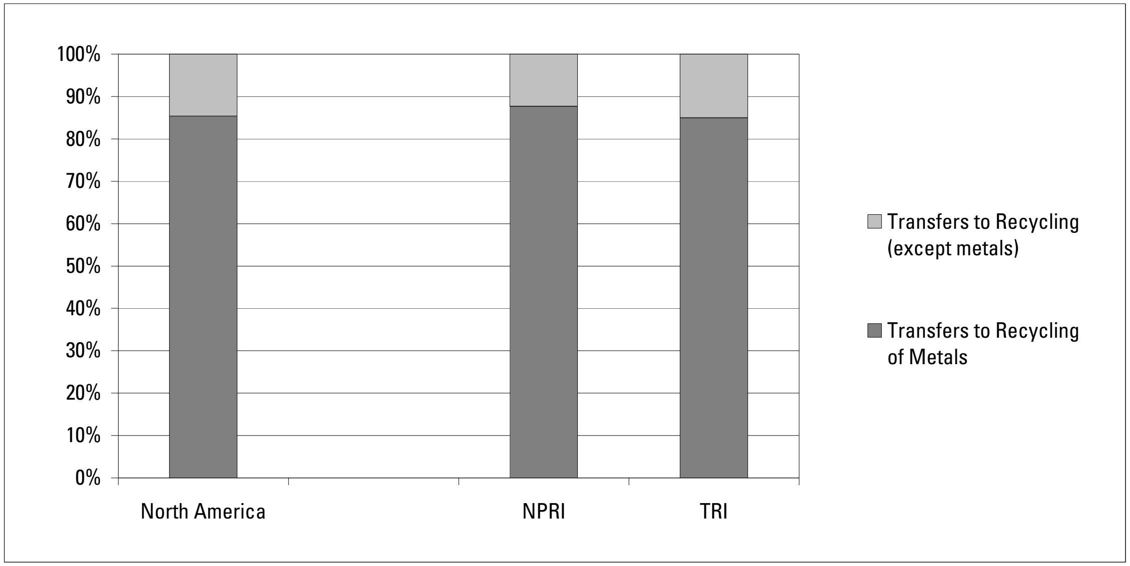
Table 5–1. Summary of Transfers to Recycling in North America, NPRI and TRI, 2000

	North America		NPRI		TRI		NPRI as % of North	TRI as % of North
	Number		Number		Number		American Total	American Total
Total Facilities	22,036		1,698		20,338		8	92
Total Forms	76,681		6,162		70,519		8	92
	kg	%	kg	%	kg	%		
Off-site Transfers to Recycling	**1,055,985,045**	**100**	**125,372,072**	**100**	**930,612,973**	**100**	**12**	**88**
Transfers to Recycling of Metals	900,765,438	85	109,890,115	88	790,875,323	85	12	88
Transfers to Recycling (except metals)	155,219,607	15	15,481,957	12	139,737,650	15	10	90

Note: Canada and US data only. Mexico data not available for 2000. Data include 206 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.

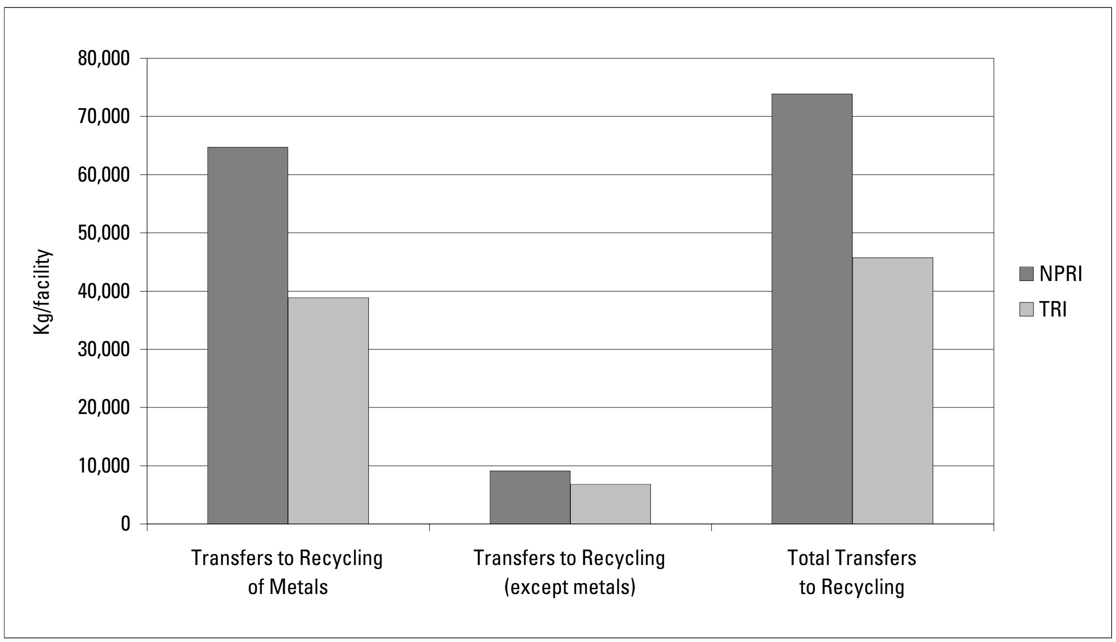
and TRI explains the differences in average transfers per facility. As noted in **Chapter 4,** the average releases of NPRI facilities were 1.2 times larger than those of TRI facilities. NPRI facilities also reported higher average amounts of off-site disposal than TRI facilities.

Figure 5–1. Percentage of Transfers to Recycling in North America by Type, NPRI and TRI, 2000



Note: Canada and US data only. Mexico data not available for 2000.

Figure 5–2. Average Kilograms per Facility of Transfers to Recycling, NPRI and TRI, 2000



Note: Canada and US data only. Mexico data not available for 2000.

5.2.1 Transfers to Recycling by State and Province, 2000

Facilities in the matched data set reported sending 1.06 billion kg of chemicals off-site for recycling in 2000. Transfers can be sent to nearby locations, out of the state or province, or out of the country. This chapter shows where the transfers originated; **Chapter 8** presents information on their destinations.

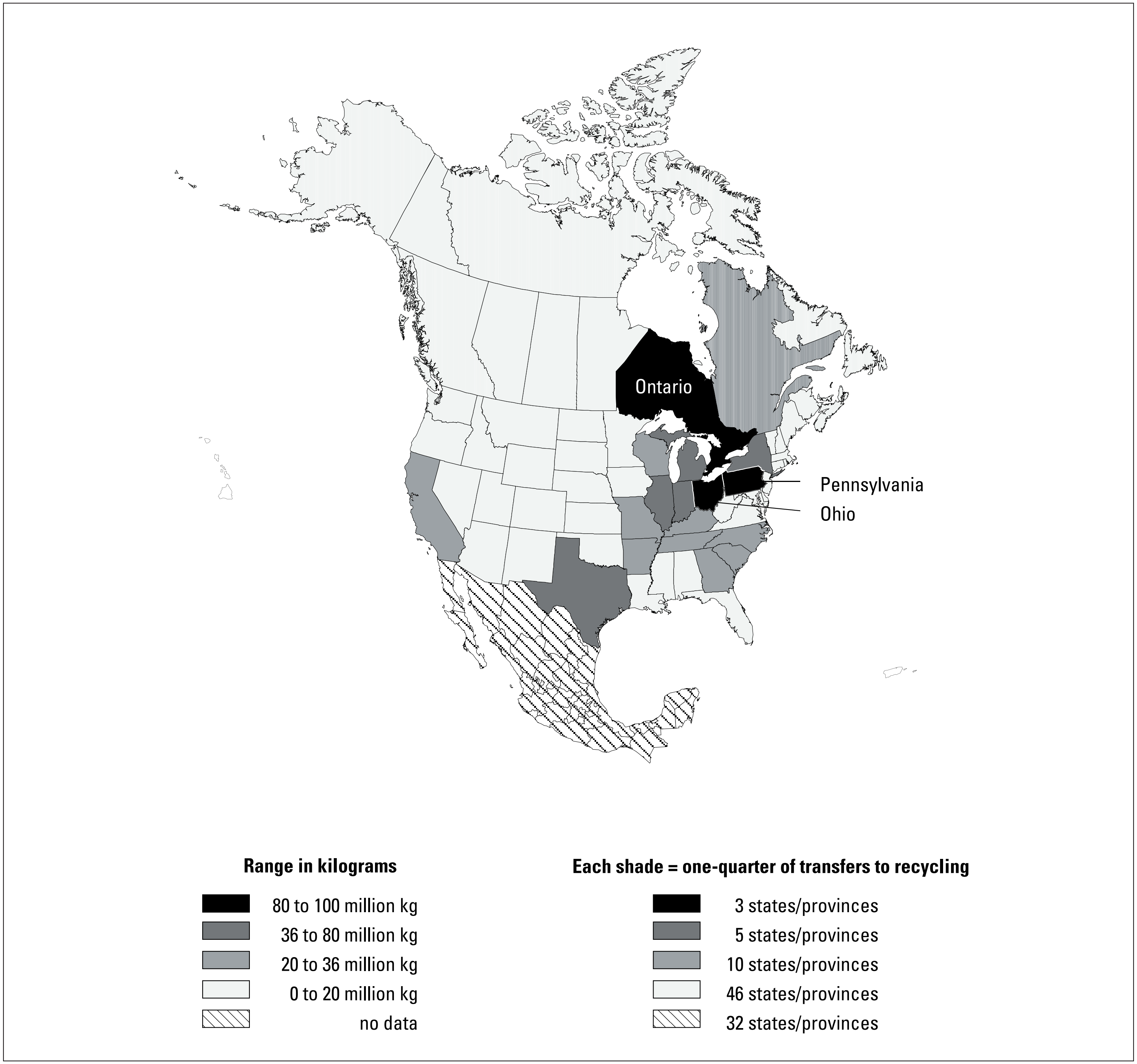
- Facilities in Ontario reported the largest amount of total transfers to recycling, 96.9 million kg, or 9 percent of all such transfers reported in North America in 2000.
- Facilities in Pennsylvania and Ohio reported the second- and third-largest amounts of total transfers to recycling, with 86.0 million kg and 81.6 million kg respectively, with each accounting for 8 percent of all such transfers.
- Ontario facilities reported the largest amounts of transfers to recycling of metals and their compounds. Texas facilities reported the largest amounts of transfers of other chemicals to recycling.

Table 5–2. Transfers to Recycling in North America, by State and Province, 2000

State/Province	Transfers to Recycling of Metals kg	Rank	Transfers to Recycling (except metals) kg	Rank	Total Transfers to Recycling kg	Rank
Alabama	19,149,559	18	757,013	29	19,906,572	19
Alaska	0	--	5	58	5	62
Alberta	2,582,651	39	793,529	28	3,376,180	40
Arizona	15,092,615	22	927,322	26	16,019,937	22
Arkansas	25,479,090	11	160,172	44	25,639,262	13
British Columbia	979,182	46	423,077	37	1,402,259	46
California	31,506,808	9	4,014,137	10	35,520,945	9
Colorado	11,087,485	26	163,287	43	11,250,773	28
Connecticut	12,893,513	23	684,127	30	13,577,640	25
Delaware	3,128,564	37	588,468	33	3,717,031	39
District of Columbia	2,943	59	0	--	2,943	59
Florida	9,240,323	31	450,332	36	9,690,656	32
Georgia	19,437,435	16	2,046,068	21	21,483,504	17
Guam	0	--	0	--	0	--
Hawaii	2,793	61	0	--	2,793	61
Idaho	665,481	48	16,703	51	682,184	49
Illinois	41,756,576	5	7,073,112	7	48,829,689	7
Indiana	57,402,834	4	10,087,056	5	67,489,891	4
Iowa	18,170,893	20	416,516	38	18,587,409	21
Kansas	17,005,336	21	2,151,468	19	19,156,804	20
Kentucky	19,168,558	17	3,379,793	13	22,548,351	16
Louisiana	9,870,039	28	4,104,875	9	13,974,914	23
Maine	1,523,414	44	84,203	48	1,607,617	44
Manitoba	1,569,633	43	123,644	45	1,693,277	43
Maryland	2,003,071	41	407,949	39	2,411,019	42
Massachusetts	9,664,736	30	855,076	27	10,519,812	30
Michigan	40,414,058	6	10,056,272	6	50,470,330	6
Minnesota	8,198,350	33	1,183,201	24	9,381,552	33
Mississippi	10,553,970	27	646,173	32	11,200,144	29
Missouri	21,719,817	14	3,368,059	14	25,087,876	14
Montana	22,963	58	32,166	50	55,129	58
Nebraska	11,505,523	24	85,083	47	11,590,607	27
Nevada	887,215	47	1,209	56	888,424	48
New Brunswick	172,038	56	7,380	52	179,418	56
New Hampshire	6,449,704	34	197,385	42	6,647,089	34
New Jersey	11,282,528	25	2,468,019	17	13,750,547	24
New Mexico	660,774	49	349,574	40	1,010,348	47
New York	35,307,735	8	1,955,689	23	37,263,424	8
Newfoundland	2,900	60	0	--	2,900	60
North Carolina	27,211,408	10	6,804,745	8	34,016,153	11
North Dakota	326,511	52	468	57	326,979	52
Nova Scotia	358,609	51	4,703	54	363,312	51
Ohio	64,728,191	3	16,854,887	2	81,583,078	3
Oklahoma	8,902,586	32	930,922	25	9,833,508	31
Ontario	85,143,132	1	11,765,258	4	96,908,390	1
Oregon	5,569,497	35	646,435	31	6,215,932	35
Pennsylvania	82,860,899	2	3,108,761	16	85,969,660	2
Prince Edward Island	0	--	0	--	0	--
Puerto Rico	1,868,166	42	3,658,520	12	5,526,686	37
Quebec	18,796,880	19	2,357,624	18	21,154,504	18
Rhode Island	2,783,352	38	3,365,134	15	6,148,486	36
Saskatchewan	285,090	53	6,742	53	291,832	54
South Carolina	19,457,703	15	14,839,000	3	34,296,704	10
South Dakota	277,295	54	48,492	49	325,787	53
Tennessee	24,594,738	12	3,868,205	11	28,462,944	12
Texas	39,536,320	7	21,539,134	1	61,075,454	5
Utah	1,204,897	45	205,133	41	1,410,030	45
Vermont	521,273	50	89,196	46	610,468	50
Virgin Islands	55,431	57	1,835	55	57,267	57
Virginia	9,688,990	29	2,064,045	20	11,753,035	26
Washington	4,802,484	36	470,005	35	5,272,489	38
West Virginia	2,564,128	40	500,046	34	3,064,173	41
Wisconsin	22,482,440	13	2,032,166	22	24,514,606	15
Wyoming	184,308	55	5	59	184,313	55
Total	**900,765,438**		**155,219,607**		**1,055,985,045**	

Note: Canada and US data only. Mexico data not available for 2000. 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.

Map 5-1. States and Provinces in North America Sending Largest Amounts of Transfers to Recycling, 2000



5.2.2 Transfers to Recycling by Industry, 2000

Facilities in three manufacturing industries—primary metals, fabricated metals products, and electronic/electrical equipment—reported the largest amounts of transfers to recycling in 2000. For all three, the transfers consisted primarily of metals and their compounds.

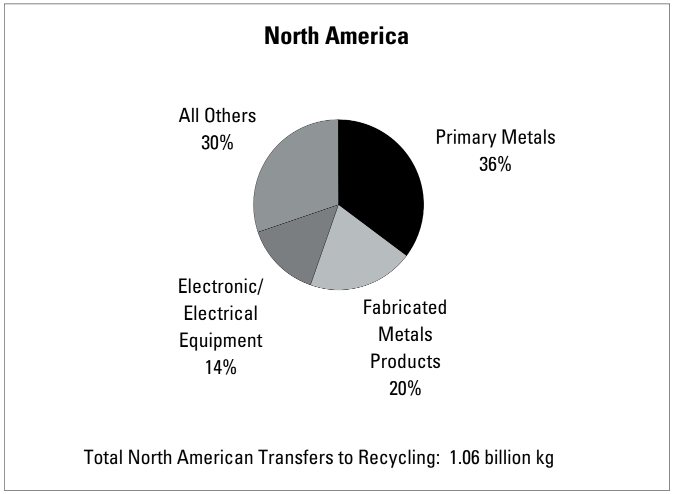
- The primary metals industry reported the largest amount of transfers to recycling, 372.8 million kg. This industry accounted for over 35 percent of total North American transfers to recycling, including 30 percent of all such transfers in NPRI and 36 percent of those in TRI.
- The fabricated metals industry reported the second-largest amount, 211.8 million kg, or 20 percent of the North American total. This sector accounted for the largest share of transfers to recycling in NPRI (40 percent) but for only 17 percent in TRI.
- The electronic/electrical equipment industry reported the third-largest amount of North American transfers, with 151.6 million kg, or 14 percent of the North American total. This sector accounted for 9 percent of transfers to recycling in NPRI and for 15 percent in TRI.
- The chemical manufacturing industry reported the largest amount of transfers to recycling of chemicals other than metals, 67.6 million kg, or 44 percent of the North American total of 155.2 million kg.

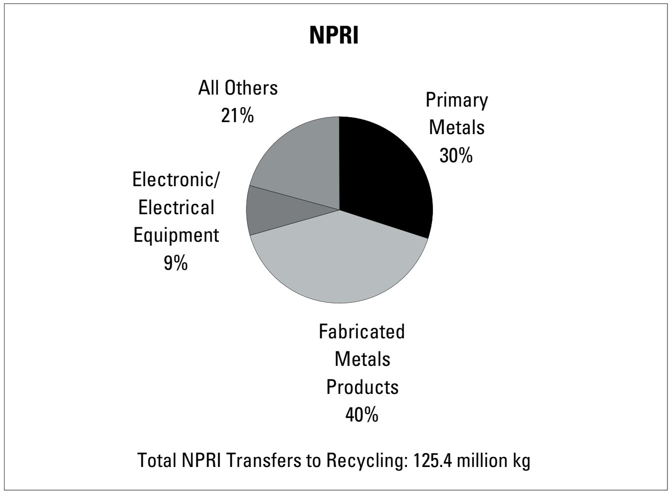
Table 5–3. Transfers to Recycling in North America, by Industry, 2000

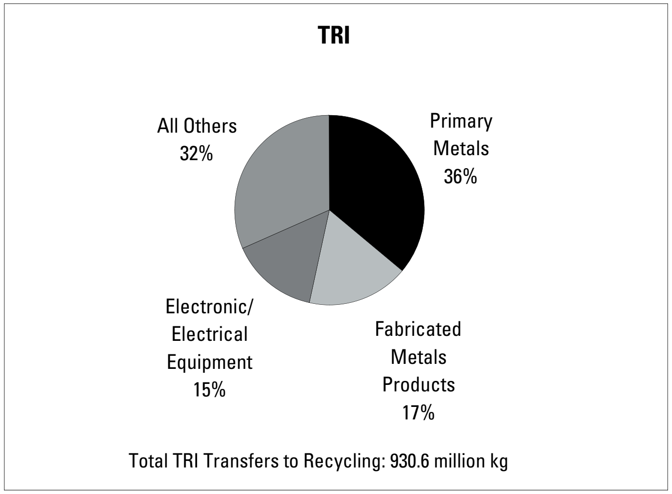
Rank	US SIC Code	Industry	Transfers to Recycling of Metals (kg)	Transfers to Recycling (except metals) (kg)	Total Transfers to Recycling (kg)	NPRI as % of North American Total	TRI as % of North American Total
1	33	Primary Metals	369,387,773	3,435,813	372,823,585	10	90
2	34	Fabricated Metals Products	205,735,402	6,078,346	211,813,747	24	76
3	36	Electronic/Electrical Equipment	147,585,168	4,050,041	151,635,208	7	93
4	--	Multiple codes 20–39*	63,417,278	16,335,735	79,753,012	0	100
5	28	Chemicals	9,115,344	67,563,165	76,678,509	7	93
6	37	Transportation Equipment	44,159,604	16,496,854	60,656,458	16	84
7	35	Industrial Machinery	37,178,868	1,897,780	39,076,648	5	95
8	29	Petroleum and Coal Products	921,152	15,788,534	16,709,686	4	96
9	495/738	Hazardous Waste Mgt./Solvent Recovery	3,782,863	7,240,444	11,023,307	11	89
10	30	Rubber and Plastics Products	4,202,451	4,734,873	8,937,324	28	72
11	39	Misc. Manufacturing Industries	5,327,813	2,608,175	7,935,989	27	73
12	38	Measurement/Photographic Instruments	3,017,207	1,795,331	4,812,538	0.4	99.6
13	27	Printing and Publishing	362,637	3,225,195	3,587,832	29	71
14	25	Furniture and Fixtures	1,160,380	1,993,519	3,153,899	20	80
15	32	Stone/Clay/Glass Products	2,179,708	253,495	2,433,203	10	90
16	491/493	Electric Utilities	1,855,087	33,133	1,888,220	43	57
17	20	Food Products	997,618	28,743	1,026,361	15	85
18	26	Paper Products	162,026	743,722	905,748	6	94
19	24	Lumber and Wood Products	19,700	446,260	465,960	35	65
20	22	Textile Mill Products	48,387	406,595	454,982	3	97
21	31	Leather Products	119,665	20	119,685	0	100
22	5169	Chemical Wholesalers	6,707	58,588	65,295	0	100
23	23	Apparel and Other Textile Products	22,562	1,758	24,321	0	100
24	12	Coal Mining	36	3,489	3,526	0	100
25	21	Tobacco Products	0	0	0	0	100
		Total	**900,765,438**	**155,219,607**	**1,055,985,045**	**12**	**88**

Note: Canada and US data only. Mexico data not available for 2000.
* Multiple SIC codes reported only in TRI.

Figure 5–3. Percentage Contribution of Top Industry Sectors to Transfers to Recycling, NPRI and TRI, 2000







Note: Canada and US data only. Mexico data not available for 2000.

5.2.3 Facilities with the Largest Transfers to Recycling, 2000

The 50 facilities in North America reporting the largest transfers to recycling accounted for 252.5 million kg, or 24 percent of all transfers to recycling in the matched data set for 2000.

- Just two of the top 50 facilities reported over 10 million kg of transfers to recycling—the Karmax Heavy Stamping facility in Milton, Ontario (13.5 million kg), and the US Mint, in Philadelphia, Pennsylvania (11.9 million kg). Both facilities' totals were comprised entirely of transfers to recycling of metals.
- Of these 50 facilities, 21 were primary metals facilities, 10 were electronic/electric equipment manufacturing facilities, and seven were fabricated metals facilities. These three industry sectors reported the largest amounts of transfers to recycling in North America in 2000.
- Thirty-seven of the 50 facilities reported transfers to recycling of metals and their compounds only.

Table 5–4. The 50 North American Facilities with the Largest Transfers to Recycling, 2000

			SIC Codes		
Rank	**Facility**	**City, State/Province**	**Canada**	**US**	**Number of Forms**
1	Karmax Heavy Stamping, Cosma International Inc.	Milton, ON	32	34	3
2	US Mint, US Department of the Treasury	Philadelphia, PA		34	4
3	Nucor Steel Arkansas, Nucor Corp.	Blytheville, AR		33	11
4	Olin Corp., Zone 17 Facility	East Alton, IL		33	9
5	North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta, OH		33	7
6	Mitsubishi Polyester Film L.L.C.	Greer, SC		Mult.	5
7	J & L Specialty Steel Inc.	Louisville, OH		33	6
8	Two Wastewater Treatment Unit, Treated Water Outsourcing (Two) L.L.C.	Oregon, OH		29	8
9	Republic Techs. Intl. Canton Facility	Canton, OH		33	9
10	US Mint, US Department of the Treasury	Denver, CO		34	3
11	Safety-Kleen Oil Recovery Co., Safety-Kleen Corp.	East Chicago, IN		29	5
12	Belden Communications Div., Belden Inc.	Phoenix, AZ		33	3
13	Parker Hannifin Brass Div.	Otsego, MI		34	2
14	Formosa Plastics Corp. Texas, Formosa Plastics Corp. USA	Point Comfort, TX		28	35
15	GE Co., Erie Plant GETS	Erie, PA		37	11
16	Chevron Phillips Chemical Co., Chevron Corp.	Port Arthur, TX		28	17
17	Price Pfister Inc., Black & Decker Corp.	Pacoima, CA		Mult.	6
18	Exide Corp.	Shreveport, LA		36	2
19	Thomas & Betts Corp.	Horseheads, NY		36	4
20	BP Amoco Polymers Inc., BP	Piedmont, SC		28	4
21	Exide Techs.	Manchester, IA		36	3
22	Chaparral Steel Midlothian L.P., Texas Inds. Inc.	Midlothian, TX		33	7
23	Essex Group Inc., Superior Telecom Inc.	Columbia City, IN		33	3
24	General Motors of Canada Limited, Delphi Canada Inc., Oshawa Battery	Oshawa, ON	33	36	2
25	Waltec Forgings Incorporated, Wallaceburg Plant	Wallaceburg, ON	30	34	3
26	Quanex Macsteel, Quanex Corp.	Fort Smith, AR		33	7
27	Douglas Battery Mfg. Co.	Winston-Salem, NC		36	3
28	Avaya Inc.	Omaha, NE		Mult.	7
29	Jessop Steel Co., Allegheny Techs. Inc.	Washington, PA		33	8
30	Noranda Inc., Affinerie CCR	Montréal-est, QC	29	33	13
31	Rea Magnet Wire Co.	Lafayette, IN		33	8
32	Engineered Controls Intl. Inc.	Whitsett, NC		34	4
33	Rome Cable Corp., Rome Group Inc.	Rome, NY		33	5
34	Johnson Controls Battery Group Inc., Johnson Controls Inc.	Saint Joseph, MO		36	3
35	Cerro Wire & Cable Co. Inc.	Hartselle, AL		33	3
36	Noranda Inc. CEZinc, Usine d'extraction de zinc	Valleyfield, QC	29	33	9
37	Mueller Brass Co., Mueller Inds. Inc.	Port Huron, MI		Mult.	6
38	C & D Techs. Dynasty Div.	Milwaukee, WI		36	1
39	Gallatin Steel Co., Dofasco Gallatin Inc./Co-Steel C.M.S. Corp.	Warsaw, KY		33	6
40	Co-Steel Lasco	Whitby, ON	29	33	6
41	Essex Group Inc., Superior Telecom Inc.	Franklin, TN		33	8
42	Co-Steel Raritan	Perth Amboy, NJ		33	6
43	Georgia Gulf Lake Charles L.L.C.	Westlake, LA		28	13
44	Exide Corp. Burlington, Exide Techs.	Burlington, IA		36	3
45	Tamco	Rancho Cucamonga, CA		33	5
46	Johnson Controls Battery Group Inc., Johnson Controls Inc.	Tampa, FL		36	2
47	Exide Corp.	Leavenworth, KS		36	2
48	Toray Plastics (America) Inc.	North Kingstown, RI		Mult.	5
49	Production Prods. Co., John Mezzalingua Associates	East Syracuse, NY		34	3
50	American Insulated Wire, Leviton Corp. Mfg. Co. Inc.	Coffeyville, KS		33	5
	Subtotal				**313**
	% of Total				**0.4**
	Total				**76,681**

Note: Canada and US data only. Mexico data not available for 2000. 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 5–4. (*continued*)

Rank	Transfers to Recycling of Metals (kg)	Transfers to Recycling (except metals) (kg)	Total Transfers to Recycling (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of transfers to recycling from the facility)
1	13,490,000	0	13,490,000	Zinc/Manganese and compounds
2	11,930,900	0	11,930,900	Copper and compounds
3	8,719,140	0	8,719,140	Zinc and compounds
4	7,904,000	3,092	7,907,093	Copper and compounds
5	7,905,690	0	7,905,690	Zinc and compounds
6	1,062	7,060,324	7,061,385	Ethylene glycol
7	6,893,749	0	6,893,749	Chromium/Nickel and compounds
8	4,590	6,826,757	6,831,347	Xylenes, Toluene
9	6,578,353	1,769	6,580,122	Zinc and compounds
10	6,397,206	0	6,397,206	Copper and compounds
11	0	6,046,945	6,046,945	Ethylene glycol
12	5,951,156	0	5,951,156	Copper and compounds
13	5,533,116	0	5,533,116	Copper and compounds
14	0	5,468,265	5,468,265	1,2-Dichloroethane, 1,1,2-Trichloroethane, Carbon tetrachloride
15	5,366,077	0	5,366,077	Manganese and compounds
16	0	5,243,091	5,243,091	Naphthalene, Styrene
17	5,117,440	0	5,117,440	Copper and compounds
18	5,016,780	0	5,016,780	Lead and compounds
19	4,997,323	0	4,997,323	Copper and compounds
20	0	4,927,492	4,927,492	N-Methyl-2-pyrrolidone
21	4,827,192	0	4,827,192	Lead and compounds
22	4,603,490	0	4,603,490	Zinc and compounds
23	4,565,759	0	4,565,759	Copper and compounds
24	4,542,000	0	4,542,000	Lead and compounds
25	4,488,420	0	4,488,420	Copper/Zinc and compounds
26	4,313,062	1,146	4,314,208	Manganese/Zinc and compounds
27	4,256,330	0	4,256,330	Lead and compounds
28	4,241,800	10,087	4,251,887	Copper and compounds
29	4,190,023	0	4,190,023	Chromium/Nickel and compounds
30	4,166,112	0	4,166,112	Copper/Lead and compounds
31	4,063,492	0	4,063,492	Copper and compounds
32	3,983,459	0	3,983,459	Copper and compounds
33	3,879,306	0	3,879,306	Copper and compounds
34	3,616,388	0	3,616,388	Lead and compounds
35	3,607,926	0	3,607,926	Copper and compounds
36	3,592,320	0	3,592,320	Copper/Lead and compounds
37	3,571,239	0	3,571,239	Zinc/Copper and compounds
38	3,570,729	0	3,570,729	Lead and compounds
39	3,535,283	0	3,535,283	Zinc and compounds
40	3,523,882	0	3,523,882	Zinc and compounds
41	3,504,574	2,376	3,506,950	Copper and compounds
42	3,501,859	0	3,501,859	Zinc and compounds
43	0	3,494,286	3,494,286	1,2-Dichloroethane, 1,1,2-Trichloroethane
44	3,472,684	0	3,472,684	Lead and compounds
45	3,449,298	0	3,449,298	Zinc and compounds
46	3,433,930	0	3,433,930	Lead and compounds
47	3,423,634	0	3,423,634	Lead and compounds
48	0	3,358,277	3,358,277	Ethylene glycol
49	3,164,233	0	3,164,233	Copper and compounds
50	3,143,311	0	3,143,311	Copper and compounds
	210,038,314	**42,443,905**	**252,482,219**	
	23	**27**	**24**	
	900,765,438	**155,219,607**	**1,055,985,045**	

5.2.4 Chemicals with the Largest Transfers to Recycling, 2000

The 25 chemicals with the largest transfers to recycling in North America, with 1.03 billion kg, represented 98 percent of all transfers to recycling in the matched data set for 2000.

- Nine of the 25 chemicals with the largest transfers to recycling (including the top six) were metals and their compounds.
- Copper and its compounds had the largest transfers to recycling, with 395.8 million kg, over 37 percent of all transfers to recycling in 2000.
- Zinc and its compounds had the second-largest, with 179.8 million kg. NPRI facilities reported 19 percent of the transfers to recycling of zinc and its compounds.
- Only one other chemical (lead and its compounds) had more than 100 million kg of transfers to recycling. All other chemicals had less than 66 million kg.

Table 5–5. The 25 Chemicals with the Largest Transfers to Recycling in North America, 2000

Rank	CAS Number		Chemical	Number of Forms	Transfers to Recycling of Metals (kg)	Transfers to Recycling (except metals) (kg)
1	--	m	Copper (and its compounds)	5,111	395,835,159	0
2	--	m	Zinc (and its compounds)	4,160	179,792,852	0
3	--	m,c,p,t	Lead (and its compounds)	2,066	127,335,735	0
4	--	m	Manganese (and its compounds)	3,998	65,904,217	0
5	--	m,c,p,t	Chromium (and its compounds)	4,223	59,535,482	0
6	--	m,c,p,t	Nickel (and its compounds)	3,824	51,221,394	0
7	107-21-1		Ethylene glycol	1,778	0	32,656,641
8	--		Xylenes	3,403	0	23,566,319
9	108-88-3	p	Toluene	3,307	0	15,898,330
10	7429-90-5	m	Aluminum (fume or dust)	410	11,991,690	0
11	78-93-3		Methyl ethyl ketone	2,117	0	9,196,670
12	67-56-1		Methanol	2,816	0	8,518,270
13	872-50-4	p	N-Methyl-2-pyrrolidone	512	0	7,655,622
14	108-10-1		Methyl isobutyl ketone	1,036	0	5,972,192
15	107-06-2	c,p,t	1,2-Dichloroethane	98	0	5,585,536
16	75-09-2	c,p,t	Dichloromethane	692	0	5,187,244
17	--	m,c,p	Cobalt (and its compounds)	759	4,581,031	0
18	127-18-4	c,p,t	Tetrachloroethylene	477	0	3,912,120
19	110-54-3		n-Hexane	1,049	0	3,586,344
20	100-41-4	c	Ethylbenzene	1,302	0	3,569,257
21	79-00-5	p	1,1,2-Trichloroethane	38	0	3,376,355
22	91-20-3		Naphthalene	699	0	2,986,884
23	--	m	Antimony (and its compounds)	793	2,025,944	0
24	79-01-6	c,p,t	Trichloroethylene	635	0	1,957,535
25	117-81-7	c,p,t	Di(2-ethylhexyl) phthalate	399	0	1,817,810
			Subtotal	**45,702**	**898,223,504**	**135,443,129**
			% of Total	**60**	**99.7**	**87**
			Total	**76,681**	**900,765,438**	**155,219,607**

Note: Canada and US data only. Mexico data not available for 2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Table 5–5. (*continued*)

Total Transfers to Recycling (kg)	NPRI as % of North American Total	TRI as % of North American Total
395,835,159	8	92
179,792,852	19	81
127,335,735	10	90
65,904,217	20	80
59,535,482	12	88
51,221,394	8	92
32,656,641	4	96
23,566,319	21	79
15,898,330	20	80
11,991,690	40	60
9,196,670	29	71
8,518,270	5	95
7,655,622	0.2	99.8
5,972,192	11	89
5,585,536	0	100
5,187,244	3	97
4,581,031	2	98
3,912,120	4	96
3,586,344	0	100
3,569,257	10	90
3,376,355	0	100
2,986,884	0.1	99.9
2,025,944	12	88
1,957,535	4	96
1,817,810	7	93
1,033,666,632	**12**	**88**
98		
1,055,985,045	**9**	**91**

5.3 Other Transfers for Further Management, 2000

Other transfers for further management include off-site transfers of chemicals (195 chemicals, not including metals and their compounds) to energy recovery, treatment, and sewage.

Off-site transfers of metals and their compounds to energy recovery, treatment, and sewage are analyzed in **Chapter 4**. 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 are not destroyed by treatment or burned in energy recovery.

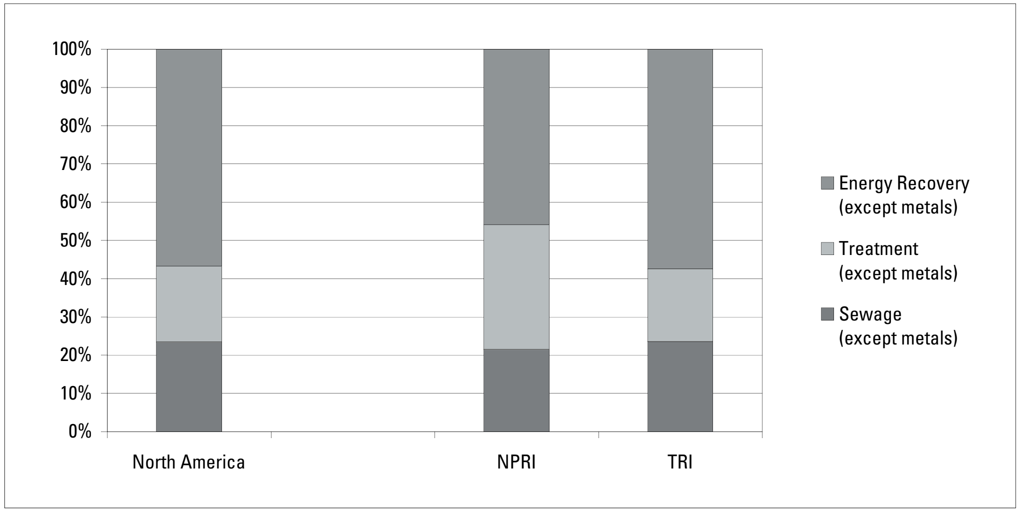
- In 2000, facilities in North America sent 624.9 million kg of chemicals (other than metals) in the matched data set to off-site energy recovery, treatment, and sewage. TRI facilities accounted for 95 percent of these transfers.
- Transfers to energy recovery (355.0 million kg) accounted for 57 percent of the North American total. They made up 46 percent of the NPRI total and 57 percent of the TRI total.
- Transfers to treatment (123.7 million kg) were 20 percent of the North American total, 33 percent of the NPRI total, and 19 percent of the TRI total.
- Transfers to sewage (146.2 million kg) made up 23 percent of the North American total, 21 percent of the NPRI total, and 24 percent of the TRI total.

Table 5–6. Summary of Other Transfers for Further Management in North America, NPRI and TRI, 2000

	North America		NPRI		TRI		NPRI as % of North American	TRI as % of North American
	Number		Number		Number		Total	Total
Total Facilities	22,036		1,698		20,338		8	92
Total Forms	76,681		6,162		70,519		8	92
	kg	%	kg	%	kg	%		
Other Off-site Transfers for Further Management (not including recycling)	**624,894,030**	**100**	**33,588,031**	**100**	**591,305,999**	**100**	**5**	**95**
Energy Recovery (except metals)	355,015,520	57	15,430,088	46	339,585,432	57	4	96
Treatment (except metals)	123,657,878	20	10,955,270	33	112,702,608	19	9	91
Sewage (except metals)	146,220,632	23	7,202,673	21	139,017,959	24	5	95

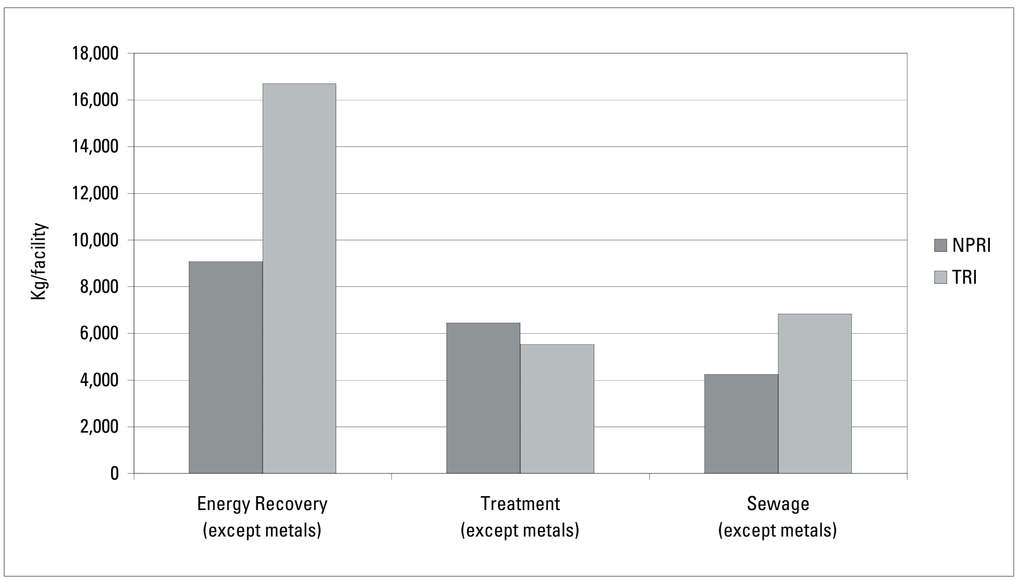
Note: Canada and US data only. Mexico data not available for 2000. Data include 206 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination 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.

Figure 5–4. Percentage of Other Transfers for Further Management in North America by Type, NPRI and TRI, 2000



Note: Canada and US data only. Mexico data not available for 2000.

Figure 5–5. Average Kilograms per Facility of Other Transfers for Further Management, NPRI and TRI, 2000



Note: Canada and US data only. Mexico data not available for 2000.

- The average amount of transfers to energy recovery reported per facility was almost twice as large (1.8 times) in TRI as in NPRI.
- For transfers to sewage, as well, the TRI per-facility average was 1.6 times as large as NPRI facilities.
- For transfers to treatment, however, the NPRI per-facility average was higher—about 1.2 times the average of TRI facilities.

5.3.1 Other Transfers for Further Management by State and Province, 2000

Off-site transfers for further management may be to nearby locations, out of the state or province, or out of the country. **Chapter 8** presents information on the destinations of these transfers; this section shows where they originated.

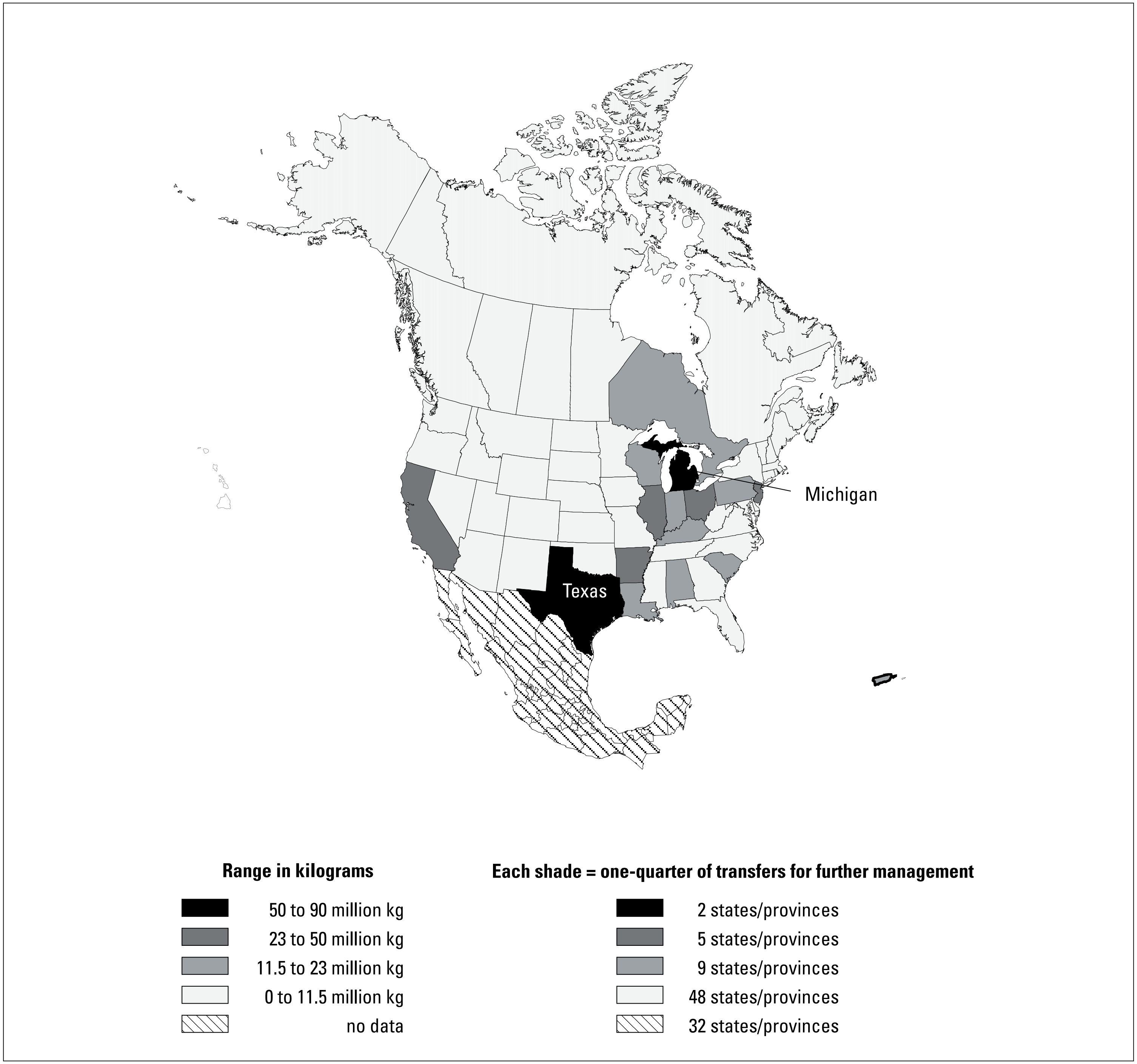
- The jurisdiction with the largest other transfers for further management in 2000 was Texas, with a total of 89.2 million kg to energy recovery, treatment, and sewage, or 14 percent of all North American transfers of this kind. Texas reported the highest transfers to sewage (except metals) and the highest transfers to treatment (except metals) in North America in 2000.
- Michigan reported the second-highest total other transfers for further management, 67.8 million kg. Michigan facilities reported the highest transfers to energy recovery (except metals).
- New Jersey ranked third in other transfers, with 44.2 million kg. The state had the second-largest transfers to sewage and the third-largest transfers to energy recovery.

Table 5–7. Other Transfers for Further Management, by State and Province, 2000

	Transfers to Energy Recovery (except metals)		Transfers to Treatment (except metals)		Transfers to Sewage (except metals)		Total Other Transfers for Further Management	
State/Province	kg	Rank	kg	Rank	kg	Rank	kg	Rank
Alabama	13,948,914	9	5,811,463	6	2,236,217	20	21,996,595	9
Alaska	240	57	1,107	59	2	57	1,350	60
Alberta	861,635	35	674,104	31	1,126,067	28	2,661,806	35
Arizona	955,659	33	370,079	36	961,140	32	2,286,878	37
Arkansas	22,757,775	4	1,267,110	25	629,839	36	24,654,723	7
British Columbia	443,560	40	245,977	38	57,398	50	746,935	42
California	11,886,484	13	3,613,589	13	11,246,728	3	26,746,801	5
Colorado	1,439,433	29	944,124	27	510,335	37	2,893,892	33
Connecticut	1,205,215	32	3,052,979	16	1,061,507	30	5,319,702	30
Delaware	951,184	34	359,889	37	819,702	35	2,130,775	38
District of Columbia	0	--	0	--	0	--	0	--
Florida	1,233,157	31	679,268	30	3,476,027	14	5,388,452	29
Georgia	6,307,698	16	1,399,225	24	1,796,046	23	9,502,969	20
Guam	0	--	0	--	0	--	0	--
Hawaii	200	58	1,107	60	0	--	1,307	61
Idaho	49,900	49	13,976	55	388,754	38	452,630	47
Illinois	16,668,625	6	4,409,582	11	4,302,737	12	25,380,944	6
Indiana	6,095,578	17	3,387,063	15	2,432,166	19	11,914,806	16
Iowa	1,783,554	27	993,035	26	2,903,925	16	5,680,514	27
Kansas	1,427,372	30	31,244	49	972,068	31	2,430,684	36
Kentucky	14,296,431	8	3,601,834	14	3,222,397	15	21,120,662	10
Louisiana	8,208,410	14	5,988,702	5	249,354	45	14,446,466	15
Maine	167,422	45	22,110	53	272,151	44	461,683	46
Manitoba	222,540	43	241,577	39	206	54	464,323	45
Maryland	404,699	41	2,446,541	18	1,883,901	22	4,735,141	32
Massachusetts	3,260,396	23	2,130,418	21	4,706,073	11	10,096,887	19
Michigan	51,335,293	1	9,012,348	2	7,492,022	5	67,839,663	2
Minnesota	4,805,239	20	551,506	33	5,263,962	7	10,620,707	18
Mississippi	2,394,210	25	819,874	29	1,560,883	26	4,774,967	31
Missouri	5,180,325	19	1,700,492	23	1,970,533	21	8,851,349	21
Montana	10,585	52	2,467	57	120	55	13,172	57
Nebraska	170,881	44	64,478	46	293,760	42	529,119	44
Nevada	12,201	51	22,659	52	15,555	52	50,415	55
New Brunswick	0	--	59,527	47	0	--	59,527	54
New Hampshire	723,644	37	48,180	48	323,308	40	1,095,132	39
New Jersey	23,115,107	3	4,851,903	9	16,263,227	2	44,230,237	3
New Mexico	55,671	48	26,783	50	276,755	43	359,209	48
New York	1,698,395	28	2,184,859	19	4,768,434	10	8,651,688	23
Newfoundland	0	--	0	--	0	--	0	--
North Carolina	3,982,332	21	2,862,104	17	1,136,791	27	7,981,227	24
North Dakota	19,047	50	1,526	58	157,045	48	177,619	51
Nova Scotia	8,580	53	25,342	51	416	53	34,338	56
Ohio	20,524,167	5	6,844,227	3	9,606,330	4	36,974,725	4
Oklahoma	522,753	38	203,277	40	308,358	41	1,034,388	41
Ontario	11,959,617	11	5,778,570	7	5,112,774	8	22,850,961	8
Oregon	513,945	39	169,360	42	4,956,155	9	5,639,459	28
Pennsylvania	7,222,922	15	4,868,635	8	3,523,774	13	15,615,332	14
Prince Edward Island	0	--	126,464	43	0	--	126,464	52
Puerto Rico	11,952,736	12	6,838,955	4	847,811	34	19,639,502	12
Quebec	1,934,156	26	3,782,292	12	867,664	33	6,584,112	25
Rhode Island	376,650	42	528,206	34	189,038	46	1,093,894	40
Saskatchewan	0	--	21,417	54	38,148	51	59,565	53
South Carolina	15,945,047	7	2,180,615	20	2,504,659	17	20,630,320	11
South Dakota	156,994	46	74,744	45	63,767	49	295,504	49
Tennessee	3,096,180	24	883,858	28	1,751,568	24	5,731,606	26
Texas	50,794,653	2	19,697,403	1	18,677,449	1	89,169,505	1
Utah	68,883	47	199,671	41	383,781	39	652,335	43
Vermont	905	56	101,254	44	182,188	47	284,347	50
Virgin Islands	3,581	54	3,744	56	0	--	7,325	58
Virginia	3,340,332	22	581,705	32	7,242,838	6	11,164,876	17
Washington	806,947	36	419,165	35	1,622,999	25	2,849,111	34
West Virginia	5,631,237	18	1,938,408	22	1,093,454	29	8,663,098	22
Wisconsin	12,074,768	10	4,495,049	10	2,470,214	18	19,040,031	13
Wyoming	1,454	55	708	61	113	56	2,276	59
Total	**355,015,520**		**123,657,878**		**146,220,632**		**624,894,030**	

Note: Canada and US data only. Mexico data not available for 2000. 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.

Map 5-2. States and Provinces in North America Sending Largest Other Transfers for Further Management, 2000



5.3.2 Other Transfers for Further Management by Industry, 2000

Facilities in the chemical manufacturing sector and the hazardous waste management/solvent recovery sector reported the largest amounts of other transfers for further management in North America in 2000.

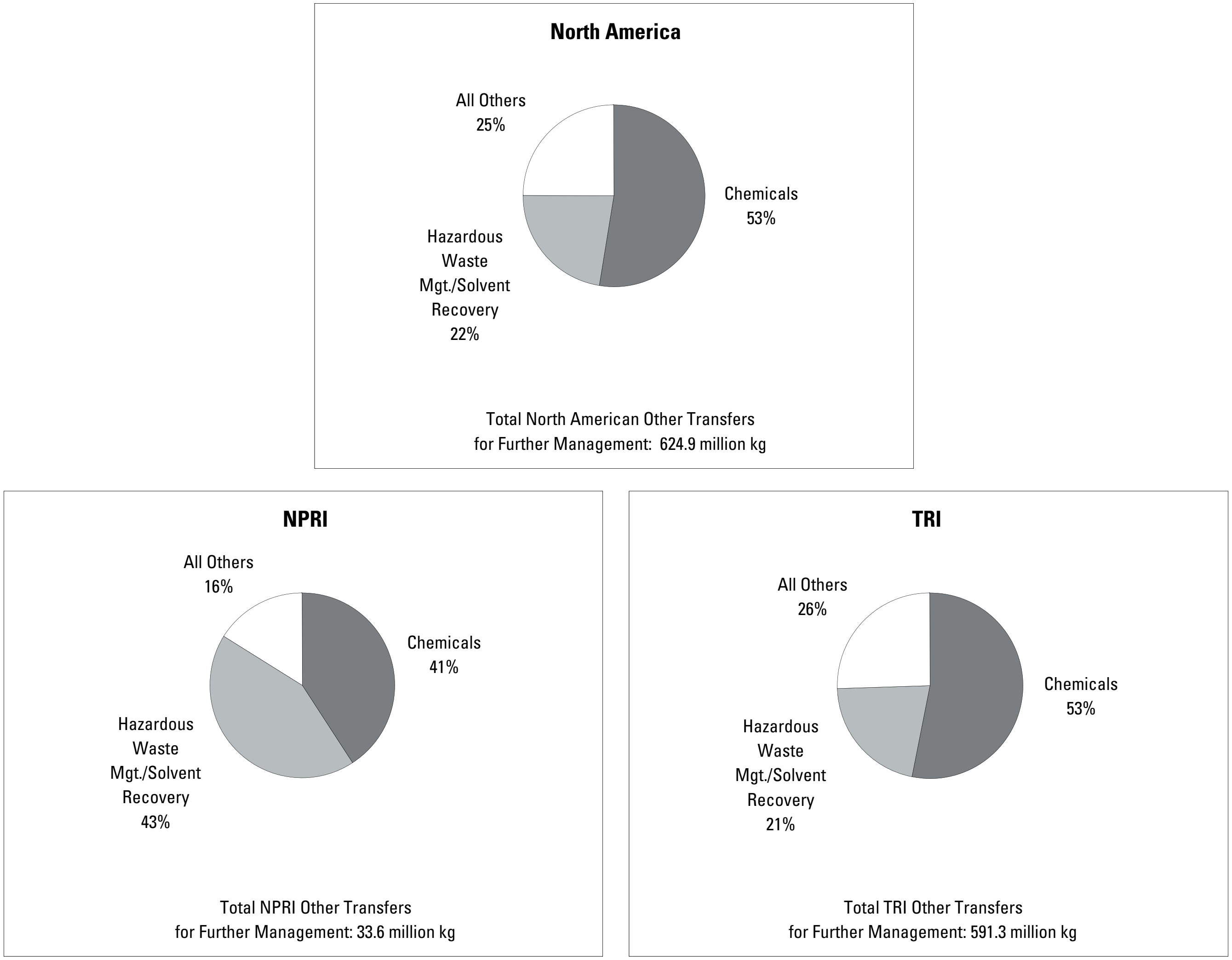
- The chemical manufacturing sector reported the largest total other transfers for further management, 328.2 million kg, or 53 percent of the North American total for such transfers. Chemical manufacturing had the largest totals across all three areas—transfers to energy recovery (182.5 million kg), transfers to treatment (80.7 million kg), and transfers to sewage (65.0 million kg). The sector accounted for 41 percent of other transfers in NPRI and 53 percent in TRI.
- Hazardous waste management/solvent recovery facilities reported the second-largest such transfers, 139.8 million kg, or 22 percent of the North American total. This sector accounted for 43 percent of total other transfers in NPRI and 21 percent in TRI.
- No other industry sector reported more than 28 million kg of total other transfers for further management.

Table 5–8. Other Transfers for Further Management in North America by Industry, 2000

Rank	US SIC Code	Industry	Transfers to Energy Recovery (except metals) (kg)	Transfers to Treatment (except metals) (kg)	Transfers to Sewage (except metals) (kg)	Total Other Transfers for Further Management (kg)	NPRI as % of North American Total	TRI as % of North American Total
1	28	Chemicals	182,518,494	80,664,958	64,978,082	328,161,534	4	96
2	495/738	Hazardous Waste Mgt./Solvent Recovery	120,628,891	17,773,138	1,423,460	139,825,489	10	90
3	--	Multiple codes 20–39*	13,185,686	3,833,847	10,625,572	27,645,104	0	100
4	26	Paper Products	3,219,854	3,952,108	16,771,664	23,943,626	0.4	99.6
5	36	Electronic/Electrical Equipment	6,410,781	1,545,321	10,491,233	18,447,335	1	99
6	34	Fabricated Metals Products	4,845,622	3,038,482	8,311,778	16,195,882	6	94
7	20	Food Products	58,054	388,457	13,465,744	13,912,255	9	91
8	33	Primary Metals	2,375,597	2,314,118	7,357,027	12,046,742	2	98
9	37	Transportation Equipment	5,134,033	1,804,018	3,269,096	10,207,148	10	90
10	30	Rubber and Plastics Products	3,052,972	1,376,712	1,549,085	5,978,769	10	90
11	5169	Chemical Wholesalers	4,318,230	1,324,994	15,554	5,658,778	0.5	99.5
12	29	Petroleum and Coal Products	705,313	1,626,242	3,012,815	5,344,370	7	93
13	32	Stone/Clay/Glass Products	1,381,055	453,344	1,855,627	3,690,026	2	98
14	27	Printing and Publishing	1,370,616	662,069	549,212	2,581,897	4	96
15	39	Misc. Manufacturing Industries	854,786	921,390	680,763	2,456,938	7	93
16	35	Industrial Machinery	905,743	416,195	1,084,645	2,406,583	1	99
17	38	Measurement/Photographic Instruments	1,029,536	755,488	201,080	1,986,103	0	100
18	25	Furniture and Fixtures	1,284,283	543,125	8,232	1,835,639	13	87
19	22	Textile Mill Products	759,801	119,524	415,629	1,294,954	1	99
20	24	Lumber and Wood Products	949,942	114,842	104,526	1,169,311	4	96
21	31	Leather Products	7,888	12,732	40,359	60,979	1	99
22	491/493	Electric Utilities	5,845	16,484	308	22,638	53	47
23	23	Apparel and Other Textile Products	12,497	0	8,653	21,150	0	100
24	21	Tobacco Products	0	290	488	778	0	100
25	12	Coal Mining	0	0	0	0	0	100
		Total	**355,015,520**	**123,657,878**	**146,220,632**	**624,894,030**	**5**	**95**

Note: Canada and US data only. Mexico data not available for 2000.
* Multiple SIC codes reported only in TRI.

Figure 5–6. Percentage Contribution of Top Industry Sectors to Other Transfers for Further Management, NPRI and TRI, 2000



Note: Canada and US data only. Mexico data not available for 2000.

5.3.3 Largest Amounts of Transfers to Energy Recovery: Facilities and Chemicals, 2000

The 50 facilities in North America reporting the largest transfers to energy recovery accounted for 213.6 million kg, or 34 percent of all such transfers.

- One hazardous waste management/solvent recovery facility in Arkansas reported 18.0 million kg of transfers to energy recovery, almost 3 percent of all such transfers in 2000.
- Another hazardous waste management/solvent recovery facility, in Michigan, reported 13.9 million kg of transfers to energy recovery.

Query Builder

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

To generate a list of chemicals with the largest transfers to energy recovery using *Taking Stock* Online:

1. select **Chemical** report.
2. select the year **2000**.
3. select **Canada & USA** for the geographic area,
   select **All chemicals** for the chemical,
   select **All industries** for the industrial sector.
4. select **Treanfers to energy recovery**.

Then click on ✓ **Run the query**

Once you have the report, go to the column titled "Transfers to energy recovery" and click on the **arrow pointing down** to sort in descending order and get the 10 chemicals with the largest transfers to energy recovery.

Table 5–9. The 50 North American Facilities with the Largest Transfers to Energy Recovery, 2000

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Transfers to Energy Recovery (except metals) (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of transfers to energy recovery from the facility)
1	Rineco	Benton, AR		495/738	38	18,037,462	Xylenes, Toluene, Methyl ethyl ketone, Methanol
2	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	21	13,874,327	Toluene, Xylenes, Methanol, Methyl isobutyl ketone, Methyl ethyl ketone
3	Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo, MI		28	28	12,687,274	Methanol, Toluene
4	Pfizer Inc., Parke-Davis Div.	Holland, MI		28	13	12,414,766	Methanol, Toluene
5	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	7	11,178,961	Cyclohexane, Xylenes, Toluene, Methyl ethyl ketone
6	Marisol Inc.	Middlesex, NJ		495/738	22	10,181,502	Toluene, Xylenes, Methanol
7	Philip Services Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	19	8,761,340	Xylenes, Toluene
8	Equistar Chemicals L.P., Victoria Facility	Victoria, TX		28	5	8,034,327	Ethylene
9	Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment Co.	Sumter, SC		495/738	5	7,564,841	Methyl ethyl ketone, Toluene
10	Phenolchemie Inc.	Theodore, AL		28	12	5,580,072	Acetophenone
11	Safety-Kleen Envirosystems Co. of Puerto Rico Inc.	Manati, PR		495/738	5	5,560,990	Dichloromethane, Acetonitrile, Xylenes
12	Romic Environmental Techs. Corp., U.S. Liquids Inc.	East Palo Alto, CA		495/738	11	5,173,111	N-Methyl-2-pyrrolidone, Methyl ethyl ketone, Toluene
13	Celanese Ltd. Clear Lake Plant, Celanese Americas Corp.	Pasadena, TX		28	19	5,035,921	Diethyl sulfate, Acrylic acid
14	Heat Treatment Services Inc., Rhodia Inc.	Dallas, TX		495/738	10	4,876,586	Xylenes, Toluene, n-Hexane
15	Safety-Kleen Corp.	Denton, TX		495/738	13	3,915,182	Xylenes, Toluene, Methyl ethyl ketone
16	Lyondell Chemical Co., Bayport Facility	Pasadena, TX		28	11	3,907,508	tert-Butyl alcohol, Formic acid
17	Safety-Kleen Sys. Inc.	Dolton, IL		495/738	8	3,768,557	Toluene, Xylenes, Methyl ethyl ketone
18	Disposal Systems Inc., GNI Group Inc.	Deer Park, TX		495/738	24	3,596,451	Toluene
19	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	10	3,540,118	N-Methyl-2-pyrrolidone, Toluene, Dichloromethane, Methanol
20	Hydrite Chemical Co.	Cottage Grove, WI		28	20	3,492,943	Methanol, Toluene
21	WRR Environmental Services Co. Inc., Caribou Corp.	Eau Claire, WI		495/738	14	3,490,277	Xylenes, Toluene, Methyl ethyl ketone
22	Merck & Co. Inc.	Albany, GA		28	10	3,382,104	Methanol, Toluene
23	3M Cottage Grove Center, 3M Co. Inc.	Cottage Grove, MN		Mult.	50	3,308,055	Xylenes, Methyl ethyl ketone, Toluene
24	Hukill Chemical Corp.	Bedford, OH		495/738	17	3,271,477	Xylenes, Toluene, Methyl ethyl ketone
25	Kemet Electronics Corp.	Simpsonville, SC		36	1	3,153,632	Methanol
26	Abbott Labs, North Chicago Facility	North Chicago, IL		28	19	2,998,709	Methanol, Acetonitrile
27	Union Carbide Corp., Institute WV Plant Ops.	Institute, WV		28	22	2,693,923	Ethylene glycol
28	Dow Corning Corp.	Midland, MI		28	22	2,612,292	Methanol, Toluene, Xylenes
29	Merck & Co. Inc.	Rahway, NJ		28	9	2,556,259	Toluene, Methanol
30	Resolution Performance Prods., Deer Park Plant	Deer Park, TX		28	9	2,539,683	4,4'-Isopropylidenediphenol, Phenol
31	Ciba Specialty Chemicals	West Memphis, AR		28	14	2,421,283	Methanol
32	Milsolv Brenntag Corp., Brenntag Inc.	Menomonee Falls, WI		5169	21	2,194,926	Toluene, Xylenes, Methyl ethyl ketone
33	Wyckoff Inc. (dba DSM Catalytica Pharmaceuticals), DSM Catalytica Pharmaceutical	South Haven, MI		28	9	2,081,769	Methanol, Toluene
34	Gage Prods. Co.	Ferndale, MI		28	13	1,948,280	Xylenes, Methanol, Ethylbenzene
35	Onyx Environmental Services L.L.C.	Azusa, CA		495/738	8	1,922,373	Methyl ethyl ketone, Xylenes, Toluene
36	Degussa-Huls Corp.	Theodore, AL		28	30	1,901,724	Methanol, Toluene, Methyl isobutyl ketone
37	Safety-Kleen Canada Inc., Centre de Recyclage de St-Constant	St-Constant, QC	99	495/738	12	1,879,000	Toluene, Xylenes, Methyl ethyl ketone
38	Chemical Solvents, Denison Avenue Facility	Cleveland, OH		28	16	1,654,469	N-Methyl-2-pyrrolidone, Toluene, Xylenes, Methanol
39	3M	Decatur, AL		Mult.	20	1,623,155	Methanol, Toluene
40	BASF Corp.	Geismar, LA		28	39	1,617,234	N-Methyl-2-pyrrolidone
41	Perstorp Polyols Inc.	Toledo, OH		28	5	1,405,896	Methanol
42	Teva Pharmaceuticals USA Inc., Teva Pharmeucital Inds. Ltd.	Mexico, MO		28	7	1,396,059	Methanol
43	DuPont Agricultural Caribe Inds. Ltd.	Manati, PR		28	5	1,355,294	Xylenes, Methanol
44	Crompton Mfg. Co. Inc., Crompton Corp.	Geismar, LA		28	25	1,349,206	Diphenylamine, Toluene, N-Nitrosodiphenylamine
45	ISP Van Dyk Inc., International Specialty Prods.	Belleville, NJ		28	3	1,325,028	Toluene
46	Millennium Petrochemicals Inc., La Porte Plant, Millennium Chemicals Inc.	La Porte, TX		28	9	1,311,900	Vinyl acetate
47	Roche Colorado Corp., Syntex USA Inc.	Boulder, CO		28	10	1,281,406	Methanol, n-Hexane, N-Methyl-2-pyrrolidone
48	Aimco Solrec Ltd.	Milton, ON	37	28	7	1,271,040	Xylenes, Toluene, Methyl ethyl ketone
49	Abbott Health Prods. Inc., Abbott Labs.	Barceloneta, PR		28	12	1,224,023	Acetonitrile
50	Equistar Chemicals L.P., La Porte Plant	La Porte, TX		28	15	1,219,976	Vinyl acetate
	Subtotal				**754**	**213,572,692**	
	% of Total				**1**	**34**	
	Total				**76,681**	**624,894,030**	

Note: Canada and US data only. Mexico data not available for 2000. 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 5–10. The 50 North American Facilities with the Largest Transfers to Treatment, 2000

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Transfers to Treatment (except metals) (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of transfers to treatment from the facility)
1	DuPont Beaumont Plant	Beaumont, TX		28	32	3,234,770	Aniline
2	Stora Enso N.A., Wisconsin Rapids Pulp Mill	Wisconsin Rapids, WI		26	12	3,065,011	Methanol
3	Air Prods. & Chemicals Inc.	Geismar, LA		28	5	2,714,450	Nitric acid and nitrate compounds
4	Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo, MI		28	28	2,475,995	Dichloromethane
5	Pfizer Inc., Groton Site	Groton, CT		28	14	2,410,551	Methanol
6	FMC Corp.	Baltimore, MD		28	20	2,284,608	Methanol, Toluene
7	DuPont Mobile Plant	Axis, AL		28	11	2,241,751	Toluene, Xylenes, 1,2-Dichlorobenzene
8	Safety-Kleen Envirosystems Co. of Puerto Rico Inc.	Manati, PR		495/738	5	2,104,263	Dichloromethane
9	Dow Corning Corp.	Midland, MI		28	22	1,939,565	Xylenes, Toluene, Acetonitrile, Chlorobenzene
10	DuPont La Porte Plant	La Porte, TX		28	25	1,764,248	Methanol, Vinyl acetate
11	Bristol-Myers Squibb Mfg., Bristol Myers Squibb Co.	Humacao, PR		28	16	1,707,909	Dichloromethane, Acetonitrile, Methanol
12	Marisol Inc.	Middlesex, NJ		495/738	22	1,613,942	Toluene, Methanol, Xylenes, Dichloromethane
13	Akzo Nobel Polymer Chemicals L.L.C., Akzo Nobel Inc.	Deer Park, TX		28	8	1,582,467	n-Hexane
14	Safety-Kleen Corp.	Denton, TX		495/738	13	1,438,494	Xylenes, Toluene, Methyl ethyl ketone
15	Ciba Specialty Chemical Corp.	Mc Intosh, AL		28	32	1,354,404	Methanol
16	Sistersville Plant, Crompton Corp.	Friendly, WV		28	17	1,295,500	Methanol, Toluene
17	Lilly Tech. Center, Eli Lilly & Co.	Indianapolis, IN		28	9	1,217,642	Acetonitrile
18	Chemfirst Fine Chemicals Inc., Chemfirst Inc.	Tyrone, PA		28	23	1,139,589	Toluene, Xylenes, Methanol, Methyl isobutyl ketone
19	Pharmacia & Upjohn Caribe Inc., Pharmacia Corp.	Arecibo, PR		28	11	1,116,322	Dichloromethane
20	Services Safety-Kleen (Québec) Ltée, Centre de transfert de Thurso	Thurso, QC	77	495/738	16	995,000	Toluene, Xylenes, Methanol, Methyl isobutyl ketone, Chloromethane
21	Ashland Distribution Co., Ashland Inc.	Charlotte, NC		5169	26	979,196	Methyl ethyl ketone, Toluene, Xylenes
22	Ciba Specialty Chemicals	West Memphis, AR		28	14	973,889	Methanol
23	DuPont Chambers Works	Deepwater, NJ		28	63	954,981	Methanol, Dichloromethane, Acetonitrile, tert-Butyl alcohol
24	Tippecanoe Labs., Eli Lilly & Co.	Lafayette, IN		28	21	948,299	Methanol, Dichloromethane, Acetonitrile
25	Laporte Methanol Co. L.P.	La Porte, TX		28	4	907,029	Methanol
26	Hukill Chemical Corp.	Bedford, OH		495/738	17	897,343	Xylenes, Toluene, Methyl ethyl ketone
27	EQ Resource Recovery Inc., EQ Holding Co.	Romulus, MI		495/738	21	896,429	Methanol, Toluene, Xylenes, Methyl ethyl ketone, n-Hexane
28	DK Environmental Inc., Demenno Kerdoon	Vernon, CA		495/738	7	862,426	Nitric acid and nitrate compounds, Ethylene glycol
29	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	21	858,542	Dichloromethane, Tetrachloroethylene
30	Les Produits chimiques Delmar Inc., Laboratoires Pharmedical SA	Lasalle, QC	37	28	7	845,800	Toluene, n-Hexane
31	Roche Vitamins Inc., Hoffmann-La Roche Inc.	Freeport, TX		28	4	810,293	Methanol, Dichloromethane
32	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	7	806,001	Cyclohexane, Xylenes, Toluene
33	Rutgers Organics Corp., Rutgers AG	State College, PA		28	14	794,556	Nitric acid and nitrate compounds, Chlorine
34	Chemical Specialties Inc., Laporte Inc.	Harrisburg, NC		28	8	725,831	Nitric acid and nitrate compounds
35	Kuntz Electroplating Inc.	Kitchener, ON	30	34	5	720,113	Nitric acid and nitrate compounds
36	Oxy Vinyls L.P., La Porte VCM Plant, Occidental Petroleum Corp.	La Porte, TX		28	23	713,218	1,1,2-Trichloroethane, 1,2-Dichloroethane
37	US Filter Recovery Services (CA) Inc., US Filter Corp.	Vernon, CA		495/738	44	707,451	Cyanide and compounds
38	Bayer Corp., Baytown	Baytown, TX		28	27	704,762	Chlorobenzene, Toluenediisocyanate, Methanol
39	DDE Louisville, DuPont Dow Elastomers	Louisville, KY		28	8	700,763	Toluene
40	DuPont Agricultural Caribe Inds. Ltd.	Manati, PR		28	5	658,800	Xylenes, Methanol
41	Occidental Chemical Corp., Occidental Petroleum Corp.	Convent, LA		28	11	658,724	1,2-Dichloroethane
42	ISP Chemicals Inc.	Assonet, MA		28	6	651,360	Toluene, Methanol
43	Safety-Kleen (Baton Rouge) Inc., Safety-Kleen Corp.	Baton Rouge, LA		495/738	20	620,005	Toluene, Methyl ethyl ketone, 1,2-Dichloroethane, Tetrachloroethylene, Xylenes
44	Rohm & Haas Texas Inc., Rohm & Haas Co.	Deer Park, TX		28	30	612,059	Acrylic acid, Toluene
45	MDA Mfg. Inc.	Decatur, AL		28	4	584,610	Methanol, Chlorodifluoromethane
46	WRR Environmental Services Co. Inc., Caribou Corp.	Eau Claire, WI		495/738	14	584,602	Toluene, Methyl ethyl ketone, Trichloroethylene
47	Resolution Performance Prods. L.L.C.	Bedford Park, IL		28	9	578,928	Methyl ethyl ketone
48	Dow Chemical Co. Midland Ops.	Midland, MI		28	66	577,540	Acetonitrile, Methanol
49	Clariant LSM America Inc., Clariant Corp.	Rock Hill, SC		28	3	577,184	Methanol
50	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	10	570,434	Methyl isobutyl ketone, Methyl ethyl ketone
	Subtotal				**860**	**60,177,653**	
	% of Total				**1**	**49**	
	Total				**76,681**	**123,657,878**	

Note: Canada and US data only. Mexico data not available for 2000. 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.

- Toluene was the chemical with the largest transfers to energy recovery, with 76.6 million kg, accounting for almost 22 percent of all transfers to energy recovery.
- Methanol had the second-largest total, with 67.7 million kg. Only two other chemicals (xylenes and methyl ethyl ketone) had transfers to energy recovery in excess of 30 million kg. All other chemicals had transfers of less than 10 million kg.

5.3.4 Largest Amounts of Transfers to Treatment: Facilities and Chemicals, 2000

The 50 facilities in North America reporting the largest transfers to treatment, with 60.2 million kg, accounted for 49 percent of all such transfers.

Query Builder

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

To generate a list of chemicals with the largest transfers to treatment using *Taking Stock* Online:

1. select **Chemical** report.
2. select the year **2000**.
3. select **Canada & USA** for the geographic area,
   select **All chemicals** for the chemical,
   select **All industries** for the industrial sector.
4. select **Transfers to treatment**.

Then click on ✓ Run the query

Once you have the report, go to the column titled "Transfers to treatment" and click on the **arrow pointing down** to sort in descending order and get the 10 chemicals with the largest transfers to treatment.

- A hazardous waste management/solvent recovery facility in Texas reported 3.2 million kg of transfers to treatment, almost 3 percent of all such transfers in 2000. Only one other facility, a paper products plant in Wisconsin, reported over 3 million kg of transfers to treatment.
- Of the 50 facilities with the largest transfers to treatment, 34 were chemical manufacturing facilities and 13 were hazardous waste management/solvent recovery facilities.
- Methanol was the chemical with the largest transfers to treatment, with 24.2 million kg, accounting for almost 20 percent of all transfers to treatment.
- Toluene had the second-largest total, with 14.0 million kg. Two other chemicals (nitric acid and nitrate compounds and dichloromethane) had transfers to treatment in excess of 10 million kg.

5.3.5 Largest Amounts of Transfers to Sewage: Facilities and Chemicals, 2000

The 50 facilities in North America reporting the largest transfers to sewage accounted for 81.2 million kg, or 56 percent of all such transfers.

- The top two facilities, both chemicals manufacturers, each reported over 5 million kg and together accounted for 12.8 million kg, or 9 percent, of all transfers to sewage in 2000.
- Of the 50 facilities with the largest transfers to sewage, 26 were chemical manufacturing facilities and seven were in the paper products sector.
- Nitric acid and nitrate compounds had the largest transfers to sewage,

Table 5–11. The 50 North American Facilities with the Largest Transfers to Sewage, 2000

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Transfers to Sewage (except metals) (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of transfers to sewage from the facility)
1	Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena, TX		28	11	7,617,429	Nitric acid and nitrate compounds
2	Hercules Inc., Parlin Plant	Parlin, NJ		28	7	5,164,516	Nitric acid and nitrate compounds
3	Dominion Colour Corporation, Ajax Plant	Ajax, ON	37	28	6	3,954,000	Nitric acid and nitrate compounds
4	Celanese Ltd., Clear Lake Plant, Celanese Americas Corp.	Pasadena, TX		28	19	3,657,216	Ethylene glycol, Acrylic acid
5	Potlatch Corp., MN P & P Div.	Cloquet, MN		26	12	3,542,979	Methanol
6	Stone Container Corp., Smurfit-Stone Container Corp.	Panama City, FL		26	14	3,308,711	Methanol
7	Boise Cascade Corp.	Saint Helens, OR		26	12	3,181,029	Methanol
8	DMC-2, Degussa AG	South Plainfield, NJ		33	12	3,034,238	Methanol
9	Hercules, Hercules Inc.	Hopewell, VA		28	12	3,015,366	Nitric acid and nitrate compounds, Ethylene glycol
10	Green Tree Chemical Techs. Inc., Nitrocellulose Div.	Parlin, NJ		28	3	2,963,912	Nitric acid and nitrate compounds
11	Solutia Inc.	Springfield, MA		Mult.	17	2,756,235	Formaldehyde, Nitric acid and nitrate compounds
12	Shepherd Chemical Co.	Cincinnati, OH		28	10	2,544,696	Nitric acid and nitrate compounds
13	Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo, MI		28	28	2,516,739	Methanol, n-Butyl alcohol
14	Sud-Chemie Inc., West Plant	Louisville, KY		28	9	2,066,851	Nitric acid and nitrate compounds
15	S. D. Warren Co., Sappi Ltd.	Muskegon, MI		26	12	1,779,722	Methanol
16	Stone Container Corp., Smurfit-Stone Container Corp.	Hopewell, VA		26	11	1,757,796	Methanol
17	Aerovox, Aerovox Inc.	Huntsville, AL		36	3	1,734,360	Nitric acid and nitrate compounds
18	Westvaco Corp., Fine Papers Div.	Luke, MD		26	20	1,610,816	Methanol
19	First Chemical Corp., Chemfirst Inc.	Pascagoula, MS		28	17	1,362,671	Nitric acid and nitrate compounds
20	Equistar Chemicals, Bayport Chemicals Plant	Pasadena, TX		28	12	1,277,578	Ethylene glycol, Acetaldehyde
21	Penford Prods. Co., Penford Corp.	Cedar Rapids, IA		20	5	1,258,729	Ethylene glycol
22	International Paper, Erie Mill	Erie, PA		26	11	1,227,755	Methanol
23	Demenno / Kerdoon, World Oil Corp.	Compton, CA		29	6	1,224,946	Ethylene glycol
24	Union Carbide Corp. Texas City Plant	Texas City, TX		28	39	1,131,950	Methanol
25	A. E. Staley Mfg. Co., Sagamore Ops.	Lafayette, IN		20	5	1,059,483	Nitric acid and nitrate compounds
26	Procter & Gamble Mfg. Co., Procter & Gamble Co.	Sacramento, CA		28	3	997,732	Methanol
27	Saint-Gobain Ceramics Materials	Niagara Falls, NY		32	2	943,441	Nitric acid and nitrate compounds
28	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28	12	894,787	Methanol
29	Bristol-Myers Squibb Co., Technical Ops.	East Syracuse, NY		28	8	784,860	Nitric acid and nitrate compounds
30	Penick Corp., Penick Holding	Newark, NJ		28	1	782,451	Methanol
31	Lyondell Chemical Co., Bayport Facility	Pasadena, TX		28	11	771,305	Methanol, tert-Butyl alcohol
32	Cognis Corp., Cincinnati Plant	Cincinnati, OH		28	14	714,822	Methanol
33	Cargill Corn Milling, Cargill Inc.	Cedar Rapids, IA		20	4	703,642	Ethylene glycol
34	Rhodia Inc., Rhodia SA	Charleston, SC		28	19	692,382	Methanol
35	PQ Corp.	Kansas City, KS		28	4	673,285	Nitric acid and nitrate compounds
36	Sun Chemical Corp., Newark Plant, DIC Americas Inc.	Newark, NJ		28	1	634,921	Methanol
37	Ciba Specialty Chemicals Corp.	Newport, DE		28	5	627,568	Methanol
38	Fuji Photo Film Inc.	Greenwood, SC		Mult.	4	612,245	Nitric acid and nitrate compounds
39	Sunoco Inc., Frankford Plant	Philadelphia, PA		28	10	611,820	Methanol, Cumene hydroperoxide
40	Corning Inc.	Danville, VA		32	5	606,803	Nitric acid and nitrate compounds
41	Amber Plating Works Inc.	Chicago, IL		34	4	583,332	Nitric acid and nitrate compounds
42	Seh-America Inc.	Vancouver, WA		Mult.	4	574,603	Nitric acid and nitrate compounds
43	Saft America Inc.	Valdosta, GA		36	5	573,548	Nitric acid and nitrate compounds
44	Lyondell-Citgo Refining L.P.	Houston, TX		29	28	553,653	Diethanolamine
45	Organichem Corp.	Rensselaer, NY		28	3	545,212	Methanol
46	MEMC Electronic Materials Inc., St. Peters Plant	O Fallon, MO		36	4	544,218	Nitric acid and nitrate compounds
47	US Filter Recovery Services (CA) Inc., US Filter Corp.	Vernon, CA		495/738	44	520,167	Nitric acid and nitrate compounds
48	George Inds., Valmont Inds. Inc.	Los Angeles, CA		34	2	498,866	Nitric acid and nitrate compounds
49	Grace Davison Cincinnati Plant, W.R. Grace & Co.	Cincinnati, OH		28	2	498,866	Nitric acid and nitrate compounds
50	Engelhard Corp.	Erie, PA		28	8	459,637	Nitric acid and nitrate compounds
	Subtotal				**520**	**81,153,891**	
	% of Total				**0.7**	**56**	
	Total				**76,681**	**146,220,632**	

Note: Canada and US data only. Mexico data not available for 2000. 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.

with 81.6 million kg, accounting for almost 56 percent of all transfers to sewage.

- Methanol was the chemical with the second-largest total, with 38.5 million kg. Only one other chemical (ethylene glycol) had transfers to sewage in excess of 10 million kg. All other chemicals had transfers of less than 3 million kg.

Query Builder

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

To generate a list of chemicals with the largest transfers to sewage using *Taking Stock* Online:

1. select **Chemical** report.
2. select the year **2000**.
3. select **Canada & USA** for the geographic area,
   select **All chemicals** for the chemical,
   select **All industries** for the industrial sector.
4. select **Transfers to sewage**.

Then click on **✓Run the query**

Once you have the report, go to the column titled "Transfers to sewage" and click on the **arrow pointing down** to sort in descending order and get the 10 chemicals with the largest transfers to sewage.

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Key Findings

- Data in the matched data set for 1998 and later years include new sectors (electric utilities, hazardous waste management facilities, and chemical wholesalers) and transfers to recycling and energy recovery, but do not include chemicals added in 1999.
- Total North American releases and transfers declined from 3.34 billion kg in 1998 to 3.21 billion kg in 2000. This was a reduction of 4 percent. Total releases decreased by 5 percent, transfers to recycling increased by less than 1 percent, and other off-site transfers for further management decreased by 9 percent.
- Total amounts of releases and transfers as reported to NPRI decreased by less than 1 percent and those reported to TRI decreased by 4 percent. On-site releases in NPRI increased by 12 percent while those in TRI decreased by 7 percent. Off-site releases in NPRI decreased by 39 percent while those in TRI increased by 7 percent. Transfers to recycling increased by less than 1 percent in both NPRI and TRI. Other transfers for further management increased by 17 percent in NPRI and decreased by 11 percent in TRI.
- The jurisdictions with the highest total releases and transfers in 1998 were Texas and Ohio. In 2000, Ohio led with Texas ranked second. Ontario was ranked fourth in 1998 and third in 2000. Ohio and Texas also reported the largest total releases on- and off-site in both 1998 and 2000, while Ontario reported the largest transfers to recycling in both years.
- The primary metals sector reported the largest total North American releases and transfers in both 1998 and 2000. The chemicals, electric utilities, and hazardous waste management industries followed, with their rankings unchanged. The total for hazardous waste management, however, decreased by 25 percent between 1998 and 2000. The fifth-ranked fabricated metals products sector increased by 7 percent from 1998 to 2000.
- Facilities reporting in both 1998 and 2000 accounted for two-thirds of the decrease of 132.7 million kg, while one-third of the decrease was accounted for by the larger number facilities reporting only in 1998 offset by fewer facilities reporting only in 2000.
- While overall PRTR releases and transfers are dominated by a few facilities reporting the largest amounts, most facilities report total releases and transfers of less than 100,000 kg. Among facilities reporting in both 1998 and 2000, total releases and transfers from facilities reporting less than 100,000 kg in 1998 increased by 32 percent. Indeed, these facilities reported net increases in all types of releases and transfers in both NPRI and TRI.

6.1 Introduction

This chapter examines changes in reported amounts of North American releases and transfers from 1998 to 2000, 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 2000. Data for the new industry sectors (electrical utilities, hazardous waste management facilities, and chemical wholesalers) are included. Comparable Mexican data are not available for these years.

The information in 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 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. The 2000 data presented in this chapter are, therefore, a subset of the 2000 data presented in **Chapters 3, 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.cec.org/takingstock>.

6.2 1998–2000 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 waste is included only once. (See **Chapter 2** for a further explanation of the categories used in this report.) 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 3.34 billion kg to 3.21 billion kg, or 4 percent, from 1998 to 2000.
- North American on-site releases to air and land showed decreases of 7 and 10 percent, respectively, while on-site water discharges rose by 7 percent and underground injection rose by 4 percent. However, on-site releases in NPRI rose by 12 percent, with the

Table 6–1. Summary of Total Reported Amounts of Releases and Transfers in North America, 1998–2000

	North America				
	1998	1999	2000	Change 1998–2000	
	Number	Number	Number	Number	%
Total Facilities	21,776	21,447	21,335	-441-	2
Total Forms	71,837	71,115	70,982	-855	-1
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	
On-site Releases	**1,380,913,770**	**1,373,822,614**	**1,304,676,143**	**-76,237,627**	**-6**
Air	872,134,495	862,857,505	814,925,491	-57,209,003	-7
Surface Water	111,340,253	119,194,896	118,963,678	7,623,425	7
Underground Injection	85,675,883	80,410,009	88,753,936	3,078,053	4
Land	311,637,870	311,235,098	281,926,319	-29,711,552	-10
Off-site Releases	**277,345,296**	**271,895,561**	**273,175,487**	**-4,169,809**	**-2**
Transfers to Disposal (except metals)	32,734,061	39,183,688	37,005,803	4,271,743	13
Transfers of Metals**	244,611,235	232,711,873	236,169,684	-8,441,552	-3
Total Reported Releases On- and Off-site	**1,658,259,066**	**1,645,718,174**	**1,577,851,630**	**-80,407,436**	**-5**
Transfers Omitted for Adjustment Analysis***	50,732,788	64,703,416	48,146,409	-2,586,380	-5
Total Releases On- and Off-site (adjusted)* **	**1,607,526,278**	**1,581,014,758**	**1,529,705,222**	**-77,821,056**	**-5**
Off-site Transfers to Recycling	**1,033,664,724**	**1,061,416,863**	**1,042,426,283**	**8,761,559**	**0.8**
Transfers to Recycling of Metals	892,378,826	917,169,617	900,651,822	8,272,996	0.9
Transfers to Recycling (except metals)	141,285,898	144,247,246	141,774,461	488,563	0.3
Other Off-site Transfers for Further Management	**652,016,025**	**581,944,939**	**590,923,070**	**-61,092,954**	**-9**
Energy Recovery (except metals)	386,752,406	328,230,867	330,498,998	-56,253,408	-15
Treatment (except metals)	128,975,573	119,761,012	116,609,162	-12,366,411	-10
Sewage (except metals)	136,288,045	133,953,061	143,814,911	7,526,865	6
Total Reported Amounts of Releases and Transfers****	**3,343,939,815**	**3,289,079,977**	**3,211,200,984**	**-132,738,832**	**-4**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 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	Change 1998–2000		1998	1999	2000	Change 1998–2000	
	Number	Number	Number	Number	%	Number	Number	Number	Number	%
Total Facilities	1,511	1,614	1,664	153	10	20,265	19,833	19,671	-594	-3
Total Forms	5,072	5,487	5,757	685	14	66,765	65,628	65,225	-1,540	-2
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**		**kg**	**kg**	**kg**	**kg**	
On-site Releases	105,129,143	121,879,227	117,420,502	12,291,359	12	1,275,784,627	1,251,943,387	1,187,255,641	-88,528,986	-7
Air	81,622,545	84,345,186	87,591,134	5,968,589	7	790,511,950	778,512,319	727,334,357	-63,177,592	-8
Surface Water	4,841,318	6,499,889	6,605,002	1,763,684	36	106,498,935	112,695,007	112,358,676	5,859,741	6
Underground Injection	3,700,429	3,272,500	3,568,922	-131,507	-4	81,975,454	77,137,509	85,185,014	3,209,560	4
Land	14,839,582	27,636,546	19,548,725	4,709,143	32	296,798,288	283,598,552	262,377,594	-34,420,695	-12
Off-site Releases	**51,388,714**	**43,662,892**	**31,234,053**	**-20,154,661**	**-39**	**225,956,582**	**228,232,669**	**241,941,434**	**15,984,852**	**7**
Transfers to Disposal (except metals)	9,282,614	9,445,054	5,838,110	-3,444,504	-37	23,451,447	29,738,634	31,167,693	7,716,247	33
Transfers of Metals**	42,106,100	34,217,838	25,395,943	-16,710,157	-40	202,505,135	198,494,035	210,773,741	8,268,605	4
Total Reported Releases On- and Off-site	**156,517,857**	**165,542,119**	**148,654,555**	**-7,863,302**	**-5**	**1,501,741,209**	**1,480,176,055**	**1,429,197,075**	**-72,544,134**	**-5**
Transfers Omitted for Adjustment Analysis***	1,110,362	14,452,987	8,886,153	7,775,791	700	49,622,426	50,250,429	39,260,256	-10,362,171	-21
Total Releases On- and Off-site (adjusted)* **	**155,407,495**	**151,089,132**	**139,768,402**	**-15,639,093**	**-10**	**1,452,118,783**	**1,429,925,626**	**1,389,936,820**	**-62,181,963**	**-4**
Off-site Transfers to Recycling	**124,282,626**	**108,628,331**	**125,322,344**	**1,039,718**	**0.8**	**909,382,098**	**952,788,532**	**917,103,939**	**7,721,841**	**0.8**
Transfers to Recycling of Metals	109,460,828	93,879,987	109,859,569	398,741	0.4	782,917,998	823,289,630	790,792,253	7,874,255	1
Transfers to Recycling (except metals)	14,821,798	14,748,344	15,462,775	640,977	4	126,464,100	129,498,902	126,311,686	-152,414	-0.1
Other Off-site Transfers for Further Management	**28,112,703**	**30,201,831**	**33,002,301**	**4,889,598**	**17**	**623,903,322**	**551,743,108**	**557,920,769**	**-65,982,552**	**-11**
Energy Recovery (except metals)	12,023,812	14,069,929	15,339,319	3,315,507	28	374,728,594	314,160,938	315,159,679	-59,568,915	-16
Treatment (except metals)	10,726,089	10,747,957	10,574,333	-151,756	-1	118,249,484	109,013,055	106,034,829	-12,214,655	-10
Sewage (except metals)	5,362,802	5,383,945	7,088,649	1,725,847	32	130,925,243	128,569,116	136,726,262	5,801,018	4
Total Reported Amounts of Releases and Transfers******	**308,913,186**	**304,372,281**	**306,979,200**	**-1,933,986**	**-0.6**	**3,035,026,629**	**2,984,707,696**	**2,904,221,784**	**-130,804,846**	**-4**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 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.

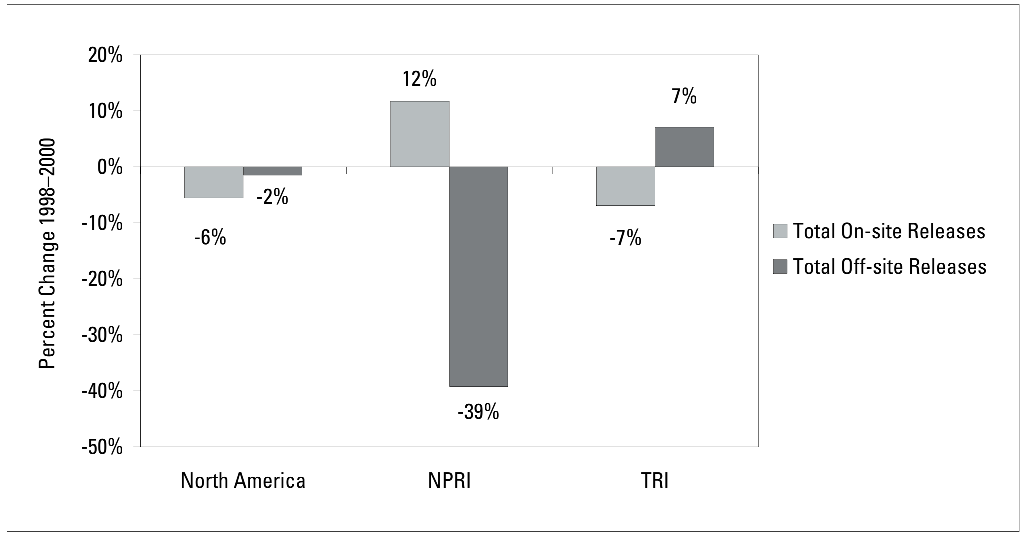
*** Transfers omitted are those off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

largest change being an increase in air emissions of 6.0 million kg.

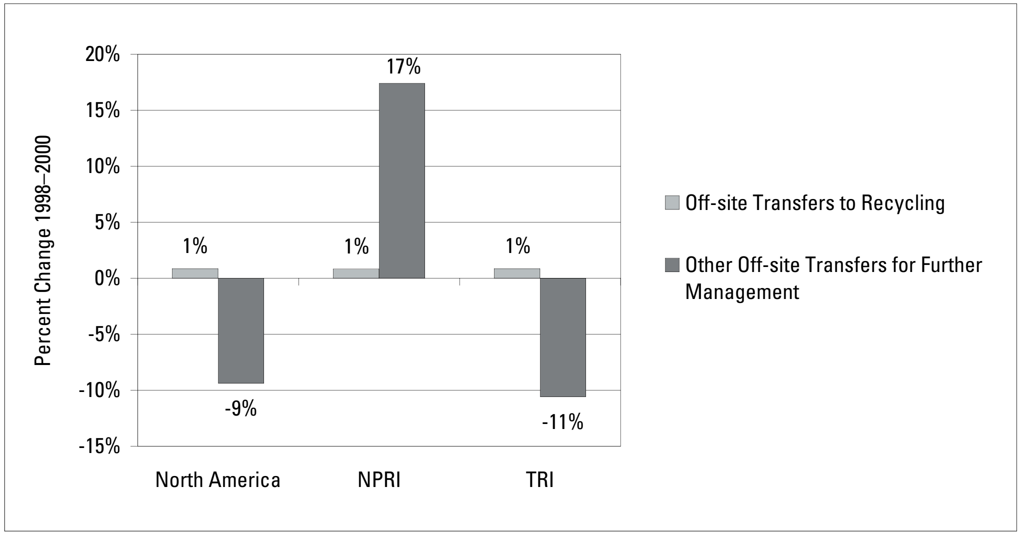
- In off-site releases, transfers to disposal (except metals) in North America rose 13 percent, from 32.7 million kg to 37.0 million kg; however, this was a decrease from the 1999 level of 39.2 million kg. Transfers of metals decreased by 3 percent. TRI off-site releases rose by 7 percent or 16.0 million kg, with transfers to disposal (except metals) increasing by 33 percent. NPRI off-site releases, however, decreased by 39 percent or 20.2 million kg.
- Transfers to recycling of metals rose by less than 1 percent and recycling of other chemicals also rose by less than 1 percent.
- Within other transfers for further management, which fell 9 percent overall, transfers to energy recovery declined by 15 percent, transfers to treatment declined by 10 percent, but transfers to sewage rose by 6 percent.

Figure 6–1. Percent Change in Releases On- and Off-site in North America, NPRI and TRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998-2000.

Figure 6–2. Percent Change in Transfers to Recycling and Other Transfers for Further Management in North America, NPRI and TRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998-2000.

6.2.1 1998–2000 Total Reported Amounts of Releases and Transfers by State and Province

- Texas reported the highest North American total releases and transfers in 2000, but the amount fell by 5 percent, from 256.5 million kg to 243.7 million kg.
- Ohio had the second-highest total releases and transfers in 2000 and the highest in 1998. Its reported amount fell by 19 percent, from 281.1 million kg to 227.4 million kg.
- Ontario had the third-highest total releases and transfers in 2000, with a decrease of 4 percent from the amount in 1998, when the province ranked fourth.
- Ohio reported the highest total releases on- and off-site in both 1998 and 2000, despite a 20-percent decrease over the time period.
- Ontario had the highest transfers to recycling in both 1998 and 2000, with a 4-percent increase.
- Texas had the highest other transfers for further management in 2000, with a 2-percent decrease. Michigan ranked first in this category in 1998, but a 43-percent decrease resulted in its dropping to second in 2000.

Table 6–2. Change in Total Reported Amounts of Releases and Transfers in North America, by State and Province, 1998–2000

	Facilities					Total Releases On- and Off-site				
	1998		2000		Change 1998–2000	1998		2000		Change 1998–2000
State/Province	Number	Rank	Number	Rank	(%)	kg	Rank	kg	Rank	(%)
Alabama	492	17	469	17	-5	53,640,932	11	58,937,568	9	10
Alaska	10	59	8	59	-20	258,033	60	118,879	62	-54
Alberta	126	40	163	34	29	18,358,083	30	18,593,006	30	1
Arizona	182	33	185	33	2	26,643,275	21	19,895,816	27	-25
Arkansas	353	25	337	25	-5	19,818,370	29	23,073,833	25	16
British Columbia	80	43	103	42	29	7,014,519	42	11,455,231	35	63
California	1,206	4	1,162	4	-4	21,508,789	27	25,686,625	22	19
Colorado	159	35	154	37	-3	3,564,063	50	3,731,541	48	5
Connecticut	291	27	277	28	-5	4,190,300	48	3,249,390	49	-22
Delaware	62	46	59	46	-5	6,377,034	44	5,284,826	43	-17
District of Columbia	2	63	4	62	100	30,048	63	24,128	64	-20
Florida	498	16	491	15	-1	53,604,809	12	56,313,531	10	5
Georgia	650	11	615	11	-5	48,764,618	14	46,790,029	14	-4
Guam	1	64	2	64	100	0	--	92,698	63	--
Hawaii	16	58	14	58	-13	815,224	55	451,571	58	-45
Idaho	54	47	57	47	6	23,030,267	26	15,399,673	32	-33
Illinois	1,186	5	1,156	5	-3	70,939,678	6	62,045,440	7	-13
Indiana	959	6	918	6	-4	80,781,511	5	82,713,866	4	2
Iowa	375	23	355	24	-5	17,387,952	31	16,460,130	31	-5
Kansas	249	31	247	31	-1	13,801,965	34	11,966,876	34	-13
Kentucky	420	21	414	21	-1	39,578,142	16	37,413,598	16	-5
Louisiana	305	26	316	26	4	52,784,110	13	50,666,177	12	-4
Maine	71	44	68	44	-4	3,700,804	49	3,969,919	47	7
Manitoba	49	49	53	48	8	4,657,273	47	4,495,492	46	-3
Maryland	169	34	159	35	-6	15,949,964	32	18,663,060	29	17
Massachusetts	437	19	425	19	-3	5,193,378	45	4,713,643	45	-9
Michigan	834	7	797	8	-4	55,273,613	9	49,223,686	13	-11
Minnesota	437	20	417	20	-5	8,267,384	40	8,932,806	39	8
Mississippi	281	29	271	29	-4	28,749,395	20	31,111,479	19	8
Missouri	532	15	515	14	-3	30,449,764	19	30,092,517	21	-1
Montana	27	56	28	57	4	24,555,220	25	24,749,187	23	1
Nebraska	145	37	151	38	4	11,531,828	38	12,168,557	33	6
Nevada	49	50	48	49	-2	3,116,833	51	2,352,470	52	-25
New Brunswick	29	54	28	55	-3	8,379,095	39	7,341,221	40	-12
New Hampshire	104	42	101	43	-3	2,960,513	53	2,519,965	51	-15
New Jersey	535	14	485	16	-9	11,717,591	37	11,422,466	36	-3
New Mexico	51	48	47	50	-8	12,928,317	36	1,916,781	54	-85
New York	611	12	587	12	-4	25,156,214	23	24,433,478	24	-3
Newfoundland	7	60	8	60	14	457,911	58	521,319	56	14
North Carolina	741	10	702	10	-5	61,111,209	7	63,159,464	6	3
North Dakota	33	51	34	51	3	3,054,739	52	2,971,016	50	-3
Nova Scotia	29	55	28	56	-3	4,678,647	46	4,928,792	44	5
Ohio	1,511	1	1,510	1	-0.1	139,187,979	1	111,677,482	1	-20
Oklahoma	288	28	291	27	1	13,983,204	33	10,318,454	37	-26
Ontario	808	8	859	7	6	91,162,510	4	78,621,108	5	-14
Oregon	235	32	225	32	-4	24,627,607	24	37,136,845	17	51
Pennsylvania	1,259	2	1,207	3	-4	96,416,889	3	96,196,828	3	-0.2
Prince Edward Island	3	61	4	61	33	207,653	62	227,545	59	10
Puerto Rico	144	38	127	40	-12	7,462,571	41	6,717,793	41	-10
Quebec	357	24	388	23	9	20,818,314	28	21,243,161	26	2
Rhode Island	120	41	121	41	1	712,379	57	452,120	57	-37
Saskatchewan	23	57	30	52	30	783,852	56	1,227,680	55	57
South Carolina	473	18	460	18	-3	33,164,005	17	32,387,802	18	-2
South Dakota	64	45	67	45	5	1,505,039	54	2,102,912	53	40
Tennessee	594	13	586	13	-1	54,322,106	10	59,161,202	8	9
Texas	1,210	3	1,217	2	1	112,575,463	2	102,307,274	2	-9
Utah	137	39	141	39	3	56,153,059	8	54,059,332	11	-4
Vermont	30	52	29	53	-3	218,443	61	141,764	61	-35
Virgin Islands	3	62	3	63	0	441,064	59	202,804	60	-54
Virginia	418	22	400	22	-4	30,788,424	18	30,417,933	20	-1
Washington	259	30	251	30	-3	13,761,650	35	9,432,928	38	-31
West Virginia	155	36	159	36	3	42,470,939	15	38,204,332	15	-10
Wisconsin	808	9	774	9	-4	26,228,464	22	19,611,723	28	-25
Wyoming	30	53	28	54	-7	6,486,039	43	5,950,856	42	-8
Total	**21,776**		**21,335**		**-2**	**1,658,259,066**		**1,577,851,630**		**-5**

Note: Canada and US data only. Mexico data not available for 1998–2000. 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		2000		Change 1998–2000	1998		2000		Change 1998–2000	1998		2000		Change 1998–2000
kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
20,027,215	21	19,906,499	19	-1	23,861,894	6	16,765,265	13	-30	97,530,042	9	95,609,332	9	-2
12,301	60	5	62	-100	2,312	60	1,123	61	-51	272,646	62	120,008	62	-56
3,111,826	39	3,373,275	40	8	1,472,305	38	2,580,434	34	75	22,942,214	38	24,546,715	36	7
18,886,727	23	15,501,999	22	-18	1,422,488	39	2,176,199	37	53	46,952,491	26	37,574,014	29	-20
19,647,363	22	25,616,092	13	30	7,225,696	22	23,464,929	7	225	46,691,429	27	72,154,854	16	55
486,257	50	1,401,947	46	188	504,971	44	716,031	42	42	8,005,747	48	13,573,209	43	70
31,362,650	11	34,567,522	9	10	19,998,018	9	24,163,322	6	21	72,869,457	14	84,417,468	11	16
8,826,937	31	11,250,758	28	27	2,327,126	35	2,180,849	36	-6	14,718,126	42	17,163,147	41	17
8,536,689	32	13,455,167	25	58	4,815,680	29	5,157,880	30	7	17,542,669	41	21,862,437	38	25
5,413,494	37	3,710,524	39	-31	1,767,969	37	2,060,101	38	17	13,558,496	43	11,055,451	44	-18
3,311	61	2,925	59	-12	0	--	0	--	--	33,358	63	27,053	64	-19
9,365,758	30	9,471,463	32	1	5,705,866	27	5,197,070	29	-9	68,676,433	17	70,982,064	17	3
24,031,262	15	21,378,095	17	-11	7,580,713	21	8,482,420	22	12	80,376,593	12	76,650,544	14	-5
0	--	0	--	--	0	--	0	--	--	0	--	92,698	63	--
45,360	58	2,793	61	-94	1,635	61	1,203	60	-26	862,219	57	455,567	59	-47
816,746	48	675,539	49	-17	392,202	46	413,185	47	5	24,239,215	35	16,488,397	42	-32
37,999,886	7	48,550,560	7	28	23,373,833	7	24,728,194	5	6	132,313,398	7	135,324,194	7	2
73,323,596	3	67,346,911	4	-8	41,570,115	4	11,618,042	15	-72	195,675,222	5	161,678,820	6	-17
23,211,049	16	18,587,358	21	-20	6,376,400	24	5,663,926	26	-11	46,975,402	25	40,711,413	28	-13
30,146,797	12	19,156,622	20	-36	2,096,130	36	2,411,331	35	15	46,044,892	28	33,534,829	30	-27
22,899,734	17	22,539,072	16	-2	11,852,585	15	20,515,603	9	73	74,330,462	13	80,468,273	13	8
22,069,014	18	13,857,226	23	-37	13,493,757	14	11,113,562	16	-18	88,346,880	11	75,636,965	15	-14
973,948	47	1,607,614	44	65	358,245	47	436,357	46	22	5,032,998	52	6,013,890	50	19
3,051,756	40	1,692,810	43	-45	352,057	48	464,152	45	32	8,061,086	47	6,652,454	48	-17
1,986,451	43	2,358,340	42	19	4,176,493	32	4,674,249	32	12	22,112,908	39	25,695,649	33	16
11,830,099	25	10,431,361	30	-12	8,493,077	19	9,730,223	19	15	25,516,554	33	24,875,227	34	-3
52,659,069	6	49,278,838	6	-6	114,606,394	1	64,984,754	2	-43	222,539,076	3	163,487,278	5	-27
10,009,071	28	9,148,652	33	-9	5,475,616	28	10,505,566	18	92	23,752,071	36	28,587,024	32	20
8,059,605	33	11,190,933	29	39	4,562,110	30	4,745,822	31	4	41,371,110	29	47,048,234	27	14
26,330,835	13	25,087,771	14	-5	10,238,652	17	8,679,780	20	-15	67,019,251	20	63,860,068	20	-5
22,617	59	55,111	58	144	28,557	57	13,059	57	-54	24,606,394	34	24,817,356	35	1
11,270,943	26	11,590,600	26	3	413,713	45	520,637	44	26	23,216,484	37	24,279,794	37	5
1,214,823	45	888,424	47	-27	31,589	56	50,415	54	60	4,363,245	53	3,291,308	53	-25
218,303	55	179,300	56	-18	56,269	55	59,527	53	6	8,653,667	46	7,580,048	47	-12
5,904,216	36	6,646,041	34	13	1,386,481	40	1,072,226	39	-23	10,251,210	45	10,238,233	45	-0.1
18,551,670	24	13,540,291	24	-27	36,869,371	5	43,434,172	3	18	67,138,633	19	68,396,929	19	2
56,899	57	818,148	48	1,338	319,438	49	308,605	48	-3	13,304,654	44	3,043,535	54	-77
37,030,613	8	37,147,612	8	0.3	8,758,842	18	8,220,884	23	-6	70,945,669	16	69,801,974	18	-2
0	--	2,900	60	--	0	--	0	--	--	457,911	60	524,219	58	14
36,632,783	9	33,984,517	10	-7	8,213,171	20	7,691,372	24	-6	105,957,163	8	104,835,353	8	-1
311,073	52	326,978	52	5	258,737	51	177,097	51	-32	3,624,550	54	3,475,091	52	-4
1,662,916	44	363,306	51	-78	301,459	50	34,338	56	-89	6,643,022	51	5,326,436	51	-20
82,644,570	2	80,968,269	3	-2	59,244,491	3	34,760,273	4	-41	281,077,039	1	227,406,025	2	-19
10,029,935	27	9,832,895	31	-2	2,447,579	34	925,556	41	-62	26,460,717	32	21,076,905	39	-20
93,444,029	1	96,885,087	1	4	20,819,038	8	22,615,364	8	9	205,425,577	4	198,121,559	3	-4
6,487,210	34	6,067,239	36	-6	6,363,814	25	5,525,205	28	-13	37,478,631	30	48,729,290	26	30
61,423,512	4	85,938,562	2	40	16,820,645	11	15,057,089	14	-10	174,661,047	6	197,192,479	4	13
0	--	0	--	--	71,041	54	110,652	52	56	278,694	61	338,197	60	21
5,913,916	35	5,503,888	37	-7	14,049,832	13	19,426,451	11	38	27,426,319	31	31,648,133	31	15
22,006,737	19	21,131,887	18	-4	4,533,008	31	6,374,439	25	41	47,358,059	24	48,749,487	25	3
5,077,288	38	6,146,079	35	21	856,697	41	1,067,345	40	25	6,646,365	50	7,665,545	46	15
300,802	53	291,832	54	-3	2,555	59	47,364	55	1,754	1,087,209	56	1,566,876	56	44
21,005,398	20	28,554,823	11	36	18,665,514	10	20,141,471	10	8	72,834,917	15	81,084,096	12	11
465,858	51	325,783	53	-30	640,236	42	292,775	49	-54	2,611,133	55	2,721,470	55	4
33,012,136	10	28,209,071	12	-15	7,082,812	23	5,570,647	27	-21	94,417,053	10	92,940,920	10	-2
60,449,701	5	59,376,971	5	-2	83,513,381	2	82,027,690	1	-2	256,538,545	2	243,711,935	1	-5
1,164,036	46	1,410,008	45	21	572,845	43	610,713	43	7	57,889,941	21	56,080,053	22	-3
236,867	54	549,924	50	132	158,880	52	284,190	50	79	614,190	59	975,878	57	59
75,073	56	57,267	57	-24	154,971	53	7,325	58	-95	671,109	58	267,396	61	-60
9,612,877	29	11,571,029	27	20	10,657,606	16	10,774,039	17	1	51,058,907	23	52,763,001	23	3
2,858,232	42	5,208,714	38	82	3,103,930	33	2,783,483	33	-10	19,723,812	40	17,425,126	40	-12
2,891,016	41	3,054,552	41	6	6,175,512	26	8,518,895	21	38	51,537,468	22	49,777,779	24	-3
25,944,344	14	24,466,191	15	-6	15,334,865	12	18,785,922	12	23	67,507,673	18	62,863,836	21	-7
619,523	49	184,313	55	-70	4,805	58	2,276	59	-53	7,110,367	49	6,137,445	49	-14
1,033,664,724		**1,042,426,283**		**0.8**	**652,016,025**		**590,923,070**		**-9**	**3,343,939,815**		**3,211,200,984**		**-4**

6.2.2 1998–2000 Total Reported Amounts of Releases and Transfers by Industry

Data comparing 1998 to 2000 include all industry sectors in the matched data set.

- Primary metals, the industry reporting the largest total amounts of releases and transfers in both years, recorded a slight decrease of 3 percent between 1998 and 2000. In 1998, its total was 724.1 million kg, while in 2000, it was 704.8 million kg.
- The chemical manufacturing sector (second in total amounts) and electric utilities (third) both showed a 1-percent decrease.
- Hazardous waste facilities, in fourth place, reported a decrease of 25 percent in total releases and transfers, from 360.8 million kg to 270.1 million kg.
- In NPRI, total releases and transfers by primary metals facilities dropped 10 percent from 77.5 million kg to 70.1 million kg, with the industry's total releases declining but transfers to recycling rising. Releases and transfers from the fabricated metals industry fell only slightly, mainly because of an increase in other transfers for further management from 225,000 kg to 1.0 million kg, which offset a decline in transfers to recycling. The total for the chemicals industry rose from 36.4 million kg to 41.2 million kg, primarily the result of an increase in total releases.
- Except for a 78.8-million-kg decrease reported by hazardous waste facilities, the TRI industries with the largest releases and transfers showed little change. Other transfers for further management by hazardous waste facilities dropped

Table 6–3. Change in Total Reported Amounts of Releases and Transfers in North America, by Industry, 1998–2000 (Ordered by Total Releases and Transfers, 2000)

US SIC		Total Releases On- and Off-site					Total Transfers to Recycling				
		1998		2000		Change 1998–2000	1998		2000		Change 1998–2000
Code	Industry	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
33	Primary Metals	354,823,577	2	320,730,233	2	-10	358,884,386	1	372,369,293	1	4
28	Chemicals	259,765,690	3	246,745,143	3	-5	75,135,466	4	67,002,101	5	-11
491/493	Electric Utilities	442,172,742	1	436,205,313	1	-1	1,876,439	16	1,884,507	16	0.4
495/738	Hazardous Waste Mgt./Solvent Recovery	144,810,643	4	125,875,169	4	-13	8,974,009	9	10,590,495	9	18
34	Fabricated Metals Products	33,270,407	9	30,501,966	11	-8	196,505,038	2	211,715,420	2	8
36	Electronic/Electrical Equipment	12,792,143	14	16,119,864	13	26	180,278,061	3	150,608,870	3	-16
--	Multiple codes 20–39*	49,454,696	7	46,471,349	7	-6	70,108,415	5	79,590,512	4	14
26	Paper Products	119,344,297	5	119,849,765	5	0.4	1,426,117	17	725,808	18	-49
37	Transportation Equipment	47,704,061	8	45,603,931	8	-4	61,843,436	6	60,497,139	6	-2
30	Rubber and Plastics Products	51,922,699	6	50,273,896	6	-3	8,733,238	11	8,828,679	10	1
29	Petroleum and Coal Products	32,484,507	10	31,723,215	10	-2	8,971,093	10	16,526,842	8	84
20	Food Products	29,546,471	11	34,410,525	9	16	1,193,652	18	1,026,288	17	-14
35	Industrial Machinery	8,458,123	16	7,436,196	16	-12	33,137,924	7	38,338,421	7	16
32	Stone/Clay/Glass Products	15,579,061	13	15,089,531	14	-3	1,970,186	15	2,430,616	15	23
24	Lumber and Wood Products	16,695,662	12	18,335,211	12	10	498,307	21	465,955	19	-6
27	Printing and Publishing	11,175,107	15	9,774,196	15	-13	3,531,937	14	3,587,718	13	2
39	Misc. Manufacturing Industries	5,069,415	19	4,602,180	18	-9	9,231,081	8	7,930,590	11	-14
25	Furniture and Fixtures	8,405,448	17	6,236,010	17	-26	4,273,845	13	3,145,677	14	-26
38	Measurement/Photographic Instruments	4,373,222	20	3,189,386	20	-27	5,053,469	12	4,551,605	12	-10
5169	Chemical Wholesalers	556,624	24	545,822	24	-2	1,141,645	19	62,193	22	-95
22	Textile Mill Products	5,247,791	18	3,679,644	19	-30	725,208	20	400,058	20	-45
12	Coal Mining	2,326,876	21	2,662,903	21	14	19,834	23	3,489	24	-82
31	Leather Products	1,484,268	22	1,067,717	22	-28	147,673	22	119,685	21	-19
21	Tobacco Products	621,352	23	591,614	23	-5	0	--	0	--	--
23	Apparel and Other Textile Products	174,185	25	130,850	25	-25	4,266	24	24,321	23	470
	Total	**1,658,259,066**		**1,577,851,630**		**-5**	**1,033,664,724**		**1,042,426,283**		**0.8**

Note: Canada and US data only. Mexico data not available for 1998–2000.
* Multiple SIC codes reported only in TRI.

Table 6–3. (*continued*)

Total Other Transfers for Further Management					Total Reported Amounts of Releases and Transfers				
1998		2000		Change 1998–2000	1998		2000		Change 1998–2000
kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
10,366,617	10	11,663,380	8	13	724,074,580	1	704,762,907	1	-3
291,363,668	1	304,824,663	1	5	626,264,823	2	618,571,907	2	-1
20,476	23	22,618	22	10	444,069,656	3	438,112,437	3	-1
206,968,833	2	133,667,739	2	-35	360,753,485	4	270,133,404	4	-25
12,379,230	6	15,919,625	6	29	242,154,675	5	258,137,011	5	7
12,167,732	8	16,934,584	5	39	205,237,937	6	183,663,318	6	-11
23,204,797	4	27,242,212	3	17	142,767,908	8	153,304,073	7	7
24,324,812	3	23,732,584	4	-2	145,095,225	7	144,308,157	8	-1
11,082,394	9	9,880,308	9	-11	120,629,891	9	115,981,378	9	-4
6,492,377	12	5,563,608	10	-14	67,148,315	10	64,666,183	10	-4
7,210,973	11	5,249,866	12	-27	48,666,573	11	53,499,923	11	10
14,956,936	5	13,851,580	7	-7	45,697,059	12	49,288,393	12	8
3,272,830	14	2,222,949	16	-32	44,868,877	13	47,997,566	13	7
4,020,434	13	3,622,546	13	-10	21,569,680	14	21,142,693	14	-2
1,272,446	20	1,167,753	20	-8	18,466,416	15	19,968,918	15	8
2,084,537	18	2,545,118	14	22	16,791,581	16	15,907,033	16	-5
2,481,361	15	2,310,197	15	-7	16,781,857	17	14,842,967	17	-12
2,314,939	17	1,825,820	18	-21	14,994,232	18	11,207,507	18	-25
2,466,147	16	1,884,567	17	-24	11,892,838	20	9,625,559	19	-19
12,188,410	7	5,525,537	11	-55	13,886,679	19	6,133,552	20	-56
1,304,443	19	1,207,625	19	-7	7,277,441	21	5,287,328	21	-27
0	--	0	--	--	2,346,710	22	2,666,392	22	14
31,816	22	37,306	21	17	1,663,757	23	1,224,708	23	-26
823	24	778	24	-5	622,175	24	592,392	24	-5
38,994	21	20,107	23	-48	217,445	25	175,278	25	-19
652,016,025		**590,923,070**		**-9**	**3,343,939,815**		**3,211,200,984**		**-4**

from 195.3 million kg in 1998 to 119.2 million kg in 2000. The total for the fabricated metals products industry rose from 186.8 million kg to 202.8 million kg, mainly because of increased transfers to recycling.

Figure 6–3. Change in NPRI Total Reported Amounts of Releases and Transfers, by Industry, 1998–2000

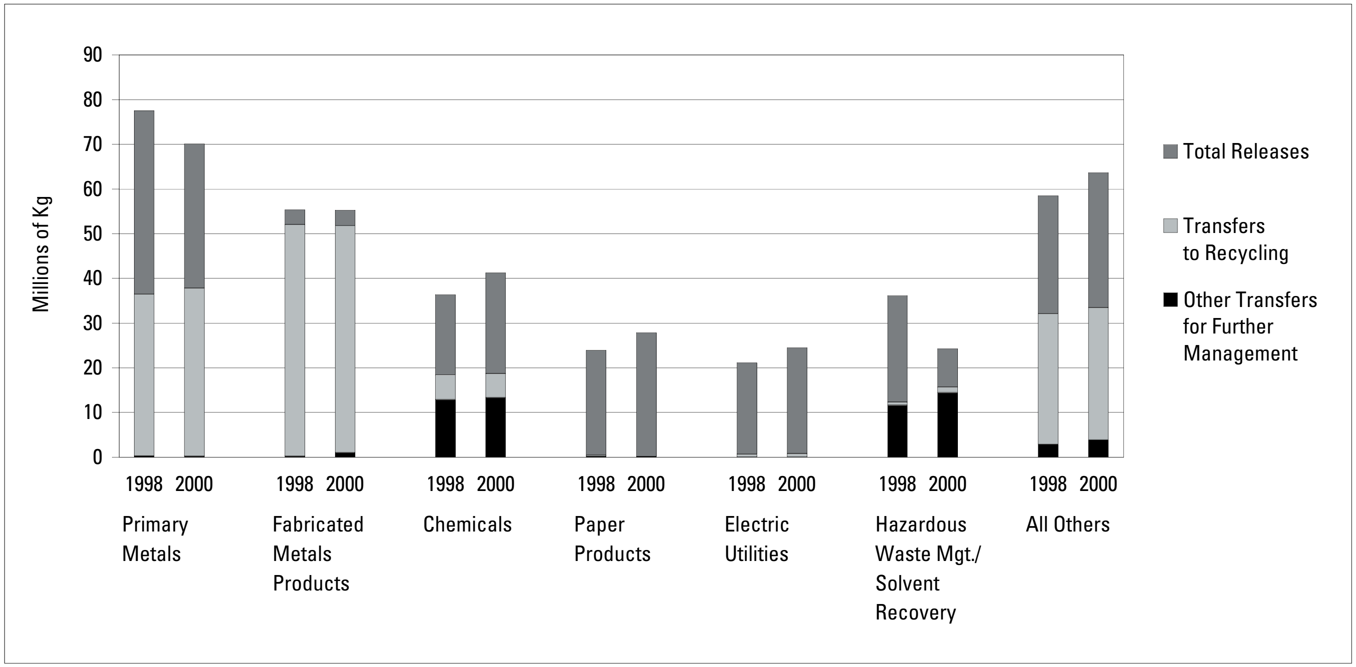
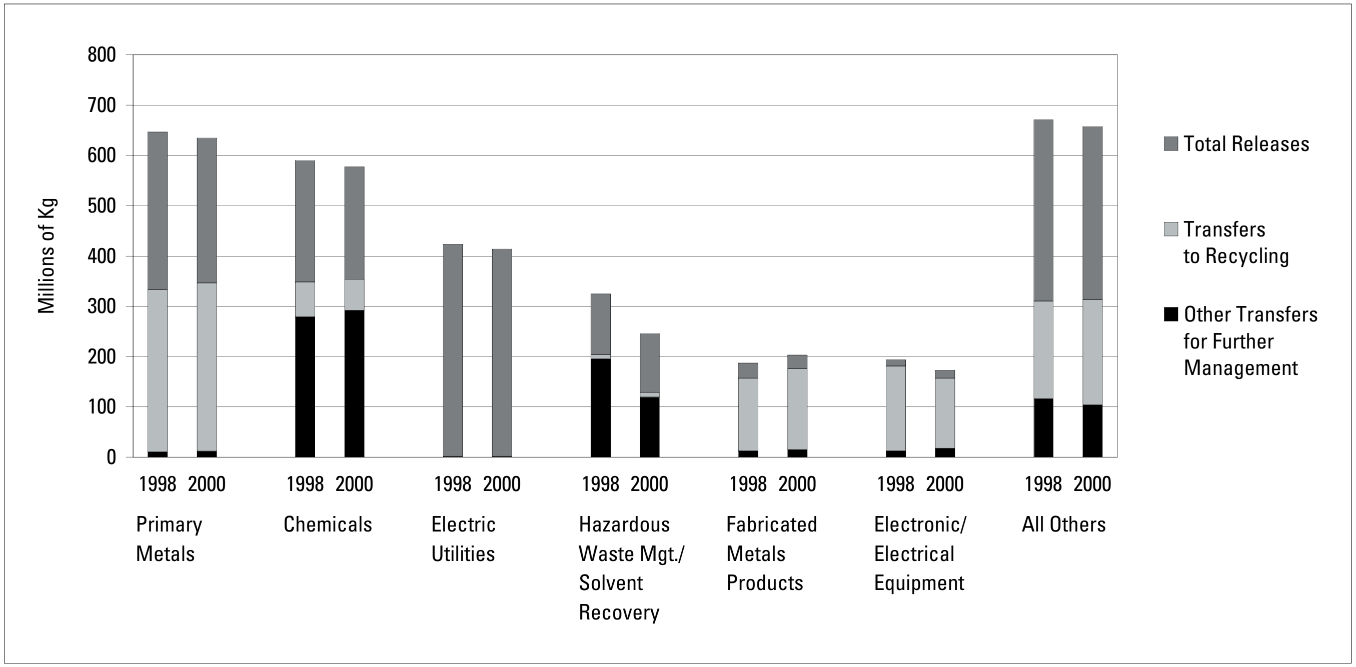


Figure 6–4. Change in TRI Total Reported Amounts of Releases and Transfers, by Industry, 1998–2000



6.2.3 Chemicals with Largest Change, 1998–2000

The 1998–2000 matched data set includes 163 chemicals reported by both NPRI and TRI facilities since 1998. It does not include those chemicals added to NPRI for 1999 or chemicals whose reporting definition changed for 2000.

- Lead and its compounds had the largest reduction in total reported amounts of releases and transfers between 1998 and 2000 (a 43.3-million-kg decrease) , while zinc and its compounds reporting the second-largest amount (34.8 million kg).
- The largest increases in total releases and transfers were for copper and its compounds (a 47.6-million-kg increase) and nitric acid and nitrate compounds (27.7 million kg).

Table 6–4. The 10 Chemicals with the Largest Decrease in Total Reported Amounts of Releases and Transfers, 1998–2000

				Total Reported Amounts of Releases and Transfers			
				1998	2000	Change 1998–2000	
Rank	CAS Number		Chemical	(kg)	(kg)	kg	%
1	--	m,c,p,t	Lead (and its compounds)	215,896,514	172,549,728	-43,346,786	-20
2	--	m	Zinc (and its compounds)	419,272,996	384,488,562	-34,784,434	-8
3	--		Xylenes	148,542,758	122,951,103	-25,591,656	-17
4	7664-93-9		Sulfuric acid	99,769,710	76,104,387	-23,665,323	-24
5	--	m,c,p,t	Chromium (and its compounds)	110,410,456	93,918,345	-16,492,111	-15
6	78-93-3		Methyl ethyl ketone	79,329,960	69,024,853	-10,305,107	-13
7	108-88-3	p	Toluene	161,085,410	151,013,074	-10,072,336	-6
8	91-20-3		Naphthalene	15,272,323	5,750,551	-9,521,771	-62
9	7782-50-5		Chlorine	28,610,166	22,313,937	-6,296,229	-22
10	106-99-0	c,p,t	1,3-Butadiene	8,266,971	1,985,933	-6,281,037	-76

Note: Canada and US data only. Mexico data not available for 1998–2000.
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, 1998–2000

				Total Reported Amounts of Releases and Transfers			
				1998	2000	Change 1998–2000	
Rank	CAS Number		Chemical	(kg)	(kg)	kg	%
1	--	m	Copper (and its compounds)	408,270,771	455,884,607	47,613,836	12
2	--		Nitric acid and nitrate compounds	232,896,599	260,640,801	27,744,202	12
3	7647-01-0		Hydrochloric acid	289,003,148	308,879,949	19,876,801	7
4	1344-28-1		Aluminum oxide (fibrous forms)	9,371,775	21,445,158	12,073,383	129
5	67-56-1		Methanol	244,914,883	256,782,202	11,867,319	5
6	7429-90-5	m	Aluminum (fume or dust)	19,527,565	23,597,474	4,069,909	21
7	50-00-0	c,p	Formaldehyde	15,044,343	16,733,070	1,688,727	11
8	100-42-5	c	Styrene	35,830,542	37,465,329	1,634,787	5
9	80-05-7		4,4'-Isopropylidenediphenol	574,103	1,972,720	1,398,617	244
10	--	m	Selenium (and its compounds)	2,033,303	3,225,054	1,191,751	59

Note: Canada and US data only. Mexico data not available for 1998–2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.

Table 6–6. The 10 Chemicals with the Largest Decrease in Total Releases On- and Off-site, 1998–2000

Rank	CAS Number		Chemical	Total Releases On- and Off-site 1998 (kg)	2000 (kg)	Change 1998–2000 kg	%
1	--	m	Zinc (and its compounds)	220,242,789	180,621,257	-39,621,532	-18
2	7664-93-9		Sulfuric acid	99,769,710	76,104,387	-23,665,323	-24
3	--	m,c,p,t	Chromium (and its compounds)	43,393,017	32,253,403	-11,139,614	-26
4	108-88-3	p	Toluene	53,374,037	44,050,557	-9,323,480	-17
5	--		Xylenes	43,850,696	34,913,872	-8,936,824	-20
6	7782-50-5		Chlorine	28,022,433	21,849,613	-6,172,820	-22
7	--	m,c,p,t	Lead (and its compounds)	43,507,882	37,566,812	-5,941,070	-14
8	78-93-3		Methyl ethyl ketone	27,273,101	22,224,647	-5,048,454	-19
9	75-09-2	c,p,t	Dichloromethane	20,993,821	16,266,078	-4,727,743	-23
10	74-85-1		Ethylene	16,643,184	13,133,764	-3,509,420	-21

Note: Canada and US data only. Mexico data not available for 1998–2000.
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, 1998–2000

Rank	CAS Number		Chemical	Total Releases On- and Off-site 1998 (kg)	2000 (kg)	Change 1998–2000 kg	%
1	7647-01-0		Hydrochloric acid	289,003,148	308,879,949	19,876,801	7
2	--		Nitric acid and nitrate compounds	146,550,018	160,459,574	13,909,556	9
3	1344-28-1		Aluminum oxide (fibrous forms)	8,846,525	21,089,012	12,242,487	138
4	--	m	Copper (and its compounds)	51,961,966	58,307,660	6,345,694	12
5	7429-90-5	m	Aluminum (fume or dust)	7,308,451	11,444,872	4,136,420	57
6	100-42-5	c	Styrene	27,265,808	28,806,187	1,540,379	6
7	107-21-1		Ethylene glycol	5,173,117	6,555,929	1,382,812	27
8	50-00-0	c,p	Formaldehyde	11,716,644	13,030,419	1,313,775	11
9	--	m	Selenium (and its compounds)	1,832,182	3,100,340	1,268,158	69
10	--	m,c,p,t	Arsenic (and its compounds)	9,967,812	11,216,812	1,249,000	13

Note: Canada and US data only. Mexico data not available for 1998–2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Query Builder
http://www.cec.org/takingstock/

To find the industries with the largest decrease in lead and its compounds using *Taking Stock* Online:

1. select **Industry** report.
2. select the year **1998 and 2000**.
3. select **Canada & USA** for the geographic area,
   select **Lead (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 1998–2000" and click on the **arrow pointing up** to get the 10 industry sectors with the largest decrease.

Once you get the report, then you can click on **arrow pointing down** in column titled "Change from 1998–2000" to get the 10 industry sectors with largest increase.

- Zinc and its compounds had the largest reduction in total releases on- and off-site between 1998 and 2000, with a decrease of 39.6 million kg. Sulfuric acid had the second-largest, with a decrease of 23.7 million kg.
- The largest increases were for hydrochloric acid (a 19.9-million-kg increase) and nitric acid and nitrate compounds (13.9 million kg).

6.2.4 1998–2000 Change in Selected Releases and Transfers

While overall releases and transfers decreased by 4 percent from 1998 to 2000, particular types of releases and transfers within the two countries show a different pattern. This section looks in more detail at on-site air releases, on-site land releases, off-site releases, and transfers to energy recovery.

On-site Air Releases

- Total on-site air releases in North America decreased by 7 percent or 57.2 million kg from 1998 to 2000. However, NPRI facilities reported a 7-percent increase of 6.0 million kg.
- Two states and two provinces reported increases of over 1 million kg in air releases from 1998 to 2000: North Carolina, British Columbia, Ontario, and Maryland. There were, however, four states reporting decreases of over 5 million kg: Illinois, Ohio, Utah, and Texas.
- Only three industry sectors (lumber and wood products, stone/clay/glass, and chemical wholesalers) reported overall increases in air emissions. The industries with the largest decreases were chemicals and primary metals, both with decreases of more than 10 million kg.
- While the five facilities with the largest increases in air releases were all electric utilities, electric utilities as a whole had decreases of 4.1 million kg,. This is because four of the five facilities with the largest decreases in air releases were also electric utilities.

Figure 6–5. Change in On-site Air Releases in North America, 1998–2000

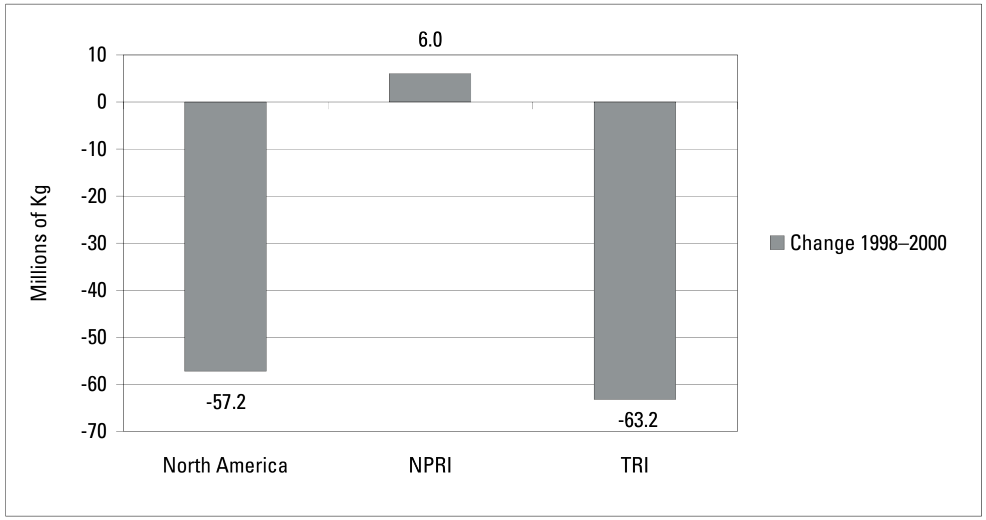


Table 6–8. The North American Facilities with the Largest Change in On-site Air Releases, 1998–2000

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	On-site Air Releases 1998 (kg)	On-site Air Releases 2000 (kg)	Change 1998–2000 (kg)
	Largest Increase						
1	Reliant Energies Inc., Keystone Power Plant	Shelocta, PA		491/493	3,954,756	8,368,174	4,413,418
2	US TVA Johnsonville Fossil Plant, US Tennessee Valley Authority	New Johnsonville, TN		491/493	2,287,286	6,355,585	4,068,299
3	Gulf Power Co., Plant Crist, Southern Co.	Pensacola, FL		491/493	4,205,899	7,536,787	3,330,888
4	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	49	491/493	4,855,140	7,639,440	2,784,300
5	Alabama Power Co., Plant Greene County, Southern Co.	Forkland, AL		491/493	2,158,691	4,327,439	2,168,747
	Largest Decrease						
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	26,163,746	19,923,810	-6,239,937
2	EME Homer City Generation L.P., Edison Intl.	Homer City, PA		491/493	4,011,984	165,422	-3,846,562
3	Baldwin Energy Complex, Dynegy Inc.	Baldwin, IL		491/493	3,830,610	185,741	-3,644,869
4	Seminole Generating Station	Palatka, FL		491/493	3,803,250	1,210,239	-2,593,011
5	Firstenergy, W.H. Sammis Plant	Stratton, OH		491/493	5,493,361	3,076,522	-2,416,839

Table 6–9. States/Provinces with Largest Change in On-site Air Releases, 1998–2000

		On-site Air Releases			
		1998	2000	Change 1998–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	North Carolina	48,975,152	53,099,186	4,124,034	8
2	British Columbia	4,945,623	8,539,146	3,593,523	73
3	Ontario	43,686,856	46,316,472	2,629,616	6
4	Maryland	13,549,396	14,969,625	1,420,229	10
5	Florida	35,841,219	36,819,337	978,118	3
	Largest Decrease				
1	Illinois	31,375,859	23,450,126	-7,925,733	-25
2	Ohio	60,315,810	52,967,329	-7,348,481	-12
3	Utah	28,780,434	21,863,056	-6,917,378	-24
4	Texas	44,876,052	38,351,309	-6,524,743	-15
5	Wisconsin	16,079,752	11,869,795	-4,209,957	-26

Table 6–10. Industries with Largest Change in On-site Air Releases, 1998–2000

			On-site Air Releases			
			1998	2000	Change 1998–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	24	Lumber and Wood Products	16,376,394	17,999,491	1,623,098	10
2	32	Stone/Clay/Glass Products	11,117,085	11,189,361	72,276	1
3	5169	Chemical Wholesalers	451,317	456,257	4,940	1
		Largest Decrease				
1	28	Chemicals	104,413,757	91,138,836	-13,274,921	-13
2	33	Primary Metals	54,310,271	42,694,195	-11,616,076	-21
3		Multiple codes 20–39*	30,294,033	24,355,204	-5,938,829	-20
4	491/493	Electric Utilities	376,169,957	372,057,513	-4,112,445	-1
5	37	Transportation Equipment	42,067,345	38,849,006	-3,218,339	-8

* Multiple SIC Codes reported only in TRI.

On-site Land Releases

- Total on-site land releases in North America decreased by 10 percent or 29.7 million kg from 1998 to 2000. NPRI facilities showed the opposite pattern, reporting a 32-percent increase of 4.7 million kg.
- Two states and one province reported increases of over 5 million kg in land releases from 1998 to 2000: Oregon, Utah, and Ontario. There were, however, five states reporting decreases of over 5 million kg: Ohio, New Mexico, Idaho, Texas, and Arizona.
- TRI facilities reporting under multiple industry sectors reported the largest increases in land releases from 1998 to 2000, over 3 million kg. The industries with the largest decreases were primary metals, with a decrease of 19.3 million kg and hazardous waste management, with 7.3 million kg.
- These two industries, primary metals and hazardous waste management, had facilities in the categories of both the largest increases and the largest decreases from 1998 to 2000. One facility in each of these two sectors reported more than 9 million kg in increases in land releases, and one each reported more than 9 million kg in decreases.

Figure 6–6. Change in On-site Land Releases in North America, 1998–2000

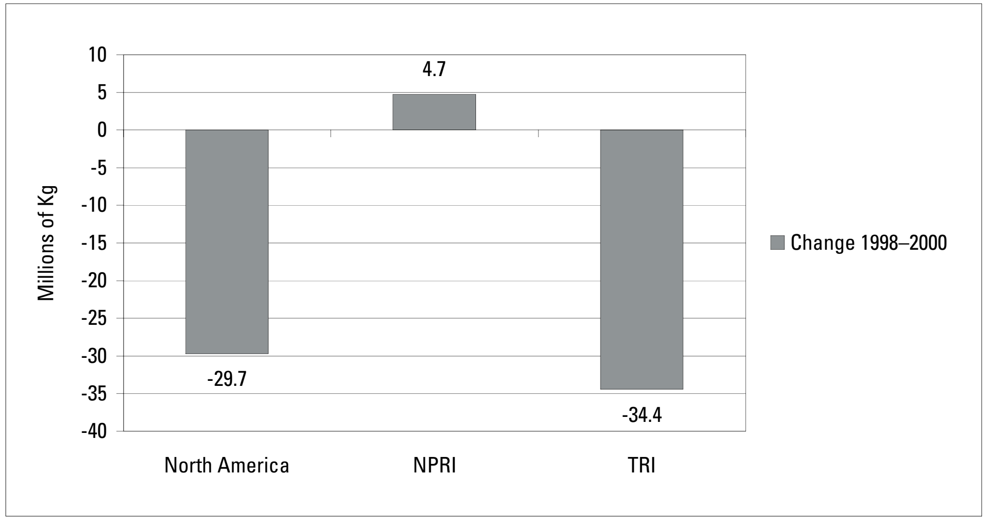


Table 6–11. The North American Facilities with the Largest Change in On-site Land Releases, 1998–2000

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	On-site Land Releases 1998 (kg)	On-site Land Releases 2000 (kg)	On-site Land Releases Change 1998–2000 (kg)
	Largest Increase						
1	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	10,499,281	24,294,201	13,794,920
2	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	15,041,474	24,360,492	9,319,018
3	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	151,141	6,995,900	6,844,759
4	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	4,725,205	9,466,740	4,741,535
5	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	5,021,534	8,823,990	3,802,456
	Largest Decrease						
1	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	22,869,841	7,562,358	-15,307,483
2	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM		33	9,806,485	0	-9,806,485
3	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	14,085,714	6,945,669	-7,140,045
4	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	6,893,424	293,968	-6,599,456
5	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico S.A. de C.V.	Hayden, AZ		33	20,797,960	16,021,494	-4,776,466

Table 6–12. States/Provinces with Largest Change in On-site Land Releases, 1998–2000

		On-site Land Releases			
		1998	2000	Change 1998–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	Oregon	11,551,395	24,440,947	12,889,553	112
2	Utah	23,239,839	29,392,043	6,152,203	26
3	Ontario	4,089,233	9,388,488	5,299,255	130
4	California	8,012,634	12,451,983	4,439,349	55
5	Michigan	4,193,426	7,117,552	2,924,127	70
	Largest Decrease				
1	Ohio	39,835,519	17,670,433	-22,165,087	-56
2	New Mexico	11,194,134	880,463	-10,313,671	-92
3	Idaho	18,482,689	11,230,947	-7,251,742	-39
4	Texas	16,146,369	9,491,023	-6,655,346	-41
5	Arizona	22,252,498	16,996,122	-5,256,376	-24

Table 6–13. Industries with Largest Change in On-site Land Releases, 1998–2000

			On-site Land Releases			
			1998	2000	Change 1998–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	--	Multiple codes 20–39*	2,099,117	5,100,749	3,001,632	143
2	35	Industrial Machinery	46,687	977,117	930,430	1,993
3	36	Electronic/Electrical Equipment	92,481	845,096	752,614	814
4	12	Coal Mining	2,002,088	2,573,678	571,590	29
5	32	Stone/Clay/Glass Products	1,500,591	1,834,761	334,170	22
		Largest Decrease				
1	33	Primary Metals	122,365,446	103,077,151	-19,288,296	-16
2	495/738	Hazardous Waste Mgt./Solvent Recovery	94,781,344	87,500,404	-7,280,940	-8
3	28	Chemicals	26,628,873	20,215,662	-6,413,211	-24
4	491/493	Electric Utilities	51,039,830	49,124,555	-1,915,276	-4
5	20	Food Products	2,761,343	2,215,760	-545,583	-20

* Multiple SIC Codes reported only in TRI.

Transfers to Disposal (except metals)

- Total off-site releases as transfers to disposal (except metals) in North America increased by 13 percent or 4.3 million kg from 1998 to 2000. TRI facilities reported a 33-percent increase of 7.7 million kg. However, NPRI facilities reported a decrease of 37 percent or 3.4 million kg.
- Four states reported increases of over 1 million kg in transfers to disposal (except metals) from 1998 to 2000: Alabama, Kansas, California, and Ohio. However, one province (Ontario) reported decreases of over 3.5 million kg, and two states (Pennsylvania and Arkansas) reported decreases of about 1 million kg.
- The two industries with the largest increases were chemicals and food products with increases of 5.9 million kg and 1.1 million kg respectively. Two chemicals facilities, one in Alabama and one in Kansas, reported a combined increase of 5.5 million kg.
- The hazardous waste management sector reported a decrease of 3.3 million kg in transfers to disposal (except metals). Two hazardous waste management facilities in Ontario reported a combined decrease of 3.4 million kg.

Figure 6–7. Change in Transfers to Disposal (except metals) in North America, 1998–2000

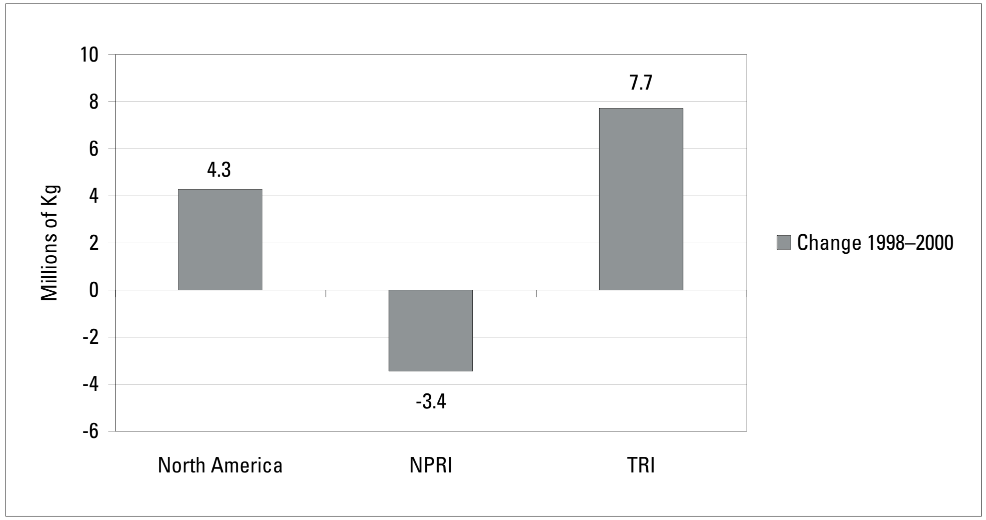


Table 6–14. The North American Facilities with the Largest Change in Transfers to Disposal (except metals), 1998–2000

			SIC Codes		Transfers to Disposal (except metals)		
Rank	Facility	City, State/Province	Canada	US	1998 (kg)	2000 (kg)	Change 1998–2000 (kg)
	Largest Increase						
1	UOP L.L.C.	Chickasaw, AL		28	128,481	3,666,434	3,537,953
2	Jayhawk Fine Chemicals Corp.	Galena, KS		28	2,755,667	4,751,891	1,996,224
3	AK Steel Corp.	Zanesville, OH		33	0	1,223,583	1,223,583
4	DK Environmental Inc., Demenno Kerdoon	Vernon, CA		495/738	10,779	1,077,645	1,066,866
5	Safety-Kleen Oil Recovery Co., Safety-Kleen Corp.	East Chicago, IN		29	0	704,966	704,966
	Largest Decrease						
1	Philip Services Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	3,520,241	596,770	-2,923,471
2	LTV Steel Co. Inc., Pittsburgh Works	Pittsburgh, PA		33	1,013,832	0	-1,013,832
3	Federal-Mogul Friction Prods., Federal-Mogul Corp.	Manila, AR		37	875,102	0	-875,102
4	Koppers Inds. Inc.	Cicero, IL		28	1,736,033	1,148,091	-587,942
5	Philip Services Inc., Rexdale Facility	Etobicoke, ON	77	495/738	1,372,400	847,059	-525,341

Table 6–15. States/Provinces with Largest Change in Transfers to Disposal (except metals), 1998–2000

		Transfers to Disposal (except metals)			
		1998	2000	Change 1998–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	Alabama	677,523	4,676,776	3,999,253	590
2	Kansas	2,797,638	4,795,493	1,997,855	71
3	California	755,124	2,180,550	1,425,426	189
4	Ohio	1,449,358	2,541,226	1,091,868	75
5	Alberta	414,665	1,127,338	712,673	172
	Largest Decrease				
1	Ontario	7,558,326	3,713,211	-3,845,115	-51
2	Pennsylvania	2,064,543	1,061,311	-1,003,232	-49
3	Arkansas	1,115,280	134,552	-980,728	-88
4	Washington	992,405	194,490	-797,915	-80
5	British Columbia	656,083	219,623	-436,460	-67

Table 6–16. Industries with Largest Change in Transfers to Disposal (except metals), 1998–2000

			Transfers to Disposal (except metals)			
			1998	2000	Change 1998–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	28	Chemicals	10,896,897	16,747,370	5,850,474	54
2	20	Food Products	373,736	1,458,240	1,084,504	290
3	29	Petroleum and Coal Products	1,629,529	2,213,960	584,431	36
4	30	Rubber and Plastics Products	1,393,755	1,886,820	493,065	35
5	491/493	Electric Utilities	267,745	516,381	248,635	93
		Largest Decrease				
1	495/738	Hazardous Waste Mgt./Solvent Recovery	8,778,960	5,452,942	-3,326,018	-38
2	37	Transportation Equipment	2,529,516	1,490,063	-1,039,453	-41
3	32	Stone/Clay/Glass Products	346,473	105,426	-241,046	-70
4	35	Industrial Machinery	191,475	70,777	-120,697	-63
5	22	Textile Mill Products	138,178	117,493	-20,685	-15

Transfers of Metals

- Total off-site releases as transfers of metals in North America decreased by 3 percent or 8.4 million kg from 1998 to 2000. TRI facilities reported a 4-percent increase of 8.3 million kg. This was offset by the 16.7-million-kg decrease reported by NPRI facilities.
- Five states reported increases of over 2 million kg in transfers of metals from 1998 to 2000: Tennessee, Arkansas, South Carolina, Pennsylvania, and Iowa. One province, Ontario, reported a decrease of 16.9 million kg. The state of Michigan reported a decrease of 6.0 million kg.
- The industry with the largest decrease was hazardous waste management. Two hazardous waste management facilities in Ontario reported a combined decrease of 11.1 million kg.
- The primary metals sector reported the second-largest decrease. However, three primary metals facilities reported increases of over 3 million kg each in transfers of metals.

Figure 6–8. Change in Transfers of Metals in North America, 1998–2000

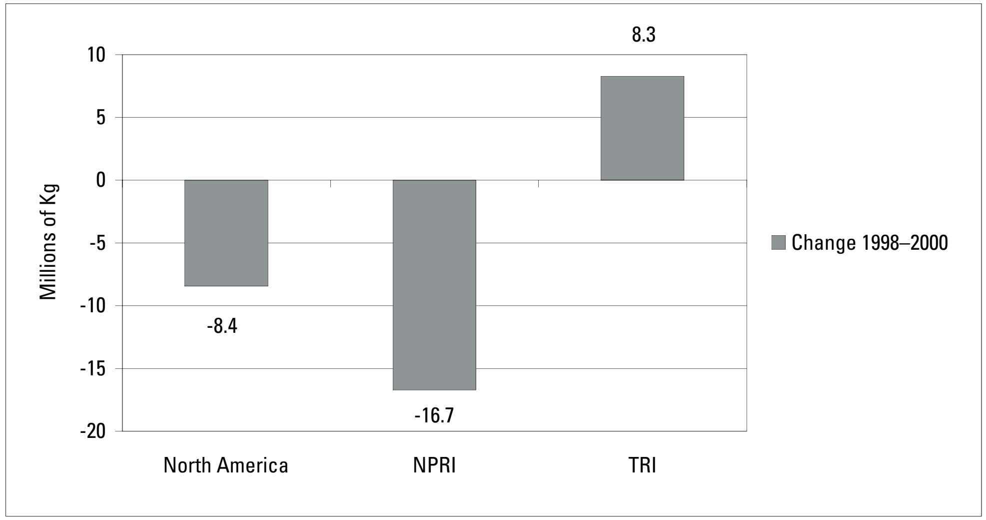


Table 6–17. The North American Facilities with the Largest Change in Transfers of Metals, 1998–2000

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Transfers of Metals 1998 (kg)	Transfers of Metals 2000 (kg)	Transfers of Metals Change 1998–2000 (kg)
	Largest Increase						
1	Steel Dynamics Inc.	Butler, IN		33	4,638,323	9,178,259	4,539,935
2	Exide Corp.	Bristol, TN		36	15	4,273,991	4,273,976
3	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	9,032,273	13,094,659	4,062,385
4	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	5,095,164	8,306,731	3,211,567
5	Waste Management Inc.	Port Arthur, TX		495/738	97,219	2,247,036	2,149,817
	Largest Decrease						
1	Philip Services Inc., Yard 3 Facility	Hamilton, ON	77	495/738	8,280,287	80,840	-8,199,447
2	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	6,961,361	981,969	-5,979,391
3	Co-Steel Lasco	Whitby, ON	29	33	5,873,182	67,923	-5,805,259
4	Philip Services Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	3,427,991	491,040	-2,936,951
5	Crystal Clean Services L.L.C.	Indianapolis, IN		495/738	2,707,241	0	-2,707,241

Table 6–18. States/Provinces with Largest Change in Transfers of Metals, 1998–2000

		Transfers of Metals			
		1998	2000	Change 1998–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	Tennessee	3,211,722	7,359,240	4,147,518	129
2	Arkansas	8,119,834	11,796,002	3,676,168	45
3	South Carolina	4,211,698	7,307,325	3,095,628	74
4	Pennsylvania	27,191,240	29,459,550	2,268,310	8
5	Iowa	3,551,129	5,614,256	2,063,127	58
	Largest Decrease				
1	Ontario	34,710,415	17,811,194	-16,899,221	-49
2	Michigan	16,620,355	10,589,325	-6,031,030	-36
3	Georgia	5,036,580	3,296,468	-1,740,112	-35
4	West Virginia	2,929,904	1,403,849	-1,526,054	-52
5	Washington	2,326,187	838,889	-1,487,299	-64

Table 6–19. Industries with Largest Change in Transfers of Metals, 1998–2000

			Transfers of Metals			
			1998	2000	Change 1998–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	28	Chemicals	10,666,308	15,700,729	5,034,421	47
2	36	Electronic/Electrical Equipment	5,155,572	8,641,031	3,485,459	68
3	37	Transportation Equipment	2,764,547	4,978,640	2,214,093	80
4		Multiple codes 20–39*	7,965,327	9,537,684	1,572,357	20
5	30	Rubber and Plastics Products	3,777,976	4,757,353	979,377	26
		Largest Decrease				
1	495/738	Hazardous Waste Mgt./Solvent Recovery	30,771,139	17,663,734	-13,107,405	-43
2	33	Primary Metals	149,060,148	140,630,835	-8,429,312	-6
3	20	Food Products	1,846,950	398,541	-1,448,408	-78
4	32	Stone/Clay/Glass Products	2,546,689	1,889,526	-657,163	-26
5	38	Measurement/Photographic Instruments	396,473	126,629	-269,843	-68

* Multiple SIC Codes reported only in TRI.

Transfers to Energy Recovery (except metals)

- Total transfers to energy recovery (except metals) in North America decreased by 15 percent or 56.3 million kg from 1998 to 2000. TRI facilities reported a 16-percent decrease of 59.6 million kg. However, NPRI facilities reported an increase of 28 percent or 3.3 million kg.
- One state, Arkansas, reported an increase of 15.7 million kg in transfers to energy recovery (except metals) from 1998 to 2000. One hazardous waste management facility in that state reported an increase of 14.5 million kg.
- However, the hazardous waste management sector as a whole reported the largest decrease in transfers to energy recovery, with a decline of 66.0 million kg overall. The five facilities with the largest decreases were all hazardous waste management facilities. They were located in Michigan, Indiana, Ohio, and Alabama—the four states with the largest reported decreases in transfers to energy recovery from 1998 to 2000.

Figure 6–9. Change in Transfers to Energy Recovery (except metals) in North America, 1998–2000

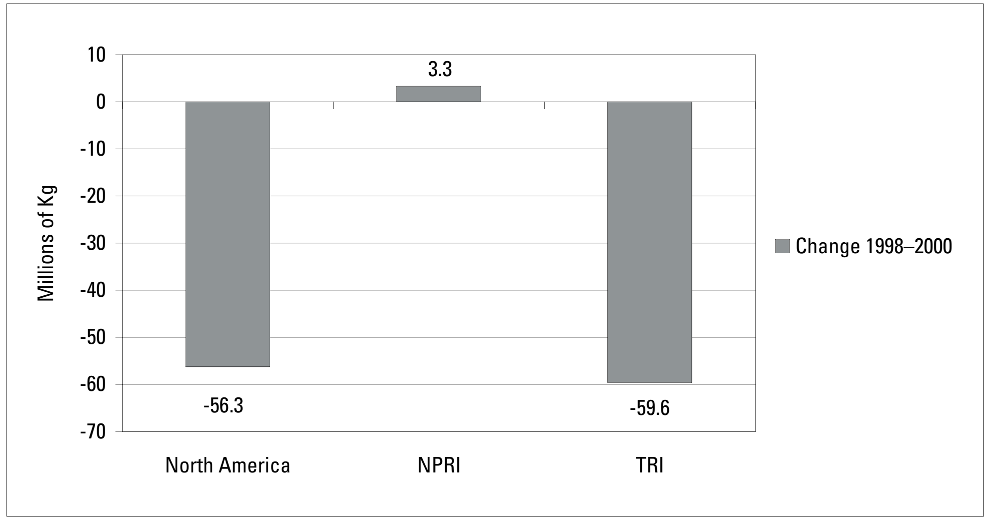


Table 6–20. The North American Facilities with the Largest Change in Transfers to Energy Recovery (except metals), 1998–2000

			SIC Codes		Transfers to Energy Recovery (except metals)		
Rank	Facility	City, State/Province	Canada	US	1998 (kg)	2000 (kg)	Change 1998–2000 (kg)
	Largest Increase						
1	Rineco	Benton, AR		495/738	2,511,007	17,060,603	14,549,596
2	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	4,242,503	11,178,961	6,936,458
3	Pfizer Inc., Parke-Davis Div.	Holland, MI		28	4,991,429	11,274,893	6,283,465
4	Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo, MI		28	7,776,156	12,491,764	4,715,608
5	Kemet Electronics Corp.	Simpsonville, SC		36	0	3,153,632	3,153,632
	Largest Decrease						
1	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	48,365,891	12,919,619	-35,446,272
2	Pollution Control Inds.	East Chicago, IN		495/738	27,401,045	34,186	-27,366,859
3	Systech Environmental Corp., Lafarge Corp.	Demopolis, AL		495/738	11,085,261	0	-11,085,261
4	North East Chemical Corp., TBN Holdings Inc.	Cleveland, OH		495/738	10,146,615	0	-10,146,615
5	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	9,935,601	2,622,443	-7,313,158

Table 6–21. States/Provinces with Largest Change in Transfers to Energy Recovery (except metals), 1998–2000

		Transfers to Energy Recovery (except metals)			
		1998	2000	Change 1998–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	Arkansas	5,973,815	21,741,075	15,767,260	264
2	Kentucky	7,989,157	14,247,227	6,258,070	78
3	South Carolina	11,462,348	15,491,784	4,029,435	35
4	Wisconsin	8,095,158	11,920,084	3,824,926	47
5	Minnesota	975,946	4,765,293	3,789,346	388
	Largest Decrease				
1	Michigan	83,218,823	48,824,448	-34,394,375	-41
2	Indiana	33,862,230	6,015,572	-27,846,658	-82
3	Ohio	43,909,577	18,760,502	-25,149,075	-57
4	Alabama	17,946,502	9,081,864	-8,864,638	-49
5	North Carolina	5,925,669	3,829,773	-2,095,896	-35

Table 6–22. Industries with Largest Change in Transfers to Energy Recovery (except metals), 1998–2000

			Transfers to Energy Recovery (except metals)			
			1998	2000	Change 1998–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	28	Chemicals	155,442,191	165,873,506	10,431,315	7
2		Multiple codes 20–39*	7,044,389	13,001,708	5,957,320	85
3	36	Electronic/Electrical Equipment	2,093,686	5,338,816	3,245,129	155
4	33	Primary Metals	1,522,596	2,266,183	743,587	49
5	34	Fabricated Metals Products	4,403,209	4,801,050	397,841	9
		Largest Decrease				
1	495/738	Hazardous Waste Mgt./Solvent Recovery	180,784,257	114,824,387	-65,959,869	-36
2	5169	Chemical Wholesalers	10,660,467	4,194,169	-6,466,297	-61
3	29	Petroleum and Coal Products	2,315,901	647,705	-1,668,196	-72
4	32	Stone/Clay/Glass Products	2,383,279	1,327,434	-1,055,845	-44
5	39	Misc. Manufacturing Industries	1,469,610	850,469	-619,141	-42

* Multiple SIC Codes reported only in TRI.

6.3 1998–2000 Change in Total Reported Amounts of Releases and Transfers for Facilities Reporting in both Years

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 in both 1998 and 2000, although fewer facilities overall reported in 2000 than in 1998. NPRI showed an increase of 10 percent in the number of facilities reporting, compared to a decrease of 3 percent for TRI.

Facilities may report in one year and not another 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, or the adoption of pollution prevention or control activities that put them below reporting thresholds. Because this analysis looks at total amounts reported in any given year, it is instructive to see the contribution to the overall decrease of both these facilities and the facilities reporting in both years.

- Facilities reporting in both 1998 and 2000 reported a net decrease in total releases and transfers of 3 percent or 90.7 million kg. Facilities reporting only in 1998 had 136.9 million kg while facilities reporting only in 2000 had 94.8 million kg, for a net decline of 40.1 million kg. Thus, two-thirds of the overall decrease for all facilities in the matched data set (132.7 million kg) is accounted for by facilities that reported in both years.

Table 6–23. Total Reported Amounts of Releases and Transfers in North America, Facilities Reporting Both Years, 1998–2000

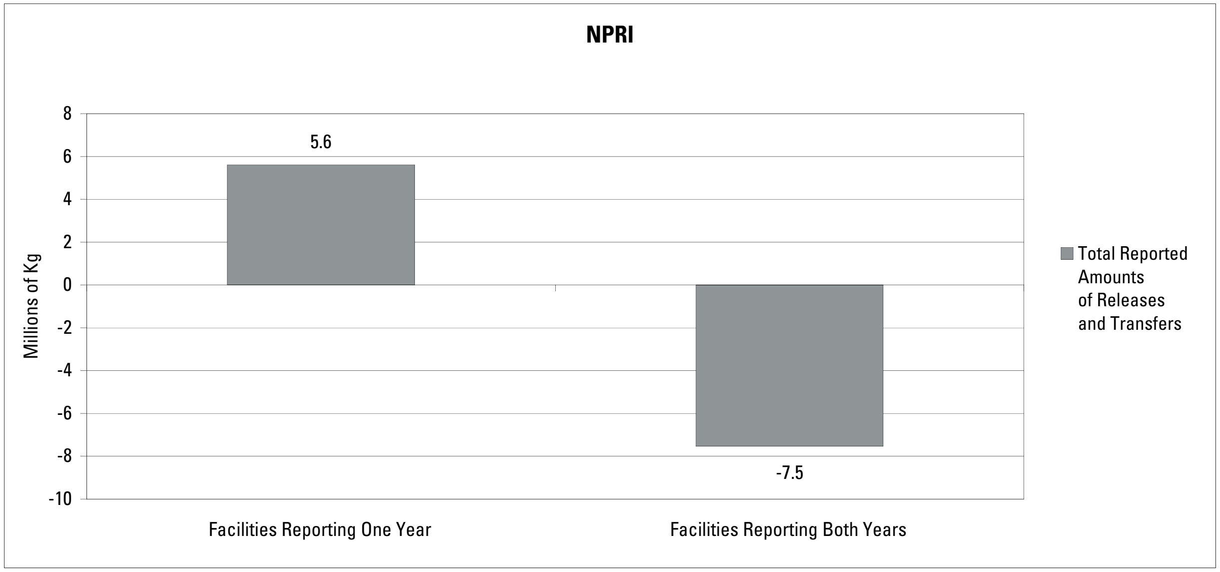
	Reported in One Year Only				Reported in Both Years				Total			
	1998	2000	Change 1998–2000		1998	2000	Change 1998–2000		1998	2000	Change 1998–2000	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	2,864	2,423	-441	-15	18,912	18,912	0	0	21,776	21,335	-441	-2
Total Forms	5,437	4,609	-828	-15	66,400	66,373	-27	-0.04	71,837	70,982	-855	-1
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	
On-site Releases*	**35,906,174**	**23,009,648**	**-12,896,527**	**-36**	**1,345,007,596**	**1,281,666,495**	**-63,341,101**	**-5**	**1,380,913,770**	**1,304,676,143**	**-76,237,627**	**-6**
Air	20,031,127	12,070,096	-7,961,031	-40	852,103,367	802,855,395	-49,247,973	-6	872,134,495	814,925,491	-57,209,003	-7
Surface Water	1,551,703	7,963,769	6,412,065	413	109,788,549	110,999,909	1,211,360	1	111,340,253	118,963,678	7,623,425	7
Underground Injection	1,078,091	25,399	-1,052,692	-98	84,597,793	88,728,537	4,130,744	5	85,675,883	88,753,936	3,078,053	4
Land	13,236,599	2,931,203	-10,305,395	-78	298,401,272	278,995,115	-19,406,156	-7	311,637,870	281,926,319	-29,711,552	-10
Off-site Releases	**7,212,655**	**6,776,984**	**-435,670**	**-6**	**270,132,641**	**266,398,503**	**-3,734,139**	**-1**	**277,345,296**	**273,175,487**	**-4,169,809**	**-2**
Transfers to Disposal (except metals)	2,683,019	1,441,845	-1,241,174	-46	30,051,041	35,563,958	5,512,917	18	32,734,061	37,005,803	4,271,743	13
Transfers of Metals**	4,529,635	5,335,139	805,504	18	240,081,600	230,834,544	-9,247,056	-4	244,611,235	236,169,684	-8,441,552	-3
Total Reported Releases On- and Off-site	**43,118,829**	**29,786,632**	**-13,332,197**	**-31**	**1,615,140,238**	**1,548,064,998**	**-67,075,239**	**-4**	**1,658,259,066**	**1,577,851,630**	**-80,407,436**	**-5**
Off-site Transfers to Recycling	**47,937,127**	**45,222,402**	**-2,714,725**	**-6**	**985,727,597**	**997,203,881**	**11,476,284**	**1**	**1,033,664,724**	**1,042,426,283**	**8,761,559**	**1**
Transfers to Recycling of Metals	43,254,019	37,719,427	-5,534,592	-13	849,124,807	862,932,395	13,807,588	2	892,378,826	900,651,822	8,272,996	1
Transfers to Recycling (except metals)	4,683,108	7,502,975	2,819,868	60	136,602,790	134,271,486	-2,331,304	-2	141,285,898	141,774,461	488,563	0.3
Other Off-site Transfers for Further Management	**45,844,166**	**19,831,623**	**-26,012,542**	**-57**	**606,171,859**	**571,091,447**	**-35,080,412**	**-6**	**652,016,025**	**590,923,070**	**-61,092,954**	**-9**
Energy Recovery (except metals)	35,980,757	9,863,465	-26,117,292	-73	350,771,649	320,635,533	-30,136,116	-9	386,752,406	330,498,998	-56,253,408	-15
Treatment (except metals)	2,757,552	4,569,189	1,811,637	66	126,218,021	112,039,973	-14,178,048	-11	128,975,573	116,609,162	-12,366,411	-10
Sewage (except metals)	7,105,856	5,398,969	-1,706,887	-24	129,182,189	138,415,941	9,233,752	7	136,288,045	143,814,911	7,526,865	6
Total Reported Amounts of Releases and Transfers	**136,900,121**	**94,840,658**	**-42,059,464**	**-31**	**3,207,039,694**	**3,116,360,326**	**-90,679,368**	**-3**	**3,343,939,815**	**3,211,200,984**	**-132,738,832**	**-4**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 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.

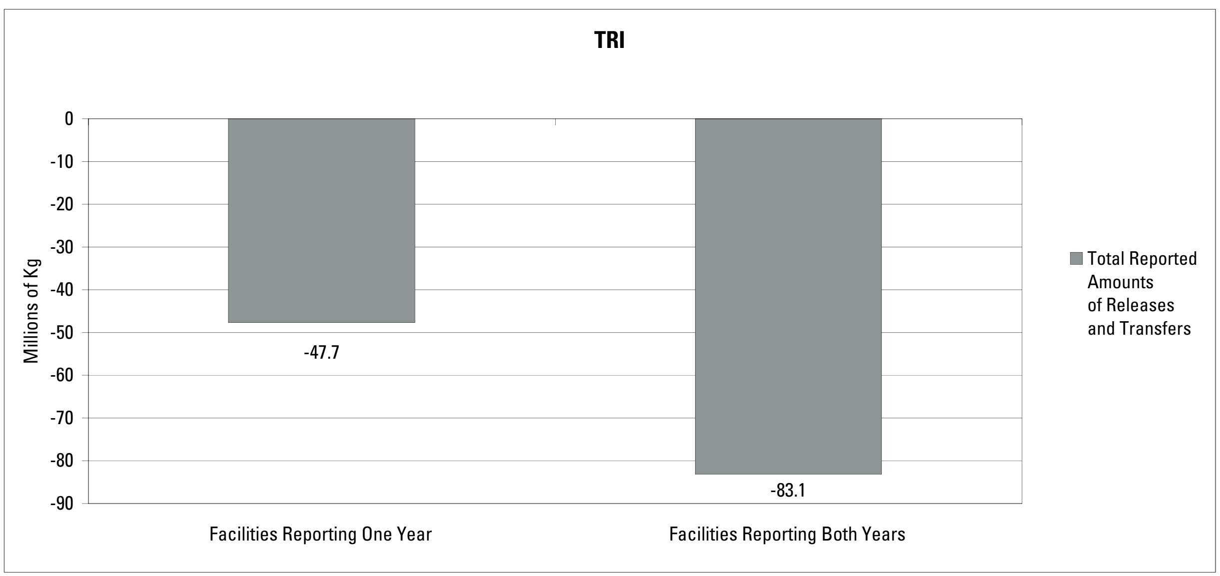
** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 6–10. Change in Total Reported Amounts of Releases and Transfers for Facilities Reporting in One or Both Years, NPRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998–2000.

Figure 6–11. Change in Total Reported Amounts of Releases and Transfers for Facilities Reporting in One or Both Years, TRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998–2000.

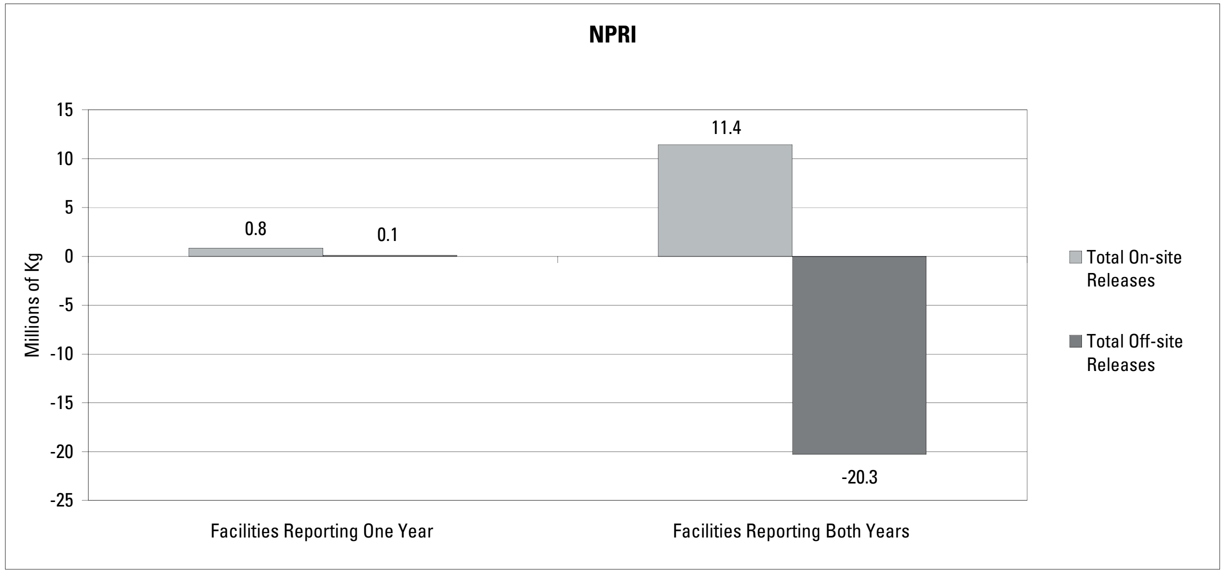
- Facilities reporting in both years had a decrease of 4 percent in total reported releases on- and off-site.
- Facilities reporting only in 2000 and not in 1998 had 7.5 million kg of transfers to recycling (except metals). This offset the 2-percent decline (2.3 million kg) in reporting of such transfers by facilities reporting in both years.
- Facilities reporting in 2000 and not in 1998 had 8.0 million kg of on-site releases to surface waters. This was much larger than the 1.2-million-kg increase of the facilities reporting in both years.

6.3.1 1998–2000 Change for NPRI and TRI for Facilities Reporting in One or in Both Years

- NPRI facilities reporting only in 2000 reported 5.6 million kg more in total releases and transfers than those reporting only in 1998. This net increase offset the decrease of 7.5 million kg reported by NPRI facilities reporting in both years.
- TRI facilities reporting only in 2000 reported 47.7 million kg less in total releases and transfers than those reporting only in 1998. This was in addition to the decrease of 83.1 million kg reported by TRI facilities reporting in both years.
- NPRI facilities reporting only in 2000 had almost 1 million kg more in total on- and off-site releases than those reporting only in 1998. NPRI facilities reporting in both years had a net increase of over 11 million kg in on-site releases and a net decrease of over 20 million kg in off-site releases.

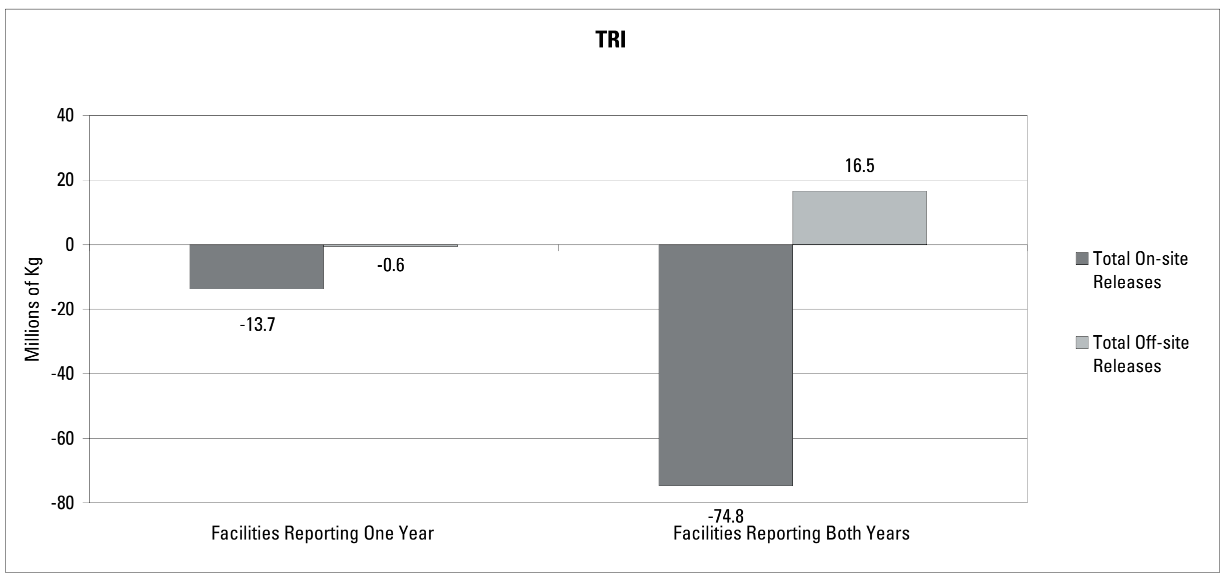
- TRI facilities reporting only in 2000 reported 13.7 million kg of on-site releases less than those reporting only in 1998. This was in addition to the 74.8-million-kg decrease in on-site releases of TRI facilities reporting in both years.
- The difference in off-site releases by those TRI facilities reporting only in one year was very small, while facilities reporting in both years had an increase of 16.5 million kg in off-site releases.

Figure 6–12. Change in Releases On- and Off-site for Facilities Reporting in One or Both Years, NPRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998–2000.

Figure 6–13. Change in Releases On- and Off-site for Facilities Reporting in One or Both Years, TRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998–2000.

Table 6–24. 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, 1998–2000

	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	2000	Change 1998–2000		1998	2000	Change 1998–2000		1998	2000	Change 1998–2000	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	15,257	15,257	0	0	3,641	3,641	0	0	18,898	18,898	0	0
Total Forms	40,384	40,772	388	1	23,622	23,083	-539	-2	61,544	61,219	-325	-1
Releases On- and Off-site	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**
On-site Releases*	**107,882,572**	**118,100,026**	**10,217,453**	**9**	**1,237,050,449**	**1,163,453,814**	**-73,596,635**	**-6**	**1,344,933,022**	**1,281,553,840**	**-63,379,182**	**-5**
Air	98,759,971	102,694,738	3,934,767	4	753,272,367	700,052,537	-53,219,830	-7	852,032,338	802,747,275	-49,285,063	-6
Surface Water	4,813,302	9,490,819	4,677,518	97	104,973,306	101,507,294	-3,466,012	-3	109,786,608	110,998,114	1,211,506	1
Underground Injection	193,982	260,670	66,689	34	84,403,811	88,467,867	4,064,056	5	84,597,793	88,728,537	4,130,744	5
Land	4,038,616	5,592,946	1,554,330	38	294,361,052	273,399,430	-20,961,623	-7	298,399,669	278,992,376	-19,407,293	-7
Off-site Releases	**26,402,477**	**36,402,392**	**9,999,915**	**38**	**243,551,820**	**228,429,028**	**-15,122,791**	**-6**	**269,954,297**	**264,831,421**	**-5,122,876**	**-2**
Transfers to Disposal (except metals)	4,950,739	8,326,077	3,375,339	68	25,075,858	27,219,788	2,143,930	9	30,026,597	35,545,866	5,519,269	18
Transfers of Metals**	21,451,738	28,076,315	6,624,577	31	218,475,962	201,209,240	-17,266,722	-8	239,927,700	229,285,555	-10,642,145	-4
Total Reported Releases On- and Off-site	**134,285,049**	**154,502,418**	**20,217,369**	**15**	**1,480,602,269**	**1,391,882,843**	**-88,719,426**	**-6**	**1,614,887,318**	**1,546,385,261**	**-68,502,058**	**-4**
Off-site Transfers to Recycling	**74,993,934**	**116,466,299**	**41,472,365**	**55**	**910,672,507**	**852,416,896**	**-58,255,611**	**-6**	**985,666,441**	**968,883,195**	**-16,783,246**	**-2**
Transfers to Recycling of Metals	62,133,445	100,868,461	38,735,016	62	786,967,937	743,111,337	-43,856,600	-6	849,101,382	843,979,799	-5,121,584	-1
Transfers to Recycling (except metals)	12,860,489	15,597,838	2,737,349	21	123,704,570	109,305,558	-14,399,012	-12	136,565,059	124,903,396	-11,661,663	-9
Other Off-site Transfers for Further Management	**47,357,832**	**67,819,515**	**20,461,683**	**43**	**558,741,673**	**497,791,519**	**-60,950,154**	**-11**	**606,099,505**	**565,611,034**	**-40,488,471**	**-7**
Energy Recovery (except metals)	20,775,937	29,152,824	8,376,887	40	329,994,694	291,480,076	-38,514,618	-12	350,770,631	320,632,900	-30,137,731	-9
Treatment (except metals)	10,738,610	13,417,083	2,678,472	25	115,410,306	95,211,962	-20,198,344	-18	126,148,916	108,629,044	-17,519,872	-14
Sewage (except metals)	15,843,285	25,249,609	9,406,324	59	113,336,673	111,099,481	-2,237,192	-2	129,179,958	136,349,090	7,169,132	6
Total Reported Amounts of Releases and Transfers	**256,636,816**	**338,788,232**	**82,151,417**	**32**	**2,950,016,449**	**2,742,091,257**	**-207,925,192**	**-7**	**3,206,653,265**	**3,080,879,490**	**-125,773,775**	**-4**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 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.

*** Does not include 14 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2000.

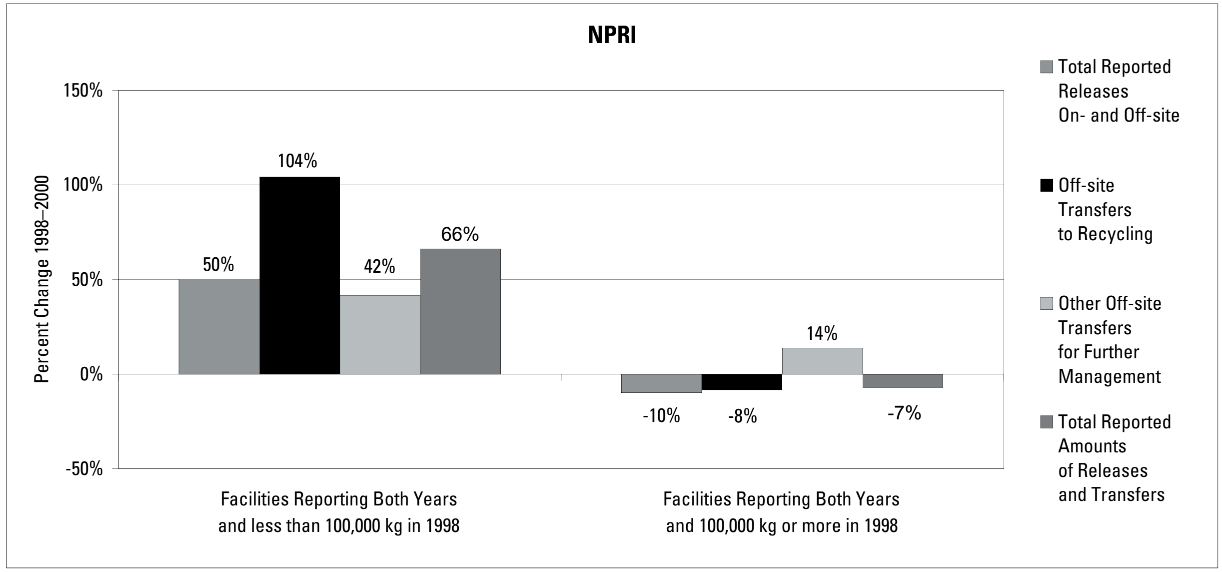
6.3.2 Facilities Reporting Total Releases and Transfers less than 100,000 kg in 1998

The overall quantities reported to the PRTRs are dominated by the facilities reporting the largest releases and transfers. Earlier tables in this chapter show their influence on the changes in total amounts reported from 1998 to 2000. This section examines reporting by facilities that had total releases and transfers of less than 100,000 kg in 1998 in contrast to facilities with 100,000 kg or more in 1998. This section includes reporting only by facilities that reported in both 1998 and 2000; however, in order to see underlying patterns, the analysis does not include 14 facilities that reported less than 100,000 kg in 1998 and more than 1,000,000 kg in 2000.

- Over 80 percent of North American facilities reporting both years (15,257 facilities) had less than 100,000 kg in 1998. They reported an overall increase of 32 percent in total releases and transfers from 1998 to 2000, compared to a decrease of 7 percent reported by the 20 percent of facilities reporting 100,000 kg or more in 1998.
- Facilities reporting less than 100,000 kg in 1998 had increases in all categories of releases and transfers, including a 15-percent increase in total releases.

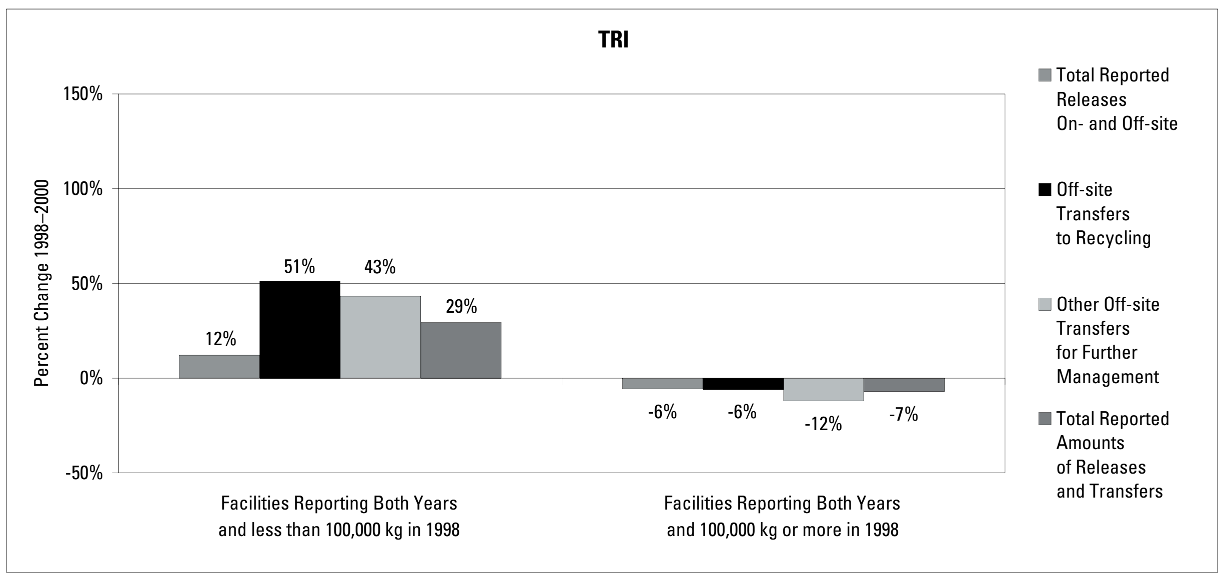
- For NPRI facilities reporting both years, those with less than 100,000 kg in 1998 showed an increase of 66 percent in total releases and transfers, compared to a decrease of 7 percent by facilities reporting 100,000 kg or more. This pattern of large increases by facilities with less than 100,000 kg held for most major categories of releases and transfers.
- NPRI facilities reporting less than 100,000 kg in 1998 showed an increase of 54 percent in on-site releases, compared to an increase of 7 percent reported by facilities reporting 100,000 kg or more. For off-site releases, facilities with less than 100,000 kg in 1998 reported an increase of 36 percent compared to a 43-percent decrease for those with 100,000 kg or more.
- TRI facilities reporting less than 100,000 kg in 1998 showed an increase of 29 percent in total releases and transfers, compared to a decrease of 7 percent by facilities reporting 100,000 kg or more. This pattern of large increases by facilities with less than 100,000 kg compared to decreases by other facilities held for all major categories of releases and transfers.
- TRI facilities reporting less than 100,000 kg in 1998 showed an increase of 6 percent in on-site releases, compared to a decrease of 7 percent by facilities reporting 100,000 kg or more. For off-site releases, facilities with less than 100,000 kg in 1998 reported an increase of 38 percent compared to a 3-percent increase for facilities with 100,000 kg or more.

Figure 6–14. Percent Change in Releases and Transfers by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1998, NPRI, 1998–2000



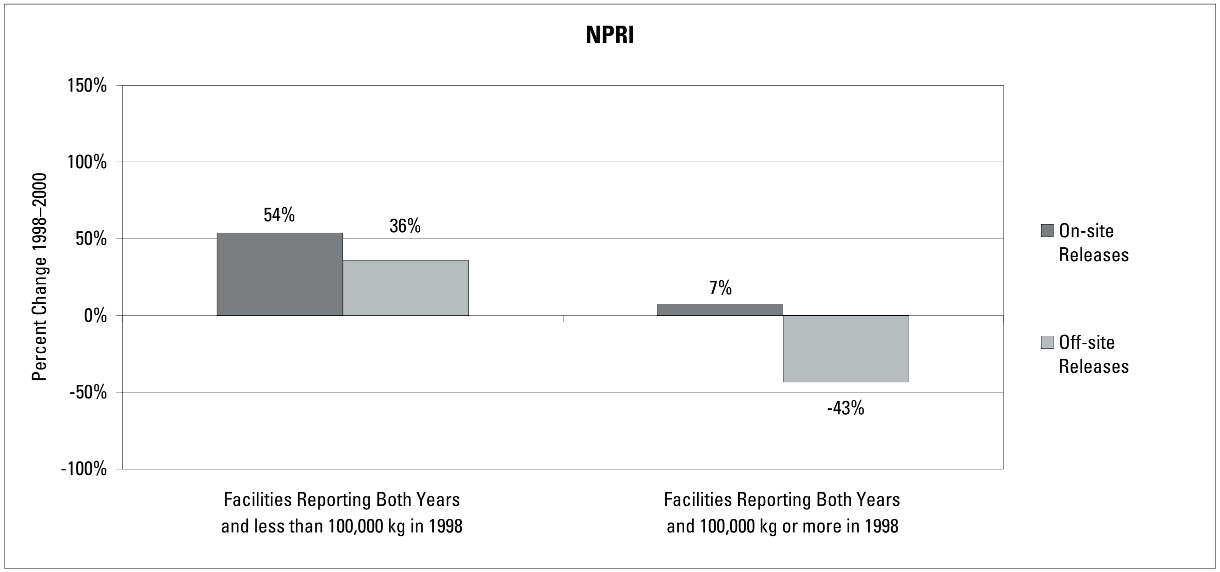
Note: Canada and US data only. Mexico data not available for 1998–2000.

Figure 6–15. Percent Change in Releases and Transfers by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1998, TRI, 1998–2000



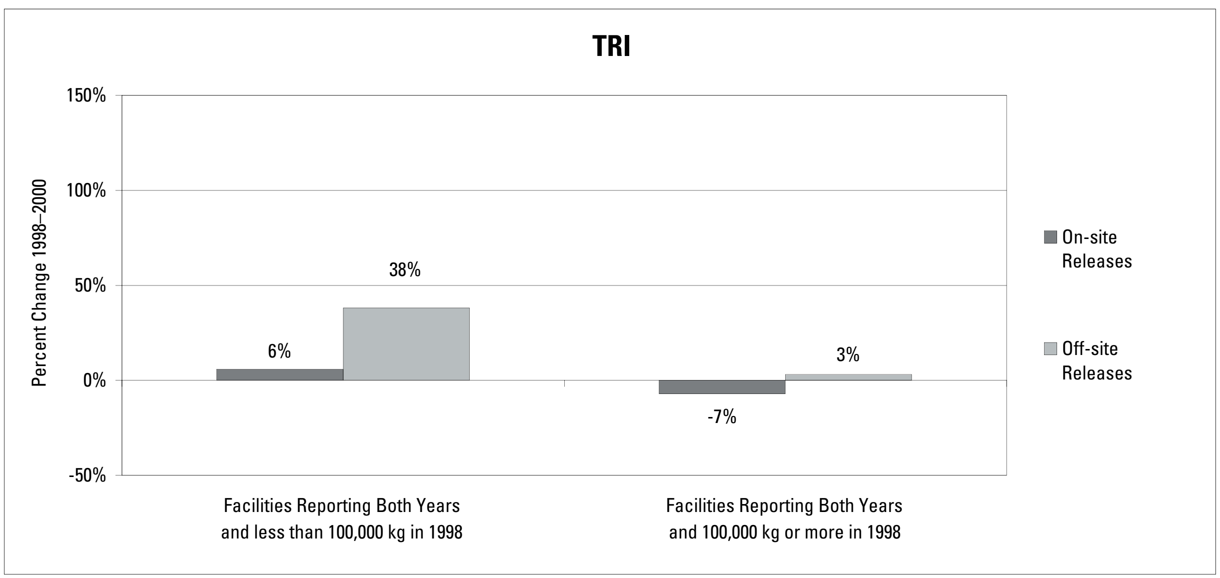
Note: Canada and US data only. Mexico data not available for 1998–2000.

Figure 6–16. Percent Change in Releases On- and Off-site by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1998, NPRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998–2000.

Figure 6–17. Percent Change in Releases On- and Off-site by Facilities Reporting less than 100,000 kg compared to Facilities Reporting more than 100,000 kg in 1998, TRI, 1998–2000



Note: Canada and US data only. Mexico data not available for 1998–2000.

- NPRI facilities reporting 100,000 kg or more in 1998 showed a much smaller increase in on-site air emissions (1.4 million kg or 2 percent) than NPRI facilities reporting less than 100,000 kg in 1998, which had increases in air releases of 3.7 million kg or 49 percent.
- Both groups of NPRI facilities reported net increases in surface water releases from 1998 to 2000. However, such releases almost doubled for NPRI facilities reporting less than 100,000 kg in 1998 (an 82-percent increase), while NPRI facilities with 100,000 kg or more in 1998 reported an increase of 42 percent.
- Transfers to recycling of metals increased by 5.7 million kg or 132 percent for NPRI facilities reporting less than 100,000 kg in 1998, while NPRI facilities reporting 100,000 kg or more in 1998 showed decreases of 9.8 million kg or 10 percent.

Table 6–25. 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, 1998–2000

	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	2000	Change 1998–2000		1998	2000	Change 1998–2000		1998	2000	Change 1998–2000	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	969	969	0	0	394	394	0	0	1,363	1,363	0	0
Total Forms	2,462	2,636	174	7	2,321	2,439	118	5	4,783	5,075	292	6
Releases On- and Off-site	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**
On-site Releases*	**8,253,467**	**12,690,023**	**4,436,556**	**54**	**93,708,271**	**100,714,955**	**7,006,684**	**7**	**101,961,738**	**113,404,978**	**11,443,240**	**11**
Air	7,437,321	11,109,872	3,672,551	49	71,426,299	72,798,130	1,371,831	2	78,863,620	83,908,002	5,044,382	6
Surface Water	457,392	833,570	376,178	82	3,984,130	5,640,148	1,656,018	42	4,441,522	6,473,718	2,032,196	46
Underground Injection	5,450	6,189	739	14	3,694,979	3,562,733	-132,246	-4	3,700,429	3,568,922	-131,507	-4
Land	276,602	679,540	402,938	146	14,562,950	18,687,257	4,124,307	28	14,839,552	19,366,797	4,527,245	31
Off-site Releases	**2,002,656**	**2,720,887**	**718,231**	**36**	**48,564,091**	**27,574,114**	**-20,989,977**	**-43**	**50,566,747**	**30,295,001**	**-20,271,746**	**-40**
Transfers to Disposal (except metals)	329,108	763,747	434,639	132	8,888,672	4,726,598	-4,162,074	-47	9,217,780	5,490,345	-3,727,435	-40
Transfers of Metals**	1,673,548	1,957,140	283,592	17	39,675,419	22,847,516	-16,827,903	-42	41,348,967	24,804,656	-16,544,311	-40
Total Reported Releases On- and Off-site	**10,256,123**	**15,410,910**	**5,154,787**	**50**	**142,272,362**	**128,289,069**	**-13,983,293**	**-10**	**152,528,485**	**143,699,979**	**-8,828,506**	**-6**
Off-site Transfers to Recycling	**5,680,096**	**11,597,179**	**5,917,083**	**104**	**109,130,183**	**100,142,089**	**-8,988,094**	**-8**	**114,810,279**	**111,739,268**	**-3,071,011**	**-3**
Transfers to Recycling of Metals	4,318,532	10,010,694	5,692,162	132	96,470,399	86,677,102	-9,793,297	-10	100,788,931	96,687,796	-4,101,135	-4
Transfers to Recycling (except metals)	1,361,564	1,586,485	224,921	17	12,659,784	13,464,987	805,203	6	14,021,348	15,051,472	1,030,124	7
Other Off-site Transfers for Further Management	**2,066,036**	**2,924,547**	**858,511**	**42**	**25,454,221**	**28,955,793**	**3,501,572**	**14**	**27,520,257**	**31,880,340**	**4,360,083**	**16**
Energy Recovery (except metals)	345,705	612,775	267,070	77	11,416,220	14,479,901	3,063,681	27	11,761,925	15,092,676	3,330,751	28
Treatment (except metals)	1,328,292	1,744,318	416,026	31	9,067,530	8,570,801	-496,729	-5	10,395,822	10,315,119	-80,703	-1
Sewage (except metals)	392,039	567,454	175,415	45	4,970,471	5,905,091	934,620	19	5,362,510	6,472,545	1,110,035	21
Total Reported Amounts of Releases and Transfers	**18,002,255**	**29,932,636**	**11,930,381**	**66**	**276,856,766**	**257,386,951**	**-19,469,815**	**-7**	**294,859,021**	**287,319,587**	**-7,539,434**	**-3**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 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.

Table 6–26. 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, 1998–2000

	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**				Facilities Reporting less than 100,000 kg in 1998 and more than 100,000 kg in 2000			
	1998	2000	Change 1998–2000		1998	2000	Change 1998–2000		1998	2000	Change 1998–2000		1998	2000	Change 1998–2000	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Total Facilities	14,288	14,288	0	0	3,247	3,247	0	0	17,535	17,535	0	0	14	14	0	0
Total Forms	37,922	38,136	214	1	23,622	23,083	-539	-2	61,544	61,219	-325	-1	73	79	6	8
Releases On- and Off-site	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**	**kg**	**kg**	**kg**	**%**
On-site Releases	**99,629,105**	**105,410,003**	**5,780,897**	**6**	**1,143,342,178**	**1,062,738,859**	**-80,603,319**	**-7**	**1,242,971,284**	**1,168,148,862**	**-74,822,422**	**-6**	**74,575**	**112,655**	**38,081**	**51**
Air	91,322,650	91,584,866	262,216	0.3	681,846,068	627,254,407	-54,591,661	-8	773,168,718	718,839,273	-54,329,445	-7	71,030	108,120	37,090	52
Surface Water	4,355,910	8,657,249	4,301,340	99	100,989,176	95,867,146	-5,122,030	-5	105,345,086	104,524,396	-820,690	-1	1,941	1,795	-146	-8
Underground Injection	188,532	254,481	65,950	35	80,708,832	84,905,134	4,196,302	5	80,897,364	85,159,615	4,262,251	5	0	0	0	--
Land	3,762,014	4,913,406	1,151,392	31	279,798,102	254,712,173	-25,085,930	-9	283,560,117	259,625,579	-23,934,538	-8	1,603	2,740	1,137	71
Off-site Releases	**24,399,821**	**33,681,505**	**9,281,684**	**38**	**194,987,729**	**200,854,914**	**5,867,186**	**3**	**219,387,550**	**234,536,420**	**15,148,870**	**7**	**178,345**	**1,567,082**	**1,388,737**	**779**
Transfers to Disposal (except metals)	4,621,631	7,562,330	2,940,700	64	16,187,186	22,493,190	6,306,004	39	20,808,817	30,055,521	9,246,704	44	24,444	18,093	-6,352	-26
Transfers of Metals*	19,778,190	26,119,175	6,340,985	32	178,800,543	178,361,724	-438,819	-0.2	198,578,733	204,480,899	5,902,166	3	153,900	1,548,990	1,395,089	906
Total Reported Releases On- and Off-site	**124,028,926**	**139,091,508**	**15,062,582**	**12**	**1,338,329,907**	**1,263,593,774**	**-74,736,133**	**-6**	**1,462,358,833**	**1,402,685,282**	**-59,673,552**	**-4**	**252,919**	**1,679,737**	**1,426,818**	**564**
Off-site Transfers to Recycling	**69,313,838**	**104,869,120**	**35,555,282**	**51**	**801,542,324**	**752,274,807**	**-49,267,517**	**-6**	**870,856,162**	**857,143,927**	**-13,712,235**	**-2**	**61,156**	**28,320,686**	**28,259,530**	**46,209**
Transfers to Recycling of Metals	57,814,913	90,857,767	33,042,854	57	690,497,538	656,434,235	-34,063,303	-5	748,312,451	747,292,003	-1,020,449	0	23,424	18,952,596	18,929,172	80,809
Transfers to Recycling (except metals)	11,498,925	14,011,353	2,512,428	22	111,044,786	95,840,571	-15,204,215	-14	122,543,711	109,851,924	-12,691,787	-10	37,731	9,368,089	9,330,358	24,729
Other Off-site Transfers for Further Management	**45,291,796**	**64,894,968**	**19,603,172**	**43**	**533,287,452**	**468,835,726**	**-64,451,726**	**-12**	**578,579,248**	**533,730,694**	**-44,848,554**	**-8**	**72,354**	**5,480,413**	**5,408,059**	**7,474**
Energy Recovery (except metals)	20,430,232	28,540,049	8,109,817	40	318,578,474	277,000,175	-41,578,299	-13	339,008,706	305,540,224	-33,468,482	-10	1,018	2,633	1,615	159
Treatment (except metals)	9,410,318	11,672,765	2,262,446	24	106,342,776	86,641,161	-19,701,615	-19	115,753,094	98,313,925	-17,439,169	-15	69,105	3,410,929	3,341,824	4,836
Sewage (except metals)	15,451,246	24,682,155	9,230,909	60	108,366,202	105,194,390	-3,171,812	-3	123,817,448	129,876,545	6,059,097	5	2,231	2,066,851	2,064,620	92,549
Total Reported Amounts of Releases and Transfers	**238,634,561**	**308,855,596**	**70,221,036**	**29**	**2,673,159,683**	**2,484,704,306**	**-188,455,377**	**-7**	**2,911,794,244**	**2,793,559,903**	**-118,234,341**	**-4**	**386,429**	**35,480,836**	**35,094,407**	**9,082**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 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.

- TRI facilities reporting less than 100,000 kg in 1998 showed little increase in on-site air emissions (0.3 percent) but almost doubled their surface water discharges. This contrasts with TRI facilities reporting 100,000 kg or more in 1998, which had decreases in air and surface water releases of 8 and 5 percent respectively.
- While TRI facilities reporting 100,000 kg or more in 1998 did report an increase in off-site releases, almost all of which was a 39-percent rise in transfers of chemicals other than metals, TRI facilities reporting less than 100,000 kg in 1998 had a substantially larger increase of 64 percent in this category as well as a 32-percent increase in transfers of metals.

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Key Findings

- In 2000, manufacturing facilities in North America released and transferred 1.25 billion kg of listed substances as reported to TRI and NPRI—a 5 percent decrease from 1995. These releases and transfers include on- and off-site releases as well as transfers to treatment and sewage.
- Total releases on- and off-site decreased by 8 percent from 1995 to 2000. 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.
- While NPRI manufacturing facilities reported a decrease of 3 percent in on-site releases from 1995 to 2000, NPRI total releases and transfers increased by less than 1 percent.
- TRI manufacturing facilities reported a 19-percent reduction in on-site releases and a 5-percent reduction in total releases and transfers from 1995 to 2000.
- Transfers off-site for further management increased in North America by 15 percent over the five-year period from 1995 through 2000. NPRI manufacturing facilities reported a 49-percent increase and TRI, a 13-percent increase.
- The per-facility averages for total releases and transfers declined in NPRI and rose slightly in TRI from 1995 to 2000. The ratio between the NPRI average and the TRI average thus decreased from 1.7 in 1995 to 1.4 in 2000. The ratio for on-site releases was 1.8 in 1995 and 1.6 in 2000. For off-site releases, however, the ratio fell from 2.8 to 1.3. The ratio for total transfers for further management remained about the same.
- The state of Texas ranked first in both 1995 and 2000 for total releases and transfers as well as total releases. The province of Ontario ranked second in 1995 and 2000 for total releases and transfers, but dropped from second to third, behind the state of Pennsylvania, for total releases in 2000.
- The manufacturing industries with the largest total releases and transfers in North America in 2000—chemicals, primary metals, and paper products—were the same as in 1995.

7.1 Introduction

This chapter examines changes in amounts of releases on- and off-site and of transfers for further management between 1995 and 2000. 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 2000. Comparable Mexican data are not available for the 1995–2000 reporting years.

The data in this chapter include data from the manufacturing sectors (US SIC codes 20–39) and data for on-site releases and transfers to disposal, treatment, and sewage. They do not include the new TRI industries that began reporting only in 1998. 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 2000 are excluded, as is mercury and its compounds, since the reporting threshold was changed for the 2000 reporting year in both NPRI and TRI. The 1998 and 2000 data presented in this chapter are thus a subset of the 1998 and 2000 data presented in **Chapters 3, 4, 5**, and **6**.

7.2 1995–2000 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 between 1995 and 2000 and was 4 percent lower at the end of the period than in 1995. The number of forms for North America decreased by 2 percent from 1995 to 2000.
- Total releases and transfers in North America were 1.25 billion kg in 2000, a decrease of 5 percent from 1995. After increasing from 1996 to 1997, total releases and transfers declined by 6 percent over the rest of the period.
- 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 2000 was 8 percent. On-site releases declined

Table 7–1. Summary of Total Releases and Transfers in North America, 1995–2000

	North America							
	1995	1996	1997	1998	1999	2000	Change 1995–2000	
	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	20,805	20,633	20,510	20,463	20,138	19,982	-823	-4
Total Forms	63,746	62,598	62,735	62,818	62,353	62,302	-1,444	-2
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**%**
On-site Releases*	**937,151,328**	**898,174,494**	**857,819,722**	**843,560,558**	**827,314,808**	**776,242,516**	**-160,908,812**	**-17**
Air	616,274,438	576,416,338	524,506,016	494,656,112	468,007,607	441,908,450	-174,365,988	-28
Surface Water	92,757,158	89,075,888	97,060,756	108,986,538	117,763,991	117,586,700	24,829,542	27
Underground Injection	94,701,044	83,975,503	80,666,341	75,980,614	70,797,271	73,938,697	-20,762,347	-22
Land	133,282,939	148,580,058	155,458,529	163,813,224	170,626,596	142,708,562	9,425,623	7
Off-site Releases	**167,086,535**	**182,205,650**	**243,970,767**	**224,831,624**	**223,847,845**	**236,319,907**	**69,233,372**	**41**
Transfers to Disposal (except metals)	21,589,840	17,193,931	23,106,339	23,643,128	28,708,350	30,974,885	9,385,045	43
Transfers of Metals**	145,496,696	165,011,719	220,864,428	201,188,496	195,139,494	205,345,023	59,848,327	41
Total Releases On- and Off-site	**1,104,237,863**	**1,080,380,144**	**1,101,790,490**	**1,068,392,182**	**1,051,162,652**	**1,012,562,423**	**-91,675,440**	**-8**
Off-site Transfers for Further Management	**209,651,847**	**211,027,220**	**234,814,281**	**237,541,938**	**231,321,608**	**240,232,564**	**30,580,716**	**15**
Treatment (except metals)	88,133,399	85,004,885	100,051,414	101,812,041	98,162,266	97,746,847	9,613,447	11
Sewage (except metals)	121,518,448	126,022,335	134,762,868	135,729,897	133,159,342	142,485,717	20,967,269	17
Total Releases and Transfers* **	**1,313,889,711**	**1,291,407,364**	**1,336,604,771**	**1,305,934,120**	**1,282,484,260**	**1,252,794,987**	**-61,094,724**	**-5**

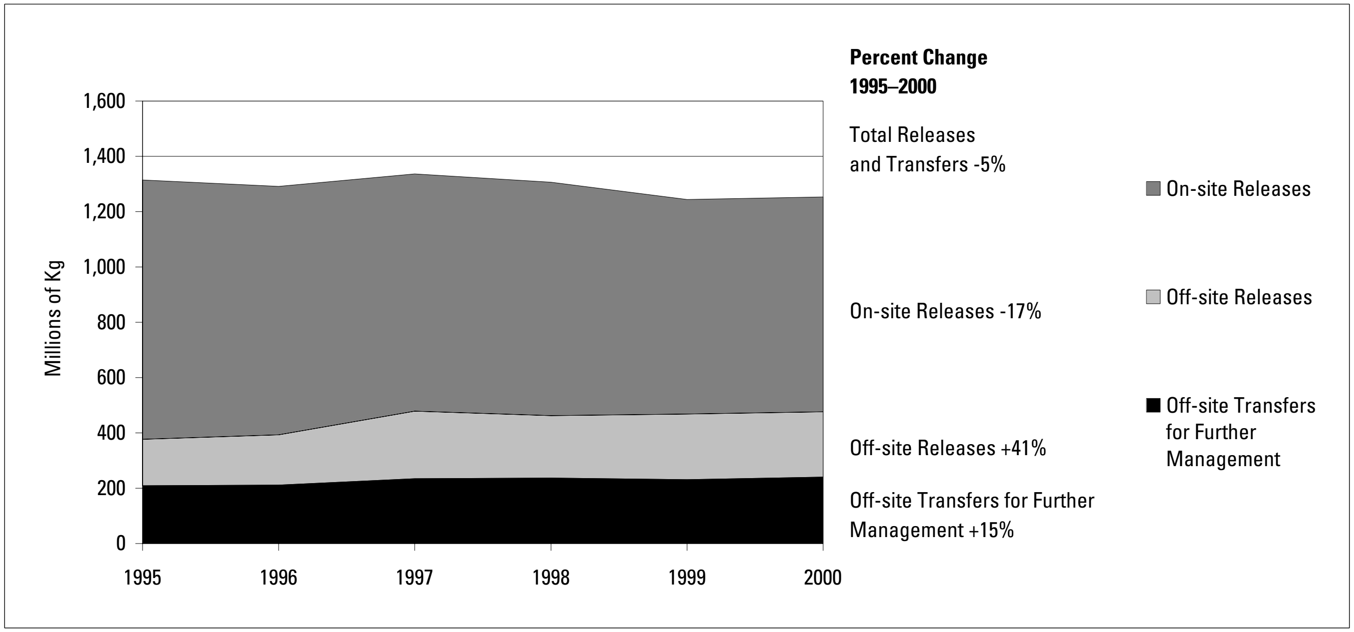
Note: Canada and US data only. Mexico data not available for 1995–2000. Data include 159 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, 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, 1995–2000



Note: Canada and US only. Mexico data not available for 1995–2000.

steadily over the period, for a 17-percent reduction from 1995 to 2000.

- Off-site releases increased by 41 percent from 1995 to 2000 in North America. Amounts increased between 1995 and 1997 and in the latest period between 1999 and 2000, but fell from 1997 to 1999.
- Transfers for further management also increased from 1995 to 2000 in North America. With the exception of 1998 to 1999, they rose in all years, including the latest, for an increase of 15 percent from 1995 to 2000.

The number of NPRI facilities reporting increased in every year, for an overall increase of 27 percent for the period. Total NPRI releases and transfers were less than 1 percent higher in 2000 than in 1995.

- Increases occurred in off-site transfers for further management (an increase of 49 percent) and on-site land releases (48-percent increase).
- On-site releases decreased by 3 percent, including a 36-percent decline in surface water discharges.
- Off-site releases decreased by 7 percent, with a 33-percent drop in transfers to disposal (except metals) and a 3-percent decrease in transfers of metals.

Table 7–2. NPRI Total Releases and Transfers, 1995–2000

	NPRI							
	1995	1996	1997	1998	1999	2000	Change 1995–2000	
	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	1,250	1,307	1,394	1,436	1,536	1,585	335	27
Total Forms	4,004	4,157	4,474	4,619	5,054	5,321	1,317	33
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**%**
On-site Releases*	**95,317,797**	**88,273,082**	**86,683,105**	**83,328,148**	**103,247,142**	**92,557,532**	**-2,760,265**	**-3**
Air	71,644,535	68,677,366	68,402,217	64,520,884	69,126,745	67,926,616	-3,717,919	-5
Surface Water	10,245,860	5,415,211	4,579,479	4,815,653	6,470,038	6,577,778	-3,668,082	-36
Underground Injection	3,556,927	4,846,549	4,197,660	3,700,429	3,272,500	3,568,922	11,995	0.3
Land	9,734,726	9,207,248	9,375,668	10,167,113	24,258,516	14,384,109	4,649,383	48
Off-site Releases	**25,653,288**	**27,093,664**	**33,755,110**	**28,897,913**	**26,547,673**	**23,793,507**	**-1,859,781**	**-7**
Transfers to Disposal (except metals)	3,768,158	1,800,796	1,824,909	2,111,621	2,285,283	2,536,468	-1,231,690	-33
Transfers of Metals**	21,885,130	25,292,868	31,930,201	26,786,292	24,262,390	21,257,039	-628,091	-3
Total Releases On- and Off-site	**120,971,085**	**115,366,746**	**120,438,215**	**112,226,061**	**129,794,815**	**116,351,039**	**-4,620,046**	**-4**
Off-site Transfers for Further Management	**10,099,154**	**12,600,593**	**13,721,496**	**13,501,861**	**13,506,727**	**15,064,971**	**4,965,817**	**49**
Treatment (except metals)	5,988,535	7,700,639	8,453,387	8,140,259	8,122,782	7,976,738	1,988,203	33
Sewage (except metals)	4,110,619	4,899,954	5,268,109	5,361,602	5,383,945	7,088,233	2,977,614	72
Total Releases and Transfers* **	**131,070,239**	**127,967,339**	**134,159,711**	**125,727,922**	**143,301,542**	**131,416,010**	**345,771**	**0.3**

Note: Canada and US data only. Mexico data not available for 1995–2000. Data include 159 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 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, 1995–2000

	TRI							
	1995	1996	1997	1998	1999	2000	Change 1995–2000	
	Number	Number	Number	Number	Number	Number	Number	%
Total Facilities	19,555	19,326	19,116	19,027	18,602	18,398	-1157	-6
Total Forms	59,742	58,441	58,261	58,199	57,299	56,982	-2,760	-5
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**%**
On-site Releases	**841,833,531**	**809,901,412**	**771,136,617**	**760,232,410**	**724,067,666**	**683,684,984**	**-158,148,547**	**-19**
Air	544,629,903	507,738,972	456,103,799	430,135,228	398,880,862	373,981,834	-170,648,069	-31
Surface Water	82,511,298	83,660,677	92,481,277	104,170,885	111,293,953	111,008,922	28,497,624	35
Underground Injection	91,144,117	79,128,954	76,468,681	72,280,185	67,524,771	70,369,775	-20,774,342	-23
Land	123,548,213	139,372,810	146,082,861	153,646,111	146,368,080	128,324,453	4,776,240	4
Off-site Releases	**141,433,247**	**155,111,986**	**210,215,657**	**195,933,711**	**197,300,172**	**212,526,400**	**71,093,153**	**50**
Transfers to Disposal (except metals)	17,821,682	15,393,135	21,281,430	21,531,507	26,423,067	28,438,417	10,616,735	60
Transfers of Metals*	123,611,566	139,718,851	188,934,227	174,402,204	170,877,104	184,087,984	60,476,418	49
Total Releases On- and Off-site	**983,266,778**	**965,013,398**	**981,352,275**	**956,166,121**	**921,367,837**	**896,211,384**	**-87,055,394**	**-9**
Off-site Transfers for Further Management	**199,552,693**	**198,426,627**	**221,092,785**	**224,040,077**	**217,814,881**	**225,167,593**	**25,614,899**	**13**
Treatment (except metals)	82,144,864	77,304,246	91,598,027	93,671,782	90,039,484	89,770,109	7,625,244	9
Sewage (except metals)	117,407,829	121,122,381	129,494,759	130,368,295	127,775,397	135,397,484	17,989,655	15
Total Releases and Transfers**	**1,182,819,472**	**1,163,440,025**	**1,202,445,060**	**1,180,206,198**	**1,139,182,718**	**1,121,378,977**	**-61,440,495**	**-5**

Note: Canada and US data only. Mexico data not available for 1995–2000. Data include 159 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 5 percent lower in 2000 than in 1995, and the numbers of facilities reporting and forms filed also decreased.
- Total TRI releases declined by 9 percent with a 19-percent decrease in on-site releases, which included a drop in on-site air releases of 31 percent.
- In TRI, both off-site releases and off-site transfers for further management increased. Off-site releases rose by 50 percent and transfers for further management increased by 13 percent.

- Total NPRI releases and transfers decreased between 1995 and 1996 and then rose one year to fall the next throughout the 1995-2000 period, including a decrease from 1999 to 2000.
- Total NPRI releases on- and off-site also rose and fell in alternate years, while on-site releases fell from 1995 to 1998, increased from 1998 to 1999, then declined to below 1995 amounts from 1999 to 2000.
- Total TRI releases and transfers decreased from 1995 to 1996 and from 1997 to 2000.
- TRI releases on- and off-site followed the same pattern—an early increase from 1996 to 1997 and decreases from 1997 to 2000. On-site releases decreased each year.

Figure 7–2. NPRI Total Releases and Transfers, 1995–2000

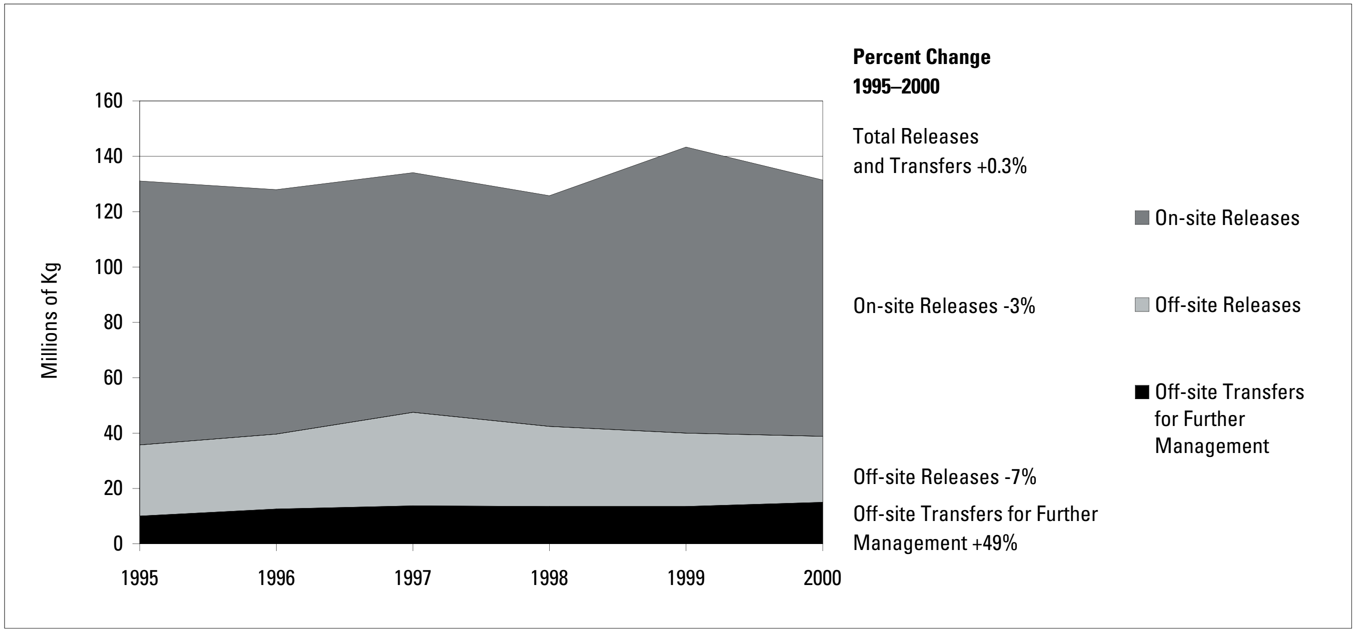


Figure 7–3. TRI Total Releases and Transfers, 1995–2000

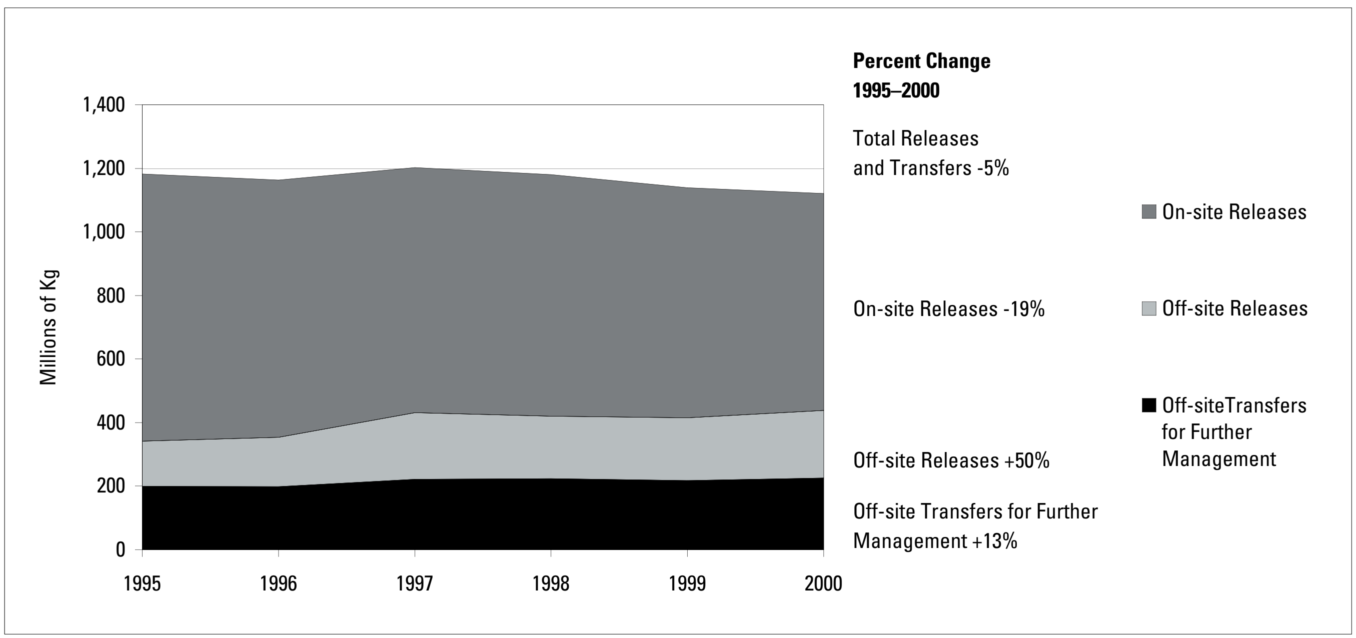


Table 7–4. Average Total Releases and Transfers per Facility, NPRI and TRI, 1995 and 2000

	NPRI		TRI		Ratio of Average per Facility (NPRI/TRI)	
	1995 (kg/facility)	2000 (kg/facility)	1995 (kg/facility)	2000 (kg/facility)	1995	2000
On-site Releases	**76,254**	**58,396**	**43,050**	**37,161**	**1.8**	**1.6**
Air	57,316	42,856	27,851	20,327	2.1	2.1
Surface Water	8,197	4,150	4,219	6,034	1.9	0.7
Underground Injection	2,846	2,252	4,661	3,825	0.6	0.6
Land	7,788	9,075	6,318	6,975	1.2	1.3
Off-site Releases	**20,523**	**15,012**	**7,233**	**11,552**	**2.8**	**1.3**
Transfers to Disposal (except metals)	3,015	1,600	911	1,546	3.3	1.0
Transfers of Metals	17,508	13,411	6,321	10,006	2.8	1.3
Total Reported Releases On- and Off-site	**96,777**	**73,408**	**50,282**	**48,712**	**1.9**	**1.5**
Off-site Transfers for Further Management	**8,079**	**9,505**	**10,205**	**12,239**	**0.8**	**0.8**
Treatment (except metals)	4,791	5,033	4,201	4,879	1.1	1.0
Sewage (except metals)	3,288	4,472	6,004	7,359	0.5	0.6
Total Releases and Transfers	**104,856**	**82,912**	**60,487**	**60,951**	**1.7**	**1.4**

- Per-facility averages for total releases and transfers declined in NPRI and rose slightly in TRI from 1995 to 2000. The ratio between the NPRI average and the TRI average thus decreased from 1.7 in 1995 to 1.4 in 2000.
- The NPRI/TRI ratio for on-site releases was 1.8 in 1995 and 1.6 in 2000. This decrease reflected a decline in the ratio of average per-facility surface water releases from 1.9 to 0.7. Other types of on-site releases remained about the same.
- For off-site releases, however, the NPRI/TRI ratio fell from 2.8 to 1.3. The average per facility dropped for NPRI and increased for TRI.
- The ratio for total transfers for further management remained about the same as both NPRI and TRI experienced increases in per-facility averages.

7.2.1 1995–2000 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**.

- Texas reported the largest total releases and transfers in North America in both 1995 and 2000, but the amount declined by 17 percent. Texas also had the largest total releases and total transfers for further management in both years, with a decrease of 24 percent in total releases but an increase of 6 percent in transfers for further management.
- Ontario reported the second-largest releases and transfers in North America in both 1995 and 2000; the amount decreased by 1 percent. Ontario had the second-largest total releases in 1995 and the third-largest in 2000, with a decrease of 6 percent. Transfers for further management in Ontario increased by 40 percent between 1995 and 2000.
- Pennsylvania reported the third-largest North American releases and transfers in 2000, an increase of 7 percent from 1995, when the state ranked fourth. Pennsylvania ranked fourth in total releases in 1995 and second in 2000, with the amount

Table 7–5. Change in Total Releases and Transfers in North America, by State and Province, 1995–2000

	Total Releases On- and Off-site					Total Transfers for Further Management				
	1995		2000		Change 1995–2000	1995		2000		Change 1995–2000
State/Province	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
Alabama	47,456,632	6	32,115,447	10	-32	3,980,778	18	7,629,216	9	92
Alaska	1,008,727	56	101,728	62	-90	14	60	996	60	7,223
Alberta	15,423,979	26	11,936,751	29	-23	694,544	37	1,676,559	33	141
Arizona	19,249,325	22	17,551,619	22	-9	931,808	35	1,210,203	36	30
Arkansas	12,628,023	29	22,278,583	19	76	876,273	36	1,635,463	34	87
British Columbia	8,591,903	35	11,366,968	30	32	31,328	52	84,076	52	168
California	13,818,339	27	13,097,032	26	-5	10,113,719	5	11,971,662	5	18
Colorado	1,627,227	51	2,557,031	46	57	671,271	38	1,326,273	35	98
Connecticut	4,748,990	42	2,360,850	47	-50	3,081,163	24	3,910,505	23	27
Delaware	3,296,907	47	3,088,750	44	-6	1,398,042	33	1,142,434	37	-18
District of Columbia	116	63	92	63	-21	0	--	0	--	--
Florida	19,525,377	20	28,030,217	11	44	3,654,583	22	4,035,721	22	10
Georgia	22,702,967	17	23,196,340	17	2	2,222,178	29	2,846,906	29	28
Hawaii	220,571	61	160,444	60	-27	3,327	55	1,003	59	-70
Idaho	5,665,147	40	8,451,968	33	49	167,446	49	381,970	41	128
Illinois	43,777,506	8	39,982,090	9	-9	7,224,215	7	7,764,125	8	7
Indiana	43,584,390	9	56,017,246	4	29	3,938,659	20	5,512,222	16	40
Iowa	11,802,237	30	13,903,685	25	18	4,370,721	16	3,880,670	24	-11
Kansas	9,485,568	33	10,626,126	31	12	1,207,211	34	994,834	38	-18
Kentucky	15,972,683	25	13,907,018	24	-13	2,760,539	26	5,371,305	17	95
Louisiana	53,754,929	5	43,847,506	7	-18	2,304,042	27	5,223,124	18	127
Maine	4,527,146	43	3,948,601	43	-13	338,093	41	282,288	46	-17
Manitoba	1,751,206	49	4,111,879	42	135	205,419	46	210,412	48	2
Maryland	5,583,559	41	5,625,082	39	1	2,247,651	28	4,270,047	21	90
Massachusetts	3,855,294	45	2,167,521	48	-44	5,398,832	13	6,527,389	12	21
Michigan	41,558,063	10	24,084,326	13	-42	11,382,112	4	14,449,830	3	27
Minnesota	8,378,168	36	6,868,029	37	-18	4,021,078	17	5,739,446	14	43
Mississippi	26,667,126	13	24,464,355	12	-8	1,860,394	31	2,328,448	31	25
Missouri	23,929,863	16	23,943,583	15	0	5,761,580	12	3,532,524	25	-39
Montana	19,391,510	21	23,289,508	16	20	12,961	53	2,473	58	-81
Nebraska	5,842,407	38	10,210,034	32	75	164,643	50	312,891	43	90
Nevada	1,532,969	52	1,266,254	50	-17	652	59	19,911	55	2,953
New Brunswick	5,688,508	39	4,654,428	41	-18	1,010	56	59,527	53	5,794
New Hampshire	1,161,294	54	1,077,573	52	-7	259,110	42	371,364	42	43
New Jersey	8,119,127	37	7,130,896	36	-12	19,788,004	2	18,740,578	2	-5
New Mexico	18,708,313	23	321,837	56	-98	184,288	48	298,795	44	62
New York	18,377,405	24	12,603,632	28	-31	4,984,961	14	6,538,286	11	31
Newfoundland	223,146	60	354,619	55	59	0	--	0	--	--
North Carolina	32,159,374	12	22,408,840	18	-30	6,215,015	10	2,868,883	28	-54
North Dakota	663,576	57	301,080	57	-55	250,574	44	158,050	49	-37
Nova Scotia	1,680,049	50	669,292	53	-60	6,261	54	6,922	56	11
Ohio	55,924,213	3	50,132,998	5	-10	12,102,482	3	14,056,837	4	16
Oklahoma	9,013,044	34	7,213,153	35	-20	252,655	43	485,798	40	92
Ontario	64,714,846	2	61,036,184	3	-6	6,977,242	8	9,767,682	6	40
Oregon	11,574,385	31	12,773,158	27	10	4,665,527	15	5,084,608	19	9
Pennsylvania	55,664,589	4	61,102,767	2	10	8,836,291	6	7,924,396	7	-10
Prince Edward Island	10,220	62	208,098	58	1,936	0	--	110,652	51	--
Puerto Rico	3,790,175	46	2,620,386	45	-31	3,533,466	23	5,537,577	15	57
Quebec	21,870,121	18	20,932,482	20	-4	2,182,585	30	3,101,777	26	42
Rhode Island	1,368,002	53	451,780	54	-67	400,647	40	271,760	47	-32
Saskatchewan	1,017,107	55	1,114,338	51	10	765	57	47,364	54	6,091
South Carolina	23,987,073	15	23,960,751	14	0	3,976,062	19	4,380,432	20	10
South Dakota	1,769,006	48	1,436,434	49	-19	201,910	47	135,790	50	-33
Tennessee	46,337,214	7	42,136,646	8	-9	3,905,740	21	2,501,584	30	-36
Texas	114,935,079	1	87,659,385	1	-24	32,084,155	1	33,965,197	1	6
Utah	35,052,995	11	49,115,545	6	40	405,649	39	541,899	39	34
Vermont	317,527	59	141,764	61	-55	206,545	45	283,405	45	37
Virgin Islands	568,232	58	189,940	59	-67	68,098	51	3,744	57	-95
Virginia	24,702,295	14	20,919,661	21	-15	6,511,302	9	7,548,975	10	16
Washington	10,535,701	32	8,400,138	34	-20	1,424,806	32	2,005,223	32	41
West Virginia	13,052,313	28	6,345,352	38	-51	3,073,628	25	2,904,705	27	-5
Wisconsin	19,836,304	19	15,896,194	23	-20	6,127,030	11	6,255,004	13	2
Wyoming	4,057,779	44	4,730,409	40	17	764	58	822	61	8
Total	**1,104,237,863**		**1,012,596,423**		**-8**	**209,651,847**		**240,232,564**		**15**

Note: Canada and US data only. Mexico data not available for 1995–2000. 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 7–5. (*continued*)

State/Province	Total Releases and Transfers 1995 kg	1995 Rank	2000 kg	2000 Rank	Change 1995–2000 (%)
Alabama	51,437,410	7	39,744,663	10	-23
Alaska	1,008,740	56	102,724	62	-90
Alberta	16,118,523	31	13,613,310	30	-16
Arizona	20,181,132	24	18,761,822	27	-7
Arkansas	13,504,296	32	23,914,046	22	77
British Columbia	8,623,231	38	11,451,044	33	33
California	23,932,058	21	25,068,694	20	5
Colorado	2,298,498	48	3,883,304	48	69
Connecticut	7,830,153	40	6,271,355	42	-20
Delaware	4,694,949	46	4,231,184	46	-10
District of Columbia	116	63	92	63	-21
Florida	23,179,961	23	32,065,939	12	38
Georgia	24,925,145	19	26,043,246	17	4
Hawaii	223,898	60	161,447	61	-28
Idaho	5,832,593	43	8,833,938	38	51
Illinois	51,001,722	8	47,746,214	8	-6
Indiana	47,523,049	10	61,529,468	5	29
Iowa	16,172,958	29	17,784,355	29	10
Kansas	10,692,779	35	11,620,961	32	9
Kentucky	18,733,222	27	19,278,323	25	3
Louisiana	56,058,971	5	49,070,629	7	-12
Maine	4,865,239	45	4,230,889	47	-13
Manitoba	1,956,625	50	4,322,291	45	121
Maryland	7,831,210	39	9,895,129	36	26
Massachusetts	9,254,126	37	8,694,911	39	-6
Michigan	52,940,175	6	38,534,157	11	-27
Minnesota	12,399,246	33	12,607,475	31	2
Mississippi	28,527,520	15	26,792,803	16	-6
Missouri	29,691,443	14	27,476,107	15	-7
Montana	19,404,471	25	23,291,982	23	20
Nebraska	6,007,050	42	10,522,924	34	75
Nevada	1,533,621	53	1,286,165	51	-16
New Brunswick	5,689,518	44	4,713,955	44	-17
New Hampshire	1,420,405	54	1,448,937	50	2
New Jersey	27,907,131	17	25,871,473	18	-7
New Mexico	18,892,602	26	620,632	55	-97
New York	23,362,367	22	19,141,919	26	-18
Newfoundland	223,146	61	354,619	58	59
North Carolina	38,374,388	11	25,277,724	19	-34
North Dakota	914,150	57	459,130	56	-50
Nova Scotia	1,686,310	52	676,214	54	-60
Ohio	68,026,694	3	64,189,835	4	-6
Oklahoma	9,265,698	36	7,698,951	41	-17
Ontario	71,692,088	2	70,803,866	2	-1
Oregon	16,239,912	28	17,857,766	28	10
Pennsylvania	64,500,880	4	69,027,163	3	7
Prince Edward Island	10,220	62	318,750	59	3,019
Puerto Rico	7,323,641	41	8,157,963	40	11
Quebec	24,052,706	20	24,034,259	21	0
Rhode Island	1,768,649	51	723,540	53	-59
Saskatchewan	1,017,872	55	1,161,702	52	14
South Carolina	27,963,134	16	28,341,183	14	1
South Dakota	1,970,916	49	1,572,223	49	-20
Tennessee	50,242,954	9	44,638,230	9	-11
Texas	147,019,234	1	121,624,582	1	-17
Utah	35,458,643	12	49,657,444	6	40
Vermont	524,072	59	425,169	57	-19
Virgin Islands	636,329	58	193,684	60	-70
Virginia	31,213,597	13	28,468,636	13	-9
Washington	11,960,507	34	10,405,360	35	-13
West Virginia	16,125,941	30	9,250,058	37	-43
Wisconsin	25,963,335	18	22,151,198	24	-15
Wyoming	4,058,543	47	4,731,231	43	17
Total	**1,313,889,711**		**1,252,828,987**		**-5**

rising by 10 percent. The state's total transfers for further management fell by 10 percent from 1995 to 2000.

- Ohio, which had the third-largest total releases and transfers in 1995, reported a 6-percent decline from 1995 to 2000 and ranked fourth in 2000. Ohio was third in total releases in 1995 and fifth in 2000, with a decrease of 10 percent.
- Indiana ranked fifth in 2000, up from tenth in 1995 due to an overall increase of 29 percent. This included an increase of 29 percent in total releases and 40 percent in total transfers for further management.

7.2.2 1995–2000 Total Releases and Transfers by Industry

Data comparing 1995 with 2000 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 new industry sectors was included in data presented in previous chapters.

- Of the 21 industry sectors in the matched data set, 14 reported decreases in total releases and transfers from 1995 to 2000.
- In both 1995 and 2000, the chemical manufacturing sector had the largest releases and transfers in North America of any manufacturing industry. Its total, however, was 12 percent lower in 2000 than in 1995, the result of a 23-percent decline in total releases. Chemicals ranked first in total releases in 1995 but second in 2000. The industry had the largest transfers for further management in both years; the amount rose 18 percent from 1995 to 2000.
- Primary metals reported the second-highest total releases and transfers in both years. The amount was 13 percent higher in 2000 than in 1995. The industry ranked first in total releases in 2000, up from second in 1995, with a 14-percent increase. Total transfers for further management from the primary metals industry were 2 percent lower in 2000 than in 1995.
- Paper products ranked third in both years in total releases and transfers, but the reported amount fell 9 percent from 1995 to 2000. The industry's total releases and total transfers for further management fell by 9 percent each.

Table 7–6. Change in Total Releases and Transfers in North America, by Industry, 1995–2000 (Ordered by Total Releases and Transfers, 2000)

		Total Releases On- and Off-site					Total Transfers for Further Management				
US SIC		1995		2000		Change 1995–2000	1995		2000		Change 1995–2000
Code	Industry	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
28	Chemicals	318,541,997	1	246,745,143	2	-23	118,179,555	1	138,951,157	1	18
33	Primary Metals	281,784,618	2	320,730,233	1	14	9,569,708	6	9,397,198	7	-2
26	Paper Products	131,470,890	3	119,849,765	3	-9	22,603,008	2	20,593,141	2	-9
--	Multiple codes 20–39*	61,993,734	4	46,471,349	5	-25	13,793,434	3	14,240,504	3	3
30	Rubber and Plastics Products	55,710,073	5	50,273,896	4	-10	2,763,492	9	2,632,394	10	-5
37	Transportation Equipment	54,104,007	6	45,603,931	6	-16	4,239,466	8	4,786,822	8	13
20	Food Products	21,612,812	9	34,410,525	7	59	10,986,131	4	13,801,294	4	26
34	Fabricated Metals Products	39,726,252	7	30,501,966	9	-23	7,670,973	7	11,118,575	6	45
29	Petroleum and Coal Products	28,119,338	8	31,723,215	8	13	2,104,791	10	4,602,161	9	119
36	Electronic/Electrical Equipment	16,038,484	11	16,119,864	11	1	9,873,473	5	11,595,768	5	17
24	Lumber and Wood Products	15,425,805	12	18,335,211	10	19	233,923	18	218,641	18	-7
32	Stone/Clay/Glass Products	13,336,241	14	15,089,531	12	13	1,273,548	13	2,295,112	11	80
27	Printing and Publishing	14,318,908	13	9,774,196	13	-32	506,677	16	1,209,269	14	139
35	Industrial Machinery	10,474,166	15	7,436,196	14	-29	1,762,067	12	1,343,727	13	-24
25	Furniture and Fixtures	18,566,065	10	6,236,010	15	-66	368,981	17	551,356	16	49
39	Misc. Manufacturing Industries	6,024,985	18	4,602,180	16	-24	856,664	15	1,459,728	12	70
22	Textile Mill Products	8,057,993	16	3,679,644	17	-54	902,832	14	485,336	17	-46
38	Measurement/Photographic Instruments	6,395,359	17	3,189,386	18	-50	1,893,829	11	911,532	15	-52
31	Leather Products	1,562,527	19	1,067,717	19	-32	31,107	20	29,417	19	-5
21	Tobacco Products	516,488	20	591,614	20	15	102	21	778	21	666
23	Apparel and Other Textile Products	457,122	21	130,850	21	-71	38,084	19	8,653	20	-77
	Total	**1,104,237,863**		**1,012,562,423**		**-8**	**209,651,847**		**240,232,564**		**15**

Note: Canada and US data only. Mexico data not available for 1995–2000.
* Multiple SIC codes reported only in TRI.

Figure 7–4. Change in NPRI Total Releases and Transfers, by Industry, 1995–2000

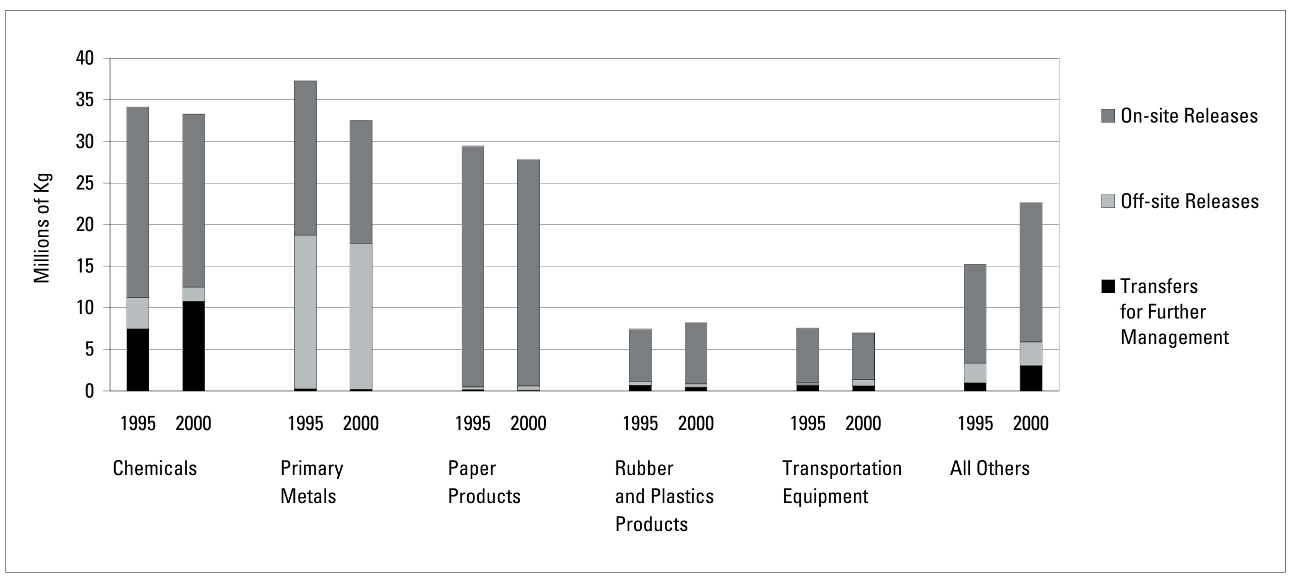
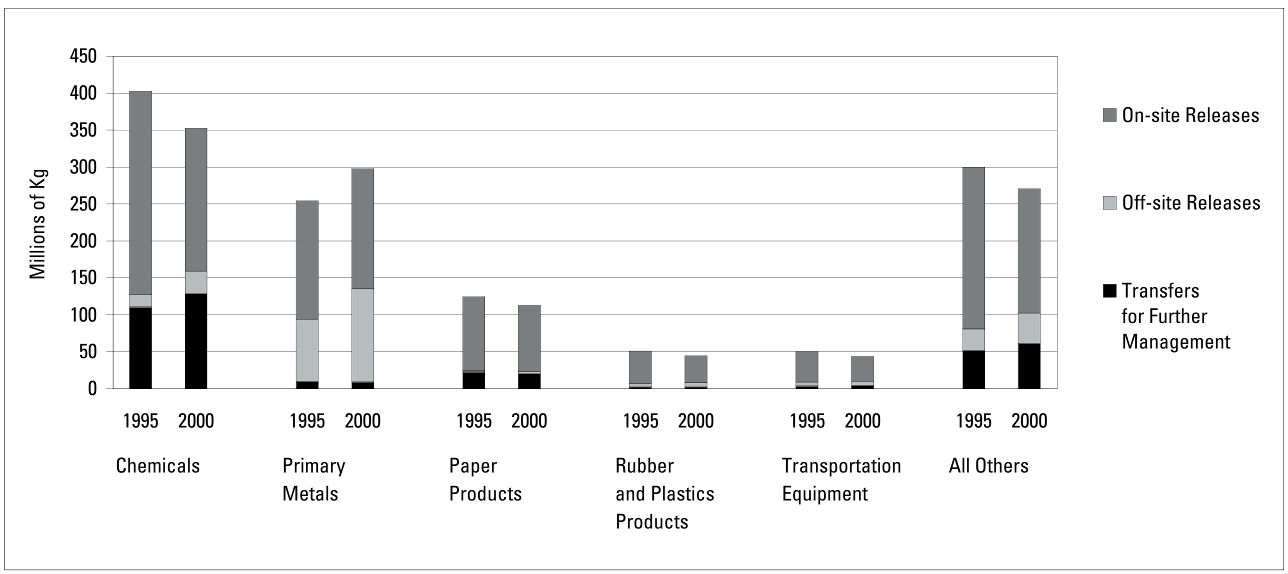


Table 7–6. (*continued*)

		Total Releases and Transfers				
US SIC		1995		2000		Change 1995–2000
Code	Industry	kg	Rank	kg	Rank	(%)
28	Chemicals	436,721,553	1	385,696,300	1	-12
33	Primary Metals	291,354,327	2	330,127,431	2	13
26	Paper Products	154,073,897	3	140,442,905	3	-9
--	Multiple codes 20–39*	75,787,168	4	60,711,853	4	-20
30	Rubber and Plastics Products	58,473,565	5	52,906,291	5	-10
37	Transportation Equipment	58,343,473	6	50,390,753	6	-14
20	Food Products	32,598,944	8	48,211,819	7	48
34	Fabricated Metals Products	47,397,225	7	41,620,541	8	-12
29	Petroleum and Coal Products	30,224,129	9	36,325,376	9	20
36	Electronic/Electrical Equipment	25,911,958	10	27,715,632	10	7
24	Lumber and Wood Products	15,659,728	12	18,553,852	11	18
32	Stone/Clay/Glass Products	14,609,790	14	17,384,643	12	19
27	Printing and Publishing	14,825,584	13	10,983,465	13	-26
35	Industrial Machinery	12,236,233	15	8,779,923	14	-28
25	Furniture and Fixtures	18,935,045	11	6,787,366	15	-64
39	Misc. Manufacturing Industries	6,881,648	18	6,061,908	16	-12
22	Textile Mill Products	8,960,825	16	4,164,980	17	-54
38	Measurement/Photographic Instruments	8,289,188	17	4,100,919	18	-51
31	Leather Products	1,593,634	19	1,097,135	19	-31
21	Tobacco Products	516,589	20	592,392	20	15
23	Apparel and Other Textile Products	495,206	21	139,503	21	-72
	Total	**1,313,889,711**		**1,252,794,987**		**-5**

Figure 7–5. Change in TRI Total Releases and Transfers, by Industry, 1995–2000



- In NPRI, the primary metals industry reported the largest total amounts of releases and transfers in 1995, with chemicals second. In 2000, the rankings had reversed. The chemicals industry reported a 2-percent reduction while the primary metals had a 13-percent reduction.
- Paper products was the third-ranked industry for total releases and transfers in NPRI in both years. Its total was 6 percent lower in 2000 than in 1995 because of a drop in total releases, which accounted for almost all of the overall total for the industry.
- In 1995 and 2000, primary metals facilities reported the largest total releases in NPRI. The chemicals industry had the largest transfers for further management in NPRI in both years, and the amount rose 44 percent from 1995 to 2000.
- In TRI, the chemicals industry reported the largest total amounts of releases and transfers in 1995 and in 2000, but the total decreased by 12 percent from 1995 to 2000.
- The TRI primary metals industry, with the second-largest releases and transfers in both 1995 and 2000, reported an overall increase of 17 percent. As a result of the reduction in total releases of chemicals facilities and the rise in releases of primary metals facilities, primary metals moved into first place for total releases in 2000, from second (after chemicals) in 1995.
- The paper products industry, third largest in total releases and transfers in TRI, reported reductions of 10 percent from 1995 to 2000. Both total releases, which made up the bulk of total releases and transfers by

the industry, and transfers for further management declined.

7.2.3 1995–2000 Change in Selected Releases and Transfers

While overall releases and transfers decreased by 5 percent from 1995 to 2000, particular types of releases and transfers within the two countries show a different pattern. This section looks in more detail at the specific type of releases and transfers that increased or decreased by the largest amounts: on-site air releases, on-site surface water discharges, transfers of metals and transfers to sewage.

QueryBuilder
http://www.cec.org/takingstock/

To find out what chemicals are being released by the facilities with the largest increases or decreases using *Taking Stock* Online:

In the box labeled "Search for a Facility" in the upper left, type in the **facility name**.

You can type in just the first name or a few characters within the name surrounded by asterisks (for example, type in *TVA* to find all US TVA facilities).

Press Enter

In the list that appears, click on the facility name.

Figure 7–6. Change in On-site Air Releases in North America, 1995–2000

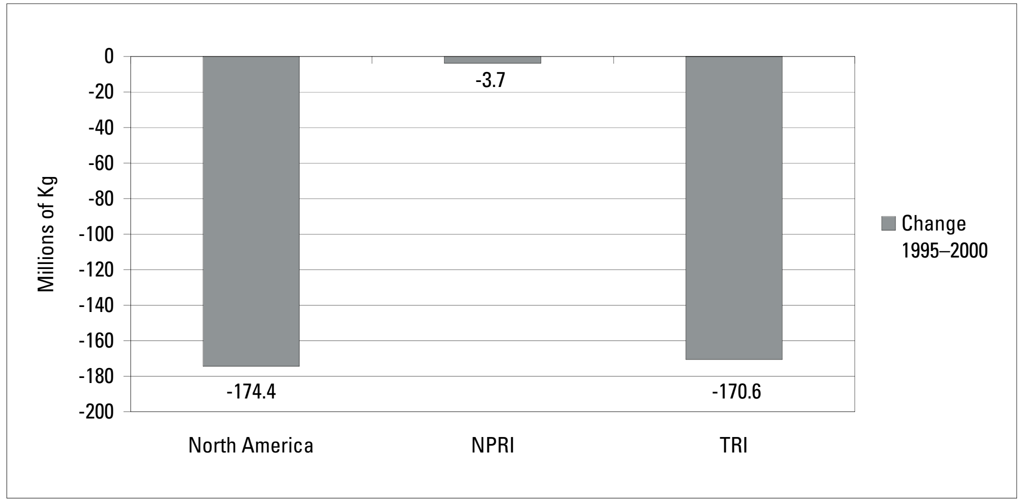


Table 7–7. The North American Facilities with the Largest Change in On-site Air Releases, 1995–2000

			SIC Codes		On-site Air Releases		
Rank	Facility	City, State/Province	Canada	US	1995 (kg)	2000 (kg)	Change 1995–2000 (kg)
	Largest Increase						
1	Ameripol Synpol Corp.	Port Neches, TX		28	221,020	1,645,059	1,424,039
2	BP Amoco, Texas City Business Unit, BP Amoco Corp.	Texas City, TX		29	293,737	1,674,483	1,380,746
3	Tolko Manitoba Kraft Papers, Tolko Industries Ltd.	The Pas, MB	27	26	0	1,075,312	1,075,312
4	International Paper Camden Mill, International Paper Co.	Camden, AR		26	426,893	1,218,271	791,378
5	Ventra Plastics, Peterborough, Ventra Group Inc.	Peterborough, ON	16	30	186,999	950,100	763,101
	Largest Decrease						
1	Acordis Cellulosic Fibers Inc., Acordis US Holding Inc.	Axis, AL		28	15,164,172	5,106,562	-10,057,610
2	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	29,168,744	19,923,810	-9,244,934
3	Port Arthur A&O Plant, Huntsman Corp., Huntsman Petrochemical Corp.	Port Arthur, TX		28	4,326,522	221,485	-4,105,037
4	Methanex Corporation, Medicine Hat Plant	Medicine Hat, AB	37	28	3,351,900	171,220	-3,180,680
5	Lenzing Fibers Corp.	Lowland, TN		28	10,521,655	7,866,198	-2,655,457

Table 7–8. States/Provinces with Largest Change in On-site Air Releases, 1995–2000

Rank	State/Province	On-site Air Releases 1995 (kg)	2000 (kg)	Change 1995–2000 kg	%
	Largest Increase				
1	British Columbia	5,752,089	8,488,508	2,736,419	48
2	Manitoba	797,863	2,626,809	1,828,946	229
3	Florida	10,975,075	12,285,132	1,310,057	12
4	New Brunswick	2,107,062	2,751,917	644,855	31
5	Montana	1,468,396	2,008,994	540,598	37
	Largest Decrease				
1	Alabama	36,739,865	17,780,391	-18,959,474	-52
2	Texas	49,200,429	35,893,005	-13,307,425	-27
3	Tennessee	37,306,683	27,276,075	-10,030,607	-27
4	North Carolina	24,409,294	14,462,158	-9,947,136	-41
5	Utah	30,554,102	21,062,816	-9,491,286	-31

Table 7–9. Industries with Largest Change in On-site Air Releases, 1995–2000

Rank	US SIC Code	Industry	On-site Air Releases 1995 (kg)	2000 (kg)	Change 1995–2000 kg	%
		Largest Increase				
1	24	Lumber and Wood Products	15,230,289	17,999,491	2,769,203	18
2	32	Stone/Clay/Glass Products	9,849,631	11,189,361	1,339,730	14
3	20	Food Products	4,085,583	4,318,946	233,363	6
		Largest Decrease				
1	28	Chemicals	151,638,200	91,138,836	-60,499,365	-40
2	--	Multiple codes 20–39*	44,895,196	24,355,204	-20,539,992	-46
3	33	Primary Metals	59,607,527	42,694,195	-16,913,332	-28
4	26	Paper Products	111,297,465	97,470,366	-13,827,099	-12
5	25	Furniture and Fixtures	18,500,144	6,092,066	-12,408,078	-67

* Multiple SIC Codes reported only in TRI.

On-site Air Releases

- Total on-site air releases in North America decreased by 28 percent or 174.4 million kg from 1995 to 2000. NPRI facilities reported a 5-percent decrease of 3.7 million kg, while TRI facilities reported a 31-percent decrease of 170.6 million kg.
- Three states reported decreases of over 10 million kg in air releases from 1995 to 2000: Alabama, Texas, and Tennessee. Two provinces and one state reported increases of over 1 million kg: British Columbia, Manitoba, and Florida.
- The chemical manufacturing industry reported the largest decrease in air releases, more than 60 million kg or 40 percent. Only three industry sectors (lumber and wood products, stone/clay/glass, and food products) reported overall increases.
- Four of the five facilities with the largest decreases in air releases were chemical manufacturers. One reported a decrease of more than 10 million kg.

On-site Surface Water Discharges

- Total on-site surface water discharges in North America rose by 27 percent or 24.8 million kg from 1995 to 2000. TRI facilities reported a 35-percent increase of 28.5 million kg, while NPRI facilities reported a 36-percent decrease of 3.7 million kg.
- One state, Pennsylvania, reported an increase of over 9 million kg in surface water discharges from 1995 to 2000. Another two states, Indiana and Nebraska, reported increases of over 3.5 million kg. However, one state and two provinces reported decreases of over 2 million kg: West Virginia, New Brunswick, and Quebec.
- Two industry sectors, primary metals and food products, reported increases in surface water discharges of more than 11 million kg. The paper products and chemical manufacturing industries reported the largest decreases, more than 3.5 million kg each.
- The facility with the largest increase in surface water discharges was a primary metals facility in Pennsylvania, which reported an increase of 8.3 million kg. The facility with the second-largest increase was in Indiana and owned by the same company. It reported an increase of 5.4 million kg.

Figure 7–7. Change in On-site Surface Water Discharges in North America, 1995–2000

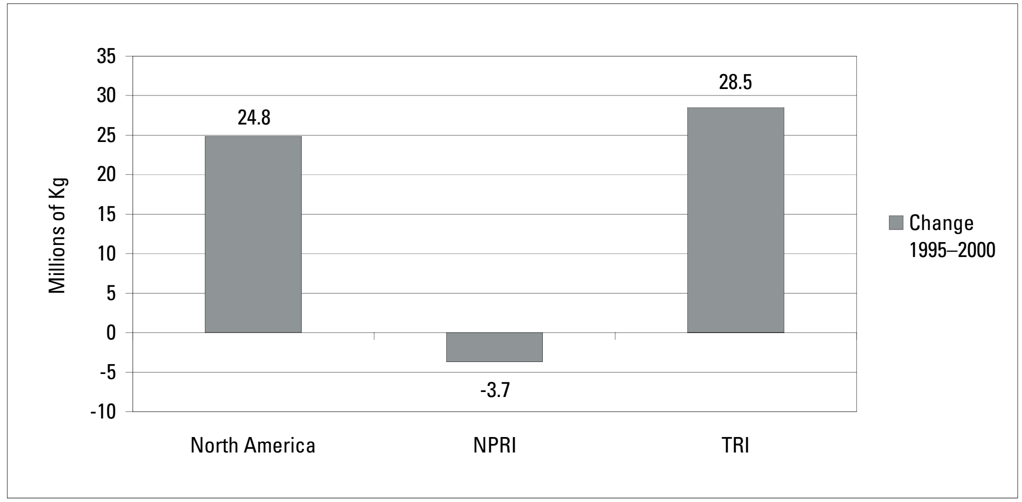


Table 7–10. The North American Facilities with the Largest Change in On-site Surface Water Discharges, 1995–2000

			SIC Codes		On-site Surface Water Discharges		
Rank	Facility	City, State/Province	Canada	US	1995 (kg)	2000 (kg)	Change 1995–2000 (kg)
	Largest Increase						
1	AK Steel Corp., Butler Works (Rte. 8 S)	Butler, PA		33	4,446,418	12,700,489	8,254,072
2	AK Steel Corp.	Rockport, IN		33	0	5,351,950	5,351,950
3	IBP Inc.	Lexington, NE		20	0	3,038,549	3,038,549
4	BASF Corp.	Freeport, TX		28	7,714,126	9,756,889	2,042,763
5	J. R. Simpolot Co., Heyburn Food Group	Heyburn, ID		Mult.	0	1,696,829	1,696,829
	Largest Decrease						
1	Bayer Corp.	New Martinsville, WV		28	3,586,650	52,442	-3,534,208
2	Irving Pulp & Paper Limited / Irving Tissue Company	Saint John, NB	27	26	3,387,916	619,210	-2,768,706
3	Emballages Smurfit-Stone Canada Inc., Usine de La Tuque	La Tuque, QC	27	26	1,917,800	27,079	-1,890,721
4	Marathon Pulp Inc.	Marathon, ON	27	26	1,334,186	13,888	-1,320,298
5	Bayer Corp., Baytown	Baytown, TX		28	1,361,116	60,317	-1,300,798

Table 7–11. States/Provinces with Largest Change in On-site Surface Water Discharges, 1995–2000

		On-site Surface Water Discharges			
		1995	2000	Change 1995–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	Pennsylvania	10,194,275	19,454,587	9,260,312	91
2	Indiana	2,114,815	7,834,592	5,719,776	270
3	Nebraska	880,371	4,816,176	3,935,805	447
4	Texas	11,994,602	14,582,112	2,587,510	22
5	Idaho	376,420	2,806,883	2,430,462	646
	Largest Decrease				
1	West Virginia	4,191,272	1,643,943	-2,547,329	-61
2	New Brunswick	3,525,372	1,063,389	-2,461,983	-70
3	Quebec	3,602,713	1,286,118	-2,316,595	-64
4	Ontario	2,653,910	1,316,902	-1,337,008	-50
5	Missouri	1,714,402	635,537	-1,078,865	-63

Table 7–12. Industries with Largest Change in On-site Surface Water Discharges, 1995–2000

			On-site Surface Water Discharges			
			1995	2000	Change 1995–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	33	Primary Metals	14,843,299	31,260,750	16,417,450	111
2	20	Food Products	14,902,813	26,018,991	11,116,177	75
3	29	Petroleum and Coal Products	3,303,404	8,321,808	5,018,403	152
4	Mult.	Multiple codes 20–39*	5,881,559	6,483,136	601,577	10
5	21	Tobacco Products	7,075	254,150	247,075	3,492
		Largest Decrease				
1	26	Paper Products	16,454,497	12,029,634	-4,424,863	-27
2	28	Chemicals	33,320,355	29,653,190	-3,667,165	-11
3	34	Fabricated Metals Products	1,208,933	844,583	-364,351	-30
4	35	Industrial Machinery	189,542	21,792	-167,751	-89
5	37	Transportation Equipment	240,340	90,268	-150,072	-62

* Multiple SIC Codes reported only in TRI.

Transfers of metals

- Total transfers of metals in North America rose by 41 percent or 59.8 million kg from 1995 to 2000. TRI facilities reported a 49-percent increase of 60.5 million kg, while NPRI facilities reported a decrease of 3 percent or 628,000 kg.
- Two states, Indiana and Arkansas, reported increases of over 10 million kg in transfers of metals from 1995 to 2000. The state of Michigan, however, reported a decrease of 5.2 million kg. The province of Ontario and the states of Arizona and Alabama reported decreases of almost 2 million kg each.
- The primary metals industry reported an increase in transfers of metals of 40.8 million kg, and the electronic/electrical equipment sector reported an increase of almost 5 million kg. The industry with the largest decrease in transfers of metals was the stone/clay/glass products sector, reporting a decline of almost 1 million kg.
- Two primary metals facilities reported increases in transfers of metals of over 8 million kg. They were located in Indiana and Arkansas. The facility with the largest decrease was a primary metals facility in Ontario reporting a decrease of 6.0 million kg.

Figure 7–8. Change in Transfers of Metals in North America, 1995–2000

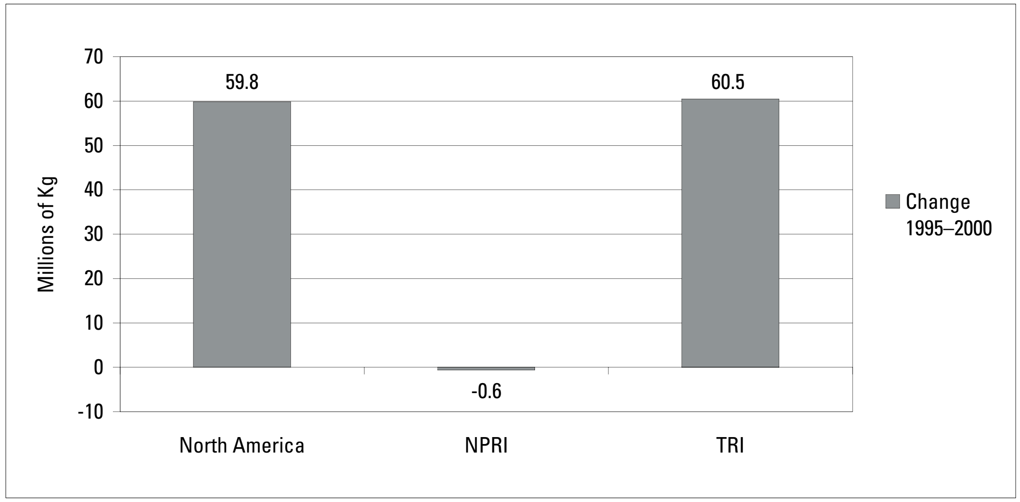


Table 7–13. The North American Facilities with the Largest Change in Transfers of Metals, 1995–2000

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Transfers of Metals 1995 (kg)	Transfers of Metals 2000 (kg)	Transfers of Metals Change 1995–2000 (kg)
	Largest Increase						
1	Steel Dynamics Inc.	Butler, IN		33	5,161	9,178,259	9,173,097
2	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	37,751	8,306,731	8,268,980
3	Nucor Steel, Nucor Corp.	Huger, SC		33	0	4,421,523	4,421,523
4	Exide Corp.	Bristol, TN		36	5	4,273,991	4,273,986
5	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	1,931,258	5,736,803	3,805,545
	Largest Decrease						
1	Co-Steel Lasco	Whitby, ON	29	33	6,030,824	67,923	-5,962,901
2	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	5,128,761	981,969	-4,146,792
3	Cerro Wire & Cable Co. Inc.	Hartselle, AL		33	3,415,766	340	-3,415,426
4	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	15,644,210	13,094,659	-2,549,551
5	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico S.A. de C.V.	Hayden, AZ		33	2,010,437	156	-2,010,281

Table 7–14. States/Provinces with Largest Change in Transfers of Metals, 1995–2000

		Transfers of Metals			
		1995	2000	Change 1995–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	Indiana	12,001,064	24,945,956	12,944,892	108
2	Arkansas	778,704	11,604,592	10,825,888	1,390
3	Ohio	11,966,746	18,738,376	6,771,630	57
4	Illinois	7,562,707	13,600,572	6,037,865	80
5	South Carolina	1,599,544	7,263,393	5,663,849	354
	Largest Decrease				
1	Michigan	14,125,561	8,950,759	-5,174,801	-37
2	Ontario	16,991,353	15,055,294	-1,936,059	-11
3	Arizona	2,275,716	372,893	-1,902,824	-84
4	Alabama	5,486,254	3,601,056	-1,885,197	-34
5	California	3,685,489	2,340,377	-1,345,112	-36

Table 7–15. Industries with Largest Change in Transfers of Metals, 1995–2000

			Transfers of Metals			
			1995	2000	Change 1995–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	33	Primary Metals	99,854,175	140,630,835	40,776,660	41
2	36	Electronic/Electrical Equipment	3,716,025	8,641,031	4,925,005	133
3	28	Chemicals	12,466,741	15,700,729	3,233,989	26
4	--	Multiple codes 20–39*	6,588,675	9,537,684	2,949,008	45
5	34	Fabricated Metals Products	8,144,285	10,786,645	2,642,360	32
		Largest Decrease				
1	32	Stone/Clay/Glass Products	2,828,851	1,889,526	-939,325	-33
2	31	Leather Products	768,422	735,586	-32,836	-4
3	27	Printing and Publishing	50,464	23,328	-27,136	-54
4	22	Textile Mill Products	259,257	232,575	-26,681	-10
5	23	Apparel and Other Textile Products	9,166	9,067	-99	-1

* Multiple SIC Codes reported only in TRI.

Transfers to sewage

- Total transfers to sewage in North America rose by 17 percent or 21.0 million kg from 1995 to 2000. TRI facilities reported an increase of 18.0 million kg or 15 percent, and NPRI facilities reported an increase of 3.0 million kg or 72 percent.
- Three states, Ohio, Kentucky and Michigan, reported increases of over 2 million kg in transfers to sewage from 1995 to 2000. The state of New Jersey had the largest decrease, 1.4 million kg.
- The chemical manufacturing industry reported increasing transfers to sewage by 7.1 million kg. The food products and primary metals sectors reported increases of 2.8 million kg each. The industry with the largest decrease in transfers to sewage was the paper products sector, with a decrease of 1.9 million kg.
- Four of the five facilities with the largest increases in transfers to sewage were chemical manufacturers reporting more than 2.0 million kg each. A paper products facility reported the largest decrease, with a decline of 3.8 million kg.

Figure 7–9. Change in Transfers to Sewage in North America, 1995–2000

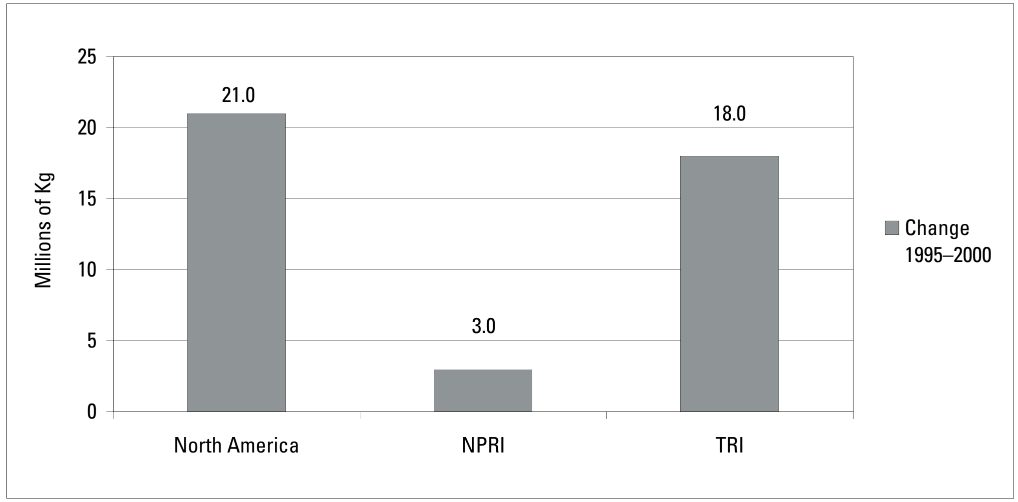


Table 7–16. The North American Facilities with the Largest Change in Transfers to Sewage, 1995–2000

Rank	Facility	City, Province/State	SIC Codes Canada	SIC Codes US	Transfers to Sewage 1995 (kg)	Transfers to Sewage 2000 (kg)	Transfers to Sewage Change 1995–2000 (kg)
	Largest Increase						
1	Green Tree Chemical Techs. Inc., Nitrocellulose Div.	Parlin, NJ		28	0	2,963,912	2,963,912
2	Celanese Ltd., Clear Lake Plant, Celanese Americas Corp.	Pasadena, TX		28	1,284,014	3,657,216	2,373,202
3	Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo, MI		28	340,884	2,426,127	2,085,242
4	Sud-Chemie Inc., West Plant	Louisville, KY		28	1,412	2,066,851	2,065,439
5	DMC-2, Degussa AG	South Plainfield, NJ		33	1,044,762	3,034,238	1,989,476
	Largest Decrease						
1	Simpson Pasadena Paper Co., Simpson Investment Co.	Pasadena, TX		26	3,783,492	0	-3,783,492
2	Hercules Inc., Parlin Plant	Parlin, NJ		28	8,438,159	5,164,516	-3,273,644
3	Penford Prods. Co., Penford Corp.	Cedar Rapids, IA		20	2,262,214	1,258,729	-1,003,485
4	Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena, TX		28	8,537,016	7,577,067	-959,949
5	Merck & Co. Inc.	Rahway, NJ		28	1,060,031	231,464	-828,567

Table 7–17. States/Provinces with Largest Change in Transfers to Sewage, 1995–2000

		Transfers to Sewage			
		1995	2000	Change 1995–2000	
Rank	State/Province	(kg)	(kg)	kg	%
	Largest Increase				
1	Ohio	6,681,037	9,341,002	2,659,966	40
2	Kentucky	549,802	3,198,598	2,648,796	482
3	Michigan	5,165,739	7,326,543	2,160,804	42
4	California	8,829,430	10,560,773	1,731,343	20
5	New York	3,145,522	4,668,596	1,523,075	48
	Largest Decrease				
1	New Jersey	17,526,591	16,088,079	-1,438,512	-8
2	Iowa	3,711,727	2,896,951	-814,777	-22
3	West Virginia	1,340,869	978,840	-362,029	-27
4	Tennessee	1,972,628	1,648,225	-324,403	-16
5	Delaware	1,103,000	788,132	-314,868	-29

Table 7–18. Industries with Largest Change in Transfers to Sewage, 1995–2000

			Transfers to Sewage			
			1995	2000	Change 1995–2000	
Rank	US SIC Code	Industry	(kg)	(kg)	kg	%
		Largest Increase				
1	28	Chemicals	57,084,952	64,141,396	7,056,444	12
2	20	Food Products	10,587,434	13,426,151	2,838,716	27
3	33	Primary Metals	4,372,408	7,168,409	2,796,001	64
4	34	Fabricated Metals Products	5,595,486	8,092,846	2,497,360	45
5	--	Multiple codes 20–39*	8,039,092	10,524,286	2,485,194	31
		Largest Decrease				
1	26	Paper Products	18,565,739	16,709,529	-1,856,211	-10
2	35	Industrial Machinery	1,395,394	965,741	-429,653	-31
3	22	Textile Mill Products	674,227	367,095	-307,132	-46
4	38	Measurement/Photographic Instruments	397,063	183,905	-213,158	-54
5	39	Misc. Manufacturing Industries	642,636	561,470	-81,166	-13

* Multiple SIC Codes reported only in TRI.

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Key Findings

- NPRI facilities sent 35.9 million kg of matched chemicals to US locations in 2000.
- TRI facilities sent 19.8 million kg of matched chemicals to Canadian locations and 35.7 million kg to Mexican locations in 2000.
- 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.
- Most transfers sent outside the country of the originating facility in 2000 were transfers of metals to recycling—76 percent for NPRI facilities and 90 percent for TRI facilities.
- A relatively small number of facilities in each country sent transfers across the US-Canada border—291 TRI facilities and 150 NPRI facilities. Ten facilities in each country accounted for half of the transfers between Canada and the US.
- Most cross-border transfers were received at sites in Ontario and Quebec in Canada and in Michigan and Pennsylvania in the United States.
- Cross-border transfers to Canada from the US decreased by 43 percent between 1998 and 2000, from 34.2 million kg to 19.5 million kg. The decrease was primarily in transfers of metals for recycling.
- Cross-border transfers to the US from Canada increased by 12 percent between 1998 and 2000, from 32.0 million kg to 35.8 million kg. The increase was in transfers of metals for recycling and transfers for energy recovery of substances other than metals.

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. Most transfers occur to sites within a nation's borders; however, listed substances can also be shipped to a North American neighbor or to another country. This chapter examines off-site transfers that were sent to sites across national boundaries in 1998 and 2000. 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.

Off-site transfers represent transfers from a facility to other locations—nearby, within the state or province, or outside the country. While other chapters examine transfers where they originate, this chapter examines the destinations of the transfers and the subset of the transfers that are sent across national boundaries.

This chapter presents

- 2000 data for transfers to disposal, recycling, energy recovery, and treatment; and
- data for the time period from 1998 to 2000.

The 1998–2000 data include only those chemicals in the matched data set for both years. 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 2000 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 2000 Transfers Outside the Country

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

- NPRI facilities reported sending 36.1 million kg outside Canada, 20 percent of all NPRI transfers for 2000.
- TRI facilities reported sending 59.5 million kg outside the US, 4 percent of all TRI transfers for 2000.
- Most transfers sent outside the country in 2000 were transfers of metals to recycling—76 percent for Canadian NPRI facilities and 90 percent for US TRI facilities.
- On the other hand, 56 percent of the transfers within Canada and 47 percent of those within the US were transfers of metals to recycling.

Table 8–1. Transfers from NPRI Facilities to Sites within Canada and to Other Countries, 2000

	Outside Canada		Within Canada		Total Off-site Transfers	
	kg	%	kg	%	kg	%
Recycling of Metals	27,459,608	76	82,241,930	56	109,701,538	60
Recycling (except metals)	2,826,311	8	12,655,646	9	15,481,957	8
Energy Recovery (except metals)	3,982,140	11	11,447,948	8	15,430,088	8
Treatment (except metals)	238,257	1	10,717,013	7	10,955,270	7
Disposal (except metals)	856,542	5	5,062,714	3	5,919,256	3
Metals to Disposal/Energy Recovery/Treatment	691,619	2	24,729,818	17	25,421,437	14
Total Off-site Transfers	**36,054,477**	**100**	**146,855,069**	**100**	**182,909,546**	**100**

Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.1% of total).

Table 8–2. Transfers from TRI Facilities to Sites within the US and to Other Countries, 2000

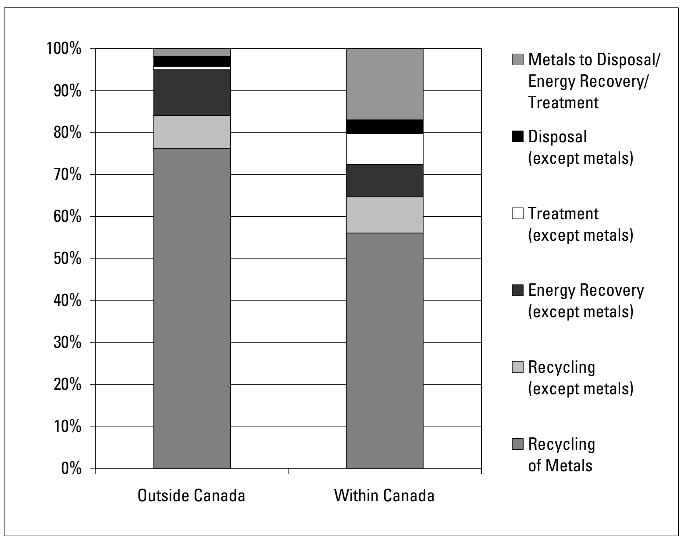
	Outside the US		Within the US		Total Off-site Transfers	
	kg	%	kg	%	kg	%
Recycling of Metals	53,587,132	90	733,820,053	47	787,407,185	21
Recycling (except metals)	876,481	1	138,718,079	9	139,594,560	9
Energy Recovery (except metals)	384,848	0.6	339,170,470	22	339,555,318	21
Treatment (except metals)	1,589,801	3	111,101,475	7	112,691,275	7
Disposal (except metals)	457,443	1	31,888,075	2	32,345,518	2
Metals to Disposal/Energy Recovery/Treatment	2,622,261	4	207,028,747	13	209,651,008	13
Total Off-site Transfers	**59,517,965**	**100**	**1,561,726,899**	**100**	**1,621,244,864**	**100**

Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.2% of total).

Figure 8–1. Percentage of Transfers Sent to Sites Within and Outside Country, NPRI and TRI, 2000

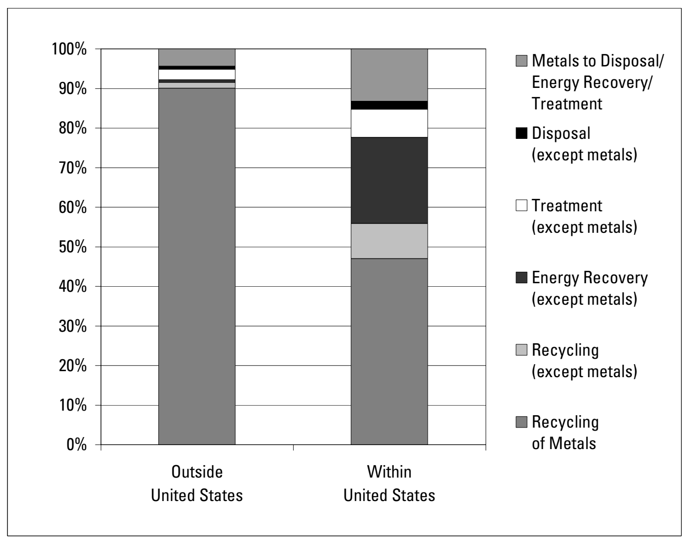
Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.2% of total).

Figure 8–2. Transfers from NPRI Facilities to Sites within Canada and to Other Countries, by Type of Transfer, 2000



Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.1% of total).

Figure 8–3. Transfers from TRI Facilities to Sites within the US and to Other Countries, by Type of Transfer, 2000



Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.2% of total).

8.2.1 Transfers Across North American Borders, 2000

Facilities in both NPRI and TRI send transfers across the border between the two countries as well as to other countries outside North America. TRI facilities also send transfers to Mexico.

- Virtually all of Canada's transfers outside its borders went to locations in the United States. NPRI facilities sent 35.9 million kg of matched chemicals to US locations in 2000.
- TRI facilities sent 19.8 million kg to Canadian locations and 35.7 million kg to Mexican locations.
- 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.
- The largest amount of transfers to the US from Canada went to the state of Michigan—9.8 million kg, representing 27 percent of all such transfers. Another 23 percent went to the state of Pennsylvania (8.2 million kg).
- The largest amount of transfers to Canada from the US was sent to Quebec—9.9 million kg or 17 percent of all US transfers to other countries. Another 14 percent went to the province of Ontario (8.3 million kg).

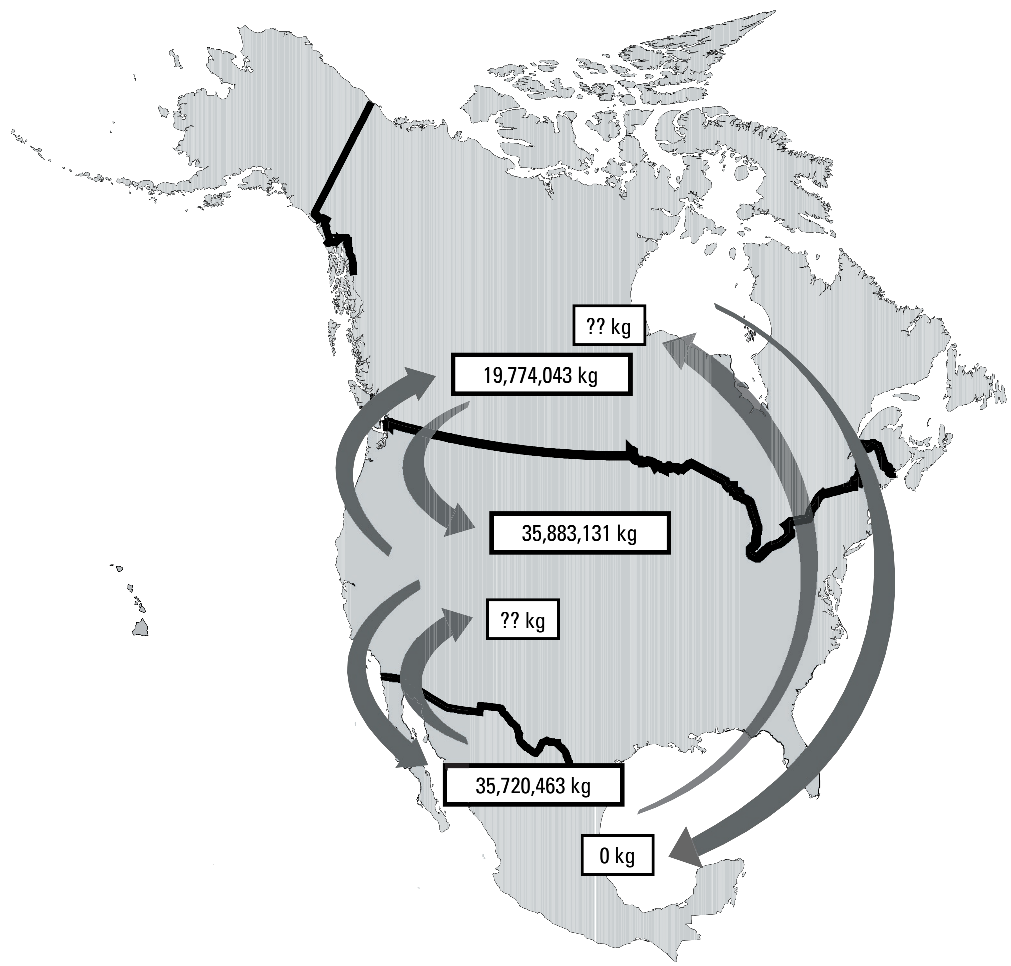
Table 8–3. NPRI Off-site Transfers from Canada to Sites in Other Countries, 2000

	Type of Transfer							
Receiving Country	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)	Transfers Outside Canada (%)
United States	**27,288,262**	**2,826,311**	**3,982,140**	**238,257**	**856,542**	**691,619**	**35,883,131**	**99.5**
Alabama	0	1	0	0	0	0	1	0.0
California	170,570	3,226	0	0	0	0	173,796	0.5
Connecticut	1,123,575	0	0	0	0	0	1,123,575	3.1
Idaho	1,362	0	0	0	0	0	1,362	0.0
Illinois	206,794	343,835	0	19,298	0	0	569,927	1.6
Indiana	232,711	152,208	204,824	0	0	0	589,743	1.6
Iowa	807,000	0	0	0	0	0	807,000	2.2
Kansas	0	0	286,880	0	0	20	286,900	0.8
Kentucky	210	0	0	0	0	0	210	0.0
Louisiana	151,605	492,746	0	0	0	0	644,351	1.8
Maryland	0	11,344	0	0	0	0	11,344	0.0
Michigan	6,997,175	1,505,400	937,210	148,357	28,061	164,152	9,780,355	27.1
Mississippi	1,910	0	0	0	0	0	1,910	0.0
Missouri	0	0	641,590	0	0	20	641,610	1.8
Nebraska	9,071	0	0	0	0	0	9,071	0.0
New Jersey	665,399	0	0	180	0	0	665,579	1.8
New York	2,942,353	0	7,481	23,688	40,000	60,390	3,073,912	8.5
North Carolina	42,220	0	0	0	2,200	9,380	53,800	0.1
Ohio	3,527,347	1	583,101	108	786,130	416,310	5,312,997	14.7
Pennsylvania	8,105,699	11,187	0	34,830	0	0	8,151,716	22.6
South Carolina	0	0	1,314,000	0	0	0	1,314,000	3.6
Tennessee	63,108	0	0	0	0	0	63,108	0.2
Texas	2,159,975	216,746	0	0	0	0	2,376,721	6.6
Utah	5,158	0	0	0	0	0	5,158	0.0
Washington	75,020	7,807	7,054	11,796	151	41,347	143,175	0.4
West Virginia	0	81,810	0	0	0	0	81,810	0.2
								0.0
Other Countries	**171,346**	**0**	**0**	**0**	**0**	**0**	**171,346**	**0.5**
Japan	145,800	0	0	0	0	0	145,800	0.4
United Kingdom	25,546	0	0	0	0	0	25,546	0.1
Total Transferred Outside Canada	**27,459,608**	**2,826,311**	**3,982,140**	**238,257**	**856,542**	**691,619**	**36,054,477**	**100.0**

Table 8–4. TRI Off-site Transfers from the US to Sites in Other Countries, 2000

Receiving Country	Type of Transfer: 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)	Transfers Outside US (%)
Canada	**14,144,050**	**843,361**	**384,848**	**1,589,801**	**457,328**	**2,354,655**	**19,774,043**	**33.2**
Alberta	142,805	7,710	0	0	0	0	150,514	0.3
British Columbia	185,337	13,686	2,785	1,234	2,565	9	205,616	0.3
Manitoba	413,695	0	0	0	176,871	0	590,566	1.0
New Brunswick	613,777	9	0	0	0	68	613,854	1.0
Ontario	4,705,715	316,212	254,031	1,408,373	211,561	1,452,005	8,347,898	14.0
Quebec	8,082,722	505,744	128,031	180,194	66,332	902,573	9,865,595	16.6
Mexico	**35,452,263**	**16,283**	**0**	**0**	**0**	**251,917**	**35,720,463**	**60.0**
Monterrey	35,252,994	188	0	0	0	251,686	35,504,867	59.7
Other Cities	199,270	16,095	0	0	0	231	215,596	0.4
Other Countries	**3,990,818**	**16,838**	**0**	**0**	**114**	**15,689**	**4,023,459**	**6.8**
Ashmore and Cartier Islands	41,697	0	0	0	0	0	41,697	0.1
Austria	1,298	0	0	0	0	0	1,298	0.0
Belgium	48,229	0	0	0	114	0	48,343	0.1
China	3,131	0	0	0	0	0	3,131	0.0
Dominican Republic	0	2,545	0	0	0	0	2,545	0.0
France	9	0	0	0	0	0	9	0.0
Germany	1,001,102	387	0	0	0	5,912	1,007,401	1.7
Italy	9,206	12,015	0	0	0	0	21,221	0.0
Japan	421,769	0	0	0	0	0	421,769	0.7
Korea	4,685	0	0	0	0	0	4,685	0.0
Netherlands	185,901	1,891	0	0	0	0	187,792	0.3
Singapore	29,220	0	0	0	0	0	29,220	0.0
Spain	1,377,049	0	0	0	0	697	1,377,745	2.3
United Arab Emirates	179,754	0	0	0	0	0	179,754	0.3
United Kingdom	687,770	0	0	0	0	9,080	696,850	1.2
Total Transferred Outside the US	**53,587,132**	**876,481**	**384,848**	**1,589,801**	**457,443**	**2,622,261**	**59,517,965**	**100.0**

Map 8–1. Off-site Transfers across North America, 2000



States/Provinces with Largest Transfers Received

	To kg	From kg
Quebec	9,865,595	5,467,943
Michigan	9,780,355	2,159,605
Ontario	8,347,898	26,936,104
Pennsylvania	8,151,716	4,114,972

Table 8–5. Off-site Transfers across National Boundaries between United States and Canada, 2000

	To/From Canadian Province														Total Cross-Boundary Transfers	
To/From US State	To Alberta (kg)	From Alberta (kg)	To British Columbia (kg)	From British Columbia (kg)	To Manitoba (kg)	From Manitoba (kg)	To New Brunswick (kg)	From New Brunswick (kg)	From Newfoundland (kg)	To Ontario (kg)	From Ontario (kg)	To Quebec (kg)	From Quebec (kg)	From Saskatchewan (kg)	To Canada (kg)	From Canada (kg)
Alabama	0	0	0	0	0	0	0	0	0	611	0	0	1	0	611	1
Alaska	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arkansas	61,224	0	0	0	0	0	0	0	0	0	0	1,159,274	0	0	1,220,499	0
California	0	130,160	13,645	40,410	304,762	0	0	0	0	0	3,226	22,646	0	0	341,053	173,796
Colorado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connecticut	0	0	0	0	0	0	0	0	0	179,575	1,096,195	370,378	27,380	0	549,953	1,123,575
Delaware	0	0	0	0	0	0	0	0	0	0	0	496,376	0	0	496,376	0
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0	6,100	0	0	0	0	6,100	0
Georgia	0	0	0	0	0	0	0	0	0	0	0	281,179	0	0	281,179	0
Guam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	0	0	0	1,362	0	0	0	0	0	0	0	0	0	0	0	1,362
Illinois	0	6,450	0	0	0	0	0	0	0	96,893	558,357	1,279,623	5,120	0	1,376,515	569,927
Indiana	0	204,824	0	0	0	0	0	0	0	192,826	384,919	8,580	0	0	201,406	589,743
Iowa	0	0	0	0	0	807,000	0	0	0	189,691	0	0	0	0	189,691	807,000
Kansas	0	8,500	0	76,100	0	202,300	0	0	0	0	0	361,276	0	0	361,276	286,900
Kentucky	0	0	0	210	0	0	0	0	0	102,434	0	704,642	0	0	807,076	210
Louisiana	0	644,351	0	0	0	0	0	0	0	150,499	0	0	0	0	150,499	644,351
Maine	0	0	0	0	0	0	0	0	0	0	0	15,141	0	0	15,141	0
Maryland	0	0	0	0	0	0	0	0	0	8	11,344	4,489	0	0	4,497	11,344
Massachusetts	0	0	0	0	0	0	0	0	0	194,244	0	541,259	0	0	735,503	0
Michigan	0	0	0	0	0	112,909	0	0	0	2,159,605	8,831,895	0	835,551	0	2,159,605	9,780,355
Minnesota	0	0	0	0	0	0	0	0	0	0	0	8,679	0	0	8,679	0
Mississippi	0	0	0	0	0	0	0	0	0	0	0	0	1,910	0	0	1,910
Missouri	0	0	0	76,610	0	0	0	0	0	0	0	5,234	565,000	0	5,234	641,610
Montana	7,710	0	0	0	0	0	0	0	0	0	0	0	0	0	7,710	0
Nebraska	0	0	0	0	0	0	0	0	0	188,693	9,071	0	0	0	188,693	9,071
Nevada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	62,674	0	17,468	0	0	80,142	0
New Jersey	65,261	0	0	0	0	0	0	5,145	0	40,556	35,501	494,523	624,933	0	600,340	665,579
New Mexico	0	0	0	0	0	0	0	0	0	0	0	1,274	0	0	1,274	0
New York	0	45,012	0	150	0	0	43,443	0	0	1,010,352	2,095,755	983,685	906,340	26,655	2,037,481	3,073,912
North Carolina	0	0	0	0	0	0	0	0	11,580	155,725	0	0	42,220	0	155,725	53,800
North Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ohio	0	26,942	0	68,960	0	0	0	0	0	1,770,345	5,217,095	39,957	0	0	1,810,302	5,312,997
Oklahoma	0	0	0	0	0	0	0	0	0	17,876	0	0	0	0	17,876	0
Oregon	0	0	8,137	0	0	0	0	0	0	0	0	0	0	0	8,137	0
Pennsylvania	0	0	0	606,500	0	0	0	34,840	0	1,437,825	7,490,017	2,677,146	20,359	0	4,114,972	8,151,716
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	103,107	0	0	103,107	0
Rhode Island	0	0	0	0	0	0	0	0	0	0	0	13,121	0	0	13,121	0
South Carolina	0	0	0	0	0	0	0	0	0	101,836	0	2	1,314,000	0	101,838	1,314,000
South Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tennessee	0	0	0	1,950	0	61,158	0	0	0	78,256	0	0	0	0	78,256	63,108
Texas	16,319	0	0	54,545	285,804	73,830	570,411	0	0	210,080	1,120,919	5,442	1,055,159	72,268	1,088,056	2,376,721
Utah	0	0	0	5,158	0	0	0	0	0	0	0	0	0	0	0	5,158
Vermont	0	0	0	0	0	0	0	0	0	0	0	32,315	0	0	32,315	0
Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	0	0	0	0	0	578	0	235,878	0	0	236,457	0
Washington	0	1,270	183,834	71,935	0	0	0	0	0	0	0	2,900	69,970	0	186,734	143,175
West Virginia	0	0	0	0	0	0	0	0	0	0	81,810	0	0	0	0	81,810
Wisconsin	0	0	0	0	0	0	0	0	0	615	0	0	0	0	615	0
Wyoming	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**150,514**	**1,067,509**	**205,616**	**1,003,890**	**590,566**	**1,257,197**	**613,854**	**39,985**	**11,580**	**8,347,898**	**26,936,104**	**9,865,595**	**5,467,943**	**98,923**	**19,774,043**	**35,883,131**

Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.2% of total).

8.2.2 Transfers between US States and Canadian Provinces, 2000

A relatively small number of facilities transfer listed substances in the matched data set across the Canada-US border. Ten facilities in each country accounted for half of such transfers in 2000.

- For 2000, 291 TRI facilities and 150 NPRI facilities reported transfers across the Canada-US border.
- Four TRI facilities and 10 NPRI facilities reported more than 1.0 million kg of cross-border transfers in 2000.
- The 10 facilities in each country with the largest cross-border transfers accounted for over half of the transfers of metals and their compounds destined for recycling.

Table 8–6. NPRI Facilities with the Largest Transfers to the US from Canada, 2000

Rank	Facility	City, Province	SIC Code Canada	SIC Code US	Number of Facilities Reporting Transfers to the US
1	Co-Steel Lasco	Whitby, ON	29	33	1
2	Brass Craft Canada Ltd., Masco Corporation	St. Thomas, ON	30	34	1
3	Nexans Canada Inc., Simcoe Plant	Simcoe, ON	33	33	1
4	Safety-Kleen Canada Inc., Centre de Recyclage de St-Constant	St-Constant, QC	99	495/738	1
5	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	1
6	L&M Precision Products Inc.	Toronto, ON	30	34	1
7	Aimco Solrec Ltd.	Milton, ON	37	28	1
8	Lofthouse Brass Manufacturing Limited, Burks Falls	Burks Falls, ON	29	34	1
9	Fisher Cast Limited, Otonabee Plant, Fisher Gauge Limited	Peterborough, ON	29	33	1
10	Philip Services Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	1
	Subtotal				**10**
	% of Total				**7**
	Total				**150**

Table 8–7. TRI Facilities with the Largest Transfers to Canada from the US, 2000

Rank	Facility	City, State	US SIC Code	Number of Facilities Reporting Transfers to Canada
1	Exide Corp.	Dunmore, PA	Mult.	1
2	Exide Corp.	Fort Smith, AR	36	1
3	Delphi Packard Electric Sys., N. River Road Facility, Delphi Automotive Sys.	Warren, OH	37	1
4	Encycle Texas Inc., ASARCO Inc.	Corpus Christi, TX	495/738	1
5	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA	33	1
6	EQ Resource Recovery Inc., EQ Holding Co.	Romulus, MI	495/738	1
7	Exide Corp.	Kankakee, IL	36	1
8	Dow Corning Corp.	Carrollton, KY	28	1
9	GE Co. Silicone Prods., GE Co.	Waterford, NY	28	1
10	Johnson Controls Battery Group Inc., Johnson Controls Inc.	Middletown, DE	36	1
	Subtotal			**10**
	% of Total			**3**
	Total			**291**

Table 8–6. (*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	3,523,882	0	0	0	0	0	3,523,882	Zinc/Lead/Manganese and its compounds
2	2,799,276	0	0	0	0	0	2,799,276	Copper/Zinc and its compounds
3	2,154,200	0	0	0	0	0	2,154,200	Copper and its compounds
4	0	0	1,879,000	0	0	0	1,879,000	Toluene, Xylenes
5	1,591,140	0	0	0	0	0	1,591,140	Zinc/Manganese and its compounds
6	1,340,097	0	0	0	0	0	1,340,097	Copper/Zinc and its compounds
7	0	0	1,271,040	333	0	0	1,271,373	Xylenes, Toluene
8	1,228,000	0	0	0	0	0	1,228,000	Copper/Zinc and its compounds
9	1,113,115	0	0	0	0	0	1,113,115	Zinc and its compounds
10	60,570	0	0	0	632,130	415,130	1,107,830	Lead/Nickel/Cadmium and its compounds
	13,810,280	**0**	**3,150,040**	**333**	**632,130**	**415,130**	**18,007,913**	
	51	**0**	**79**	**0.1**	**74**	**60**	**50**	
	27,288,262	**2,826,311**	**3,982,140**	**238,257**	**856,542**	**691,619**	**35,883,131**	

Table 8–7. (*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	2,474,376	0	0	0	0	0	2,474,376	Lead and its compounds
2	1,159,274	0	0	0	0	0	1,159,274	Lead and its compounds
3	1,138,330	0	0	0	0	0	1,138,330	Copper and its compounds
4	1,054,438	0	0	0	0	0	1,054,438	Nickel/Lead/Copper and its compounds
5	0	0	0	0	0	972,789	972,789	Lead/Zinc and its compounds
6	0	816	0	594,286	109,410	5,329	709,841	Methanol, Xylenes, Toluyene, Methyl ethyl ketone
7	684,853	0	0	0	0	0	684,853	Lead and its compounds
8	616,307	0	0	0	0	0	616,307	Copper and its compounds
9	535,420	92	0	73	0	32,721	568,306	Copper and its compounds
10	496,376	0	0	0	0	0	496,376	Lead and its compounds
	8,159,374	**908**	**0**	**594,359**	**109,410**	**1,010,839**	**9,874,890**	
	58	**0.1**	**0**	**37**	**24**	**43**	**50**	
	14,144,050	**843,361**	**384,848**	**1,589,801**	**457,328**	**2,354,655**	**19,774,043**	

The US states of Michigan and Pennsylvania received the largest amounts of transfers from NPRI facilities.

- One site in Michigan (Extruded Metals Inc. in Belding) received 2.7 million kg from Canadian facilities, which represented 20 percent of the 13.8 million kg reported transferred to this site from both Canada and the US in 2000. All of the transfers to this site were for recycling.
- A second site in Michigan (Arco Alloys Corp. in Detroit) received 1.8 million kg from Canadian facilities, which represented 94 percent of all transfers to this site in 2000. All of the transfers to this site were for recycling.
- By far, the site in Pennsylvania with the largest transfers from Canadian facilities was Horsehead Resource Development in Palmerton. It received 5.2 million kg from Canadian facilities (representing 18 percent of all transfers to this site) and 24.5 million kg from US facilities. All of the transfers from Canadian facilities were for recycling.

Table 8–8. Sites in Michigan that Received the Largest Transfers from Canada, 2000

Rank for Transfers from Canada	Facility	Location	City, State
1	Extruded Metals Inc.	Ashfield Street	Belding, MI
2	Arco Alloys Corp.	Trombly St.	Detroit, MI
3	Gage Products Company	Wanda Ave.	Ferndale, MI
4	Systech Environmental/Lafarge	Ford Avenue	Alpena, MI
5	Mueller Brass Co.	Lapeer Ave.	Port Huron, MI
1	Extruded Metals Inc.	Ashfield Street	Belding, MI
2	Arco Alloys Corp.	Trombly St.	Detroit, MI
3	Gage Products Company	Wanda Ave.	Ferndale, MI
4	Systech Environmental/Lafarge	Ford Avenue	Alpena, MI
5	Mueller Brass Co.	Lapeer Ave.	Port Huron, MI

Table 8–9. Sites in Pennsylvania that Received the Largest Transfers from Canada, 2000

Rank for Transfers from Canada	Facility	Location	City, State
1	Horsehead Resource Development Co., Inc.	Delaware Avenue - East Plant	Palmerton, PA
2	Metal Chem, Inc.	Washington Rd.	Pittsburgh, PA
3	Cerro Metal Products	Route 144	Bellefonte, PA
4	Zinc Corporation of America	Frankfort Road	Monaca, PA
5	Recmix of Pennsylvania, Inc.	Plum Run Road	Canonsburg, PA
1	Horsehead Resource Development Co Inc.	Delaware Avenue - East Plant	Palmerton, PA
2	Metal Chem, Inc.	Washington Rd.	Pittsburgh, PA
3	Cerro Metal Products	Route 144	Bellefonte, PA
4	Zinc Corporation of America	Frankfort Road	Monaca, PA
5	Recmix of Pennsylvania, Inc.	Plum Run Road	Canonsburg, PA

Table 8–8. (*continued*)

Rank for Transfers from Canada	Number of Facilities	Number of Forms	Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Disposal/Energy Recovery/ Treatment* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
			Type of Transfer							
From Canadian NPRI Facilities										
1	3	12	2,722,507	0	0	0	0	2,722,507	13,808,304	20
2	3	3	1,845,216	0	0	0	0	1,845,216	1,957,725	94
3	4	26	1,483,315	0	0	0	0	1,483,315	8,850,323	17
4	4	28	167,977	924,090	141,776	0	20	1,233,863	4,635,774	27
5	3	12	717,489	0	0	0	0	717,489	14,151,215	5
From US TRI Facilities										
1	15	36	11,085,797	0	0	0	0	11,085,797		
2	3	3	112,509	0	0	0	0	112,509		
3	34	213	7,366,823	0	0	0	185	7,367,008		
4	11	125	141	3,322,590	78,437	0	744	3,401,911		
5	28	56	13,433,726	0	0	0	0	13,433,726		

* Includes metals and their compounds.
** Does not include metals and their compounds.

Table 8–9. (*continued*)

Rank for Transfers from Canada	Number of Facilities	Number of Forms	Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Disposal/Energy Recovery/ Treatment* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
			Type of Transfer							
From Canadian NPRI Facilities										
1	3	20	5,197,953	0	0	0	0	5,197,953	29,696,513	18
2	2	2	741,928	0	0	0	0	741,928	2,701,957	27
3	1	6	618,800	0	0	0	0	618,800	11,769,251	5
4	1	1	606,500	0	0	0	0	606,500	6,182,443	10
5	1	10	523,180	0	0	0	0	523,180	2,049,940	26
From US TRI Facilities										
1	25	149	24,479,048	0	0	0	19,511	24,498,560		
2	11	17	1,960,010	0	0	0	19	1,960,029		
3	11	19	11,150,451	0	0	0	0	11,150,451		
4	39	59	5,575,943	0	0	0	0	5,575,943		
5	5	18	1,526,760	0	0	0	0	1,526,760		

* Includes metals and their compounds.
** Does not include metals and their compounds.

The Canadian provinces of Quebec and Ontario received the largest amounts of transfers from TRI facilities.

- One site in Quebec (Nova PB Inc. in Ste-Catherine) received 6.1 million kg from US facilities, representing 98 percent of all transfers to this site reported for 2000. All of the transfers to this site were for recycling.
- A second site in Quebec (Noranda Horne Smelter in Rouyn-Noranda) received 1.7 million kg from US facilities and 10.3 million kg from Canadian facilities. Most of these transfers were for recycling.
- One site in Ontario (Safety-Kleen Ltd. in Corunna) received 2.8 million kg from TRI facilities, which represented 16 percent of the total transfers it received in 2000 (this site also received 15.1 million kg from NPRI facilities). Most of the transfers from both TRI and NPRI facilities were of metals sent for disposal or of chemicals other than metals sent for treatment.
- One site in Hamilton, Ontario owned by Philips Services Inc. received a total of 1.6 million kg from the US and 2.4 million kg from sites within Canada. US transfers, all of which were sent for recycling, represented 40 percent of the total transfers received at this site in 2000

Table 8–10. Sites in Quebec that Received the Largest Transfers from the US, 2000

Rank for Transfers from the US	Facility	Location	City, Province
1	Nova PB Inc.	Garnier	Ste-Catherine, QC
2	Noranda Horne Smelter	Avenue Portelance	Rouyn-Noranda, QC
3	Stablex Canada Inc.	Boul. Industriel	Blainville, QC
4	Chemrec Inc.	Brosseau	Cowansville, QC
5	American Iron & Metal Company Inc.	Henri Bourassa E.	Montréal-Est, QC
1	Nova PB Inc.	Garnier	Ste-Catherine, QC
2	Noranda Horne Smelter	Avenue Portelance	Rouyn-Noranda, QC
3	Stablex Canada Inc.	Boul. Industriel	Blainville, QC
4	Chemrec Inc.	Brosseau	Cowansville, QC
5	American Iron & Metal Company Inc.	Henri Bourassa E.	Montréal-Est, QC

Table 8–11. Sites in Ontario that Received the Largest Transfers from the US, 2000

Rank for Transfers from the US	Facility	Location	City, Province
1	Safety-Kleen Ltd.	Telfer Road	Corunna, ON
2	Phillips Environmental (Waxman Resources)	Centennial Parkway N.	Hamilton, ON
3	Falconbridge Ltd. , Kidd Metallurical Division	Highway 101 East	Timmins, ON
4	Sam Adelstein & Company Ltd.	Welland Ave.	St Catharines, ON
5	Zalev Brothers Ltd.	Grand Marais Road E.	Windsor, ON
1	Safety-Kleen Ltd.	Telfer Road	Corunna, ON
2	Phillips Environmental (Waxman Resources)	Centennial Parkway N.	Hamilton, ON
3	Falconbridge Ltd. , Kidd Metallurical Division	Highway 101 East	Timmins, ON
4	Sam Adelstein & Company Ltd.	Welland Ave.	St Catharines, ON
5	Zalev Brothers Ltd.	Grand Marais E.	Windsor, ON

Table 8–10. (*continued*)

Rank for Transfers from the US	Number of Facilities	Number of Forms	Type of Transfer: Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Disposal/Energy Recovery/ Treatment* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From the US (%)
			From US TRI Facilities							
1	12	23	6,070,120	0	0	0	0	6,070,120	6,219,305	98
2	13	27	1,661,146	0	0	0	32,653	1,693,800	11,955,399	14
3	74	223	52,305	0	133,059	63,614	791,917	1,040,895	9,156,675	11
4	8	19	456,328	28,712	0	0	0	485,040	2,313,028	21
5	2	2	66,894	0	0	0	73,152	140,046	2,672,098	5
			From Canadian NPRI Facilities							
1	4	7	149,185	0	0	0	0	149,185		
2	12	38	10,253,920	0	4,972	0	2,707	10,261,599		
3	74	198	0	0	3,689,387	637,181	3,789,212	8,115,780		
4	9	33	1,809,472	0	18,516	0	0	1,827,988		
5	24	45	2,529,012	0	0	0	3,040	2,532,052		

* Includes metals and their compounds.
** Does not include metals and their compounds.

Table 8–11. (*continued*)

Rank for Transfers from the US	Number of Facilities	Number of Forms	Type of Transfer: Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Disposal/Energy Recovery/ Treatment* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From the US (%)
			From US TRI Facilities							
1	55	317	2	65,166	1,300,149	77,748	1,381,093	2,824,158	17,890,394	16
2	8	10	1,594,853	0	0	0	0	1,594,853	3,955,045	40
3	13	35	679,071	0	0	0	4,480	683,551	990,035	69
4	5	14	457,506	0	0	0	0	457,506	460,200	99
5	5	12	403,444	0	0	0	0	403,444	2,457,801	16
			From Canadian NPRI Facilities							
1	98	410	797,000	37,550	2,729,726	2,020,117	9,481,843	15,066,236		
2	12	16	2,360,091	0	0	0	101	2,360,192		
3	8	21	266,429	0	23,200	0	16,855	306,484		
4	1	4	2,694	0	0	0	0	2,694		
5	7	20	2,054,297	0	0	0	60	2,054,357		

* Includes metals and their compounds.
** Does not include metals and their compounds.

Most transfers between Canada and the US were transfers of metals to recycling. For NPRI facilities, this category was followed by transfers to energy recovery of chemicals other than metals; for TRI facilities, it was transfers of metals to disposal, energy recovery, and treatment.

- Thirty-six percent of all transfers to the US from Canada were by primary metals facilities. These transfers were mostly metals to recycling.
- Thirty-one percent of all transfers to the US from Canada were by fabricated metals facilities. These transfers were also mostly metals to recycling.
- Among transfers to the US from Canada, hazardous waste management facilities sent the largest amount of chemicals (other than metals) to energy recovery; total transfers by this sector represented 11 percent of all transfers to the US.

Table 8–12. NPRI Industries Reporting Transfers to the US from Canada, 2000

		Type of Transfer							
US SIC Code	Industry	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)	Total (%)
33	Primary Metals	12,778,804	19,070	0	0	24,000	101,449	12,923,323	36.0
34	Fabricated Metals Products	10,893,660	0	0	0	40,000	0	10,933,660	30.5
495/738	Hazardous Waste Mgt./Solvent Recovery	71,074	157,807	2,354,334	31,094	656,861	534,586	3,805,756	10.6
28	Chemicals	378,087	492,829	1,620,325	194,975	130,841	1,072	2,818,129	7.9
37	Transportation Equipment	724,591	1,488,438	0	0	0	0	2,213,029	6.2
36	Electronic/Electrical Equipment	932,417	28,132	0	0	0	0	960,549	2.7
39	Misc. Manufacturing Industries	804,511	0	0	12,188	0	0	816,699	2.3
27	Printing and Publishing	0	313,907	0	0	0	0	313,907	0.9
29	Petroleum and Coal Products	72,271	216,747	0	0	2,200	9,380	300,598	0.8
32	Stone/Clay/Glass Products	216,140	0	7,481	0	0	0	223,621	0.6
35	Industrial Machinery	177,023	0	0	0	0	23,370	200,393	0.6
491/493	Electric Utilities	173,122	0	0	0	0	0	173,122	0.5
30	Rubber and Plastics Products	2,960	109,381	0	0	2,640	0	114,981	0.3
20	Food Products	63,592	0	0	0	0	0	63,592	0.2
26	Paper Products	10	0	0	0	0	21,762	21,772	0.1
	Total	**27,288,262**	**2,826,311**	**3,982,140**	**238,257**	**856,542**	**691,619**	**35,883,131**	**100.0**

Table 8–13. TRI Industries Reporting Transfers to Canada from the US, 2000

US SIC Code	Industry	Type of Transfer: 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)	Total (%)
36	Electronic/Electrical Equipment	3,923,608	333	0	4,925	159	29,046	3,958,070	20.0
33	Primary Metals	1,889,109	100,104	0	0	8,104	1,323,082	3,320,399	16.8
495/738	Hazardous Waste Mgt./Solvent Recovery	1,221,237	15,278	321,187	966,856	369,884	402,906	3,297,349	16.7
--	Multiple codes 20–39*	3,179,751	0	0	33,896	1,967	63,516	3,279,130	16.6
28	Chemicals	1,205,975	408,121	41,616	555,761	53,085	41,220	2,305,777	11.7
37	Transportation Equipment	1,839,941	229	113	120	2,559	180	1,843,142	9.3
34	Fabricated Metals Products	707,864	2	0	24,908	0	472,776	1,205,550	6.1
26	Paper Products	0	204,567	21,931	0	62	54	226,614	1.1
38	Measurement/Photographic Instruments	77,642	102,252	0	549	1,424	2	181,868	0.9
29	Petroleum and Coal Products	1,134	7,712	0	899	20,086	12,155	41,985	0.2
32	Stone/Clay/Glass Products	34,585	0	0	1,513	0	0	36,098	0.2
35	Industrial Machinery	32,975	0	0	0	0	7	32,982	0.2
30	Rubber and Plastics Products	30,230	106	0	319	0	39	30,694	0.2
39	Misc. Manufacturing Industries	0	4,656	0	54	0	9,539	14,249	0.1
491/493	Electric Utilities	0	0	0	0	0	135	135	0.0
	Total	**14,144,050**	**843,361**	**384,848**	**1,589,801**	**457,328**	**2,354,655**	**19,774,043**	**100.0**

* Multiple SIC Codes reported only in TRI.

- Twenty percent of all transfers to Canada from the US were by electronic/electrical equipment manufacturers. This sector reported the largest amounts of transfers of metals to recycling of all sectors.
- Seventeen percent of all transfers to Canada from the US were by primary metals facilities. This sector reported mostly transfers of metals to recycling and transfers of metals to disposal, energy recovery, and treatment.

- Two metals (zinc and copper and their compounds) were the substances with the largest transfers to the US from Canada. Together, the two represented 65 percent of all such transfers in 2000.
- Twenty-five chemicals accounted for 99 percent of all transfers to the US from Canada.
- Toluene and xylenes were the chemicals with the largest transfers to energy recovery of substances other than metals and had the third- and fourth-largest amounts overall.

Table 8–14. Chemicals Transferred to the US from Canadian NPRI Facilities, 2000

				Type of Transfer							
Rank	CAS Number		Chemical	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)	Total (%)
1	--	m	Zinc (and its compounds)	11,807,478	0	0	0	0	178,876	11,986,354	33.4
2	--	m	Copper (and its compounds)	11,394,183	0	0	0	0	14,392	11,408,575	31.8
3	108-88-3	p	Toluene	0	324,566	1,570,646	73,614	6,652	0	1,975,478	5.5
4	95-47-6		Xylenes	0	783,791	1,139,031	2,516	13,817	0	1,939,155	5.4
5	--	m	Manganese (and its compounds)	1,121,990	0	0	0	0	124,652	1,246,642	3.5
6	--	m,c,p,t	Lead (and its compounds)	922,365	0	0	0	0	28,988	951,353	2.7
7	--	m	Aluminum (fume or dust)	937,820	0	0	0	0	11,390	949,210	2.6
8	7697-37-2		Nitric acid and nitrate compounds	0	8,020	0	659	762,130	0	770,809	2.1
9	--	m,c,p,t	Chromium (and its compounds)	350,895	0	0	0	0	296,063	646,958	1.8
10	--	m,c,p,t	Nickel (and its compounds)	604,835	0	0	0	0	36,874	641,709	1.8
11	78-93-3		Methyl ethyl ketone	0	11,200	439,334	76,128	1,960	0	528,622	1.5
12	1313-27-5		Molybdenum trioxide	0	503,796	0	0	0	0	503,796	1.4
13	108-10-1		Methyl isobutyl ketone	0	346,761	114,201	1,802	436	0	463,200	1.3
14	107-21-1		Ethylene glycol	0	231,813	77,860	11,500	436	0	321,609	0.9
15	100-41-4	c	Ethylbenzene	0	159,208	124,951	993	771	0	285,923	0.8
16	71-36-3		n-Butyl alcohol	0	41,188	126,112	157	151	0	167,608	0.5
17	67-56-1		Methanol	0	55,985	98,930	770	0	0	155,685	0.4
18	108-95-2		Phenol	0	134,542	3,633	0	0	0	138,175	0.4
19	95-63-6		1,2,4-Trimethylbenzene	0	68,672	50,001	0	0	0	118,673	0.3
20	127-18-4	c,p,t	Tetrachloroethylene	0	0	105,000	169	0	0	105,169	0.3
21	--	m	Silver (and its compounds)	86,043	0	0	0	0	0	86,043	0.2
22	75-09-2	c,p,t	Dichloromethane	0	7,807	58,261	17,554	0	0	83,622	0.2
23	1319-77-3		Cresol (mixed isomers)	0	82,204	0	0	0	0	82,204	0.2
24	79-01-6	c,p,t	Trichloroethylene	0	0	51,020	6,363	0	0	57,383	0.2
25	111-42-2		Diethanolamine	0	3,226	0	0	40,000	0	43,226	0.1
			Subtotal	**27,225,609**	**2,762,779**	**3,958,980**	**192,225**	**826,353**	**691,235**	**35,657,181**	**99.4**
			% of Total	**99.8**	**97.8**	**99.4**	**80.7**	**96.5**	**99.9**	**99.4**	
			Total	**27,288,262**	**2,826,311**	**3,982,140**	**238,257**	**856,542**	**691,619**	**35,883,131**	**100.0**

m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Table 8–15. Chemicals Transferred to Canada from US TRI Facilities, 2000

Rank	CAS Number		Chemical	Type of Transfer: 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)	Total (%)
1	--	m,c,p,t	Lead (and its compounds)	6,640,312	0	0	0	0	985,922	7,626,234	38.6
2	--	m	Copper (and its compounds)	4,541,780	0	0	0	0	119,269	4,661,050	23.6
3	--	m	Zinc (and its compounds)	850,707	0	0	0	0	667,026	1,517,733	7.7
4	--	m,c,p,t	Nickel (and its compounds)	1,043,314	0	0	0	0	273,064	1,316,378	6.7
5	108-88-3	p	Toluene	0	319,152	127,670	359,908	9,351	0	816,082	4.1
6	--	m	Manganese (and its compounds)	574,895	0	0	0	0	5,232	580,127	2.9
7	95-47-6		Xylenes	0	2,260	122,592	340,590	13,224	0	478,666	2.4
8	--	m,c,p,t	Chromium (and its compounds)	284,336	0	0	0	0	189,103	473,439	2.4
9	67-56-1		Methanol	0	11,752	29,587	207,147	77,102	0	325,589	1.6
10	75-09-2	c,p,t	Dichloromethane	0	210,337	0	13,042	590	0	223,970	1.1
11	7697-37-2		Nitric acid and nitrate compounds	0	1,083	0	94,772	123,672	0	219,527	1.1
12	78-93-3		Methyl ethyl ketone	0	16,349	25,097	98,238	5,652	0	145,336	0.7
13	107-21-1		Ethylene glycol	0	13,504	185	181	118,013	0	131,883	0.7
14	75-45-6	t	Chlorodifluoromethane (HCFC-22)	0	103,333	0	463	0	0	103,796	0.5
15	75-01-4	c,p,t	Vinyl chloride	0	96,410	0	0	1	0	96,411	0.5
16	110-54-3		n-Hexane	0	300	28,070	53,757	3,299	0	85,425	0.4
17	--	m	Antimony (and its compounds)	74,072	0	0	0	0	9,825	83,897	0.4
18	--	m,c,p,t	Cadmium (and its compounds)	24,660	0	0	0	0	58,237	82,897	0.4
19	108-10-1		Methyl isobutyl ketone	0	18,471	10,542	43,623	2,095	0	74,732	0.4
20	100-41-4	c	Ethylbenzene	0	4,768	15,653	48,191	1,646	0	70,257	0.4
21	--	m	Silver (and its compounds)	63,769	0	0	0	0	834	64,603	0.3
22	110-86-1		Pyridine	0	0	0	55,761	197	0	55,958	0.3
23	872-50-4	p	N-Methyl-2-pyrrolidone	0	31,386	7,632	15,201	113	0	54,332	0.3
24	91-20-3		Naphthalene	0	0	209	2,517	43,154	0	45,880	0.2
25	--	m,p,t	Mercury (and its compounds)	1	0	0	0	0	45,644	45,644	0.2
			Subtotal	**14,097,847**	**829,107**	**367,236**	**1,333,392**	**398,110**	**2,354,155**	**19,379,846**	**98.0**
			% of Total	**99.7**	**98.3**	**95.4**	**83.9**	**87.1**	**100.0**	**98.0**	
			Total	**14,144,050**	**843,361**	**384,848**	**1,589,801**	**457,328**	**2,354,655**	**19,774,043**	**100.0**

m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

- Two metals (lead and copper and their compounds) were the substances with the largest transfers to Canada from the US. Together, these two metals represented 62 percent of all such transfers in 2000.
- Twenty-five chemicals accounted for 98 percent of all transfers to Canada from the US in 2000.
- Two other metals (zinc and nickel and their compounds) had the third- and fourth-largest amounts overall.

8.3 1998–2000 Cross-Border Transfers

Transfers to recycling and energy recovery became mandatory for NPRI for the 1998 reporting year. Therefore, comparisons of all types of transfers can be made for the years 1998 to 2000. However, the 1998–2000 data can only compare those chemicals in the matched data set for both years. Thus, for this section, the new chemicals added to NPRI for the 2000 reporting year and chemicals whose reporting definition has changed (mercury and its compounds) are excluded from the 2000 data.

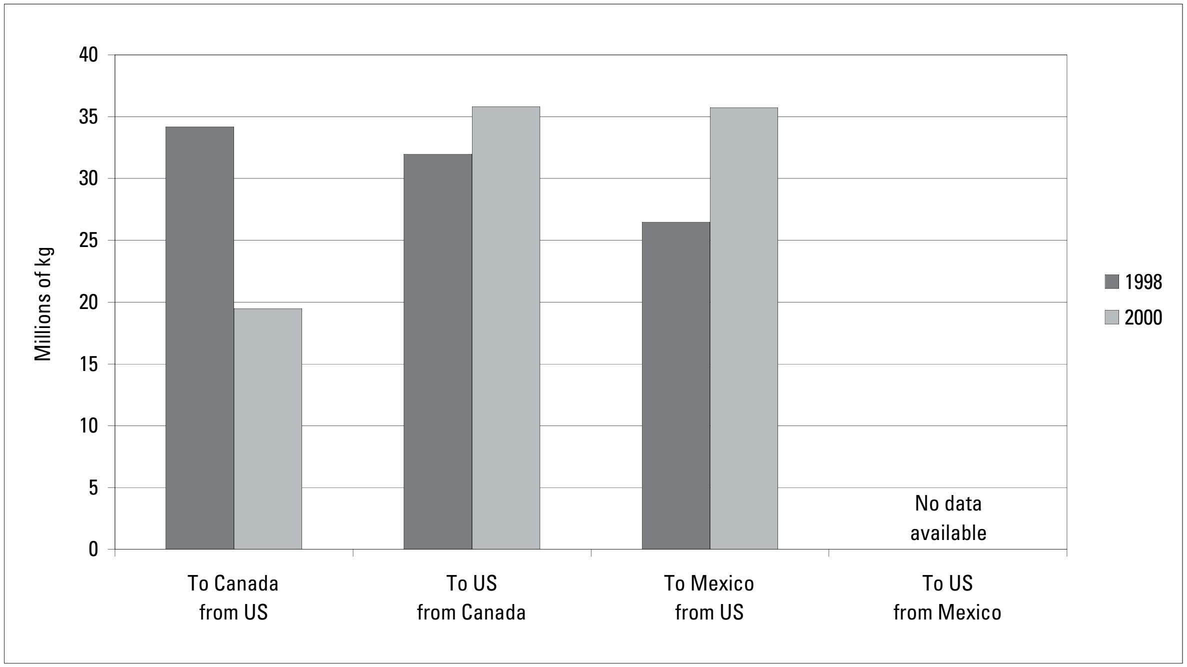
- Transfers to Canada from the US decreased from 34.2 million kg to 19.5 million kg from 1998 to 2000, a decrease of 43 percent. The decrease occurred primarily in recycling of metals.
- Transfers to the US from Canada increased from 32.0 million kg to 35.8 million kg from 1998 to 2000, an increase of 12 percent. The increase occurred primarily in transfers of metals to recycling. Transfers of metals to disposal, energy recovery, and treatment decreased by 1.2 million kg.
- TRI facilities transferred 35.7 million kg to Mexican sites in 2000, an increase of 35 percent over 1998 amounts. The vast majority of these transfers were of metals to recycling.
- No data are available for transfers from Mexico to the US.

Table 8–16. Off-site Transfers to/from Canada, Mexico and the US, 1998–2000

Type of Transfer	1998 (kg)	2000 (kg)	Change 1998–2000 kg	Change 1998–2000 %
To Canada from the US	**34,174,493**	**19,465,754**	**-14,708,739**	**-43**
Recycling of Metals	24,542,651	14,144,050	-10,398,601	-42
Recycling (except metals)	1,012,444	708,341	-304,102	-30
Energy Recovery (except metals)	1,847,935	349,146	-1,498,789	-81
Treatment (except metals)	3,586,646	1,513,033	-2,073,613	-58
Disposal (except metals)	309,551	442,173	132,622	43
Metals to Disposal/Energy Recovery/Treatment	2,875,267	2,309,011	-566,256	-20
To the US from Canada	**31,972,271**	**35,805,284**	**3,833,013**	**12**
Recycling of Metals	21,819,095	27,269,470	5,450,375	25
Recycling (except metals)	3,558,057	2,814,984	-743,073	-21
Energy Recovery (except metals)	3,261,930	3,982,009	720,079	22
Treatment (except metals)	299,182	214,756	-84,426	-28
Disposal (except metals)	1,172,331	832,542	-339,789	-29
Metals to Disposal/Energy Recovery/Treatment	1,861,676	691,523	-1,170,153	-63
To Mexico from the US	**26,460,194**	**35,720,146**	**9,259,953**	**35**
Recycling of Metals	26,418,211	35,451,951	9,033,740	34
Recycling (except metals)	13	16,283	16,270	128,129
Energy Recovery (except metals)	0	0	0	--
Treatment (except metals)	0	0	0	--
Disposal (except metals)	0	0	0	--
Metals to Disposal/Energy Recovery/Treatment	41,970	251,913	209,943	500
To the US from Mexico	**(No data available)**			

Note: Does not include transfers to sewage. Data on Mexico transfers to the US or Canada not available for 1998–2000.

Figure 8–4. Change in Off-site Transfers to/from Canada, Mexico and the US, 1998–2000



Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 1998–2000.

- While the transfers of the matched chemicals from US facilities to Canadian sites decreased by 43 percent and increased by 35 percent to Mexican sites, overall transfers, including those within the US, decreased by 3 percent.
- Although transfers to US sites from Canadian facilities increased by 12 percent, overall Canadian facilities decreased their transfers to other Canadian sites by 7 percent and overall transfers, including those within Canada, decreased 4 percent.

Table 8–17. Total Off-site Transfers to/from Canada, Mexico and the US, 1998–2000

	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			
	1998 (kg)	2000 (kg)	Change 1998–2000 kg	%
From US Facilities	**1,626,800,494**	**1,578,981,295**	**-47,819,199**	**-3**
To US	1,566,165,807	1,523,795,395	-42,370,412	-3
To Canada	34,174,493	19,465,754	-14,708,739	-43
To Mexico	26,460,194	35,720,146	9,259,952	35
From Canadian Facilities	**203,765,833**	**196,163,700**	**-7,602,133**	**-4**
To Canada	171,793,562	160,358,416	-11,435,146	-7
To US	31,972,271	35,805,284	3,833,013	12
To Mexico	0	0	0	0

Note: Does not include transfers to sewage. Data on Mexico transfers to the US or Canada not available for 1998–2000.

8.3.1 1998–2000 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 2000.

- The Canadian primary metals sector, which had the largest transfers to the US in both years, increased its transfers by 2.5 million kg (24 percent) from 1998 to 2000.
- The Canadian fabricated metals sector reported the largest increase in cross-border transfers from 1998 to 2000, 5.9 million kg or 116 percent.
- The Canadian electronic/electrical equipment sector reported the largest decrease in cross-border transfers, a decline of 4.9 million kg.

Table 8–18. NPRI Off-site Transfers to the US from Canada, by Industry, 1998–2000 (Ordered by Largest Transfers in 2000)

		Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			
US SIC Code	Industry	1998 (kg)	2000 (kg)	Change 1998–2000 kg	Change 1998–2000 %
33	Primary Metals	10,373,603	12,899,071	2,525,468	24
34	Fabricated Metals Products	5,061,143	10,933,660	5,872,517	116
495/738	Hazardous Waste Mgt./Solvent Recovery	3,907,024	3,793,129	-113,895	-3
28	Chemicals	2,762,995	2,807,128	44,133	2
37	Transportation Equipment	1,459,822	2,202,309	742,487	51
36	Electronic/Electrical Equipment	5,881,154	954,174	-4,926,980	-84
39	Misc. Manufacturing Industries	838,000	804,511	-33,489	-4
27	Printing and Publishing	5,797	313,907	308,110	5,315
29	Petroleum and Coal Products	922,760	300,598	-622,162	-67
32	Stone/Clay/Glass Products	121,129	223,621	102,492	85
35	Industrial Machinery	174,494	200,393	25,899	15
491/495	Electric Utilities	268,032	173,057	-94,975	-35
30	Rubber and Plastics Products	3,884	114,374	110,490	2,845
20	Food Products	191,573	63,592	-127,981	-67
26	Paper Products	861	21,760	20,899	2,427
	Total	**31,972,271**	**35,805,284**	**3,833,013**	**12**

Table 8–19. TRI Off-site Transfers to Canada from the US, by Industry, 1998–2000 (Ordered by Largest Transfers in 2000)

US SIC Code	Industry	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal 1998 (kg)	2000 (kg)	Change 1998–2000 kg	%
36	Electronic/Electrical Equipment	5,336,540	3,958,070	-1,378,470	-26
33	Primary Metals	9,893,548	3,320,399	-6,573,149	-66
--	Multiple codes 20–39*	8,438,593	3,274,459	-5,164,134	-61
495/738	Hazardous Waste Mgt./Solvent Recovery	5,373,449	3,163,116	-2,210,334	-41
28	Chemicals	3,222,707	2,160,911	-1,061,796	-33
37	Transportation Equipment	523,679	1,843,142	1,319,463	252
34	Fabricated Metals Products	718,113	1,205,550	487,437	68
26	Paper Products	284,067	204,683	-79,384	-28
38	Measurement/Photographic Instruments	199,320	181,848	-17,472	-9
29	Petroleum and Coal Products	22,761	41,901	19,140	84
32	Stone/Clay/Glass Products	35,537	36,098	561	2
35	Industrial Machinery	26,278	32,982	6,704	26
30	Rubber and Plastics Products	70,578	30,690	-39,888	-57
39	Misc. Manufacturing Industries	29,210	11,883	-17,327	-59
491/493	Electric Utilities	0	23	23	--
23	Apparel and Other Textile Products	113	0	-113	-100
	Total	**34,174,493**	**19,465,754**	**-14,708,739**	**-43**

* Multiple SIC Codes reported only in TRI.

- The US primary metals industry reported the largest transfers to Canada in 1998 but decreased its transfers by 6.6 million kg, more than any other sector.
- The US electronic/electrical equipment sector had the fourth-largest transfers in 1998 and, despite reporting a decrease of 1.4 million kg or 26 percent, the largest in 2000.
- The US sector with the largest increase in transfers to Canada from 1998 to 2000 was the transportation equipment sector.

8.3.2 1998–2000 Transfers by Chemical

In both TRI and NPRI, a few chemicals accounted for most of the transfers between Canada and the US in 1998 and 2000.

- Twenty-five chemicals accounted for more than 97 percent of all cross-border transfers in both 1998 and 2000.
- Zinc and its compounds was the substance transferred to the US from Canada in the largest amount in 2000, having increased by 94 percent or 5.8 million kg.
- Though it had the largest cross-border transfers in 1998, Copper and its compounds dropped to second in 2000, despite an increase of 47 percent or 3.6 million kg from 1998 to 2000.
- Toluene and xylenes ranked third and fourth, respectively, in 2000. Transfers of toluene to the US from Canada increased by 43 percent while those of xylenes decreased by 15 percent.

Table 8–20. NPRI Off-site Transfers to the US from Canada, by Chemical, 1998–2000 (Chemicals with Largest Transfers in 2000)

				Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			
				1998	2000	Change 1998–2000	
Rank	CAS Number		Chemical	(kg)	(kg)	kg	%
1	--	m	Zinc (and its compounds)	6,188,771	11,986,354	5,797,583	94
2	--	m	Copper (and its compounds)	7,759,914	11,408,575	3,648,661	47
3	108-88-3	p	Toluene	1,376,703	1,975,478	598,775	43
4	1330-20-7		Xylenes	2,275,615	1,939,155	-336,460	-15
5	--	m	Manganese (and its compounds)	724,266	1,246,642	522,376	72
6	--	m,c,p,t	Lead (and its compounds)	6,276,900	951,353	-5,325,547	-85
7	7429-90-5	m	Aluminum (fume or dust)	1,620,290	949,210	-671,080	-41
8	7697-37-2		Nitric acid and nitrate compounds	607,179	770,809	163,630	27
9	--	m,c,p,t	Chromium (and its compounds)	463,877	646,958	183,081	39
10	--	m,c,p,t	Nickel (and its compounds)	481,672	641,709	160,037	33
11	78-93-3		Methyl ethyl ketone	549,332	528,622	-20,710	-4
12	1313-27-5		Molybdenum trioxide	31,629	503,796	472,167	1,493
13	108-10-1		Methyl isobutyl ketone	411,175	463,200	52,025	13
14	107-21-1		Ethylene glycol	1,378,003	321,609	-1,056,394	-77
15	100-41-4	c	Ethylbenzene	239,210	285,923	46,713	20
16	71-36-3		n-Butyl alcohol	77,959	167,608	89,649	115
17	67-56-1		Methanol	197,548	155,685	-41,863	-21
18	108-95-2		Phenol	748,347	138,175	-610,172	-82
19	95-63-6		1,2,4-Trimethylbenzene	67,543	118,673	51,130	76
20	127-18-4	c,p,t	Tetrachloroethylene	56,420	105,169	48,749	86
21	--	m	Silver (and its compounds)	133,122	86,043	-47,079	-35
22	75-09-2	c,p,t	Dichloromethane	125,756	83,622	-42,134	-34
23	1319-77-3		Cresol (mixed isomers)	33,733	82,204	48,471	144
24	79-01-6	c,p,t	Trichloroethylene	40,194	57,383	17,189	43
25	111-42-2		Diethanolamine	2,940	43,226	40,286	1,370
			Subtotal	**31,868,098**	**35,657,181**	**3,789,083**	**12**
			% of Total	**99.7**	**99.6**		
			Total	**31,972,271**	**35,805,284**	**3,833,013**	**12**

m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Table 8–21. TRI Off-site Transfers to Canada from the US, by Chemical, 1998–2000 (Chemicals with Largest Transfers in 2000)

				Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			
				1998	2000	Change 1998–2000	
Rank	CAS Number		Chemical	(kg)	(kg)	kg	%
1	--	m,c,p,t	Lead (and its compounds)	9,043,404	7,626,234	-1,417,169	-16
2	--	m	Copper (and its compounds)	14,460,881	4,661,050	-9,799,831	-68
3	--	m	Zinc (and its compounds)	1,408,483	1,517,733	109,250	8
4	--	m,c,p,t	Nickel (and its compounds)	1,217,115	1,316,378	99,263	8
5	108-88-3	p	Toluene	1,672,313	816,082	-856,231	-51
6	--	m	Manganese (and its compounds)	450,288	580,127	129,839	29
7	--		Xylenes	1,663,654	478,666	-1,184,988	-71
8	--	m,c,p,t	Chromium (and its compounds)	461,349	473,439	12,090	3
9	67-56-1		Methanol	480,062	325,589	-154,473	-32
10	75-09-2	c,p,t	Dichloromethane	521,305	223,970	-297,336	-57
11	--		Nitric acid and nitrate compounds	198,200	219,527	21,327	11
12	78-93-3		Methyl ethyl ketone	303,758	145,336	-158,422	-52
13	107-21-1		Ethylene glycol	55,645	131,883	76,238	137
14	75-01-4	c,p,t	Vinyl chloride	167,728	96,411	-71,317	-43
15	--	m	Antimony (and its compounds)	117,833	83,897	-33,936	-29
16	--	m,c,p,t	Cadmium (and its compounds)	80,442	82,897	2,455	3
17	108-10-1		Methyl isobutyl ketone	126,186	74,732	-51,454	-41
18	100-41-4	c	Ethylbenzene	184,401	70,257	-114,144	-62
19	--	m	Silver (and its compounds)	94,001	64,603	-29,398	-31
20	110-86-1		Pyridine	10,974	55,958	44,984	410
21	91-20-3		Naphthalene	251,756	45,880	-205,876	-82
22	--	m,c,p	Cobalt (and its compounds)	61,979	43,815	-18,165	-29
23	127-18-4	c,p,t	Tetrachloroethylene	63,766	37,563	-26,203	-41
24	79-01-6	c,p,t	Trichloroethylene	59,321	29,388	-29,933	-50
25	1313-27-5		Molybdenum trioxide	0	26,233	26,233	--
			Subtotal	**33,154,844**	**19,227,647**		**-42**
			% of Total	**97**	**99**		
			Total	**34,174,493**	**19,465,754**		**-43**

m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

- Lead and its compounds was the substance with the highest transfers to Canada from the US in 2000, though the amount was 1.4 million kg lower than in 1998, a decrease of 16 percent.
- Although copper and its compounds was the substance transferred from the US to Canada in the largest amount in 1998, a 68-percent decrease in such transfers (9.8 million kg) dropped it to second place in 2000, behind lead and its compounds.
- Cross-border transfers to Canada of two other metals—zinc and nickel and their compounds—ranked third and fourth respectively in 2000, both having increased by 8 percent.

8.3.3 Sites with largest Change in Cross-border Transfers, 1998–2000

A few sites in both Canada and the US that received transfers from facilities in the other country experienced large changes in those cross-border transfers from 1998 to 2000.

- Transfers from Canadian facilities to four sites in the US decreased by over one million kg from 1998 to 2000. These sites had a combined decrease of 8.2 million kg.
- Three sites in the US had increases of over 1 million kg in transfers from Canadian facilities. These sites had a combined increase of 9.0 million kg.
- Of the 10 US sites with the largest increase in transfers from Canadian facilities, nine had not received transfers from Canadian facilities in 1998.

Table 8–22. NPRI Off-site Transfers to the US from Canada, Receiving Sites in the US with Largest Change 1998–2000

				Total Transfers to Recycling/ Energy Recovery/Treatment/Disposal			
				1998	2000	Change 1998–2000	
Rank	Receiving Site in US	Address	City, State	(kg)	(kg)	kg	%
	Decreases						
1	Exide Corporation	Penn Street	Reading, PA	2,653,500	0	-2,653,500	-100
2	Revere Smelting & Refining Corp.	Ballard Road	Middletown, NY	2,651,000	0	-2,651,000	-100
3	Browning-Ferris Industries - Arbor Hills Landfill	Six Mile Road	Northville, MI	1,566,932	2,500	-1,564,432	-100
4	Schilberg Integrated Metals Corp.	Riverview Square	East Hartford, CT	2,423,000	1,096,195	-1,326,805	-55
5	Midwest Zinc	Westweed	Chicago, IL	715,185	0	-715,185	-100
6	Systech Environmental Corp.	Ford Avenue	Alpena, MI	1,901,267	1,223,536	-677,731	-36
7	Alchem Aluminum Inc.	W Garfield Ave.	Coldwater, MI	1,284,822	661,548	-623,274	-49
8	Union Carbide Corporation (Texas City)	Fifth Ave. South	Texas City, TX	620,400	0	-620,400	-100
9	Philip Enterprises Inc. (PetroChem)	Lycaste	Detroit, MI	574,205	0	-574,205	-100
10	Union Carbide Corporation (Institute)	Route 25	Charleston, WV	509,438	0	-509,438	-100
	Increases						
1	Horsehead Resource Development Co Inc.	Delaware Avenue - East Plant	Palmerton, PA	0	5,197,701	5,197,701	--
2	Extruded Metals Inc.	Ashfield Street	Belding, MI	0	2,722,507	2,722,507	--
3	Warrenton Copper	Philip Parkway	Streetsboro, OH	0	1,077,100	1,077,100	--
4	Outokumpu American Brass	Sayre Street	Buffalo, NY	0	836,740	836,740	--
5	Metal Chem	Washington Rd.	Pittsburgh, PA	0	741,928	741,928	--
6	Imco Recycling	North Fillmore Road	Coldwater, MI	0	694,000	694,000	--
7	Phelps Dodge Refining Corp.	N Loop Dr.	El Paso, TX	938,244	1,628,534	690,290	74
8	Holnam Inc.	Hwy 79 North	Clarksville, MO	0	641,590	641,590	--
9	Cerro	Long Branch Road	Bellefonte, PA	0	618,800	618,800	--
10	Zinc Corporation of America	Frankfort Road	Monaca, PA	0	606,500	606,500	--

Table 8–23. TRI Off-site Transfers to Canada from the US, Receiving Sites in Canada with Largest Change 1998–2000

				Total Transfers to Recycling/ Energy Recovery/Treatment/Disposal			
				1998	2000	Change 1998–2000	
Rank	Receiving Site in Canada	Address	City, Province	(kg)	(kg)	kg	%
	Decreases						
1	Philips Services/Waxman	Centennial Pkwy	Hamilton, ON	8,805,420	1,594,853	-7,210,567	-82
2	Safety-Kleen (Sarnia) Ltd	Telfer Road	Corunna, ON	4,943,922	2,751,789	-2,192,134	-44
3	Noranda, Inc. Horne Smelter	Avenue Real-Caouette	Rouyn-Noranda, QC	3,830,832	2,310,017	-1,520,815	-40
4	Philips Services, Inc.	Snow Valley Road	Barrie, ON	1,482,635	0	-1,482,635	-100
5	Nova PB Inc.	rue Garnier	Ste-Catherine, QC	7,325,057	6,070,120	-1,254,937	-17
6	Norsk Hydro	Boul. Raoul-Duchesne	Bécancour, QC	1,147,392	82,653	-1,064,739	-93
7	Philips Services, Inc.	Parkdale Avenue	Hamilton, ON	699,371	0	-699,371	-100
8	Philips Services, Inc.	King Street West	Hamilton, ON	392,919	0	-392,919	-100
9	Philips Services/Waxman	Burlington St. E.	Hamilton, ON	314,673	0	-314,673	-100
10	Safety-Kleen (Mississauga) Ltd	Avonhead Road	Mississauga, ON	526,025	222,012	-304,013	-58
	Increases						
1	Ingot Metal Co. Limited	Fenmar Dr.	Weston, ON	16,327	590,566	574,239	3,517
2	Sam Adelstein & Co., Ltd.	Welland	St. Catharines, ON	61,338	457,506	396,168	646
3	Falconbridge Kidd Metallurgy	Hwy. 101 East	Timmins, ON	308,063	683,551	375,487	122
4	Inco Limited	Thomson Smelter Complex	Thomson, MB	277,254	590,566	313,312	113
5	Stablex Canada Inc.	Industrial Blvd.	Blainville, QC	785,763	1,025,884	240,120	31
6	Zalev Brothers Ltd.	Grand Marais Road East	Windsor, ON	169,223	403,444	234,220	138
7	Falconbridge Ltd.	Smelter Main Gate	Falconbridge, ON	127,102	306,426	179,325	141
8	Triple M Metal	International Drive	Brampton, ON	11,397	154,202	142,805	1,253
9	CRI Environment Inc	rue du Progres	Coteau-du-lac, QC	4,799	107,500	102,701	2,140
10	Dominion Nickel Alloys Ltd.	Appleby Lane	Burlington, ON	289,946	350,639	60,693	21

- Transfers from US facilities to one Philips Services site in Hamilton, Ontario, decreased by 7.2 million kg. Four other sites also owned by Philips Services showed large decreases and received no such transfers for 2000.
- Decreases of over 1 million kg in transfers from US facilities occurred at six transfer sites in Canada. These sites had a combined decrease of 14.7 million kg.
- All increases in transfers from US facilities to individual Canadian sites were less than 575,000 million kg.

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Key Findings

- This chapter presents data for four groups of chemicals in the matched data set: metals and their compounds, known or suspected carcinogens, California Proposition 65 chemicals, and CEPA toxics. In addition, a special section on benzene is included.
- Metals and their compounds accounted for 42 percent of total releases and transfers of all matched chemicals. Total releases on- and off-site of metals increased by 24 percent from 1995 to 2000, compared with a decrease of 8 percent for all matched chemicals.
- Known or suspected carcinogens comprised 14 percent of total releases on- and off-site of all matched chemicals in 2000. Such releases decreased by 9 percent from 1998 to 2000, compared with 5 percent for all matched chemicals.
- California Proposition 65 chemicals accounted for 16 percent of total releases on- and off-site of all matched chemicals in 2000. Such releases decreased by 12 percent from 1998 to 2000, compared with 5 percent for all matched chemicals.
- CEPA toxic chemicals (those listed as toxic under the Canadian Environmental Protection Act of 1999) accounted for 13 percent of total releases on- and off-site of all matched chemicals in 2000. Such releases decreased by 12 percent from 1998 to 2000, compared with 5 percent for all matched chemicals.

Benzene

- Benzene is a carcinogen, a developmental toxin, and a neurotoxin commonly found in urban air in North America. Modeling demonstrates the significant contribution of mobile sources to national benzene concentrations and of industrial sources to local “hot spots” of benzene.
- Over 7.5 million kg of benzene were released and transferred in North America in 2000 from industrial sources. Almost 4 million kg of benzene were released directly into the air from industrial sources, from both stack and fugitive sources. Fugitive air emissions of benzene from industrial sources were as large as stack emissions. Facilities reporting to NPRI tended to report lower stack emissions of benzene and much higher fugitive emissions of benzene than TRI facilities.
- A handful of facilities and sectors are responsible for the majority of benzene air emissions from point sources in North America, and only a few of these facilities have demonstrated progress in reducing benzene emissions. Benzene releases from all industrial sources decreased by one-third from 1995 to 2000, partially as a result of regulations and programs to reduce emissions of air toxics. Government actions to reduce benzene in gasoline and in tailpipe emissions have also helped reduce benzene from mobile sources. These programs have resulted in reductions in benzene concentrations in the environment, but concentrations remain higher near specific sources such as steel mills, petroleum refineries, and chemical processing facilities.

9.1 Introduction

Chapter 9 examines releases and transfers in North America for several groups of chemicals. 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 2000 reporting year.

This chapter presents data for four groups of chemicals: metals; known and suspected carcinogens; chemicals on the California Proposition 65 list of substances linked to cancer, birth defects, and reproductive harm; and CEPA (Canadian Environmental Protection Act) toxics. The last section presents the PRTR data as well as other sources for benzene, a chemical in the matched data set.

Appendix C presents information on the potential health effects of the substances with the largest releases and transfers. **Appendix D** describes uses of these substances.

9.2 Metals and their Compounds

Of the 206 chemicals in the matched data set for 2000, 14 are metals and their compounds. Transfers of metals to disposal, sewage, treatment, and energy recovery facilities 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 are not destroyed by treatment or burned in energy recovery.

9.2.1 Releases and Transfers of Metals and their Compounds, 2000

- Total reported amounts of releases and transfers of the 14 metals and their compounds that are reportable to both NPRI and TRI totaled 1.40 billion kg in 2000, or 42 percent of total releases and transfers of all chemicals in the matched data set.
- Transfers to recycling of metals were 27 percent (900.8 million kg) of total reported amounts in 2000. This amount also represented 85 percent of transfers to recycling of all matched chemicals.
- Copper and its compounds, with 455.9 million kg, had the largest total reported amounts of releases and transfers, primarily due to its transfers to recycling. Zinc and its compounds ranked second, with 384.5 million kg, and had the largest on- and off-site releases.
- The primary metals industry accounted for 44 percent of all reported amounts of releases and transfers of metals in 2000, with the fabricated

Table 9–1. Total Reported Amounts of Releases and Transfers of Metals and their Compounds in North America, 2000

				Releases On- and Off-site									
				Total On-site Releases		Total Off-site Releases*		Total Reported Releases On- and Off-site		Total Off-site Transfers to Recycling		Total Reported Amounts of Releases and Transfers	
CAS Number		Chemical	Number of Forms	kg	Rank	kg	Rank	kg	Rank	kg	Rank	kg	Rank
--		Copper (and its compounds)	5,111	43,586,267	3	16,463,181	5	60,049,448	3	395,835,159	1	455,884,607	1
--		Zinc (and its compounds)	4,160	87,825,137	1	116,870,572	1	204,695,710	1	179,792,852	2	384,488,562	2
--	c,p,t	Lead (and its compounds)	2,066	22,540,032	4	22,673,961	3	45,213,993	4	127,335,735	3	172,549,728	3
--		Manganese (and its compounds)	3,998	61,150,524	2	37,912,242	2	99,062,766	2	65,904,217	4	164,966,982	4
--	c,p,t	Chromium (and its compounds)	4,223	16,483,509	5	17,899,354	4	34,382,863	5	59,535,482	5	93,918,345	5
--	c,p,t	Nickel (and its compounds)	3,824	12,294,094	6	11,050,526	6	23,344,619	6	51,221,394	6	74,566,014	6
7429-90-5		Aluminum (fume or dust)	410	6,300,037	8	5,305,747	7	11,605,784	7	11,991,690	7	23,597,474	7
--	c,p,t	Arsenic (and its compounds)	676	8,643,096	7	2,866,208	8	11,509,304	8	725,228	11	12,234,532	8
--	c,p	Cobalt (and its compounds)	759	2,100,282	10	647,095	12	2,747,377	12	4,581,031	8	7,328,408	9
--		Antimony (and its compounds)	793	1,341,516	11	1,933,350	9	3,274,866	9	2,025,944	9	5,300,810	10
--	c,p,t	Cadmium (and its compounds)	204	1,280,155	12	1,510,197	10	2,790,351	11	640,002	12	3,430,353	11
--		Selenium (and its compounds)	144	2,231,435	9	880,633	11	3,112,068	10	112,986	14	3,225,054	12
--		Silver (and its compounds)	164	294,397	13	156,618	14	451,015	14	950,103	10	1,401,117	13
--	p,t	Mercury (and its compounds)	1,645	151,870	14	432,870	13	584,740	13	113,616	13	698,356	14
		Subtotal	**28,177**	**266,222,350**		**236,602,553**		**502,824,903**		**900,765,438**		**1,403,590,341**	
		% of Total	**37**	**20**		**86**		**31**		**85**		**42**	
		Total for Matched Chemicals	**76,681**	**1,358,445,770**		**274,904,461**		**1,633,350,231**		**1,055,985,045**		**3,314,229,305**	

Note: Canada and US data only. Mexico data not available for 2000.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.
* Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 9–1. Total Reported Amounts of Releases and Transfers of Metals and their Compounds by Industry, 2000

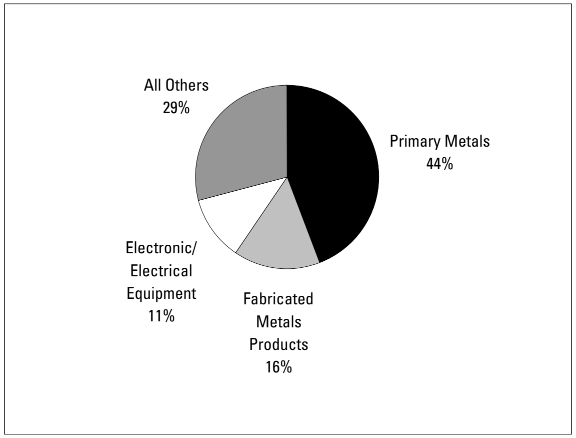
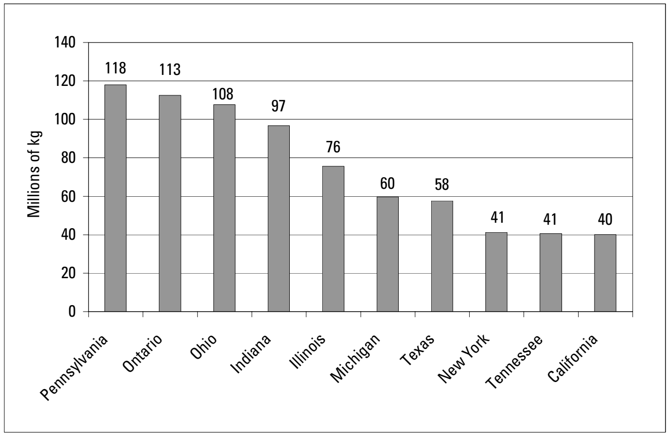


Figure 9–2. States/Provinces with Largest Total Reported Amounts of Releases and Transfers of Metals and their Compounds, 2000



metals industry accounting for another 15 percent.

- The states of Pennsylvania and Ohio and the province of Ontario each reported more than 100 million kg of releases and transfers of metals in 2000.
- Two TRI primary metals facilities, one in Utah and one in Montana, each reported more than 20 million kg of releases and transfers of metals in 2000.
- The NPRI facility with the largest amounts of releases and transfers was a fabricated metals facility in Ontario that reported 13.5 million kg.

Table 9–2. Facilities in US and Canada with Largest Total Reported Amounts of Releases and Transfers of Metals and their Compounds, 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Total Reported Amounts of Releases and Transfers of Metals and their Compounds (kg)
		US				
1	1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	24,476,792
2	2	ASARCO Inc.	East Helena, MT		33	21,266,813
3	3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Grupo México S.A. de C.V.	Hayden, AZ		33	17,042,930
4	4	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13,311,725
6	5	US Mint, US Department of the Treasury	Philadelphia, PA		34	11,931,469
		Canada				
5	1	Karmax Heavy Stamping, Cosma International Inc.	Milton, ON	32	34	13,490,300
17	2	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	7,345,022
24	3	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	6,210,933
34	4	Co-Steel Lasco	Whitby, ON	29	33	4,706,944
38	5	General Motors of Canada Limited, Delphi Canada Inc., Oshawa Battery	Oshawa, ON	33	36	4,542,710

Total releases are adjusted to omit counting off-site releases that are also reported as on-site releases by another NPRI or TRI facility.

- Total releases (adjusted) of metals and their compounds in 2000 were 460.8 million kg, 29 percent of total releases of all matched chemicals. Most of the off-site transfers sent to other NPRI or TRI facilities for disposal were metals (transfers of metals represented 87 percent of all off-site releases reported as on-site releases by other NPRI or TRI facilities).
- Total on-site releases of metals were 266.2 million kg, 20 percent of on-site releases of all matched chemicals.
- On-site land releases of metals and their compounds accounted for 85 percent of all such releases in North America. Off-site releases of metals (which are primarily transfers to land disposal) were 86 percent of all off-site releases in 2000.
- Zinc and its compounds, with 180.6 million kg, had the largest total releases. It also had the largest on-site air emissions, on-site land releases, and off-site releases in the metals group. Manganese and its compounds ranked second, with 95.4 million kg, and had the largest on-site releases to surface water and underground injection—more than 3.5 million kg in each category.

Table 9–3. Releases On- and Off-site of Metals and their Compounds in North America, 2000

				On-site Releases					
			Number	Air	Surface Water	Underground Injection	Land	Total On-site Releases	
CAS Number		Chemical	of Forms	(kg)	(kg)	(kg)	(kg)	kg	Rank
--		Zinc (and its compounds)	4,160	5,450,307	700,199	263,817	81,406,879	87,825,137	1
--		Manganese (and its compounds)	3,998	1,473,148	3,529,411	4,366,960	51,770,267	61,150,524	2
--		Copper (and its compounds)	5,111	1,543,666	227,956	230,304	41,579,827	43,586,267	3
--	c,p,t	Lead (and its compounds)	2,066	1,057,909	44,659	123,740	21,310,311	22,540,032	4
--	c,p,t	Chromium (and its compounds)	4,223	618,769	126,607	1,569,349	14,162,839	16,483,509	5
--	c,p,t	Nickel (and its compounds)	3,824	1,062,487	137,331	321,104	10,769,719	12,294,094	6
7429-90-5		Aluminum (fume or dust)	410	734,735	2,338	0	5,561,116	6,300,037	8
--	c,p,t	Arsenic (and its compounds)	676	257,592	77,299	94,357	8,213,741	8,643,096	7
--		Antimony (and its compounds)	793	51,510	35,708	18,204	1,235,615	1,341,516	11
--		Selenium (and its compounds)	144	298,782	29,554	30,814	1,871,960	2,231,435	9
--	c,p	Cobalt (and its compounds)	759	55,795	37,675	17,406	1,989,006	2,100,282	10
--	c,p,t	Cadmium (and its compounds)	204	47,506	4,970	31,421	1,196,034	1,280,155	12
--	p,t	Mercury (and its compounds)	1,645	74,150	1,103	1,090	75,527	151,870	14
--		Silver (and its compounds)	164	10,554	3,141	8,714	271,844	294,397	13
		Subtotal	**28,177**	**12,736,911**	**4,957,951**	**7,077,280**	**241,414,685**	**266,222,350**	
		% of Total	**37**	**1**	**4**	**7**	**85**	**20**	
		Total for Matched Chemicals	**76,681**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**	

Note: Canada and US data only. Mexico data not available for 2000.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Table 9–3. (*continued*)

Total Off-site Releases*		Total Releases: Total Reported Releases On- and Off-site		Total Releases: Adjustment Component**	Total Releases: Total Releases (adjusted)***	
kg	Rank	kg	Rank	(kg)	kg	Rank
116,870,572	1	204,695,710	1	24,074,453	180,621,257	1
37,912,242	2	99,062,766	2	3,694,841	95,367,925	2
16,463,181	5	60,049,448	3	1,741,788	58,307,660	3
22,673,961	3	45,213,993	4	7,647,181	37,566,812	4
17,899,354	4	34,382,863	5	2,129,460	32,253,403	5
11,050,526	6	23,344,619	6	1,719,269	21,625,351	6
5,305,747	7	11,605,784	7	160,913	11,444,872	7
2,866,208	8	11,509,304	8	292,492	11,216,812	8
1,933,350	9	3,274,866	9	142,719	3,132,147	9
880,633	11	3,112,068	10	11,728	3,100,340	10
647,095	12	2,747,377	12	20,076	2,727,301	11
1,510,197	10	2,790,351	11	329,304	2,461,047	12
432,870	13	584,740	13	23,758	560,982	13
156,618	14	451,015	14	2,453	448,562	14
236,602,553		**502,824,903**		**41,990,434**	**460,834,469**	
86		**31**		**87**	**29**	
274,904,461		**1,633,350,231**		**48,201,339**	**1,585,148,892**	

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

- The primary metals industry accounted for 49 percent of all reported amounts of releases of metals in 2000, with the hazardous waste management sector accounting for another 15 percent and the electric utilities sector, for 13 percent.
- TRI facilities in the states of Ohio reported more than 42 million kg of total releases of metals. TRI facilities in four other states (Indiana, Pennsylvania, Illinois and Utah) reported more than 30 million kg.

Figure 9–3. Total Releases On- and Off-site of Metals and their Compounds by Industry, 2000

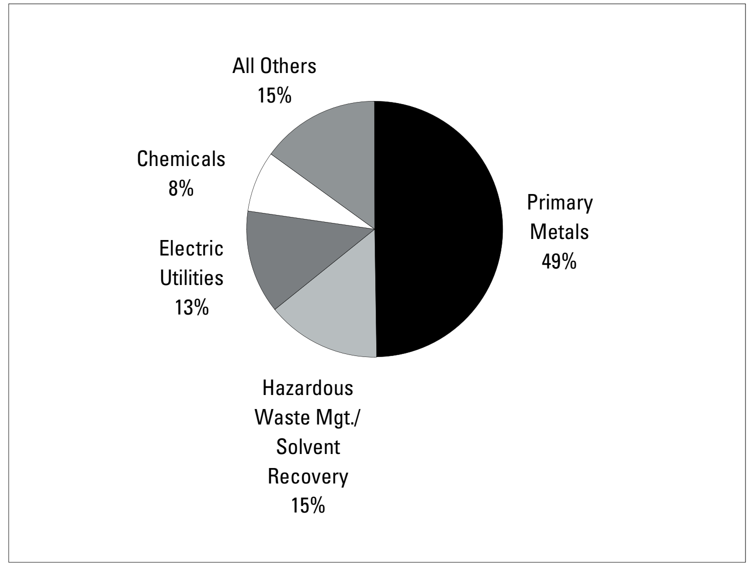


Figure 9–4. States/Provinces with Largest Total Releases of Metals and their Compounds, 2000

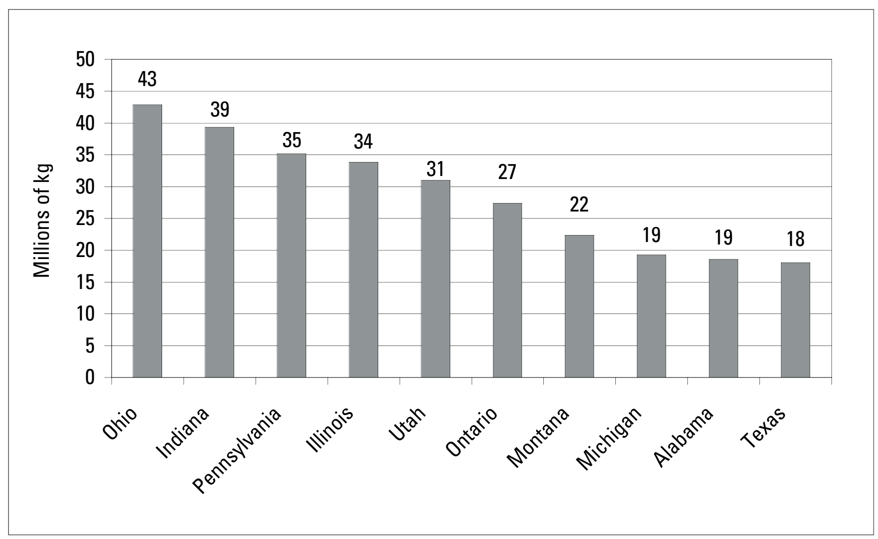


Table 9–4. Facilities in US and Canada with Largest Total Releases of Metals and their Compounds, 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Total Releases of Metals and their Compounds (kg)
		US				
1	1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	24,476,778
2	2	ASARCO Inc.	East Helena, MT		33	21,266,813
3	3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico S.A. de C.V.	Hayden, AZ		33	16,073,644
4	4	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13,311,725
5	5	Steel Dynamics Inc.	Butler, IN		33	9,191,972
		Canada				
14	1	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	6,210,933
15	2	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	5,753,882
43	3	Ispat Sidbec Inc., Aciérie, Ispat International Ltd.	Contrecœur, QC	29	33	2,059,794
45	4	Ivaco Rolling Mills	L'Orignal, ON	29	33	2,013,890
51	5	Stelco McMaster Ltée	Contrecœur, QC	29	33	1,614,887

- Two TRI primary metals facilities, one in Utah and one in Montana, each reported more than 20 million kg of total releases of metals in 2000.
- The NPRI facility with the largest amounts of releases and transfers was in Ontario and reported 6.2 million kg.

9.2.2 Releases and Transfers of Metals and their Compounds, 1998–2000

Reporting on mercury and its compounds is not included when comparing trends from 1998 to 2000 because the reporting threshold was lowered for the 2000 reporting year.

- Lead and zinc and their compounds had the largest reported reductions in total releases and transfers from 1998 to 2000 of all metals. The reductions were 43.3 million kg for lead and 34.8 million kg for zinc.
- Copper and its compounds led the increases with 47.6 million kg. Other metals with increases reported less than 5 million kg in increases.
- Zinc and chromium and their compounds had the largest reported reductions in total releases on- and off-site from 1998 to 2000 of all metals. The reductions were 39.6 million kg for zinc and 11.1 million kg for chromium.
- Copper and its compounds had increases in releases on- and off-site of 6.3 million kg, and aluminum had increases of 4.1 million kg.

Table 9–5. Change in Total Reported Amounts of Releases and Transfers of Metals and their Compounds in North America, 1998–2000

			Total Reported Amounts of Releases and Transfers			
			1998	2000	Change 1998–2000	
CAS Number		Chemical	(kg)	(kg)	kg	%
--	c,p,t	Lead (and its compounds)	215,896,514	172,549,728	-43,346,786	-20
--		Zinc (and its compounds)	419,272,996	384,488,562	-34,784,434	-8
--	c,p,t	Chromium (and its compounds)	110,410,456	93,918,345	-16,492,111	-15
--	c,p,t	Cadmium (and its compounds)	5,250,707	3,430,353	-1,820,354	-35
--		Manganese (and its compounds)	166,082,187	164,966,982	-1,115,205	-1
--	c,p,t	Nickel (and its compounds)	75,143,658	74,566,014	-577,644	-1
--		Antimony (and its compounds)	5,811,411	5,300,810	-510,601	-9
--		Silver (and its compounds)	1,800,156	1,401,117	-399,039	-22
--	c,p	Cobalt (and its compounds)	7,070,498	7,328,408	257,910	4
--	c,p,t	Arsenic (and its compounds)	11,393,105	12,234,532	841,427	7
--		Selenium (and its compounds)	2,033,303	3,225,054	1,191,751	59
7429-90-5		Aluminum (fume or dust)	19,527,565	23,597,474	4,069,909	21
--		Copper (and its compounds)	408,270,771	455,884,607	47,613,836	12
		Subtotal	**1,447,963,327**	**1,402,891,985**	**-45,071,341**	**-8**
		% of Total	**43**	**44**		
		Total for Matched Chemicals	**3,343,939,815**	**3,211,200,984**	**-132,738,831**	**-4**

Note: Canada and US data only. Mexico data not available for 1998–2000.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Table 9–6. Change in Total Releases On- and Off-site of Metals and their Compounds in North America, 1998–2000

			Total Releases On- and Off-site (adjusted)*			
			1998	2000	Change 1998–2000	
CAS Number		Chemical	(kg)	(kg)	kg	%
--		Zinc (and its compounds)	220,242,789	180,621,257	-39,621,532	-18
--	c,p,t	Chromium (and its compounds)	43,393,017	32,253,403	-11,139,614	-26
--	c,p,t	Lead (and its compounds)	43,507,882	37,566,812	-5,941,070	-14
--		Manganese (and its compounds)	97,545,127	95,367,925	-2,177,202	-2
--	c,p,t	Cadmium (and its compounds)	4,296,933	2,461,047	-1,835,886	-43
--	c,p	Cobalt (and its compounds)	2,898,322	2,727,301	-171,021	-6
--		Antimony (and its compounds)	3,235,293	3,132,147	-103,146	-3
--		Silver (and its compounds)	485,067	448,562	-36,505	-8
--	c,p,t	Nickel (and its compounds)	20,500,243	21,625,351	1,125,108	5
--	c,p,t	Arsenic (and its compounds)	9,967,812	11,216,812	1,249,000	13
--		Selenium (and its compounds)	1,832,182	3,100,340	1,268,158	69
7429-90-5		Aluminum (fume or dust)	7,308,451	11,444,872	4,136,420	57
--		Copper (and its compounds)	51,961,966	58,307,660	6,345,694	12
		Subtotal	**507,175,084**	**460,273,487**	**-46,901,597**	**-9**
		% of Total	**32**	**30**		
		Total for Matched Chemicals	**1,607,526,278**	**1,529,705,222**	**-77,821,056**	**-5**

Note: Canada and US data only. Mexico data not available for 1998–2000.
c = Known or suspected carcinogen.
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.

Table 9–7. Change in Total Releases On- and Off-site of Metals and their Compounds in North America, 1995–2000

CAS Number		Chemical	Total Releases On- and Off-site 1995 (kg)	2000 (kg)	Change 1995–2000 kg	%
--	c,p,t	Chromium (and its compounds)	26,867,913	21,532,908	-5,335,005	-20
--		Antimony (and its compounds)	2,788,631	2,187,770	-600,861	-22
--		Silver (and its compounds)	49,833	68,521	18,688	38
--	c,p	Cobalt (and its compounds)	689,856	744,446	54,590	8
--		Selenium (and its compounds)	226,301	322,424	96,123	42
--	c,p,t	Cadmium (and its compounds)	1,339,614	1,603,280	263,667	20
--	c,p,t	Nickel (and its compounds)	7,624,079	9,395,055	1,770,976	23
7429-90-5		Aluminum (fume or dust)	5,442,731	7,680,711	2,237,979	41
--	c,p,t	Arsenic (and its compounds)	2,197,818	5,242,674	3,044,856	139
--	c,p,t	Lead (and its compounds)	23,474,138	29,893,235	6,419,098	27
--		Copper (and its compounds)	34,794,927	41,617,203	6,822,275	20
--		Manganese (and its compounds)	55,925,201	72,307,118	16,381,916	29
--		Zinc (and its compounds)	128,698,037	167,941,166	39,243,129	30
		Subtotal	**290,119,080**	**360,536,510**	**70,417,430**	**24**
		% of Total	**26**	**36**		
		Total for Matched Chemicals	**1,104,237,863**	**1,012,596,423**	**-91,641,440**	**-8**

Note: Canada and US data only. Mexico data not available for 1995–2000.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

9.2.3 Releases and Transfers of Metals and their Compounds from the Manufacturing Sectors, 1995–2000

Trends in releases and transfers from 1995 to 2000 include data reported by the manufacturing sectors. The industries added to TRI reporting for the 1998 reporting year (electric utilities, hazardous waste management facilities, and chemical wholesalers) are not included; nor are transfers to recycling because such reporting was voluntary under NPRI until 1998. Reporting on mercury and its compounds is not included when comparing 1995–2000 trends because the reporting threshold was lowered for the 2000 reporting year.

- Total releases on- and off-site of metals and their compounds increased by 24 percent from 1995 to 2000, compared with a decrease of 8 percent for all matched chemicals.
- Chromium and its compounds had the largest reported reduction in total releases on- and off-site from 1995 to 2000 of all metals, with a decrease of 5.3 million kg.
- Antimony and its compounds also decreased (by 601,000 kg). All other metals had increases.

9.3 Known or Suspected Carcinogens

Of the 206 chemicals in the matched data set, 58 are known or suspected carcinogens. A chemical is designated as a known or suspected carcinogen by the International Agency for Research on Cancer (IARC) <http://www.iarc.fr/> or by the US National Toxicology Program (NTP)<http://ntp-server.niehs.nih.gov>. Because chemicals and their compounds are reported as single substance categories in the PRTRs, *Taking Stock* treats a chemical as a carcinogen if it or any of its compounds is a designated carcinogen.

9.3.1 Releases On- and Off-site of Carcinogens, 2000

- Fourteen percent of all releases on- and off-site in North America in 2000 were of designated carcinogens. Total releases on- and off-site of carcinogens came to 219.0 million kg.
- Lead and its compounds were released in the largest amounts: 37.6 million kg, including 21.3 million kg of on-site land releases—the largest of any designated carcinogen. Lead also had the largest off-site releases with 22.7 million kg.
- Chromium and its compounds ranked second, with 32.3 million kg, of which 14.2 million kg was on-site land releases.
- Styrene had the largest on-site air emissions with 27.6 million kg.

Table 9–8. On- and Off-site Releases in North America of Known or Suspected Carcinogens, 2000

				On-site Releases					
CAS Number		Chemical	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases kg	Rank
--	m,p,t	Lead (and its compounds)	2,066	1,057,909	44,659	123,740	21,310,311	22,540,032	2
--	m,p,t	Chromium (and its compounds)	4,223	618,769	126,607	1,569,349	14,162,839	16,483,509	3
100-42-5		Styrene	1,793	27,554,300	1,524	118,261	122,121	27,799,853	1
--	m,p,t	Nickel (and its compounds)	3,824	1,062,487	137,331	321,104	10,769,719	12,294,094	7
75-09-2	p,t	Dichloromethane	692	16,018,372	4,668	90,616	41,100	16,155,791	4
1332-21-4	p,t	Asbestos (friable)	123	1,150	0	0	12,325,137	12,326,287	6
50-00-0	p	Formaldehyde	992	7,028,062	213,605	5,555,628	49,593	12,848,438	5
--	m,p,t	Arsenic (and its compounds)	676	257,592	77,299	94,357	8,213,741	8,643,096	8
75-07-0	p,t	Acetaldehyde	344	6,541,342	111,968	489,522	10,275	7,153,200	9
79-01-6	p,t	Trichloroethylene	635	5,008,956	269	21,713	4,404	5,035,687	10
100-41-4		Ethylbenzene	1,302	4,335,523	8,315	257,382	21,482	4,625,588	11
71-43-2	p,t	Benzene	574	3,938,294	9,368	330,402	21,754	4,300,419	12
79-06-1	p	Acrylamide	90	6,828	73	3,918,078	2	3,925,080	13
--	m,p	Cobalt (and its compounds)	759	55,795	37,675	17,406	1,989,006	2,100,282	15
--	m,p,t	Cadmium (and its compounds)	204	47,506	4,970	31,421	1,196,034	1,280,155	19
107-13-1	p,t	Acrylonitrile	125	437,358	452	1,794,916	52,335	2,286,222	14
108-05-4		Vinyl acetate	210	1,607,913	1,078	240,725	47,551	1,897,587	16
67-66-3	p	Chloroform	139	1,579,727	25,918	102,831	6,249	1,714,725	17
127-18-4	p,t	Tetrachloroethylene	477	1,600,918	560	27,388	6,512	1,636,658	18
106-99-0	p,t	1,3-Butadiene	205	1,092,326	527	385	27,274	1,120,699	20
117-81-7	p,t	Di(2-ethylhexyl) phthalate	399	127,785	271	113	2,822	131,013	27
107-06-2	p,t	1,2-Dichloroethane	98	255,282	450	77,836	1,148	334,717	22
75-01-4	p,t	Vinyl chloride	58	366,998	102	19,796	0	387,082	21
123-91-1	p	1,4-Dioxane	68	47,822	74,370	0	8,223	130,415	28
75-56-9	p	Propylene oxide	123	212,258	5,284	952	52,259	270,754	23
75-21-8	p,t	Ethylene oxide	160	229,595	3,135	102	182	233,090	24
584-84-9		Toluene-2,4-diisocyanate	65	1,524	2	0	5,515	7,051	43
56-23-5	p,t	Carbon tetrachloride	67	129,128	83	28,210	379	157,800	25
98-95-3	p	Nitrobenzene	30	18,884	54	134,732	8	153,678	26
106-89-8	p	Epichlorohydrin	78	91,186	176	0	1,791	93,748	29
106-46-7	p	1,4-Dichlorobenzene	30	66,160	543	3,719	82	70,605	30
140-88-5	p	Ethyl acrylate	117	52,188	45	183	5,789	58,333	31
--	t	Polychlorinated alkanes (C10 to C13)	63	3,102	2,588	0	0	5,689	45
26471-62-5	p	Toluenediisocyanate (mixed isomers)	205	16,466	1,134	0	13,487	31,615	32
121-14-2	p	2,4-Dinitrotoluene	17	876	80	113	12,621	13,690	37
101-77-9	p	4,4'-Methylenedianiline	23	5,854	134	13,605	4	19,597	33
67-72-1	p	Hexachloroethane	23	15,628	5	278	1	15,912	34
96-09-3	p	Styrene oxide	5	22	0	0	15,414	15,435	35
62-56-6	p	Thiourea	30	582	121	0	13,063	13,765	36
120-80-9		Catechol	142	3,569	8,257	0	274	12,101	38
101-14-4	p	4,4'-Methylenebis(2-chloroaniline)	24	7	0	0	11,861	11,873	39
100-44-7	p	Benzyl chloride	41	8,644	39	204	119	9,006	40
302-01-2	p	Hydrazine	69	2,281	6,454	0	168	8,902	41
79-46-9	p	2-Nitropropane	7	8,490	102	0	0	8,591	42
106-88-7		1,2-Butylene oxide	16	3,749	2,585	0	18	6,352	44
139-13-9	p	Nitrilotriacetic acid	21	2,295	4	998	0	3,417	48
563-47-3	p	3-Chloro-2-methyl-1-propene	3	3,873	0	0	0	3,873	46
64-67-5	p	Diethyl sulfate	33	3,571	0	0	0	3,571	47
77-78-1	p	Dimethyl sulfate	38	3,292	10	0	18	3,321	49
91-08-7		Toluene-2,6-diisocyanate	27	203	0	0	0	205	53
606-20-2	p	2,6-Dinitrotoluene	8	230	15	113	0	358	50
612-83-9	p	3,3'-Dichlorobenzidine dihydrochloride	17	7	2	0	0	10	57
96-45-7	p	Ethylene thiourea	16	125	5	0	0	129	54
7758-01-2	p	Potassium bromate	3	229	0	0	0	229	51
95-80-7	p	2,4-Diaminotoluene	5	213	0	0	0	213	52
94-59-7	p	Safrole	4	118	0	0	0	118	55
115-28-6	p	Chlorendic acid	2	15	0	0	0	15	56
		Subtotal	**21,588**	**81,533,379**	**912,915**	**15,386,182**	**70,522,686**	**168,383,677**	
		% of Total	**28**	**10**	**1**	**16**	**25**	**12**	
		Total for all Matched Chemicals	**76,681**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**	

Note: Canada and US data only. Mexico data not available for 2000. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carginogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) of the US National Toxicology Program (NTP).
m = Metal and its compounds.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Table 9–8. (*continued*)

Off-site Releases				Total Releases				
Disposal (except metals) (kg)	Transfers 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	22,673,961	22,673,961	1	45,213,993	1	7,647,181	37,566,812	1
0	17,899,354	17,899,354	2	34,382,863	2	2,129,460	32,253,403	2
1,006,674	0	1,006,674	7	28,806,527	3	340	28,806,187	3
0	11,050,526	11,050,526	3	23,344,619	4	1,719,269	21,625,351	4
114,230	0	114,230	16	16,270,021	5	3,943	16,266,078	5
3,105,826	0	3,105,826	4	15,432,114	6	20,600	15,411,514	6
223,103	0	223,103	10	13,071,541	7	41,122	13,030,419	7
0	2,866,208	2,866,208	5	11,509,304	8	292,492	11,216,812	8
1,800	0	1,800	34	7,155,001	9	0	7,155,001	9
75,862	0	75,862	19	5,111,549	10	801	5,110,747	10
126,542	0	126,542	15	4,752,130	11	7,032	4,745,098	11
80,341	0	80,341	18	4,380,760	12	8,199	4,372,561	12
4,868	0	4,868	28	3,929,948	13	0	3,929,948	13
0	647,095	647,095	8	2,747,377	15	20,076	2,727,301	14
0	1,510,197	1,510,197	6	2,790,351	14	329,304	2,461,047	15
146,813	0	146,813	14	2,433,036	16	2	2,433,033	16
14,157	0	14,157	23	1,911,744	17	23	1,911,721	17
6,374	0	6,374	26	1,721,099	18	1,263	1,719,836	18
19,191	0	19,191	22	1,655,849	19	1,149	1,654,701	19
84,291	0	84,291	17	1,204,990	20	0	1,204,990	20
566,066	0	566,066	9	697,079	21	0	697,079	21
203,431	0	203,431	11	538,148	22	14,768	523,379	22
643	0	643	43	387,724	23	0	387,724	23
162,085	0	162,085	13	292,500	24	0	292,500	24
3,095	0	3,095	30	273,849	25	0	273,849	25
25,769	0	25,769	21	258,859	26	0	258,859	26
183,708	0	183,708	12	190,759	27	0	190,759	27
1,034	0	1,034	40	158,835	28	0	158,835	28
3,044	0	3,044	31	156,722	29	0	156,722	29
5,036	0	5,036	27	98,784	30	0	98,784	30
117	0	117	48	70,722	31	0	70,722	31
4,490	0	4,490	29	62,823	32	1	62,822	32
50,294	0	50,294	20	55,984	33	0	55,984	33
10,672	0	10,672	24	42,287	34	1,948	40,339	34
8,885	0	8,885	25	22,575	35	0	22,575	35
2,971	0	2,971	32	22,568	36	0	22,568	36
2,205	0	2,205	33	18,117	37	0	18,117	37
0	0	--	50	15,435	38	0	15,435	38
429	0	429	44	14,194	39	0	14,194	39
1,190	0	1,190	38	13,291	40	0	13,291	40
0	0	--	51	11,873	41	0	11,873	41
1,380	0	1,380	37	10,386	42	0	10,386	42
0	0	--	52	8,902	43	0	8,902	43
293	0	293	46	8,885	44	0	8,885	44
0	0	--	53	6,352	45	0	6,352	45
1,500	0	1,500	36	4,917	46	0	4,917	46
0	0	--	54	3,873	47	0	3,873	47
282	0	282	47	3,852	48	0	3,852	48
0	0	--	55	3,321	49	0	3,321	49
1,664	0	1,664	35	1,869	50	0	1,869	50
918	0	918	41	1,277	51	0	1,277	51
1,043	0	1,043	39	1,053	52	0	1,053	52
916	0	916	42	1,045	53	0	1,045	53
340	0	340	45	569	54	0	569	54
58	0	58	49	271	55	0	271	55
0	0	--	56	118	56	0	118	56
0	0	--	57	15	57	0	15	57
6,253,630	**56,647,340**	**62,900,970**		**231,284,647**		**12,238,974**	**219,045,673**	
16	**24**	**23**		**14**		**25**	**14**	
38,301,908	**236,602,553**	**274,904,461**		**1,633,350,231**		**48,201,339**	**1,585,148,892**	

* 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.

Lead and its compounds, the designated carcinogen with the largest total releases, had the largest off-site releases of all the designated carcinogens in 2000. The most important use of lead is in the production of batteries. Lead compounds appear in dyes, explosives, asbestos brake linings, insecticides and rodenticides, ointments and other products, and are used as catalysts, cathode material, flame retardant, metal and wire coating, and as a constituent in glass.

- The primary metals industry accounted for 51 percent of all off-site releases of designated carcinogens in 2000. The electronic/electrical equipment sector accounted for another 23 percent.
- TRI facilities in Tennessee reported more than 4.5 million kg of off-site releases of lead and its compounds, while those in Pennsylvania reported more than 2.6 million kg.
- One TRI facility in Tennessee's electronic/electrical equipment sector reported 4.3 million kg of off-site releases of lead and its compounds in 2000.
- The NPRI facility with the largest off-site releases of lead and its compounds was a primary metals facility in New Brunswick that reported 286,000 kg.

Figure 9–5. Off-site Releases of Lead (and its compounds) by Industry, 2000

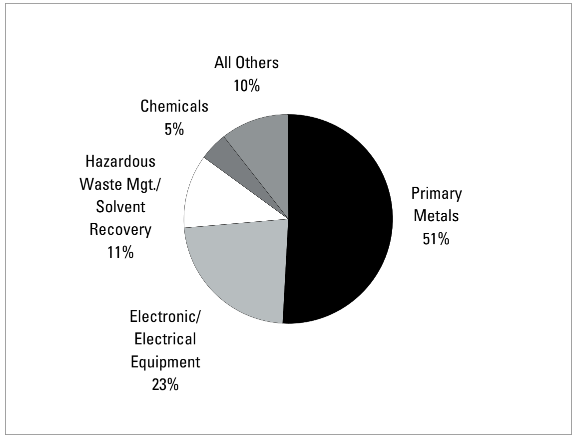


Figure 9–6. States/Provinces with Largest Off-site Releases of Lead (and its compounds), 2000

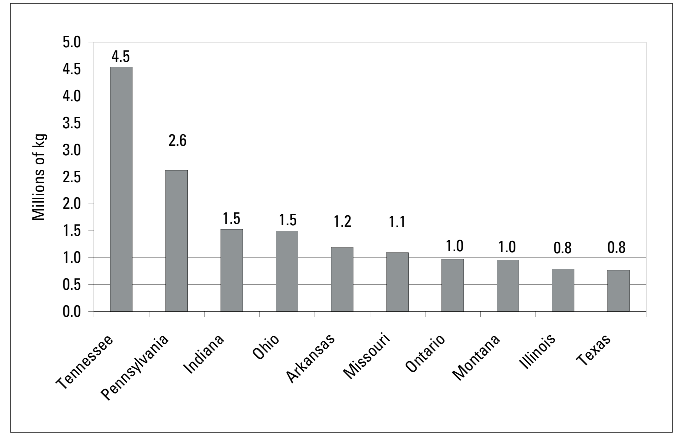


Table 9–9. Facilities in US and Canada with Largest Off-site Releases of Lead (and its compounds), 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Off-site Releases of Lead (and its compounds) (kg)
		US				
1	1	Exide Corp.	Bristol, TN		36	4,273,985
2	2	Doe Run Co. Recycling Facility, Renco Group Inc.	Boss, MO		33	1,040,732
3	3	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	1,029,608
4	4	ASARCO Inc.	East Helena, MT		33	956,986
5	5	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA		33	680,274
		Canada				
12	1	Noranda Inc., Brunswick Smelter	Belledune, NB	29	33	286,000
34	2	Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	Thorold, ON	49	495/738	147,505
35	3	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	144,470
42	4	Tonolli Canada Limited	Mississauga, ON	29	33	117,109
47	5	Ivaco Rolling Mills	L'Orignal, ON	29	33	96,860

Figure 9–7. Total On-site Air Releases of Styrene by Industry, 2000

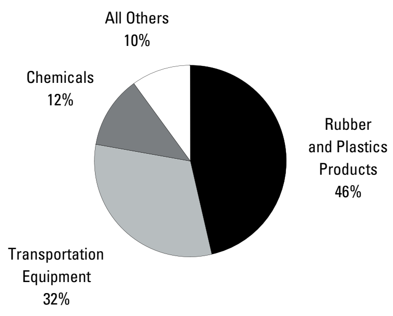


Figure 9–8. States/Provinces with Largest Total On-site Air Releases of Styrene, 2000

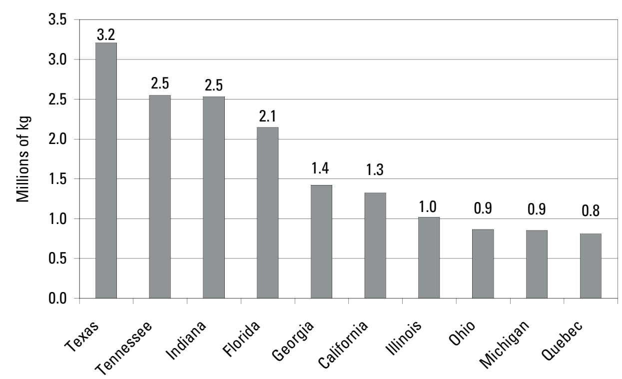


Table 9–10. Facilities in US and Canada with Largest Total On-site Air Releases of Styrene, 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Total On-site Air Releases of Styrene (kg)
		US				
1	1	Ameripol Synpol Corp.	Port Neches, TX		28	1,620,946
2	2	Aguaglass Corp., Masco Corp.	Adamsville, TN		30	659,861
3	3	Aquaglass Performance Plant, Masco Corp.	McEwen, TN		30	389,551
4	4	Lasco Bathware Inc.	Cordele, GA		30	339,471
5	5	Lasco Bathware Inc.	Yelm, WA		30	282,753
		Canada				
22	1	MAAX, MAAX Westco Armstrong	Armstrong, BC	37	28	145,340
37	2	MAAX, MAAX Inc. - Division Fibre de Verre Moderne - Usine 5	Tring-Jonction, QC	16	30	125,400
48	3	Camoplast Inc., Division Roski I	Roxton Falls, QC	16	30	110,140
56	4	Whitewater Specialties Ltd., Whitewater West Industries Ltd.	Kelowna, BC	16	30	100,000
65	5	Camoplast Inc, Division Acton Vale	Acton Vale, QC	32	30	92,680

Styrene had the largest on-site air releases of all designated carcinogens in 2000. Styrene is mainly used (two-thirds) in producing polystyrene. It is also used in the production of acrylonitrile-butadiene-styrene (ABS) resins and acrylonitrile-sytrene resins, which are used in automobile parts, appliances (including refrigerators and freezers), pipes, business machines, and luggage and recreational goods.

- The rubber and plastics products industry accounted for 46 percent of all on-site air releases of styrene in 2000. The transportation equipment sector accounted for another 32 percent.
- TRI facilities in Texas reported more than 3.2 million kg of on-site air releases of styrene, while those in Tennessee and Indiana reported more than 2.5 million kg each.
- One TRI facility in Texas's chemical manufacturing industry reported 1.6 million kg of on-site air releases of styrene in 2000.
- The NPRI facility with the largest on-site air releases of styrene was a chemical manufacturing facility in British Columbia that reported over 145,000 kg.

9.3.2 Releases On- and Off-site of Carcinogens, 1998–2000

Reporting on five designated carcinogens is not included when comparing trends from 1998 to 2000 because reporting under NPRI on these substances was added for the 1999 reporting year. The five substances are 3,3'-dichlorobenzidine dihydrochloride, 3-chloro-2-methyl-1-propene, chlorendic acid, polychlorinated alkanes (C10 to C13), and potassium bromate.

- Total releases on- and off-site of the group of designated carcinogens decreased by 9 percent from 1998 to 2000, compared with a decrease of 5 percent for all matched chemicals.
- Among designated carcinogens, chromium and its compounds had the largest reported reduction in total releases on- and off-site from 1998 to 2000, with a decrease of 11.1 million kg.
- Lead and its compounds had the second-largest decrease with 5.9 million kg.
- Styrene led the increases with 1.5 million kg. Formaldehyde and arsenic and its compounds each increased by about 1.3 million kg.

Table 9–11. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1998–2000

			Total Releases On- and Off-site (adjusted)*			
			1998	2000	Change 1998–2000	
CAS Number		Chemical	(kg)	(kg)	kg	%
--	m,p,t	Chromium (and its compounds)	43,393,017	32,253,403	-11,139,614	-26
--	m,p,t	Lead (and its compounds)	43,507,882	37,566,812	-5,941,070	-14
75-09-2	p,t	Dichloromethane	20,993,821	16,266,078	-4,727,743	-23
--	m,p,t	Cadmium (and its compounds)	4,296,933	2,461,047	-1,835,886	-43
79-01-6	p,t	Trichloroethylene	6,863,378	5,110,747	-1,752,631	-26
67-66-3	p	Chloroform	3,182,709	1,719,836	-1,462,873	-46
127-18-4	p,t	Tetrachloroethylene	2,660,295	1,654,701	-1,005,594	-38
71-43-2	p,t	Benzene	5,110,173	4,372,561	-737,612	-14
100-41-4		Ethylbenzene	5,129,348	4,745,098	-384,250	-7
--	m,p	Cobalt (and its compounds)	2,898,322	2,727,301	-171,021	-6
106-99-0	p,t	1,3-Butadiene	1,356,989	1,204,990	-151,999	-11
108-05-4		Vinyl acetate	2,047,220	1,911,721	-135,498	-7
75-56-9	p	Propylene oxide	360,152	273,849	-86,303	-24
75-21-8	p,t	Ethylene oxide	345,070	258,859	-86,211	-25
98-95-3	p	Nitrobenzene	234,314	156,722	-77,592	-33
75-01-4	p,t	Vinyl chloride	459,171	387,724	-71,447	-16
123-91-1	p	1,4-Dioxane	343,083	292,500	-50,583	-15
95-80-7	p	2,4-Diaminotoluene	25,406	271	-25,136	-99
106-46-7	p	1,4-Dichlorobenzene	94,248	70,722	-23,526	-25
117-81-7	p,t	Di(2-ethylhexyl) phthalate	714,483	697,079	-17,404	-2
302-01-2	p	Hydrazine	25,920	8,902	-17,017	-66
101-77-9	p	4,4'-Methylenedianiline	32,735	22,568	-10,167	-31
139-13-9	p	Nitrilotriacetic acid	13,517	4,917	-8,600	-64
106-89-8	p	Epichlorohydrin	104,117	98,784	-5,332	-5
100-44-7	p	Benzyl chloride	14,852	10,386	-4,465	-30
67-72-1	p	Hexachloroethane	21,511	18,117	-3,394	-16
79-46-9	p	2-Nitropropane	11,151	8,885	-2,266	-20
106-88-7		1,2-Butylene oxide	8,609	6,352	-2,257	-26
77-78-1	p	Dimethyl sulfate	5,404	3,321	-2,083	-39
96-45-7	p	Ethylene thiourea	3,034	1,045	-1,990	-66
120-80-9		Catechol	14,395	13,291	-1,104	-8
26471-62-5	p	Toluenediisocyanate (mixed isomers)	41,378	40,339	-1,040	-3
140-88-5	p	Ethyl acrylate	63,711	62,822	-889	-1
90-94-8	p	Michler's ketone	232	0	-232	-100
94-59-7	p	Safrole	5	118	113	2,500
91-08-7		Toluene-2,6-diisocyanate	1,199	1,869	670	56
64-67-5	p	Diethyl sulfate	2,887	3,852	966	33
606-20-2	p	2,6-Dinitrotoluene	242	1,277	1,034	427
62-56-6	p	Thiourea	4,161	14,194	10,033	241
56-23-5	p,t	Carbon tetrachloride	147,747	158,835	11,087	8
101-14-4	p	4,4'-Methylenebis(2-chloroaniline)	14	11,873	11,859	84,284
96-09-3	p	Styrene oxide	347	15,435	15,088	4,347
121-14-2	p	2,4-Dinitrotoluene	6,359	22,575	16,216	255
107-06-2	p,t	1,2-Dichloroethane	452,009	523,379	71,370	16
107-13-1	p,t	Acrylonitrile	2,348,378	2,433,033	84,655	4
1332-21-4	p,t	Asbestos (friable)	15,280,226	15,411,514	131,288	1
584-84-9		Toluene-2,4-diisocyanate	5,066	190,759	185,692	3,665
75-07-0	p,t	Acetaldehyde	6,270,980	7,155,001	884,021	14
79-06-1	p	Acrylamide	2,887,781	3,929,948	1,042,168	36
--	m,p,t	Nickel (and its compounds)	20,500,243	21,625,351	1,125,108	5
--	m,p,t	Arsenic (and its compounds)	9,967,812	11,216,812	1,249,000	13
50-00-0	p	Formaldehyde	11,716,644	13,030,419	1,313,775	11
100-42-5		Styrene	27,265,808	28,806,187	1,540,379	6
		Subtotal	**241,234,486**	**218,984,179**	**-22,250,307**	**-9**
		% of Total	**15**	**14**		
		Total for Matched Chemicals	**1,607,526,278**	**1,529,705,222**	**-77,821,056**	**-5**

Note: Canada and US data only. Mexico data not available for 1998–2000. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carginogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) of 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.

Table 9–12. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1995–2000

CAS Number		Chemical	Total Releases On- and Off-site 1995 (kg)	2000 (kg)	Change 1995–2000 kg	%
75-09-2	p,t	Dichloromethane	28,559,898	16,086,139	-12,473,759	-44
79-01-6	p,t	Trichloroethylene	12,622,504	5,049,505	-7,572,998	-60
--	m,p,t	Chromium (and its compounds)	26,867,913	21,532,908	-5,335,005	-20
67-66-3	p	Chloroform	5,120,411	1,634,272	-3,486,140	-68
127-18-4	p,t	Tetrachloroethylene	4,547,089	1,498,118	-3,048,972	-67
1332-21-4	p,t	Asbestos (friable)	5,739,844	2,932,199	-2,807,645	-49
71-43-2	p,t	Benzene	6,226,862	4,113,927	-2,112,934	-34
117-81-7	p,t	Di(2-ethylhexyl) phthalate	1,705,906	696,203	-1,009,702	-59
100-41-4		Ethylbenzene	5,600,533	4,626,959	-973,574	-17
107-13-1	p,t	Acrylonitrile	3,074,265	2,422,227	-652,037	-21
108-05-4		Vinyl acetate	2,471,020	1,852,175	-618,845	-25
106-99-0	p,t	1,3-Butadiene	1,611,816	1,202,334	-409,482	-25
75-21-8	p,t	Ethylene oxide	478,190	239,313	-238,878	-50
75-56-9	p	Propylene oxide	421,097	221,926	-199,171	-47
107-06-2	p,t	1,2-Dichloroethane	616,736	451,999	-164,737	-27
75-01-4	p,t	Vinyl chloride	499,299	367,095	-132,203	-26
56-23-5	p,t	Carbon tetrachloride	226,895	138,641	-88,253	-39
123-91-1	p	1,4-Dioxane	369,221	285,056	-84,165	-23
106-89-8	p	Epichlorohydrin	167,169	98,743	-68,426	-41
106-46-7	p	1,4-Dichlorobenzene	123,682	70,458	-53,224	-43
140-88-5	p	Ethyl acrylate	106,425	56,575	-49,850	-47
302-01-2	p	Hydrazine	16,757	2,526	-14,231	-85
96-45-7	p	Ethylene thiourea	9,270	982	-8,288	-89
79-46-9	p	2-Nitropropane	15,665	8,561	-7,104	-45
98-95-3	p	Nitrobenzene	162,245	156,659	-5,586	-3
26471-62-5	p	Toluenediisocyanate (mixed isomers)	35,531	30,027	-5,504	-15
62-56-6	p	Thiourea	5,726	1,245	-4,481	-78
120-80-9		Catechol	14,624	13,291	-1,333	-9
90-94-8	p	Michler's ketone	715	0	-715	-100
100-44-7	p	Benzyl chloride	10,813	10,372	-441	-4
101-14-4	p	4,4'-Methylenebis(2-chloroaniline)	124	12	-112	-90
96-09-3	p	Styrene oxide	106	22	-84	-79
95-80-7	p	2,4-Diaminotoluene	227	211	-15	-7
94-59-7	p	Safrole	116	118	2	2
77-78-1	p	Dimethyl sulfate	3,052	3,305	252	8
91-08-7		Toluene-2,6-diisocyanate	1,449	1,869	420	29
64-67-5	p	Diethyl sulfate	3,278	3,848	570	17
606-20-2	p	2,6-Dinitrotoluene	270	1,158	888	329
106-88-7		1,2-Butylene oxide	5,029	6,348	1,319	26
139-13-9	p	Nitrilotriacetic acid	1,957	4,917	2,960	151
101-77-9	p	4,4'-Methylenedianiline	19,571	22,568	2,997	15
584-84-9		Toluene-2,4-diisocyanate	4,165	9,210	5,044	121
67-72-1	p	Hexachloroethane	9,176	16,031	6,856	75
121-14-2	p	2,4-Dinitrotoluene	1,697	8,600	6,902	407
--	m,p	Cobalt (and its compounds)	689,856	744,446	54,590	8
75-07-0	p,t	Acetaldehyde	6,996,592	7,152,848	156,257	2
--	m,p,t	Cadmium (and its compounds)	1,339,614	1,603,280	263,667	20
79-06-1	p	Acrylamide	2,859,445	3,929,948	1,070,503	37
--	m,p,t	Nickel (and its compounds)	7,624,079	9,395,055	1,770,976	23
50-00-0	p	Formaldehyde	10,073,961	13,003,212	2,929,251	29
--	m,p,t	Arsenic (and its compounds)	2,197,818	5,242,674	3,044,856	139
--	m,p,t	Lead (and its compounds)	23,474,138	29,893,235	6,419,098	27
100-42-5		Styrene	21,258,626	28,760,445	7,501,819	35
		Subtotal	**183,992,465**	**165,603,792**	**-18,388,673**	**-10**
		% of Total	**17**	**16**		
		Total for Matched Chemicals	**1,104,237,863**	**1,012,596,423**	**-91,641,440**	**-8**

Note: Canada and US data only. Mexico data not available for 1995–2000. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carginogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) of the US National Toxicology Program (NTP).
m = Metal and its compounds.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

9.3.3 Releases On- and Off-site of Carcinogens from the Manufacturing Sector, 1995–2000

Reporting on five designated carcinogens that were added to the NPRI list with the 1999 reporting year is not included when comparing trends from 1995 to 2000.

- Total releases on- and off-site of the group of designated carcinogens decreased by 10 percent, compared with a decrease of 8 percent by all matched chemicals.
- Among designated carcinogens, dichloromethane had the largest reported reduction in total releases from 1995 to 2000, with a decrease of 12.5 million kg.
- Trichloroethylene had the second-largest decrease with 7.6 million kg.
- Styrene led the increases with 7.5 million kg. Lead and its compounds increased by 6.4 million kg.

9.4 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. 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 2000. This section summarizes the data on North American releases of these "Proposition 65" substances in 2000.

9.4.1 Releases and Transfers of California Proposition 65 Chemicals, 2000

- Proposition 65 chemicals made up 16 percent of all North American releases in 2000.
- Toluene was released in the largest amount: 44.1 million kg, including 42.4 million kg of on-site air releases.
- Lead and its compounds ranked second, with 37.6 million kg. Lead had both the largest on-site releases to land, with 21.3 million kg, and the largest off-site releases (primarily land disposal), with 22.7 million kg.
- Chromium and its compounds ranked third, with 32.3 million kg of total releases.

Table 9–13. On- and Off-site Releases of California Proposition 65 Chemicals in North America, 2000

				On-site Releases					
CAS Number		Chemical	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases kg	Rank
108-88-3		Toluene	3,307	42,415,775	18,553	248,615	63,974	42,758,382	1
--	m,c,t	Lead (and its compounds)	2,066	1,057,909	44,659	123,740	21,310,311	22,540,032	2
--	m,c,t	Chromium (and its compounds)	4,223	618,769	126,607	1,569,349	14,162,839	16,483,509	4
--	m,c,t	Nickel (and its compounds)	3,824	1,062,487	137,331	321,104	10,769,719	12,294,094	8
75-15-0		Carbon disulfide	120	18,476,907	1,680	7,917	1,303	18,487,806	3
75-09-2	c,t	Dichloromethane	692	16,018,372	4,668	90,616	41,100	16,155,791	5
1332-21-4	c,t	Asbestos (friable)	123	1,150	0	0	12,325,137	12,326,287	7
50-00-0	c	Formaldehyde	992	7,028,062	213,605	5,555,628	49,593	12,848,438	6
--	m,c,t	Arsenic (and its compounds)	676	257,592	77,299	94,357	8,213,741	8,643,096	9
75-07-0	c,t	Acetaldehyde	344	6,541,342	111,968	489,522	10,275	7,153,200	10
79-01-6	c,t	Trichloroethylene	635	5,008,956	269	21,713	4,404	5,035,687	11
71-43-2	c,t	Benzene	574	3,938,294	9,368	330,402	21,754	4,300,419	12
79-06-1	c	Acrylamide	90	6,828	73	3,918,078	2	3,925,080	13
872-50-4		N-Methyl-2-pyrrolidone	512	1,477,826	5,973	938,827	68,100	2,490,759	14
--	m,c	Cobalt (and its compounds)	759	55,795	37,675	17,406	1,989,006	2,100,282	16
--	m,c,t	Cadmium (and its compounds)	204	47,506	4,970	31,421	1,196,034	1,280,155	20
107-13-1	c,t	Acrylonitrile	125	437,358	452	1,794,916	52,335	2,286,222	15
67-66-3	c	Chloroform	139	1,579,727	25,918	102,831	6,249	1,714,725	17
127-18-4	c,t	Tetrachloroethylene	477	1,600,918	560	27,388	6,512	1,636,658	18
74-87-3		Chloromethane	115	1,291,653	792	74,601	558	1,367,604	19
106-99-0	c,t	1,3-Butadiene	205	1,092,326	527	385	27,274	1,120,699	22
75-00-3		Chloroethane	63	1,179,913	314	50	0	1,180,277	21
117-81-7	c,t	Di(2-ethylhexyl) phthalate	399	127,785	271	113	2,822	131,013	33
--	m,t	Mercury (and its compounds)	1,645	74,150	1,103	1,090	75,527	151,870	32
62-53-3		Aniline	83	89,000	5,761	345,622	135	440,518	23
107-06-2	c,t	1,2-Dichloroethane	98	255,282	450	77,836	1,148	334,717	27
109-86-4		2-Methoxyethanol	49	413,478	10,107	0	8,273	431,857	24
74-83-9	t	Bromomethane	49	421,937	17	2	4	421,960	25
75-01-4	c,t	Vinyl chloride	58	366,998	102	19,796	0	387,082	26
123-91-1	c	1,4-Dioxane	68	47,822	74,370	0	8,223	130,415	34
75-56-9	c	Propylene oxide	123	212,258	5,284	952	52,259	270,754	28
75-21-8	c,t	Ethylene oxide	160	229,595	3,135	102	182	233,090	29
56-23-5	c,t	Carbon tetrachloride	67	129,128	83	28,210	379	157,800	30
98-95-3	c	Nitrobenzene	30	18,884	54	134,732	8	153,678	31
554-13-2		Lithium carbonate	55	8,468	122	0	49,146	57,836	40
78-87-5		1,2-Dichloropropane	17	119,703	198	2	173	120,077	35
106-89-8	c	Epichlorohydrin	78	91,186	176	0	1,791	93,748	36
106-46-7	c	1,4-Dichlorobenzene	30	66,160	543	3,719	82	70,605	37
140-88-5	c	Ethyl acrylate	117	52,188	45	183	5,789	58,333	39
110-80-5		2-Ethoxyethanol	43	54,284	172	0	4,748	59,206	38
79-00-5		1,1,2-Trichloroethane	38	42,539	286	2	5,357	48,292	41
26471-62-5	c	Toluenediisocyanate (mixed isomers)	205	16,466	1,134	0	13,487	31,615	43
74-88-4		Methyl iodide	14	32,500	10	4	454	32,968	42
91-22-5		Quinoline	19	10,179	10	14,246	5	24,440	44
121-14-2	c	2,4-Dinitrotoluene	17	876	80	113	12,621	13,690	49
101-77-9	c	4,4'-Methylenedianiline	23	5,854	134	13,605	4	19,597	45
67-72-1	c	Hexachloroethane	23	15,628	5	278	1	15,912	46
25321-14-6		Dinitrotoluene (mixed isomers)	9	4,028	2	1,497	0	5,527	55
96-09-3	c	Styrene oxide	5	22	0	0	15,414	15,435	47
62-56-6	c	Thiourea	30	582	121	0	13,063	13,765	48
101-14-4	c	4,4'-Methylenebis(2-chloroaniline)	24	7	0	0	11,861	11,873	50
81-88-9		C.I. Food Red 15	4	0	0	0	10,833	10,833	51
100-44-7	c	Benzyl chloride	41	8,644	39	204	119	9,006	52
302-01-2	c	Hydrazine	69	2,281	6,454	0	168	8,902	53
79-46-9	c	2-Nitropropane	7	8,490	102	0	0	8,591	54
64-75-5		Tetracycline hydrochloride	5	5	0	0	0	5	72
139-13-9	c	Nitrilotriacetic acid	21	2,295	4	998	0	3,417	58
924-42-5		N-Methylolacrylamide	35	1,838	476	0	19	2,347	60
563-47-3	c	3-Chloro-2-methyl-1-propene	3	3,873	0	0	0	3,873	56
64-67-5	c	Diethyl sulfate	33	3,571	0	0	0	3,571	57
77-78-1	c	Dimethyl sulfate	38	3,292	10	0	18	3,321	59
28407-37-6		C.I. Direct Blue 218	8	0	9	0	773	782	62
79-34-5		1,1,2,2-Tetrachloroethane	20	2,210	6	2	0	2,218	61
606-20-2	c	2,6-Dinitrotoluene	8	230	15	113	0	358	63
612-83-9	c	3,3'-Dichlorobenzidine dihydrochloride	17	7	2	0	0	10	71
96-45-7	c	Ethylene thiourea	16	125	5	0	0	129	66
90-43-7		2-Phenylphenol	19	118	5	0	0	122	67
7758-01-2	c	Potassium bromate	3	229	0	0	0	229	64
95-80-7	c	2,4-Diaminotoluene	5	213	0	0	0	213	65
94-59-7	c	Safrole	4	118	0	0	0	118	68
86-30-6		N-Nitrosodiphenylamine	6	22	0	0	0	22	69
115-28-6	c	Chlorendic acid	2	15	0	0	0	15	70
1314-20-1		Thorium dioxide	1	0	0	0	0	0	--
120-58-1		Isosafrole	2	0	0	0	0	0	--
		Subtotal	**24,208**	**114,140,029**	**934,162**	**16,402,291**	**70,615,106**	**202,124,960**	
		% of Total	**32**	**13**	**1**	**17**	**25**	**15**	
		Total for all Matched Chemicals	**76,681**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**	

Note: Canada and US data only. Mexico data not available for 2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
t = CEPA Toxic chemical.

Table 9–13. (*continued*)

Off-site Releases								
Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases kg	Total Off-site Releases Rank	Total Reported Releases On- and Off-site kg	Total Reported Releases On- and Off-site Rank	Adjustment Component* (kg)	Total Releases (adjusted)** kg	Total Releases (adjusted)** Rank
1,351,465	0	1,351,465	7	44,109,847	2	59,290	44,050,557	1
0	22,673,961	22,673,961	1	45,213,993	1	7,647,181	37,566,812	2
0	17,899,354	17,899,354	2	34,382,863	3	2,129,460	32,253,403	3
0	11,050,526	11,050,526	3	23,344,619	4	1,719,269	21,625,351	4
2,015	0	2,015	42	18,489,822	5	0	18,489,822	5
114,230	0	114,230	16	16,270,021	6	3,943	16,266,078	6
3,105,826	0	3,105,826	4	15,432,114	7	20,600	15,411,514	7
223,103	0	223,103	12	13,071,541	8	41,122	13,030,419	8
0	2,866,208	2,866,208	5	11,509,304	9	292,492	11,216,812	9
1,800	0	1,800	43	7,155,001	10	0	7,155,001	10
75,862	0	75,862	21	5,111,549	11	801	5,110,747	11
80,341	0	80,341	20	4,380,760	12	8,199	4,372,561	12
4,868	0	4,868	32	3,929,948	13	0	3,929,948	13
419,480	0	419,480	11	2,910,239	14	67	2,910,171	14
0	647,095	647,095	8	2,747,377	16	20,076	2,727,301	15
0	1,510,197	1,510,197	6	2,790,351	15	329,304	2,461,047	16
146,813	0	146,813	15	2,433,036	17	2	2,433,033	17
6,374	0	6,374	29	1,721,099	18	1,263	1,719,836	18
19,191	0	19,191	24	1,655,849	19	1,149	1,654,701	19
4,424	0	4,424	35	1,372,028	20	0	1,372,028	20
84,291	0	84,291	19	1,204,990	21	0	1,204,990	21
15,714	0	15,714	25	1,195,991	22	0	1,195,991	22
566,066	0	566,066	9	697,079	23	0	697,079	23
0	432,870	432,870	10	584,740	24	23,758	560,982	24
102,885	0	102,885	17	543,404	25	3,514	539,890	25
203,431	0	203,431	13	538,148	26	14,768	523,379	26
28,079	0	28,079	22	459,937	27	0	459,937	27
0	0	0	--	421,960	28	0	421,960	28
643	0	643	53	387,724	29	0	387,724	29
162,085	0	162,085	14	292,500	30	0	292,500	30
3,095	0	3,095	36	273,849	31	0	273,849	31
25,769	0	25,769	23	258,859	32	0	258,859	32
1,034	0	1,034	48	158,835	33	0	158,835	33
3,044	0	3,044	37	156,722	34	0	156,722	34
86,136	0	86,136	18	143,972	35	0	143,972	35
3	0	3	62	120,079	36	0	120,079	36
5,036	0	5,036	31	98,784	37	0	98,784	37
117	0	117	59	70,722	38	0	70,722	38
4,490	0	4,490	34	62,823	39	1	62,822	39
685	0	685	52	59,891	40	0	59,891	40
4,592	0	4,592	33	52,884	41	0	52,884	41
10,672	0	10,672	26	42,287	42	1,948	40,339	42
29	0	29	61	32,997	43	0	32,997	43
2,386	0	2,386	40	26,826	44	0	26,826	44
8,885	0	8,885	28	22,575	45	0	22,575	45
2,971	0	2,971	38	22,568	46	0	22,568	46
2,205	0	2,205	41	18,117	47	0	18,117	47
10,020	0	10,020	27	15,546	48	0	15,546	48
0	0	0	--	15,435	49	0	15,435	49
429	0	429	54	14,194	50	0	14,194	50
0	0	0	--	11,873	51	0	11,873	51
0	0	0	--	10,833	52	0	10,833	52
1,380	0	1,380	46	10,386	53	0	10,386	53
0	0	0	--	8,902	54	0	8,902	54
293	0	293	56	8,885	55	0	8,885	55
5,238	0	5,238	30	5,243	56	0	5,243	56
1,500	0	1,500	45	4,917	57	0	4,917	57
2,499	0	2,499	39	4,846	58	0	4,846	58
0	0	0	--	3,873	59	0	3,873	59
282	0	282	57	3,852	60	0	3,852	60
0	0	0	--	3,321	61	0	3,321	61
1,745	0	1,745	44	2,527	62	0	2,527	62
282	0	282	58	2,500	63	0	2,500	63
918	0	918	49	1,277	64	0	1,277	64
1,043	0	1,043	47	1,053	65	0	1,053	65
916	0	916	50	1,045	66	0	1,045	66
704	0	704	51	826	67	0	826	67
340	0	340	55	569	68	0	569	68
58	0	58	60	271	69	0	271	69
0	0	0	--	118	70	0	118	70
0	0	0	--	22	71	0	22	71
0	0	0	--	15	72	0	15	72
0	0	0	--	0	--	0	0	--
0	0	0	--	0	--	0	0	--
6,907,781	**57,080,209**	**63,987,990**		**266,112,950**		**12,318,208**	**253,794,742**	
18	**24**	**23**		**16**		**26**	**16**	
38,301,908	**236,602,553**	**274,904,461**		**1,633,350,231**		**48,201,339**	**1,585,148,892**	

* 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.

Toluene, a developmental toxicant, had the largest on-site air releases of all California Proposition 65 chemicals in 2000. By far the largest use of toluene 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. It is also used in paints, lacquers, thinners and strippers, adhesives, and cosmetic nail products.

- The printing and publishing sector accounted for 19 percent of all on-site air releases of toluene in 2000. The chemical manufacturing sector accounted for another 14 percent, while the rubber and plastics products sector represented 13 percent.
- NPRI facilities in Ontario reported 4.4 million kg of on-site releases of toluene. TRI facilities in Tennessee reported 3.4 million kg, and those in Indiana reported 2.6 million kg.
- The TRI facility with the largest on-site air releases of toluene was a paper products facility in South Carolina that reported 1.1 million kg.
- The NPRI facility with the largest on-site air releases of toluene was a manufacturer of transportation equipment in Ontario that reported over 524,000 kg.

Chromium and its compounds had the third-largest releases on- and off-site of all California Proposition 65 chemicals in 2000. Chromium is used in steel and other alloys; in making refractories (bricks used in industrial furnaces); in dyes and pigments; and in plating chrome, tanning leather, and preserving wood. Chromium and its compounds are also used as cleaning agents in electroplating and textile manufacturing. Hexavalent chromium (Cr VI), the

Figure 9–9. On-site Air Releases of Toluene by Industry, 2000

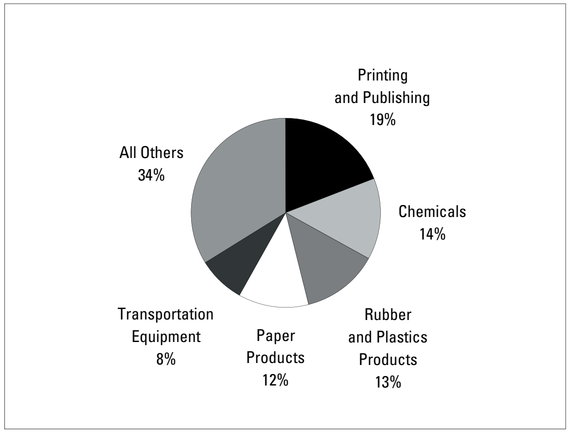


Figure 9–10. States/Provinces with Largest On-site Air Releases of Toluene, 2000

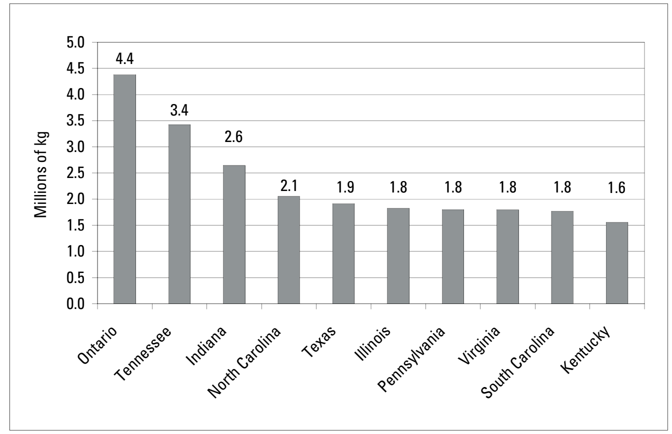


Table 9–14. Facilities in US and Canada with Largest On-site Air Releases of Toluene, 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	On-site Air Releases of Toluene (kg)
		US				
1	1	Intertape Polymer Group, Columbia Div.	Columbia, SC		26	1,090,249
2	2	Quebecor World	Dickson, TN		27	801,693
3	3	Shurtape Techs. Inc., Hickory Tape Plant, STM Inc.	Hickory, NC		26	753,514
4	4	Quebecor World, Corinth, Quebecor World	Corinth, MS		27	648,583
5	5	QP Memphis Corp., Quebecor World Inc.	Memphis, TN		27	644,278
		Canada				
8	1	General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa, ON	32	37	524,280
11	2	Ventra Plastics, Peterborough, Ventra Group Inc.	Peterborough, ON	16	30	414,200
24	3	Quebecor World Inc., Quebecor World, Islington	Etobicoke, ON	28	27	279,196
25	4	Canadian Technical Tape, Montreal Plant	St-Laurent, QC	27	26	275,090
29	5	Imperial Home Decor Group ULC, IHDG Brampton	Brampton, ON	28	27	231,400

Figure 9–11. Total Releases On- and Off-site of Chromium (and its compounds) by Industry, 2000

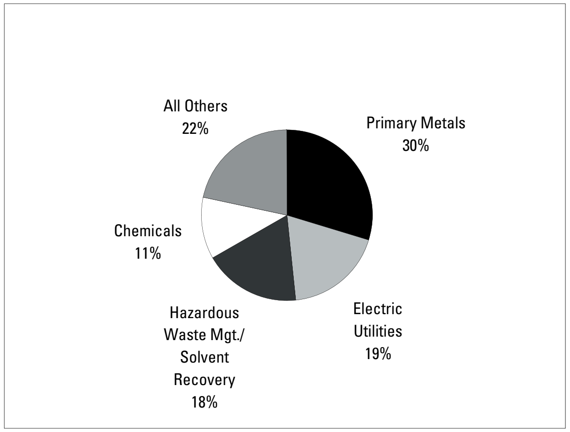


Figure 9–12. States/Provinces with Largest Total Releases On- and Off-site of Chromium (and its compounds), 2000

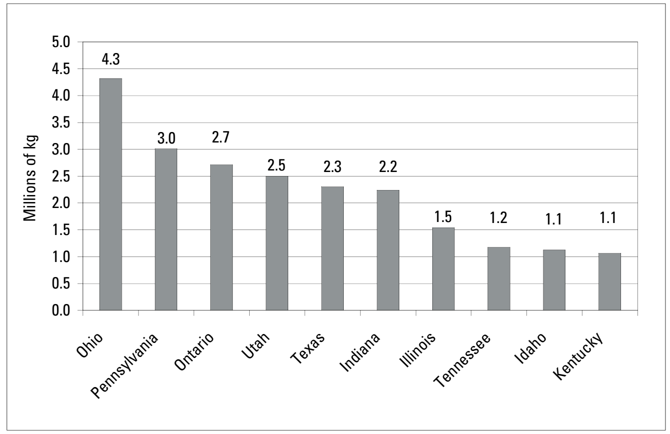


Table 9–15. Facilities in US and Canada with Largest Total Releases On- and Off-site of Chromium (and its compounds), 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Total Releases On- and Off-site of Chromium (and its compounds) (kg)
		US				
1	1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	2,100,116
2	2	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1,507,116
4	3	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	907,073
5	4	Union Electric Steel Corp., Ampco-Pittsburgh Corp.	Burgettstown, PA		35	804,104
6	5	P4 Production L.L.C., Pharmacia Corp.	Soda Springs, ID		Mult.	682,881
		Canada				
3	1	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	925,235
9	2	Slater Stainless Corp., Aciers Inoxydables Atlas, Slater Steel Inc.	Sorel-Tracy, QC	29	33	542,210
10	3	Philip Services Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	466,800
31	4	Dominion Castings Ltd., ABC NACO Inc.	Hamilton, ON	29	33	165,385
33	5	Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	Thorold, ON	49	495/738	149,344

form of chromium listed as a carcinogen under Proposition 65, is more toxic than the trivalent (Cr III) form; under some conditions, however, trivalent chromium may be converted to hexavalent chromium. Inhalation effects include irritation/damage to nose, lungs, stomach, and intestines. Ingestion can lead to stomach upset and ulcers, convulsions, and damage to kidneys and liver. Because both TRI and NPRI require 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. Because of the toxicity of some chromium compounds and the element's ability to convert from one form to another, chromium and its compounds are included in this analysis.

- The primary metals industry accounted for 30 percent of total releases of chromium and its compounds in 2000. The electric utilities sector accounted for another 19 percent.
- TRI facilities in Ohio reported 4.3 million kg of releases of chromium and its compounds, while TRI facilities in Pennsylvania reported 3.0 million kg.
- One TRI primary metals facility in Utah reported releasing 2.1 million kg of chromium and its compounds in 2000.
- The NPRI facility with the largest releases of chromium and its compounds was a primary metals facility in Ontario that reported more than 925,000 kg.

9.4.2 Releases On- and Off-site of California Proposition 65 Chemicals, 1998–2000

Reporting on nine chemicals (3,3'-dichlorobenzidine dihydrochloride, 3-chloro-2-methyl-1-propene, C.I. Direct Blue 218, chlorendic acid, lithium carbonate, N-methyl-2-pyrrolidone, N-methylolacrylamide, potassium bromate, and tetracycline hydrochloride) is not included when comparing trends in California Proposition 65 chemicals from 1998 to 2000 because reporting under NPRI on these substances was added after the 1998 reporting year. 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 Proposition 65 chemicals decreased by 12 percent from 1998 to 2000, compared with a decrease of 5 percent for all matched chemicals.
- Chromium and its compounds had the largest reported reduction in total releases on- and off-site from 1998 to 2000 of the Proposition 65 chemicals, with a decrease of 11.1 million kg.
- Toluene had the second-largest decrease, with 9.3 million kg.
- Formaldehyde and arsenic and its compounds led the increases with about 1.3 million kg each.

Table 9–16. Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1998–2000

			Total Releases On- and Off-site (adjusted)*			
			1998	2000	Change 1998–2000	
CAS Number		Chemical	(kg)	(kg)	kg	%
--	m,c,t	Chromium (and its compounds)	43,393,017	32,253,403	-11,139,614	-26
108-88-3		Toluene	53,374,037	44,050,557	-9,323,480	-17
--	m,c,t	Lead (and its compounds)	43,507,882	37,566,812	-5,941,070	-14
75-09-2	c,t	Dichloromethane	20,993,821	16,266,078	-4,727,743	-23
--	m,c,t	Cadmium (and its compounds)	4,296,933	2,461,047	-1,835,886	-43
79-01-6	c,t	Trichloroethylene	6,863,378	5,110,747	-1,752,631	-26
67-66-3	c	Chloroform	3,182,709	1,719,836	-1,462,873	-46
75-15-0		Carbon disulfide	19,774,756	18,489,822	-1,284,934	-6
127-18-4	c,t	Tetrachloroethylene	2,660,295	1,654,701	-1,005,594	-38
71-43-2	c,t	Benzene	5,110,173	4,372,561	-737,612	-14
74-87-3		Chloromethane	1,723,980	1,372,028	-351,951	-20
74-83-9	t	Bromomethane	712,373	421,960	-290,413	-41
--	m,c	Cobalt (and its compounds)	2,898,322	2,727,301	-171,021	-6
106-99-0	c,t	1,3-Butadiene	1,356,989	1,204,990	-151,999	-11
62-53-3		Aniline	648,846	539,890	-108,956	-17
79-00-5		1,1,2-Trichloroethane	145,035	52,884	-92,151	-64
75-56-9	c	Propylene oxide	360,152	273,849	-86,303	-24
75-21-8	c,t	Ethylene oxide	345,070	258,859	-86,211	-25
98-95-3	c	Nitrobenzene	234,314	156,722	-77,592	-33
75-01-4	c,t	Vinyl chloride	459,171	387,724	-71,447	-16
109-86-4		2-Methoxyethanol	511,413	459,937	-51,476	-10
123-91-1	c	1,4-Dioxane	343,083	292,500	-50,583	-15
95-80-7	c	2,4-Diaminotoluene	25,406	271	-25,136	-99
106-46-7	c	1,4-Dichlorobenzene	94,248	70,722	-23,526	-25
117-81-7	c,t	Di(2-ethylhexyl) phthalate	714,483	697,079	-17,404	-2
302-01-2	c	Hydrazine	25,920	8,902	-17,017	-66
78-87-5		1,2-Dichloropropane	135,863	120,079	-15,784	-12
101-77-9	c	4,4'-Methylenedianiline	32,735	22,568	-10,167	-31
139-13-9	c	Nitrilotriacetic acid	13,517	4,917	-8,600	-64
25321-14-6		Dinitrotoluene (mixed isomers)	23,060	15,546	-7,514	-33
79-34-5		1,1,2,2-Tetrachloroethane	7,950	2,500	-5,450	-69
106-89-8	c	Epichlorohydrin	104,117	98,784	-5,332	-5
100-44-7	c	Benzyl chloride	14,852	10,386	-4,465	-30
67-72-1	c	Hexachloroethane	21,511	18,117	-3,394	-16
79-46-9	c	2-Nitropropane	11,151	8,885	-2,266	-20
77-78-1	c	Dimethyl sulfate	5,404	3,321	-2,083	-39
96-45-7	c	Ethylene thiourea	3,034	1,045	-1,990	-66
26471-62-5	c	Toluenediisocyanate (mixed isomers)	41,378	40,339	-1,040	-3
140-88-5	c	Ethyl acrylate	63,711	62,822	-889	-1
90-94-8	c	Michler's ketone	232	0	-232	-100
86-30-6		N-Nitrosodiphenylamine	34	22	-12	-35
120-58-1		Isosafrole	0	0	0	--
1314-20-1		Thorium dioxide	0	0	0	--
90-43-7		2-Phenylphenol	751	826	75	10
94-59-7	c	Safrole	5	118	113	2,500
64-67-5	c	Diethyl sulfate	2,887	3,852	966	33
606-20-2	c	2,6-Dinitrotoluene	242	1,277	1,034	427
110-80-5		2-Ethoxyethanol	58,770	59,891	1,120	2
74-88-4		Methyl iodide	30,399	32,997	2,598	9
91-22-5		Quinoline	21,628	26,826	5,198	24
62-56-6	c	Thiourea	4,161	14,194	10,033	241
81-88-9		C.I. Food Red 15	0	10,833	10,833	--
56-23-5	c,t	Carbon tetrachloride	147,747	158,835	11,087	8
75-00-3		Chloroethane	1,184,666	1,195,991	11,325	1
101-14-4	c	4,4'-Methylenebis(2-chloroaniline)	14	11,873	11,859	84,284
96-09-3	c	Styrene oxide	347	15,435	15,088	4,347
121-14-2	c	2,4-Dinitrotoluene	6,359	22,575	16,216	255
107-06-2	c,t	1,2-Dichloroethane	452,009	523,379	71,370	16
107-13-1	c,t	Acrylonitrile	2,348,378	2,433,033	84,655	4
1332-21-4	c,t	Asbestos (friable)	15,280,226	15,411,514	131,288	1
75-07-0	c,t	Acetaldehyde	6,270,980	7,155,001	884,021	14
79-06-1	c	Acrylamide	2,887,781	3,929,948	1,042,168	36
--	m,c,t	Nickel (and its compounds)	20,500,243	21,625,351	1,125,108	5
--	m,c,t	Arsenic (and its compounds)	9,967,812	11,216,812	1,249,000	13
50-00-0	c	Formaldehyde	11,716,644	13,030,419	1,313,775	11
		Subtotal	**285,116,402**	**250,161,491**	**-34,954,910**	**-12**
		% of Total	**18**	**16**		
		Total for Matched Chemicals	**1,607,526,278**	**1,529,705,222**	**-77,821,056**	**-5**

Note: Canada and US data only. Mexico data not available for 1998–2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
t = CEPA Toxic chemical.
* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Table 9–17. Change in Total Releases On- and Off-site of California Proposition 65 Chemicals in North America, 1995–2000

			Total Releases On- and Off-site			
			1995	2000	Change 1995–2000	
CAS Number		Chemical	(kg)	(kg)	kg	%
108-88-3		Toluene	73,897,610	42,957,217	-30,940,393	-42
75-15-0		Carbon disulfide	38,195,290	18,489,217	-19,706,074	-52
75-09-2	c,t	Dichloromethane	28,559,898	16,086,139	-12,473,759	-44
79-01-6	c,t	Trichloroethylene	12,622,504	5,049,505	-7,572,998	-60
--	m,c,t	Chromium (and its compounds)	26,867,913	21,532,908	-5,335,005	-20
67-66-3	c	Chloroform	5,120,411	1,634,272	-3,486,140	-68
127-18-4	c,t	Tetrachloroethylene	4,547,089	1,498,118	-3,048,972	-67
1332-21-4	c,t	Asbestos (friable)	5,739,844	2,932,199	-2,807,645	-49
71-43-2	c,t	Benzene	6,226,862	4,113,927	-2,112,934	-34
74-87-3		Chloromethane	3,013,520	1,363,373	-1,650,147	-55
117-81-7	c,t	Di(2-ethylhexyl) phthalate	1,705,906	696,203	-1,009,702	-59
74-83-9	t	Bromomethane	1,192,360	421,955	-770,405	-65
107-13-1	c,t	Acrylonitrile	3,074,265	2,422,227	-652,037	-21
106-99-0	c,t	1,3-Butadiene	1,611,816	1,202,334	-409,482	-25
75-00-3		Chloroethane	1,497,458	1,195,991	-301,467	-20
75-21-8	c,t	Ethylene oxide	478,190	239,313	-238,878	-50
75-56-9	c	Propylene oxide	421,097	221,926	-199,171	-47
107-06-2	c,t	1,2-Dichloroethane	616,736	451,999	-164,737	-27
78-87-5		1,2-Dichloropropane	282,179	120,025	-162,154	-57
75-01-4	c,t	Vinyl chloride	499,299	367,095	-132,203	-26
62-53-3		Aniline	660,742	531,344	-129,398	-20
56-23-5	c,t	Carbon tetrachloride	226,895	138,641	-88,253	-39
123-91-1	c	1,4-Dioxane	369,221	285,056	-84,165	-23
79-00-5		1,1,2-Trichloroethane	127,610	45,826	-81,784	-64
106-89-8	c	Epichlorohydrin	167,169	98,743	-68,426	-41
110-80-5		2-Ethoxyethanol	115,225	54,706	-60,519	-53
106-46-7	c	1,4-Dichlorobenzene	123,682	70,458	-53,224	-43
140-88-5	c	Ethyl acrylate	106,425	56,575	-49,850	-47
302-01-2	c	Hydrazine	16,757	2,526	-14,231	-85
90-43-7		2-Phenylphenol	14,845	826	-14,019	-94
96-45-7	c	Ethylene thiourea	9,270	982	-8,288	-89
79-46-9	c	2-Nitropropane	15,665	8,561	-7,104	-45
98-95-3	c	Nitrobenzene	162,245	156,659	-5,586	-3
26471-62-5	c	Toluenediisocyanate (mixed isomers)	35,531	30,027	-5,504	-15
62-56-6	c	Thiourea	5,726	1,245	-4,481	-78
79-34-5		1,1,2,2-Tetrachloroethane	4,764	2,489	-2,275	-48
90-94-8	c	Michler's ketone	715	0	-715	-100
100-44-7	c	Benzyl chloride	10,813	10,372	-441	-4
101-14-4	c	4,4'-Methylenebis(2-chloroaniline)	124	12	-112	-90
96-09-3	c	Styrene oxide	106	22	-84	-79
95-80-7	c	2,4-Diaminotoluene	227	211	-15	-7
1314-20-1		Thorium dioxide	0.5	0	0	-100
81-88-9		C.I. Food Red 15	0	0	0	--
94-59-7	c	Safrole	116	118	2	2
86-30-6		N-Nitrosodiphenylamine	5	9	5	100
77-78-1	c	Dimethyl sulfate	3,052	3,305	252	8
64-67-5	c	Diethyl sulfate	3,278	3,848	570	17
606-20-2	c	2,6-Dinitrotoluene	270	1,158	888	329
25321-14-6		Dinitrotoluene (mixed isomers)	14,558	15,546	988	7
139-13-9	c	Nitrilotriacetic acid	1,957	4,917	2,960	151
101-77-9	c	4,4'-Methylenedianiline	19,571	22,568	2,997	15
67-72-1	c	Hexachloroethane	9,176	16,031	6,856	75
121-14-2	c	2,4-Dinitrotoluene	1,697	8,600	6,902	407
91-22-5		Quinoline	12,962	26,826	13,864	107
74-88-4		Methyl iodide	18,239	32,996	14,757	81
109-86-4		2-Methoxyethanol	419,486	451,787	32,301	8
--	m,c	Cobalt (and its compounds)	689,856	744,446	54,590	8
75-07-0	c,t	Acetaldehyde	6,996,592	7,152,848	156,257	2
--	m,c,t	Cadmium (and its compounds)	1,339,614	1,603,280	263,667	20
79-06-1	c	Acrylamide	2,859,445	3,929,948	1,070,503	37
--	m,c,t	Nickel (and its compounds)	7,624,079	9,395,055	1,770,976	23
50-00-0	c	Formaldehyde	10,073,961	13,003,212	2,929,251	29
--	m,c,t	Arsenic (and its compounds)	2,197,818	5,242,674	3,044,856	139
--	m,c,t	Lead (and its compounds)	23,474,138	29,893,235	6,419,098	27
		Subtotal	**274,103,874**	**196,043,630**	**-78,060,244**	**-28**
		% of Total	**25**	**19**		
		Total for Matched Chemicals	**1,104,237,863**	**1,012,596,423**	**-91,641,440**	**-8**

Note: Canada and US data only. Mexico data not available for 1995–2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
t = CEPA Toxic chemical.

9.4.3 Releases and Transfers of California Proposition 65 Chemicals from the Manufacturing Sector, 1995–2000

Reporting on nine chemicals (3,3'-dichlorobenzidine dihydrochloride, 3-chloro-2-methyl-1-propene, C.I. Direct Blue 218, chlorendic acid, lithium carbonate, N-methyl-2-pyrrolidone, N-methylolacrylamide, potassium bromate, and tetracycline hydrochloride) is not included when comparing trends in California Proposition 65 chemicals from 1995 to 2000 because reporting under NPRI on these substances was added after the 1995 reporting year. Also, mercury and its compounds are not included because the threshold for reporting mercury and its compounds was lowered for the 2000 reporting year. In addition, industries that were added to TRI reporting for the 1998 reporting year (electric utilities, hazardous waste management facilities, chemical wholesalers, coal mines) are not included.

- Total releases on- and off-site of Proposition 65 chemicals decreased by 28 percent from 1995 to 2000, compared with a decrease of 8 percent for all matched chemicals.
- Toluene had the largest reported reduction in total releases on- and off-site from 1995 to 2000 of the California Proposition 65 chemicals, with a decrease of 30.9 million kg.
- Carbon disulfide had the second-largest decrease, with 19.7 million kg.
- Lead and its compounds had the largest increase, with 6.4 million kg. Arsenic and its compounds increased by 3.0 million kg.

9.5 CEPA Toxic Chemicals

Chapter 2 outlines the definition of toxic chemicals under the Canadian Environmental Protection Act of 1999. As of 9 May 2001, 52 chemicals were listed as toxic under the CEPA. Thirty-one of these are included in the matched data set. For this analysis, chromium and its compounds is considered a CEPA toxic chemical, although only hexavalent chromium is on the CEPA list.

9.5.1 Releases and Transfers of CEPA Toxics, 2000

- North American releases of the listed CEPA toxic chemicals in 2000 totaled 205.0 million kg, or 13 percent of releases of all matched chemicals.
- Hydrogen fluoride was released in the largest amount: 38.0 million kg, including 35.7 million kg of on-site air releases.
- Lead and its compounds ranked second, with 37.6 million kg. Lead had both the largest on-site releases to land, with 21.3 million kg, and the largest off-site releases (primarily land disposal), with 22.7 million kg.

Table 9–18. On- and Off-site Releases of CEPA Toxics in North America, 2000

				On-site Releases					
				Air	Surface Water	Underground Injection	Land	Total On-site Releases	
CAS Number		Chemical	Number of Forms	(kg)	(kg)	(kg)	(kg)	kg	Rank
7664-39-3		Hydrogen fluoride	1,077	35,691,786	11,999	2,131,519	44,751	37,880,319	1
--	m,c,p	Lead (and its compounds)	2,066	1,057,909	44,659	123,740	21,310,311	22,540,032	2
--	m,c,p	Chromium (and its compounds)	4,223	618,769	126,607	1,569,349	14,162,839	16,483,509	3
--	m,c,p	Nickel (and its compounds)	3,824	1,062,487	137,331	321,104	10,769,719	12,294,094	6
75-09-2	c,p	Dichloromethane	692	16,018,372	4,668	90,616	41,100	16,155,791	4
1332-21-4	c,p	Asbestos (friable)	123	1,150	0	0	12,325,137	12,326,287	5
--	m,c,p	Arsenic (and its compounds)	676	257,592	77,299	94,357	8,213,741	8,643,096	7
75-07-0	c,p	Acetaldehyde	344	6,541,342	111,968	489,522	10,275	7,153,200	8
79-01-6	c,p	Trichloroethylene	635	5,008,956	269	21,713	4,404	5,035,687	9
71-43-2	c,p	Benzene	574	3,938,294	9,368	330,402	21,754	4,300,419	10
75-45-6		Chlorodifluoromethane (HCFC-22)	275	4,033,165	1,526	0	0	4,034,699	11
--	m,c,p	Cadmium (and its compounds)	204	47,506	4,970	31,421	1,196,034	1,280,155	14
107-13-1	c,p	Acrylonitrile	125	437,358	452	1,794,916	52,335	2,286,222	12
127-18-4	c,p	Tetrachloroethylene	477	1,600,918	560	27,388	6,512	1,636,658	13
106-99-0	c,p	1,3-Butadiene	205	1,092,326	527	385	27,274	1,120,699	15
117-81-7	c,p	Di(2-ethylhexyl) phthalate	399	127,785	271	113	2,822	131,013	26
--	m,p	Mercury (and its compounds)	1,645	74,150	1,103	1,090	75,527	151,870	24
107-06-2	c,p	1,2-Dichloroethane	98	255,282	450	77,836	1,148	334,717	19
74-83-9	p	Bromomethane	49	421,937	17	2	4	421,960	16
76-14-2		Dichlorotetrafluoroethane (CFC-114)	13	416,398	410	0	0	416,808	17
75-01-4	c,p	Vinyl chloride	58	366,998	102	19,796	0	387,082	18
107-02-8		Acrolein	35	190,399	292	91,166	183	282,039	20
75-21-8	c,p	Ethylene oxide	160	229,595	3,135	102	182	233,090	22
75-71-8		Dichlorodifluoromethane (CFC-12)	46	252,946	3	0	0	252,949	21
56-23-5	c,p	Carbon tetrachloride	67	129,128	83	28,210	379	157,800	23
75-69-4		Trichlorofluoromethane (CFC-11)	40	137,780	438	0	0	138,218	25
--	c	Polychlorinated alkanes (C10 to C13)	63	3,102	2,588	0	0	5,689	30
76-15-3		Monochloropentafluoroethane (CFC-115)	5	27,868	2	0	0	27,870	27
75-63-8		Bromotrifluoromethane (Halon 1301)	9	12,738	0	0	0	12,654	28
75-72-9		Chlorotrifluoromethane (CFC-13)	3	7,756	2	0	0	7,758	29
353-59-3		Bromochlorodifluoromethane (Halon 1211)	5	419	0	0	0	419	31
		Subtotal	**18,215**	**80,062,212**	**541,098**	**7,244,750**	**68,266,432**	**156,132,805**	
		% of Total	**24**	**9**	**0.5**	**7**	**24**	**11**	
		Total for all Matched Chemicals	**76,681**	**858,240,898**	**119,754,045**	**97,742,427**	**282,595,481**	**1,358,445,770**	

Note: Canada and US data only. Mexico data not available for 2000.
m = Metal and its compounds.
c = Known or suspected carginogen.
p = California Proposition 65 chemical.

Table 9–18. (*continued*)

Off-site Releases				Total Releases				
Disposal (except metals) (kg)	Transfers 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
320,904	0	320,904	9	38,201,224	2	246,737	37,954,487	1
0	22,673,961	22,673,961	1	45,213,993	1	7,647,181	37,566,812	2
0	17,899,354	17,899,354	2	34,382,863	3	2,129,460	32,253,403	3
0	11,050,526	11,050,526	3	23,344,619	4	1,719,269	21,625,351	4
114,230	0	114,230	12	16,270,021	5	3,943	16,266,078	5
3,105,826	0	3,105,826	4	15,432,114	6	20,600	15,411,514	6
0	2,866,208	2,866,208	5	11,509,304	7	292,492	11,216,812	7
1,800	0	1,800	20	7,155,001	8	0	7,155,001	8
75,862	0	75,862	15	5,111,549	9	801	5,110,747	9
80,341	0	80,341	14	4,380,760	10	8,199	4,372,561	10
57,392	0	57,392	16	4,092,092	11	30,385	4,061,706	11
0	1,510,197	1,510,197	6	2,790,351	12	329,304	2,461,047	12
146,813	0	146,813	11	2,433,036	13	2	2,433,033	13
19,191	0	19,191	19	1,655,849	14	1,149	1,654,701	14
84,291	0	84,291	13	1,204,990	15	0	1,204,990	15
566,066	0	566,066	7	697,079	16	0	697,079	16
0	432,870	432,870	8	584,740	17	23,758	560,982	17
203,431	0	203,431	10	538,148	18	14,768	523,379	18
0	0	--	26	421,960	19	0	421,960	19
0	0	--	27	416,808	20	0	416,808	20
643	0	643	22	387,724	21	0	387,724	21
186	0	186	23	282,225	22	0	282,225	22
25,769	0	25,769	18	258,859	23	0	258,859	23
0	0	--	25	252,949	24	0	252,949	24
1,034	0	1,034	21	158,835	25	0	158,835	25
64	0	64	24	138,282	26	0	138,282	26
50,294	0	50,294	17	55,984	27	0	55,984	27
0	0	--	28	27,870	28	0	27,870	28
0	0	--	29	12,654	29	0	12,654	29
0	0	--	30	7,758	30	0	7,758	30
0	0	--	31	419	31	0	419	31
4,854,138	**56,433,115**	**61,287,253**		**217,420,058**		**12,468,050**	**204,952,008**	
13	**24**	**22**		**13**		**26**	**13**	
38,301,908	**236,602,553**	**274,904,461**		**1,633,350,231**		**48,201,339**	**1,585,148,892**	

* 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.

Hydrogen fluoride had the largest on-site air releases of all the CEPA toxic chemicals in 2000. In North America, much of the hydrogen fluoride manufactured is used to produce fluorocarbons (including CFCs and HCFCs). It is also used in steel pickling and the production of aluminum fluoride. Hydrogen fluoride is not a carcinogen, but inhalation can irritate the nose, throat, and respiratory system. Ingestion can cause mouth, throat, and stomach burns and may be fatal.

- The electric utility sector accounted for 78 percent of all on-site air releases of hydrogen fluoride in 2000.
- TRI facilities in Ohio reported 3.0 million kg of on-site air releases of hydrogen fluoride, while those in North Carolina reported 2.5 million kg.
- The TRI facility with the largest on-site air releases of hydrogen fluoride was an electric utility in Alabama that reported almost 451,000 kg.
- The NPRI facility with the largest on-site air releases of hydrogen fluoride was a primary metals facility in British Columbia that reported over 535,000 kg.

Figure 9–13. On-site Air Releases of Hydrogen Fluoride by Industry, 2000

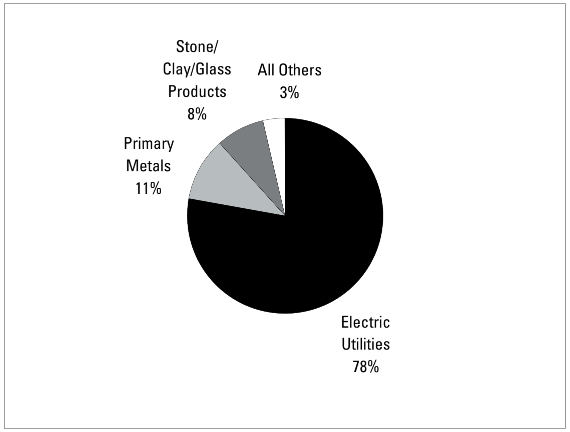


Figure 9–14. States/Provinces with Largest On-site Air Releases of Hydrogen Fluoride, 2000

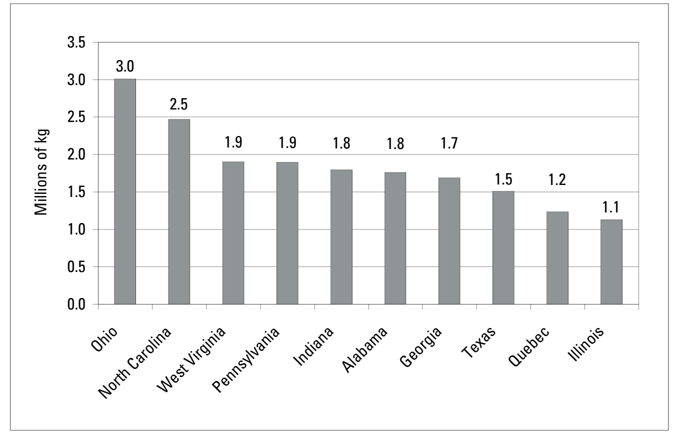


Table 9–19. Facilities in US and Canada with Largest On-site Air Releases of Hydrogen Fluoride, 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	On-site Air Releases of Hydrogen Fluoride (kg)
		US				
2	1	Alabama Power Co., Plant Gaston, Southern Co.	Wilsonville, AL		491/493	450,954
4	2	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	399,093
5	3	John E. Amos Power Plant, American Electric Power	Winfield, WV		491/493	385,488
6	4	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	380,195
8	5	Duke Energy, Marshall Steam Station.	Terrell, NC		491/493	367,349
		Canada				
1	1	Alcan Primary Metal Group - British Columbia, Kitimat Works	Kitimat, BC	29	33	535,331
3	2	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	49	491/493	427,893
7	3	TransAlta Corporation, Sundance Thermal Generation Plant	Duffield, AB	49	491/493	377,020
9	4	Société Canadienne de Métaux Reynolds Ltée, Aluminerie de Baie-Comeau	Baie-Comeau, QC	29	33	367,000
22	5	Alcan Groupe Métal Primaire, Usine Arvida	Jonquière, QC	29	33	250,990

Figure 9–15. On-site Releases to Land of Lead (and its compounds) by Industry, 2000

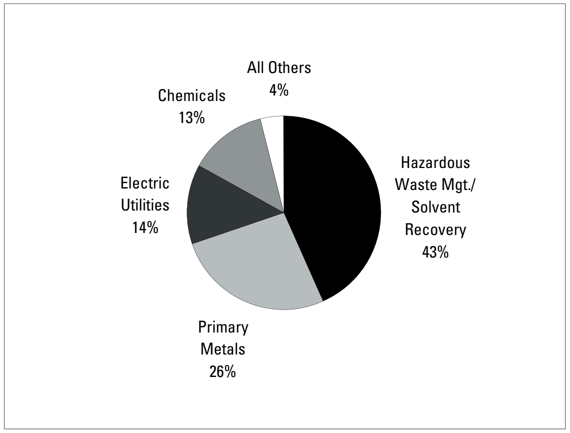


Figure 9–16. States/Provinces with Largest On-site Releases to Land of Lead (and its compounds), 2000

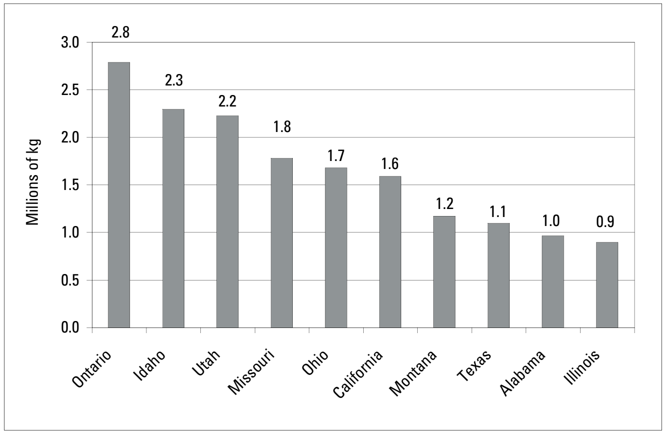


Table 9–20. Facilities in US and Canada with Largest On-site Releases to Land of Lead (and its compounds), 2000

North American Rank	Country Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	On-site Releases to Land of Lead (and its compounds) (kg)
		US				
2	1	US Ecology Idaho Inc., American Ecology Corp.	Grand View, ID		495/738	2,273,016
3	2	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	1,768,821
4	3	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	1,437,907
5	4	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	1,269,841
6	5	ASARCO Inc.	East Helena, MT		33	1,149,464
		Canada				
1	1	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	2,661,800
23	2	Ispat Sidbec Inc., Aciérie, Ispat International Ltd.	Contrecoeur, QC	29	33	98,845
29	3	Co-Steel Lasco	Whitby, ON	29	33	77,052
31	4	Gerdau MRM Steel Inc., MRM Steel, Gerdau Steel Inc.	Selkirk, MB	29	33	70,585
55	5	Ispat Sidbec Inc., Sidbec-Feruni (Ispat) Inc. Contrecoeur	Contrecoeur, QC	29	33	36,510

Lead and its compounds had the largest on-site land releases of all the CEPA toxic chemicals in 2000. In addition to being a carcinogen, lead exposure can affect almost every organ and system: most sensitive is the central nervous system, particularly in children. Lead can cause premature births, growth deficits, and mental impairment in offspring of exposed mothers.

- The hazardous waste management sector accounted for 43 percent of all on-site land releases of lead and its compounds in 2000. The primary metals sector accounted for another 26 percent.
- NPRI facilities in Ontario reported 2.8 million kg of on-site land releases of lead and its compounds, while TRI facilities in Idaho reported 2.3 million kg.
- One TRI hazardous waste management facility in Idaho reported 2.3 million kg of on-site land releases of lead and its compounds in 2000.
- The NPRI facility with the largest on-site land releases of lead and its compounds was in Ontario and reported 2.7 million kg.

9.5.2 Releases On- and Off-site of CEPA Toxic Chemicals, 1998–2000

Reporting on eight ozone depleters as well as on acrolein carcinogens is not included when comparing trends in CEPA toxics from 1998 to 2000 because reporting under NPRI on these substances was added after the 1998 reporting year. Also, mercury and its compounds are not included because the threshold for reporting changed for the 2000 reporting year under both NPRI and TRI.

- Total releases on- and off-site of CEPA toxics decreased by 12 percent from 1998 to 2000, compared with a decrease of 5 percent for all matched chemicals.
- Chromium and its compounds had the largest reported reduction in total releases on- and off-site from 1998 to 2000 of the CEPA toxics, with a decrease of 11.1 million kg.
- Lead and its compounds had the second-largest decrease, with 5.9 million kg.
- Arsenic and its compounds led the increases with 1.2 million kg. Nickel and its compounds increased by 1.1 million kg.

Table 9–21. Change in Total Releases On- and Off-site of CEPA Toxics in North America, 1998–2000

			Total Releases On- and Off-site (adjusted)*			
			1998	2000	Change 1998–2000	
CAS Number		Chemical	(kg)	(kg)	kg	%
--	m,c,p	Chromium (and its compounds)	43,393,017	32,253,403	-11,139,614	-26
--	m,c,p	Lead (and its compounds)	43,507,882	37,566,812	-5,941,070	-14
75-09-2	c,p	Dichloromethane	20,993,821	16,266,078	-4,727,743	-23
7664-39-3		Hydrogen fluoride	41,070,429	37,954,487	-3,115,943	-8
--	m,c,p	Cadmium (and its compounds)	4,296,933	2,461,047	-1,835,886	-43
79-01-6	c,p	Trichloroethylene	6,863,378	5,110,747	-1,752,631	-26
127-18-4	c,p	Tetrachloroethylene	2,660,295	1,654,701	-1,005,594	-38
71-43-2	c,p	Benzene	5,110,173	4,372,561	-737,612	-14
74-83-9	p	Bromomethane	712,373	421,960	-290,413	-41
106-99-0	c,p	1,3-Butadiene	1,356,989	1,204,990	-151,999	-11
75-21-8	c,p	Ethylene oxide	345,070	258,859	-86,211	-25
75-01-4	c,p	Vinyl chloride	459,171	387,724	-71,447	-16
117-81-7	c,p	Di(2-ethylhexyl) phthalate	714,483	697,079	-17,404	-2
56-23-5	c,p	Carbon tetrachloride	147,747	158,835	11,087	8
107-06-2	c,p	1,2-Dichloroethane	452,009	523,379	71,370	16
107-13-1	c,p	Acrylonitrile	2,348,378	2,433,033	84,655	4
1332-21-4	c,p	Asbestos (friable)	15,280,226	15,411,514	131,288	1
75-07-0	c,p	Acetaldehyde	6,270,980	7,155,001	884,021	14
--	m,c,p	Nickel (and its compounds)	20,500,243	21,625,351	1,125,108	5
--	m,c,p	Arsenic (and its compounds)	9,967,812	11,216,812	1,249,000	13
		Subtotal	**226,451,408**	**199,134,372**	**-27,317,036**	**-12**
		% of Total	**14**	**13**		
		Total for Matched Chemicals	**1,607,526,278**	**1,529,705,222**	**-77,821,056**	**-5**

Note: Canada and US data only. Mexico data not available for 1998–2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
* Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Table 9–22. Change in Total Releases On- and Off-site of CEPA Toxics in North America, 1995–2000

CAS Number		Chemical	Total Releases On- and Off-site 1995 (kg)	2000 (kg)	Change 1995–2000 kg	%
75-09-2	c,p	Dichloromethane	28,559,898	16,086,139	-12,473,759	-44
79-01-6	c,p	Trichloroethylene	12,622,504	5,049,505	-7,572,998	-60
--	m,c,p	Chromium (and its compounds)	26,867,913	21,532,908	-5,335,005	-20
127-18-4	c,p	Tetrachloroethylene	4,547,089	1,498,118	-3,048,972	-67
1332-21-4	c,p	Asbestos (friable)	5,739,844	2,932,199	-2,807,645	-49
71-43-2	c,p	Benzene	6,226,862	4,113,927	-2,112,934	-34
117-81-7	c,p	Di(2-ethylhexyl) phthalate	1,705,906	696,203	-1,009,702	-59
74-83-9	p	Bromomethane	1,192,360	421,955	-770,405	-65
107-13-1	c,p	Acrylonitrile	3,074,265	2,422,227	-652,037	-21
106-99-0	c,p	1,3-Butadiene	1,611,816	1,202,334	-409,482	-25
75-21-8	c,p	Ethylene oxide	478,190	239,313	-238,878	-50
107-06-2	c,p	1,2-Dichloroethane	616,736	451,999	-164,737	-27
75-01-4	c,p	Vinyl chloride	499,299	367,095	-132,203	-26
56-23-5	c,p	Carbon tetrachloride	226,895	138,641	-88,253	-39
75-07-0	c,p	Acetaldehyde	6,996,592	7,152,848	156,257	2
--	m,c,p	Cadmium (and its compounds)	1,339,614	1,603,280	263,667	20
7664-39-3		Hydrogen fluoride	7,402,733	8,229,597	826,865	11
--	m,c,p	Nickel (and its compounds)	7,624,079	9,395,055	1,770,976	23
--	m,c,p	Arsenic (and its compounds)	2,197,818	5,242,674	3,044,856	139
--	m,c,p	Lead (and its compounds)	23,474,138	29,893,235	6,419,098	27
		Subtotal	**143,004,549**	**118,669,254**	**-24,335,295**	**-17**
		% of Total	**13**	**12**		
		Total for Matched Chemicals	**1,104,237,863**	**1,012,596,423**	**-91,641,440**	**-8**

Note: Canada and US data only. Mexico data not available for 1995–2000.
m = Metal and its compounds.
c = Known or suspected carcinogen.
p = California Proposition 65 chemical.

9.5.3 Releases and Transfers of CEPA Toxic Chemicals from the Manufacturing Sector, 1995–2000

Reporting on eight ozone depleters and as well as on acrolein is not included when comparing trends from 1995 to 2000 because they were added to NPRI after 1995. Nor are mercury and its compounds included because the reporting threshold was lowered for the 2000 reporting year.

- Total releases on- and off-site of CEPA toxics decreased by 17 percent from 1995 to 2000, compared with a decrease of 8 percent for all matched chemicals.
- Dichloromethane had the largest reported reduction in total releases on- and off-site from 1995 to 2000 of the CEPA toxics, with a decrease of 12.5 million kg.
- Trichloroethylene had the second-largest decrease, with 7.6 million kg.
- Lead and its compounds had the largest increase, with 6.4 million kg. Arsenic and its compounds increased by 3.0 million kg.

9.6 Benzene

This section provides an in-depth look at releases and transfers of one chemical, benzene, and augments this analysis with other data to provide a more comprehensive picture of benzene in the North American environment. Benzene was chosen for analysis because it was suggested in several consultative meetings; it is a carcinogen, a developmental toxin, and a neurotoxin; it is emitted from both industrial and other sources; and it has shown reductions over time.

9.6.1 What is Benzene?

Benzene is a clear, flammable, colorless liquid at room temperature (Environment Canada, 1993). Ninety-five percent of commercial benzene (CAS 71-43-2) is produced from petroleum. The United States is its largest producer and accounts for about 30 percent of world production (Kirk-Othmer, 1999).

Benzene is a recognized carcinogen, a developmental toxin, and a reproductive toxin (IARC and California Proposition 65, 2002). Some researchers also consider benzene to be a blood or cardiovascular toxin, an endocrine disrupter, a gastrointestinal or liver toxin, an immunotoxin, a neurotoxin, a respiratory toxin, and a skin or sense organ toxin (Scorecard, 2002). Based on a 1996 US-wide assessment, benzene is one of the three air toxics identified by the US EPA as posing the greatest nationwide cancer risk (EPA, 2002).

In Canada, most human exposure to benzene is from the air; food and drinking water are only minor sources of daily exposure (Environment Canada, 1993). Benzene is considered "toxic" under the Canadian Environmental Protection Act. Benzene is also considered to be a "non-threshold" chemical, that is, there is some chance of adverse effects at any level of exposure.

In the US, benzene is considered a high-volume chemical, with production exceeding one million pounds (454,000 kg) annually. In contrast to many high-production-volume chemicals, the eight toxicity tests considered essential for a basic understanding of chemical hazards have been completed for benzene.

9.6.2 What is Benzene used for?

Benzene is used as a chemical intermediate for the production of many industrial compounds, including styrene, phenol, cyclohexane (nylon), aniline (dyes), and alkylbenzenes (detergents). These chemicals are then used in producing pharmaceuticals, plastics, resins, dyes, and pesticides. Benzene, along with other aromatic hydrocarbons such as toluene and xylene, is used as a component of motor gasoline. This use has been substantially reduced in the US and Canada but is still extensively used in other countries (Kirk-Othmer, 1999). Benzene has historically been used as a solvent in a number of industries, including laboratory chemicals, pesticide manufacturing, pharmaceutical manufacturing, printing, pulp and paper, and manufacturing of wood stains and varnishes. Benzene is no longer widely used as a solvent because of its health hazards.

9.6.3 What are the Sources of Benzene?

Benzene can enter the environment from:

- mobile sources such as cars, trucks and off road vehicles;
- industrial sources such as refineries and chemical manufacturers;
- consumer products such as stains and varnishes;
- cigarette smoke;
- area sources such as service stations and storage tanks; and
- natural sources such as forest fires and volcanoes.

An EPA US-wide assessment based on 1996 data estimated total benzene emissions at approximately 337,000 tons (305.7 million kg) per year, with

- 50 percent from on-road mobile sources such as cars and trucks,
- 28 percent from non-road mobile sources such as construction equipment,
- 18 percent from area sources, and
- 4 percent from major sources such as industrial facilities.

While mobile sources were found to be the predominant source of nationwide benzene emissions, in certain areas of the US, industrial sources play an important role in increasing local benzene emissions and, thereby, increasing both local exposure and cancer risk (EPA, 2002).

Benzene is easily volatilized into the air so it is known as a volatile organic compound or VOC. VOCs are a large family of chemicals that contribute to the formation of smog. Once in the air, benzene can be broken down into a variety of other toxic chemicals including formaldehyde, phenol, and nitrobenzene. Because the half-life of benzene in air is relatively short, emissions of benzene tend to stay in the local or regional area, relatively close to their sources. Unlike some persistent toxics, long-range transport of benzene is not common (Environment Canada, 1993).

Most of the benzene that is released into surface waters is volatilized into the air within days; thus, very little benzene is bioaccumulated in algae, plants, or fish. In addition, fish that do accumulate benzene can rapidly clear the chemical when moved to cleaner water. Benzene leaking from underground storage tanks or landfill sites can contaminate groundwater (Environment Canada, 1993).

Table 9–23. Summary of Total Reported Amounts of Releases and Transfers of Benzene in North America, NPRI and TRI, 2000

	North America		NPRI		TRI		NPRI as % of North American Total	TRI as % of North American Total
	Number	%	Number	%	Number	%		
Total Forms	574		53		521		9	91
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**		
On-site Releases*	**4,300,419**	**57**	**1,008,365**	**75**	**3,292,054**	**53**	**23**	**77**
Total Air Releases	3,938,294	52	957,694	71	2,980,600	48	24	76
Stack Air Releases	1,910,484	25	101,372	8	1,809,112	29	5	95
Fugitive and Other Air Releases	2,027,810	27	856,322	63	1,171,488	19	42	58
Surface Water	9,368	0.1	700	0.1	8,668	0.1	7	93
Underground Injection	330,402	4	49,223	4	281,179	5	15	85
Land	21,754	0.3	148	0.01	21,606	0.4	1	99
Off-site Releases (transfers to disposal)	**80,341**	**1**	**56,481**	**4**	**23,860**	**0.4**	**70**	**30**
Total Reported Releases On- and Off-site	**4,380,760**	**58**	**1,064,846**	**79**	**3,315,914**	**54**	**24**	**76**
Off-site Releases Omitted for Adjustment Analysis**	8,199	0.1	0	0.0	8,199	0.1	0	100
Total Releases On- and Off-site (adjusted)***	**4,372,561**	**58**	**1,064,846**	**79**	**3,307,715**	**54**	**24**	**76**
Off-site Transfers to Recycling	**831,659**	**11**	**3,197**	**0.2**	**828,462**	**13**	**0.4**	**99.6**
Other Transfers Off-site for Further Management	**2,309,971**	**31**	**283,063**	**21**	**2,026,908**	**33**	**12**	**88**
Energy Recovery	1,337,910	18	173,719	13	1,164,191	19	13	87
Treatment	895,114	12	108,846	8	786,268	13	12	88
Sewage	76,947	1	498	0.04	76,449	1	0.6	99.4
Total Reported Amounts of Releases and Transfers	**7,522,390**	**100**	**1,351,106**	**100**	**6,171,284**	**100**	**18**	**82**

Note: Canada and US data only. Mexico data not available for 2000. 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.

** 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.

9.6.4 Benzene Releases from Industrial Sources in North America

One source of information on benzene releases to the environment comes from PRTR data. These data provide one of the best pictures of releases and transfers of benzene from industrial, manufacturing, electric utility, hazardous waste, coal mining, and other facilities. However, PRTR data do not include emissions of benzene from mobile, non-point, natural, or area sources. Putting PRTR data together with other information provides a more complete picture of sources of benzene emissions into the environment.

Releases and Transfers, 2000

The matched PRTR data indicate that over 7.5 million kg of benzene were released and transferred in North America in 2000.

- Over half of the total amount of 7.5 million kg—almost 4 million kg of benzene—was released directly into the air. Much smaller amounts of benzene were released on-site to water or sent either on- or off-site to land disposal. About 330,000 kg of benzene was injected into underground wells.
- Transfers for further management accounted for almost one-third of the total releases and transfers of benzene in 2000. Over 1.3 million kg was sent for energy recovery and 895,000 kg was sent for treatment. Transfers for recycling were 11 percent of the total (about 832,000 kg).
- NPRI facilities reported more benzene than expected given the number of facilities. NPRI facilities make up 9 percent of North American facilities, yet they accounted for

18 percent of the total releases and transfers in North America.

- NPRI and TRI also showed different patterns of releases and transfers of benzene. Facilities reporting to NPRI were more likely to release benzene to air and transfer benzene off-site for disposal than TRI facilities. Facilities reporting to TRI were more likely to transfer benzene for recycling than NPRI facilities.

Releases and Transfers by Industry, 2000

Three sectors, chemicals, petroleum and coal products (including refineries), and hazardous waste management/solvent recovery facilities reported the largest releases and transfers of benzene in 2000. These three sectors accounted for over three-quarters of the total amount of benzene reported.

- The chemical manufacturing sector reported 41 percent of its releases and transfers of benzene as on-site releases, 37 percent as transfers for further management, and 22 percent as transfers to recycling.
- The petroleum products sector reported most of its total releases and transfers of benzene as on-site releases (80 percent).
- Hazardous waste management facilities reported 74 percent of their releases and transfers of benzene as transfers to energy recovery.

Table 9–24. Total Reported Amounts of Releases and Transfers of Benzene in North America by Industry, 2000

				Releases On- and Off-site		
Rank	US SIC Code	Industry	Number of Forms	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
1	28	Chemicals	171	1,277,953	13,706	1,291,658
2	29	Petroleum and Coal Products	201	1,304,805	23,057	1,327,862
3	495/738	Hazardous Waste Mgt./Solvent Recovery	31	136,185	42,402	178,587
4	33	Primary Metals	38	882,748	854	883,602
5	20	Food Products	9	194,177	0	194,177
6		Multiple codes 20–39*	24	160,390	298	160,688
7	26	Paper Products	5	151,083	0	151,083
8	491/493	Electric Utilities	3	88,245	0	88,245
9	32	Stone/Clay/Glass Products	12	68,404	0	68,404
10	37	Transportation Equipment	67	10,042	25	10,067
11	34	Fabricated Metals Products	4	13,919	0	13,919
12	35	Industrial Machinery	4	11,844	0	11,844
13	36	Electronic/Electrical Equipment	2	622	0	622
14	30	Rubber and Plastics Products	1	0	0	0
15	5169	Chemical Wholesalers	2	0	0	0
		Total	**574**	**4,300,419**	**80,341**	**4,380,760**

Note: Canada and US data only. Mexico data not available for 2000.
* Multiple SIC Codes reported only in TRI.

Table 9–24. (*continued*)

	Other Off-site Transfers for Further Management				
Total Off-site Transfers to Recycling (kg)	Transfers to Energy Recovery (except metals) (kg)	Transfers to Treatment (except metals) (kg)	Transfers to Sewage (except metals) (kg)	Total Other Off-site Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers (kg)
681,170	490,389	664,749	2,923	1,158,061	3,130,889
147,744	3,579	88,214	70,681	162,474	1,638,080
0	834,070	117,861	113	952,044	1,130,631
448	5	149	460	614	884,664
0	0	0	0	0	194,177
561	5,791	22,413	2,766	30,971	192,219
0	0	0	0	0	151,083
0	0	0	0	0	88,245
0	2,063	142	0	2,205	70,609
1,737	1,424	1,586	3	3,014	14,818
0	23	0	0	23	13,942
0	566	0	0	566	12,410
0	0	0	0	0	622
0	0	0	0	0	0
0	0	0	0	0	0
831,659	**1,337,910**	**895,114**	**76,947**	**2,309,971**	**7,522,390**

Releases and Transfers by State/Province, 2000

Three jurisdictions, Texas, Ontario, and Louisiana, reported the largest amounts of benzene for several different categories: on-site releases, air releases, total releases, and total reported amounts.

- Texas led in on-site releases, transfers to recycling, transfers to energy recovery, and transfers to treatment.
- Ontario ranked second in both on-site releases and transfers to energy recovery.
- Louisiana ranked third in both on-site releases and transfers to treatment.

Two TRI facilities, both in Texas, reported the largest total amounts of benzene in North America in 2000:

- Chevron Phillips Chemical Co., Chevron Corp., in Port Arthur, Texas, reported over 650,000 kg of benzene, almost 500,000 kg of which was transferred to recycling.
- Disposal Systems Inc., GNI Group Inc., Deer Park, Texas, reported about 620,000 kg of benzene, mainly transferred to energy recovery.

All other reported amounts of benzene were less than 200,000 kg and mainly released to air.

Table 9–25. Total Reported Amounts of Releases and Transfers of Benzene in North America by State/Province, 2000

		Releases On- and Off-site			
		Total On-site Releases	Total Off-site Releases	Total Reported Releases On- and Off-site	
State/Province	Number of Forms	(kg)	(kg)	kg	Rank
Alabama	15	82,696	5	82,701	11
Alaska	4	7,553	0	7,553	42
Alberta	12	227,663	15,537	243,200	4
Arizona	2	0	0	0	--
Arkansas	7	22,909	2	22,911	26
British Columbia	4	5,069	0	5,069	46
California	31	21,587	78	21,665	28
Colorado	2	2,386	2	2,388	48
Connecticut	3	0	0	0	--
Delaware	3	9,538	0	9,538	38
Florida	4	194,676	0	194,676	6
Georgia	8	26,985	0	26,985	24
Hawaii	2	7,015	14	7,028	44
Illinois	28	221,148	602	221,750	5
Indiana	16	101,239	671	101,909	9
Iowa	4	5,215	0	5,215	45
Kansas	8	48,017	2	48,019	16
Kentucky	16	42,372	317	42,689	18
Louisiana	44	415,139	1,424	416,563	3
Maryland	3	7,288	9	7,297	43
Michigan	27	75,667	968	76,635	14
Minnesota	15	8,347	4	8,351	40
Mississippi	5	27,717	236	27,953	23
Missouri	7	216	0	216	51
Montana	4	8,625	0	8,625	39
Nebraska	6	116	80	196	52
Nevada	1	137	0	137	53
New Brunswick	1	1,163	0	1,163	49
New Hampshire	1	12,102	0	12,102	35
New Jersey	13	121,925	46	121,971	8
New Mexico	4	15,232	0	15,232	31
New York	4	13,282	0	13,282	33
Newfoundland	1	13,456	0	13,456	32
North Carolina	6	11,206	0	11,206	36
North Dakota	3	7,937	27	7,964	41
Nova Scotia	1	4,353	0	4,353	47
Ohio	37	152,463	575	153,039	7
Oklahoma	6	42,191	0	42,191	19
Ontario	23	668,094	33,841	701,935	2
Oregon	2	21,368	1	21,370	29
Pennsylvania	15	76,768	567	77,335	12
Puerto Rico	5	32,219	2	32,221	21
Quebec	9	69,870	7,103	76,973	13
Saskatchewan	2	18,697	0	18,697	30
South Carolina	4	22,889	0	22,889	27
South Dakota	4	404	0	404	50
Tennessee	9	32,431	9	32,440	20
Texas	99	1,121,678	15,076	1,136,754	1
Utah	9	23,718	618	24,336	25
Virgin Islands	1	10,959	0	10,959	37
Virginia	6	98,302	0	98,302	10
Washington	9	45,044	3	45,047	17
West Virginia	6	52,015	2,404	54,418	15
Wisconsin	6	29,217	113	29,331	22
Wyoming	7	12,113	5	12,117	34
Total	**574**	**4,300,419**	**80,341**	**4,380,760**	

Note: Canada and US data only. Mexico data not available for 2000. 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 9–25. (*continued*)

Total Off-site Transfers to Recycling (kg)	Other Off-site Transfers for Further Management: Transfers to Energy Recovery (except metals) (kg)	Transfers to Treatment (except metals) (kg)	Transfers to Sewage (except metals) (kg)	Total Other Off-site Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers: kg	Rank
40	222	45	210	477	83,218	15
1	2	20	0	22	7,576	43
2,960	0	18,739	498	19,237	265,397	6
0	380	7,044	0	7,423	7,424	44
0	22,177	6,286	2	28,465	51,376	20
0	0	0	0	0	5,069	48
70	113	16,587	13,945	30,645	52,380	18
2	0	4,505	0	4,505	6,895	46
0	0	0	0	0	0	--
0	35	158	0	194	9,732	39
0	0	0	0	0	194,676	9
0	24,158	263	0	24,421	51,406	19
0	32	36	0	68	7,096	45
374	127,120	9,073	2,791	138,985	361,109	4
116	2,599	3,868	9	6,475	108,500	13
0	287	737	0	1,024	6,239	47
250	119	490	0	610	48,879	21
2,683	1,313	188,063	3	189,379	234,751	7
3,673	126,574	64,508	0	191,082	611,318	3
40,816	0	5,084	1	5,085	53,198	17
7,323	46,300	78,080	4,601	128,981	212,939	8
794	48	27	0	75	9,220	40
0	6,628	7,942	0	14,571	42,524	23
0	28	0	0	28	244	53
5	0	231	2	233	8,863	41
0	3,867	372	0	4,239	4,435	49
0	0	0	0	0	137	54
0	0	0	0	0	1,163	51
0	0	0	0	0	12,102	36
141	153	356	10	518	122,630	12
8	5	7	10	21	15,262	32
128	0	1,448	0	1,448	14,858	33
0	0	0	0	0	13,456	34
0	0	488	0	488	11,694	37
28	0	2	0	2	7,994	42
0	0	3	0	3	4,356	50
139,869	4,854	31,091	4	35,948	328,856	5
1	28	185	0	212	42,405	24
0	156,719	39,881	0	196,600	898,535	2
0	0	24	113	137	21,507	30
389	7,196	19,147	27,324	53,668	131,391	11
0	2	113	0	116	32,337	26
1	17,000	50,223	0	67,223	144,197	10
236	0	0	0	0	18,933	31
0	1,487	14	2	1,502	24,391	29
0	0	0	0	0	404	52
0	81	321	8,059	8,462	40,902	25
631,645	788,021	334,008	14,617	1,136,645	2,905,044	1
1	0	335	4,512	4,847	29,183	28
35	0	54	0	54	11,048	38
39	136	502	231	869	99,211	14
19	2	2,508	2	2,513	47,579	22
12	0	1,998	0	1,998	56,429	16
0	226	236	0	462	29,793	27
0	0	14	0	14	12,131	35
831,659	**1,337,910**	**895,114**	**76,947**	**2,309,971**	**7,522,390**	

Query Builder

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

To find the facilities with the largest reported amounts of total releases and transfers of benzene using *Taking Stock* Online:

1. select **Facility** report.
2. select the year **2000**.
3. select **Canada & USA** for the geographic area,
   select **Benzene** for the chemical,
   select **All industries** for the industrial sector.
4. check all boxes.

Then click on ✓ Run the query

Once you have the report, go to the column titled "Total releases and Transfers" and click on the **arrow pointing down** to sort the list in descending order and get the 10 facilities with the largest total releases and transfers.

On-site Releases to Air, 2000

The jurisdictions with the largest on-site air releases of benzene were Texas, Ontario, and Louisiana.

- These three jurisdictions accounted for almost half of all on-site air releases of benzene in 2000: Texas facilities reported 24 percent of the total, Ontario had 17 percent, and Louisiana ranked third, with 8 percent.
- Texas had the largest stack air releases (557,000 kg), and Ontario had the largest fugitive and other air releases (627,000 kg).

Table 9–26. On-site Air Releases of Benzene in North America by State/Province, 2000

State/Province	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total Air Releases kg	Rank
Alabama	35,991	46,583	82,574	11
Alaska	3,628	3,645	7,273	42
Alberta	56,664	121,750	178,414	6
Arizona	0	0	0	--
Arkansas	8,468	14,312	22,779	27
British Columbia	1,454	3,015	4,469	46
California	13,998	7,167	21,165	28
Colorado	963	1,423	2,386	48
Connecticut	0	0	0	--
Delaware	1,401	8,136	9,537	37
Florida	194,676	0	194,676	5
Georgia	19,433	7,548	26,981	24
Hawaii	4,166	2,839	7,005	43
Illinois	51,183	167,405	218,588	4
Indiana	70,270	25,326	95,596	9
Iowa	680	4,535	5,215	44
Kansas	32,390	15,539	47,929	16
Kentucky	16,678	25,529	42,207	18
Louisiana	187,595	110,604	298,199	3
Maryland	6,959	329	7,288	41
Michigan	60,035	15,562	75,598	13
Minnesota	4,357	3,987	8,344	39
Mississippi	17,957	9,753	27,710	23
Missouri	196	20	216	51
Montana	4,694	3,923	8,617	38
Nebraska	2	113	116	53
Nevada	44	93	137	52
New Brunswick	0	1,125	1,125	49
New Hampshire	12,102	0	12,102	34
New Jersey	99,652	22,083	121,736	8
New Mexico	6,403	8,822	15,225	30
New York	3,411	9,757	13,169	32
Newfoundland	13	13,292	13,305	31
North Carolina	11,050	155	11,205	35
North Dakota	680	7,256	7,937	40
Nova Scotia	265	4,045	4,310	47
Ohio	116,130	36,182	152,312	7
Oklahoma	24,619	17,371	41,989	19
Ontario	41,001	626,740	667,741	2
Oregon	4,127	680	4,807	45
Pennsylvania	18,010	58,370	76,380	12
Puerto Rico	9,843	22,369	32,212	21
Quebec	1,681	67,952	69,633	14
Saskatchewan	294	18,403	18,697	29
South Carolina	22,842	44	22,886	26
South Dakota	404	0	404	50
Tennessee	29,207	3,222	32,429	20
Texas	556,919	402,145	959,064	1
Utah	4,763	18,838	23,601	25
Virgin Islands	8,381	2,578	10,959	36
Virginia	81,863	11,896	93,758	10
Washington	17,977	26,985	44,962	17
West Virginia	11,762	40,241	52,003	15
Wisconsin	28,543	674	29,217	22
Wyoming	4,659	7,449	12,108	33
Total	**1,910,484**	**2,027,810**	**3,938,294**	

Note: Canada and US data only. Mexico data not available for 2000. 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 9–27. Facilities in US and in Canada with Largest On-site Air Releases of Benzene in 2000, 1995–2000

					On-site Air Releases of Benzene						
					1995			2000			
			SIC Codes		Stack Air Releases	Fugitive and Other Air Releases	Total Air Releases	Stack Air Releases	Fugitive and Other Air Releases	Total Air Releases	Change 1995–2000
Rank	Facility	City, State/Province	Canada	US	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)
1	Stelco Inc., Hilton Works	Hamilton, ON	29	33	340	170,580	170,920	3,469	170,354	173,823	2,903
2	Algoma Steel Inc	Sault Ste. Marie, ON	29	33	616	164,511	165,127	610	162,276	162,886	-2,241
3	US Sugar Corp., Bryant Mill	Bryant, FL		20	0	0	0	142,503	0	142,503	142,503
4	Tosco Wood River Refy., Tosco Corp.	Roxana, IL		29	11,338	45,351	56,689	7,256	126,984	134,240	77,551
5	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	840	456,920	457,760	0	122,130	122,130	-335,630

Five facilities stand out as reporting the largest quantities of benzene to air in North America:

- Stelco Inc., Hilton Works, Hamilton, Ontario,
- Algoma Steel Inc., in Sault Ste. Marie, Ontario,
- US Sugar Corp., Bryant Mill, Bryant, Florida,
- Tosco Wood River Refinery, Tosco Corp., Roxana, Illinois, and
- Dofasco Inc., Dofasco in Hamilton, Ontario.

At two of these facilities, Stelco and Algoma, air emissions of benzene did not change significantly between 1995 and 2000; over the same time period, Tosco Wood Refinery increased benzene emissions; and US Sugar did not report benzene in 1995. In contrast, Dofasco reduced its air releases of benzene by about three-quarters between 1995 and 2000.

QueryBuilder
http://www.cec.org/takingstock/

To find out more about the chemicals and amounts reported by these facilities using *Taking Stock* Online:

In the box labeled "Search for a facility" type in the **facility name**.

Press Enter

In the list that appears, click on the facility name.

Fugitive Air Emissions from Industrial Sources are as Large as Stack Air Emissions

PRTR data illustrate the large emissions of benzene into the air from both stack and fugitive releases.

- For benzene, which evaporates easily, fugitive emissions are as large as stack emissions in North America.
- In 2000, over 2 million kg of benzene were emitted to the air from fugitive sources. This is slightly larger than the 1.9 million kg of benzene emitted to the air from stacks.

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 perspective as they can occur continuously, are often emitted close to the ground, and can be emitted in high concentrations.

NPRI reporting of on-site air releases includes 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. The more detailed reporting

Figure 9–17. Stack and Fugitive Air Releases, NPRI and TRI, 2000

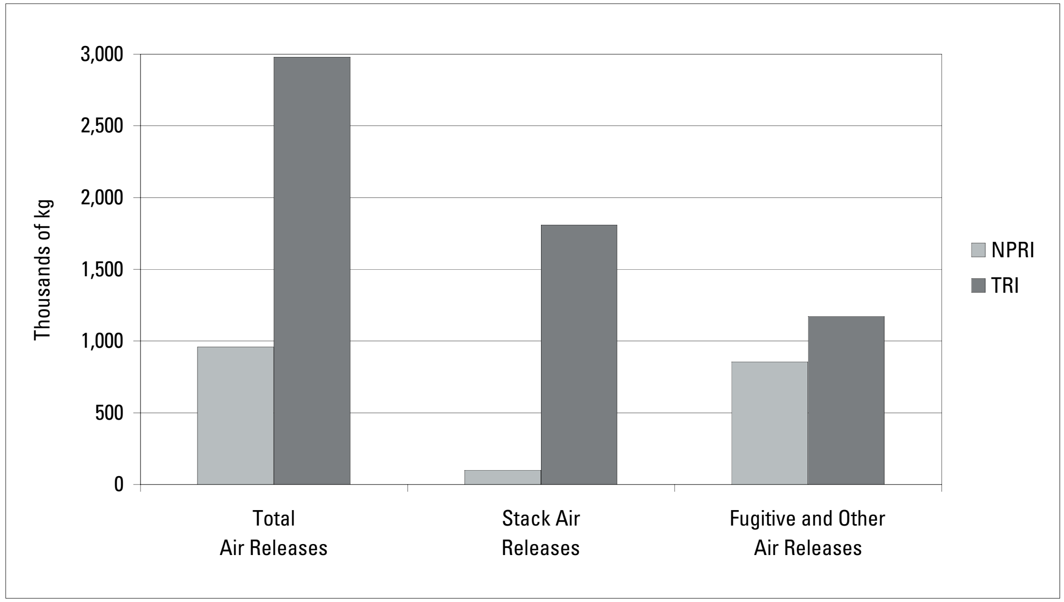
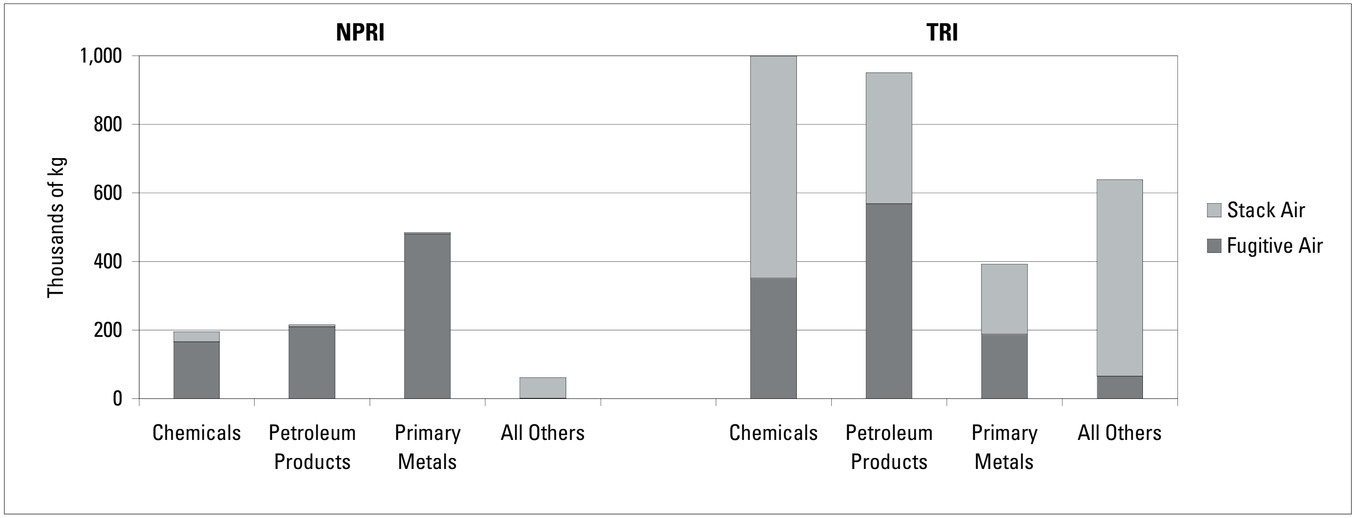


Figure 9–18. Stack and Fugitive Air Releases of Benzene by Industry, NPRI and TRI, 2000



under NPRI has been aggregated into two categories, stack releases and fugitive and other releases to match the TRI categories.

NPRI Facilities reported Proportionally Larger Fugitive Air Emissions than TRI Facilities

There were significant differences between NPRI and TRI in the amount of benzene released through fugitive and stack releases.

- In NPRI, fugitive releases were over eight times as large as stack releases. For TRI, fugitive releases were smaller than stack releases.
- NPRI facilities reported 42 percent of the total North American fugitive air releases of benzene and 5 percent of stack air releases.

The proportionally larger NPRI fugitive emissions are driven by a handful of facilities. Over half of the NPRI fugitive releases of benzene are reported by just three Ontario steel plants:

- Stelco Inc., Hilton Works in Hamilton (reported 170,000 kg);
- Algoma Steel Inc., in Sault Ste. Marie (reported 162,000 kg); and
- Dofasco Inc., also in Hamilton (reported 122,000 kg).

The first two of these steel mills had the largest fugitive releases of benzene in North America. These three steel mills and other facilities resulted in Ontario having the largest fugitive emissions of benzene in North America in 2000.

- Primary metals facilities in TRI reported roughly the same amounts of benzene from stack as from fugitive sources (about 200,000 kg each). The TRI primary metal facility with the largest fugitive emissions of benzene was the Wheeling-Pittsburgh Steel Corp. Steubenville East plant in Follansbee, West Virginia, which reported about 36,000 kg.
- Steel mills in Canada reported lower amounts of benzene emitted from the stack and much higher fugitive emissions than steel mills reporting to TRI. In general, the NPRI chemical manufacturing and petroleum products sectors showed similar differences with lower reporting of stack releases of benzene and much higher fugitive releases of benzene than TRI.

This finding is supported by looking at benzene emissions per facility.

- On average per facility, stack releases of benzene were generally lower in NPRI than TRI. However, fugitive emissions per facility were much higher for NPRI than TRI facilities.
- Particularly noticeable is the primary metals sector where fugitive emissions for NPRI facilities were twenty times those of TRI facilities. On a per-facility basis, some sectors with relatively few facilities had the highest average air releases of benzene. These include primary metals in NPRI and paper products and electric utilities in TRI.

Table 9–28. On-site Air Releases per Facility of Benzene by Industry, NPRI and TRI, 2000

			NPRI				
					Average Releases per Facility		
North American Total Air Releases Rank	US SIC Code	Industry	Number of Facilities	Total Air Releases (kg)	Stack Air Releases (kg/facility)	Fugitive and Other Air Releases (kg/facility)	Total Air Releases (kg/facility)
1	28	Chemicals	11	195,229	2,695	15,053	17,748
2	29	Petroleum and Coal Products	25	215,946	267	8,371	8,638
3	33	Primary Metals	4	484,992	1,160	120,088	121,248
4	20	Food Products	0	0	--	--	--
5		Multiple codes 20–39*	0	0	--	--	--
6	26	Paper Products	2	25,544	12,772	0	12,772
7	491/493	Electric Utilities	0	0	--	--	--
8	32	Stone/Clay/Glass Products	1	34,826	34,826	0	34,826
9	34	Fabricated Metals Products	1	10	10	0	10
10	35	Industrial Machinery	0	0	--	--	--
11	37	Transportation Equipment	0	0	--	--	--
12	495/738	Hazardous Waste Mgt./Solvent Recovery	9	1,147	4	124	127
13	36	Electronic/Electrical Equipment	0	0	--	--	--
14	30	Rubber and Plastics Products	0	0	--	--	--
15	5169	Chemical Wholesalers	0	0	--	--	--
		Total	**53**	**957,694**	**1,913**	**16,157**	**18,070**

Note: Canada and US data only. Mexico data not available for 2000.
* Multiple SIC Codes reported only in TRI.

Table 9–28. (*continued*)

			TRI				
					Average Releases per Facility		
North American Total Air Releases Rank	US SIC Code	Industry	Number of Facilities	Total Air Releases (kg)	Stack Air Releases (kg/facility)	Fugitive and Other Air Releases (kg/facility)	Total Air Releases (kg/facility)
1	28	Chemicals	160	999,286	4,051	2,195	6,246
2	29	Petroleum and Coal Products	176	950,976	2,180	3,223	5,403
3	33	Primary Metals	34	391,914	5,998	5,529	11,527
4	20	Food Products	9	194,177	21,551	24	21,575
5		Multiple codes 20–39*	23	159,631	4,448	2,492	6,940
6	26	Paper Products	3	125,539	41,846	0	41,846
7	491/493	Electric Utilities	3	88,245	29,415	0	29,415
8	32	Stone/Clay/Glass Products	11	33,578	3,031	22	3,053
9	34	Fabricated Metals Products	3	13,909	4,636	0	4,636
10	35	Industrial Machinery	4	11,844	2,227	734	2,961
11	37	Transportation Equipment	66	10,039	94	58	152
12	495/738	Hazardous Waste Mgt./Solvent Recovery	22	837	14	24	38
13	36	Electronic/Electrical Equipment	2	622	311	0	311
14	30	Rubber and Plastics Products	1	0	0	0	0
15	5169	Chemical Wholesalers	2	0	0	0	0
		Total	**519**	**2,980,600**	**3,486**	**2,257**	**5,743**

Note: Canada and US data only. Mexico data not available for 2000.
* Multiple SIC Codes reported only in TRI.

9.6.5 Benzene Releases from Industrial Sources are decreasing Over Time

Releases on- and off-site and transfers to treatment and sewage of benzene decreased by 34 percent from 1995 to 2000.

- In 1995, over 7.5 million kg of benzene were released and transferred; by 2000, this had fallen to 5.0 million kg. Both air and fugitive releases of benzene dropped dramatically, by more than one-third, from 1995 to 2000. Releases to water and land and transfers to sewage and treatment also dropped.
- The only increases reported over this period were in amounts of benzene injected underground on-site (up 38 percent) and in off-site releases (transfers to disposal) (up 17 percent).
- This trend is based on reporting by industries common to the TRI and NPRI between 1995 and 2000 and thus does not include electric utilities, hazardous waste/solvent recovery facilities or transfers to recycling or energy recovery.

Table 9–29. Summary of Releases and Transfers of Benzene in North America, 1995–2000

	1995	1996	1997	1998
	Number	Number	Number	Number
Total Forms	505	505	504	523
	kg	kg	kg	kg
On-site Releases*	**6,194,380**	**5,667,573**	**5,649,699**	**4,889,877**
Air	6,015,174	5,419,490	5,414,757	4,502,983
Stack Air Releases	2,726,672	2,488,236	2,792,368	2,071,072
Fugitive and Other Air Releases	3,288,502	2,931,254	2,622,389	2,431,911
Surface Water	15,979	13,230	6,169	8,368
Underground Injection	154,217	184,702	199,817	271,043
Land	9,010	50,152	28,526	107,482
Off-site Releases (transfers to disposal)	**32,482**	**28,817**	**43,300**	**85,815**
Total Releases On- and Off-site	**6,226,862**	**5,696,391**	**5,692,999**	**4,975,693**
Transfers Off-site for Further Management	**1,320,049**	**1,133,860**	**1,116,238**	**2,191,006**
Transfers to Treatment (except metals)	1,222,069	1,035,971	1,016,073	2,097,432
Transfers to Sewage (except metals)	97,979	97,889	100,165	93,574
Total Releases and Transfers	**7,546,910**	**6,830,251**	**6,809,237**	**7,166,698**

Note: Canada and US data only. Mexico data not available for 2000. 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.

Table 9–29. (*continued*)

1999	2000	Change 1995–2000	
Number	Number	Number	%
520	538	33	7
kg	kg	kg	%
4,732,216	**4,075,989**	**-2,118,391**	**-34**
4,394,376	3,848,064	-2,167,110	-36
2,174,476	1,821,905	-904,767	-33
2,219,900	2,026,160	-1,262,342	-38
7,092	9,365	-6,614	-41
322,258	212,725	58,509	38
8,342	5,234	-3,776	-42
73,953	**37,939**	**5,457**	**17**
4,806,169	**4,113,927**	**-2,112,934**	**-34**
1,527,242	**854,087**	**-465,962**	**-35**
1,432,172	777,253	-444,816	-36
95,069	76,834	-21,145	-22
6,333,411	**4,968,014**	**-2,578,896**	**-34**

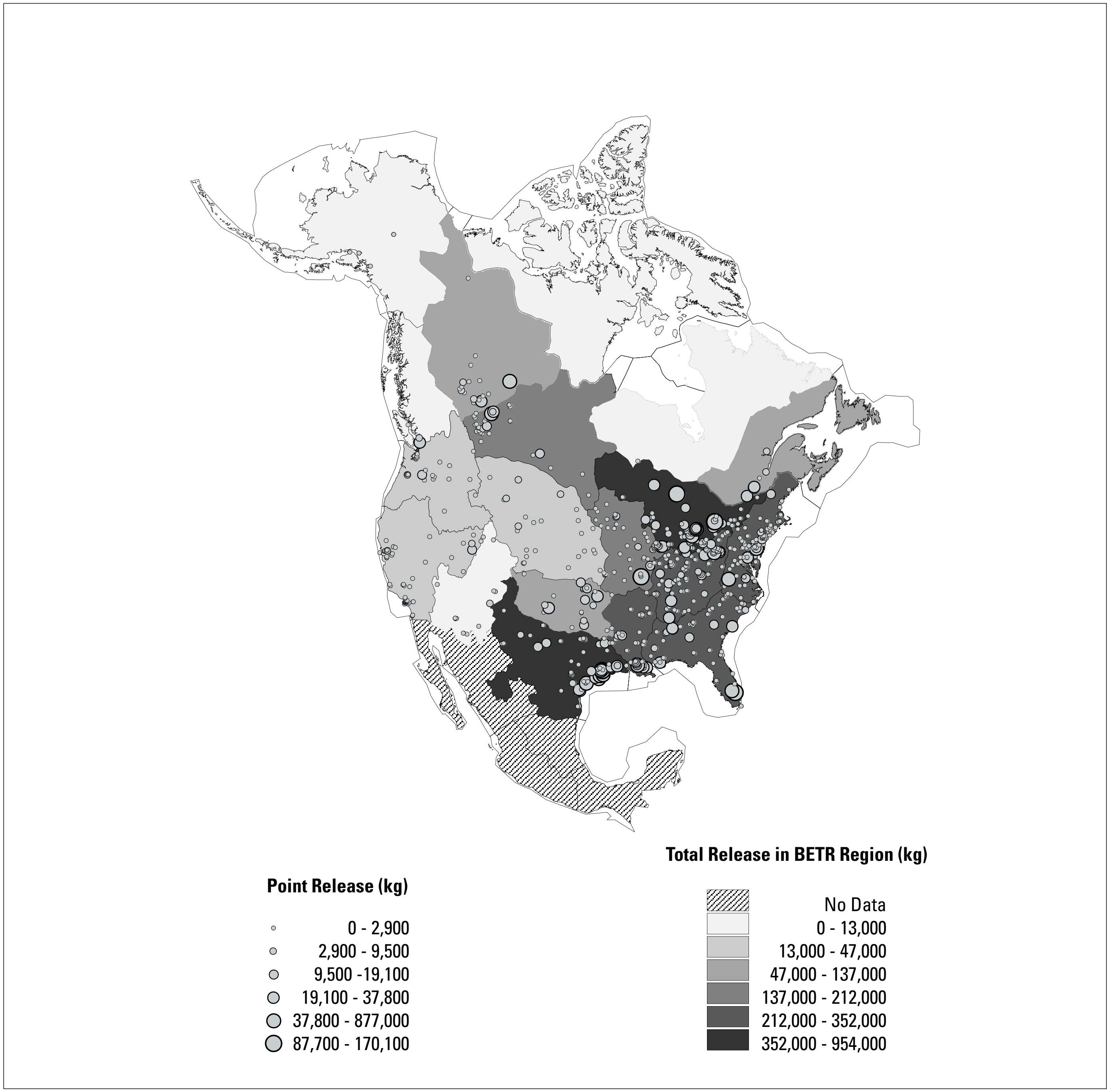
9.6.6 Benzene Levels in the Air are also decreasing in North America

The reduction in releases of benzene from industrial sources has occurred simultaneously with reductions in benzene levels in gasoline and has been reflected in reduced benzene concentrations in the air across North America. In Canada, average benzene levels in Canadian cities have fallen by 49 percent since monitoring began in 1989 (from about 4 µg/m^3 to about 2 µg/m^3) (Environment Canada, 2002). However, benzene levels remain high around gasoline service stations, certain industrial sources such as petroleum refineries, petrochemical facilities, and steel mills. Benzene levels are generally four times higher in city centers than in rural areas.

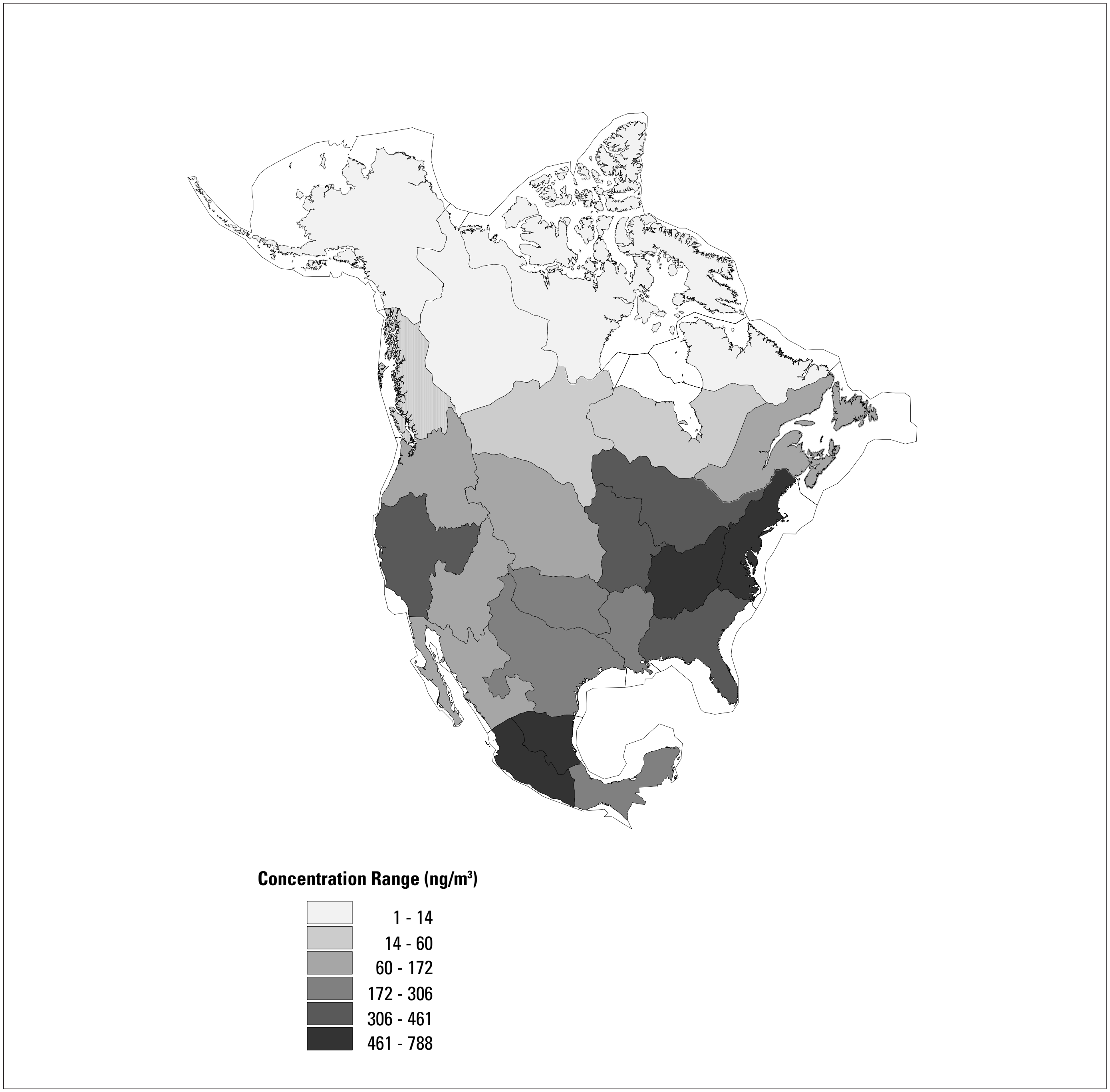
Benzene is the most widely monitored air toxic in the US. Measurements from 95 urban monitoring sites across the US showed, on average, a 47-percent drop in benzene levels from 1996 to 2000. This reduction may reflect new car emission standards, cleaner burning gasoline, and new standards for benzene emitted from oil refineries and chemicals processes (EPA, 2002).

Automatic air monitoring equipment designed to measure benzene and other compounds is scheduled to be installed in Mexico City in 2002 and 2003. Difficulties in calibrating existing monitors limit the ability to track benzene levels in Mexico City.

Map 9–1. PRTR Reported Benzene Emissions to Air in 2000



Map 9–2. Modelled Benzene Concentration in Air due to PRTR and Diffuse Emissions



Note: PRTR data for Mexico not available. Diffuse sources include mobile sources such as emissions from cars and trucks.

Modeling Demonstrates the Importance of Mobile Sources to National Benzene Concentrations and Industrial Sources to Local Communities

Researchers from two academic institutions have developed a continental-scale computer model that incorporates PRTR and other data to map contaminant concentrations and long-range transport across North America. The Berkeley-Trent (BETR) model is the first model detailed enough to predict the fate and the movement of toxics between different regions in North America. Thanks to the assistance of Matthew Macleod and David Woodfine, benzene data from TRI and NPRI for the 2000 reporting year and other data on diffuse sources were used in the BETR model to map concentrations of benzene in North America.

The model demonstrates that mobile sources account for a large amount of the background benzene concentrations across North America. The PRTR data account for a large amount of the higher benzene concentrations in many local communities. The map shows the close correlation between the location of benzene releases and higher benzene concentrations, which is expected since the volatility of benzene reduces the possibility of long-range transport.

Adding human exposure calculations is the next step in the evolution of the BETR model. For more information about the BETR model, please contact Matthew Macleod at <mjmacleod@lbl.gov> or David Woodfine <dwoodfine@trentu.ca>.

9.6.7 Industries and Nongovernmental Groups Work to reduce Releases of Benzene in Local Communities

Montreal, Quebec

The BETR model demonstrated that in some local communities, concentrations of benzene are higher than national levels. For example, benzene levels in the air in the east end of Montreal, Quebec, have historically been the highest in Canada. While motor traffic can account for some benzene emissions, high levels in Montreal's east end are mostly from industrial sources (Germain, 2001). These sources included six oil refineries and tank farms (although four have since closed). A local Montreal environmental group, the Société pour vaincre la pollution or STOP, worked with the municipal government, Environment Canada, and industries to reduce benzene levels in the community. STOP participated in the development of the Canadian Council of Environment Ministers' two guidelines to help reduce fugitive VOC emissions from equipment leaks (in 1993) and from above ground storage tanks (in 1995). STOP worked with the Montreal regional government to strengthen the local bylaw in 2001 to require both guidelines. This resulted in a number of new measures including tougher definitions of leaky valves, better operation and maintenance, improved seals, and floating roofs in storage tanks.

A decrease of 65 percent was observed in the mean benzene level in air at the east end sampling station from 1997 to 2000 (from approximately 11 $\mu g/m^3$ to 5 $\mu g/m^3$) (Gagnon, 2001). This reflects a number of reduction measures including those implemented at the main industrial sources of benzene. Benzene air emissions from Petro-Canada-Raffinerie de Montréal declined from 39,000 kg in 1997 to 26,000 kg in 2000. Similarly, the Produits Shell Canada refinery in East Montréal reduced its benzene air emissions from 25,000 kg in 1997 to 8,500 kg in 2000. These reductions were from fugitive and other releases and not from stack releases, which have always been zero.

Calcasieu Parish, Louisiana

In another community, Calcasieu Parish, Louisiana, in the US, two environmental groups, the Calcasieu League for Environmental Action Now (CLEAN) and the Mossville Environmental Action Network (MEAN) have worked to reduce levels of toxic chemicals, including benzene, in their community.

The industrial complex of Calcasieu Parish consists of 55 industrial facilities that include oil refineries, petrochemical plants, poly vinyl chloride manufacturing facilities, marine terminals, a hazardous waste landfill, and a natural gas/coal fired power plant. Thirty-one facilities reported under the TRI for 2000, and eight reported releases of benzene to air.

Fugitive releases are often greater than stack releases (in some instances, they account for 80 to 98 percent of) and have been identified by the two community groups as a problem. Based on requests from the groups, EPA reviewed the TRI fugitive data, evaluated the effectiveness of the Leak Detection and Repair Program in identifying leaks, and determined the time frame in which the leaks were repaired. The TRI data show that fugitive air releases from the eight facilities decreased by 68 percent from 1995 to 2000. The decrease in fugitive air releases offset the 75-percent increase in stack air releases at these facilities for an overall decrease of 38 percent in total air releases of benzene.

Table 9–30. TRI Facilities in Calcasieu Parish, Louisiana with Benzene Releases to Air, 1995–2000

		On-site Air Releases of Benzene						
		1995			2000			
Facility	City	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total Air Releases (kg)	Stack Air Releases (kg)	Fugitive and Other Air Releases (kg)	Total Air Releases (kg)	Change 1995–2000 (kg)
Citgo Petroleum Corp.	Lake Charles	8,617	36,281	44,898	12,882	12,550	25,432	-19,466
Westlake Petrochemicals Corp.	Sulphur	1	966	966	5,885	1,000	6,886	5,919
Condea Vista, Lake Charles Chemical Complex	Westlake	2,278	7,563	9,840	4,737	1,270	6,008	-3,833
Conoco, Lake Charles Refy.	Westlake	3,220	9,524	12,744	2,885	2,181	5,067	-7,677
Equistar Chemicals L.P., Lake Charles Plant	Sulphur	1,346	2,872	4,218	923	1,380	2,304	-1,914
Calcasieu Refining Co.	Lake Charles	337	3,258	3,595	113	1,079	1,192	-2,402
Westlake Styrene Corp.	Sulphur	281	231	512	744	170	914	402
Pecan Grove Marine Terminal	Sulphur	0	0	0	16	16	32	32
Total for Calcasieu Parish, Louisiana		**16,078**	**60,694**	**76,773**	**28,186**	**19,648**	**47,834**	**-28,939**

In addition to releases, the community was concerned about the additional emissions from accidental releases and upset conditions. Two vinyl chloride facilities in Calcasieu reported accidental releases in 2001: a Sasol facility reported releasing 5,619 pounds (2,554 kg) of benzene in one accident, and the Condea Vista facility reported releasing 107.5 pounds (48.9 kg) of benzene during three accidental releases. In response to data from the community groups demonstrating that accidents and upsets occurred on 30 to 70 percent of days, the EPA initiated the Episodic Initiative with the 11 facilities responsible for almost half of the TRI releases in EPA Region 6 (which includes Louisiana) to identify the root causes of the accidents. Steps have been initiated to implement recommendations to reduce accidental releases.

At the request of CLEAN, the EPA set up open path monitors at the Citgo refinery and the Westlake Styrene plant. The benzene concentration in the air downwind of the refinery was 3.6 ppb. The Louisiana Ambient Air Standard for benzene is 3.76 ppb annual average. Community sampling efforts had identified up to 15 ppb benzene on the highway outside the Citgo refinery. The benzene measurements off-site of the styrene plant were 3.1 ppb upwind and 7.4 ppb (4 to 24 ppb) downwind of the styrene facility. The elevated level upwind was due to the marine loading facilities for refinery products. The styrene plant was identified as a large source of benzene emissions. Community samples off-site of the styrene plant had identified 22 and 870 ppb benzene in the air in a residential area.

CLEAN and MEAN also requested the EPA to use the Trace Atmospheric Gas Analyzer (TAGA) mobile monitoring system in Calcasieu Parish. The van traveled the roads and highways around industrial facilities and in residential areas for 10 days. When the TAGA unit monitored near the Citgo refinery, the air contained 25 to 51 ppb benzene. Near the styrene plant benzene concentrations ranged from 28 to 97 ppb. The data generated by the TAGA unit verified the data previously developed by the community groups.

Based on all of the data compiled by the community and the EPA, four additional toxic monitoring stations were established. The first year's data showed benzene detected in all five stations but below the ambient air standard.

Through the efforts of the community, a large body of data has been developed in Calcasieu Parish and used to work with the EPA for additional enforcement actions, monitoring, and programs that have reduced the concentration of toxic chemicals released into the air.

Mexico City

Academic institutions, in collaboration with the *Instituto Mexicano del Petróleo,* have used a combination of air and passive personal monitors to measure benzene and other compounds in Mexico City. Their work indicates that benzene concentrations vary considerably from place to place in Mexico City. The objective of their latest published work was to evaluate hydrocarbon concentrations, especially benzene, toluene, and xylenes, at street level and in the atmosphere to obtain basic indicators to relate contaminants in the microenvironment to corresponding macro environmental concentration levels. The monitoring sites selected form part of the automatic air monitoring network (RAMA) in Mexico City. The sites included areas of high-volume traffic; concentrations of industrial activity; residential areas or a mixture of residential, commercial, and industrial areas; and sites near specific services such as hospitals or gas stations. Benzene concentrations varied from a minimum of 8 ppb up to 303 ppb in some locations. The mean benzene concentration was 61 ppb (Ortiz, 2002).

Benzene concentrations can also vary within the same neighborhood. Benzene concentrations at the *Universidad Nacional Autónoma de México* averaged 3 ppb, but in the vicinity of a nearby gas station, they were as high as 26 ppb—more than eight times the average. The maximum benzene concentration measured at the gas station was 141 ppb (Humberto *et al.,* in press).

9.6.8 Regulations to Reduce Benzene across North America

Benzene in Gasoline

In gasoline, benzene enhances octane and reduces knock. Benzene in gasoline is a major source of atmospheric benzene. Across North America, governments have moved to reduce the benzene levels in gas as a way of reducing atmospheric concentrations of benzene and thereby reducing human exposure. In Canada, benzene levels in gasoline have historically been as high two percent but this was reduced by about half, to one percent by volume as of July 1999. Benzene levels in conventional US gasoline have averaged approximately 1 percent by volume in 1998-1999, well below the limit of 1.3 percent. The US EPA has designated benzene as a mobile source air toxic and is developing a toxic performance requirement, rather than a specific benzene-content standard. Since 1996, the only two types of gasoline sold in the Valley of Mexico have contained one percent by volume of benzene.

In addition to cleaner fuel, recent regulations have resulted in cleaner vehicles. In the US, the national low emission vehicle program, Tier 2 motor vehicle emission standards, inspection and maintenance programs, and heavy-duty vehicle standards have helped to reduce air toxics. While many of these controls were put in place to reduce ozone and particulate matter to help reduce smog and improve visibility, many of these actions will also result in reductions in air toxics such as benzene. As newer cars with their tougher emission control equipment replace older cars, benzene emissions are likely to decrease across North America. EPA estimates that the new US emission control requirements will reduce emissions of a number of air toxics, including benzene, from highway motor vehicles by up to 75 percent from 1990 levels (EPA, 2002).

Benzene Emissions from Industrial Sources

Across North America, a variety of programs and regulations have reduced benzene emissions from industrial sources. Some of these programs have been geared towards a specific industrial sector, while others have focused specifically on benzene reduction. In the US, new emission regulations have required reductions in a number of sources such as chemical plants, oil refineries, and steel mills that are sources of benzene. For example, the Synthetic Organic Chemical Manufacturing Industry rule is expected to reduce air toxics from this sector by about 90 percent from 1994 levels. A new national emission standard for hazardous air pollutants from certain types of sources at petroleum refineries is estimated to reduce air toxics by 87 percent from current levels when implemented by 2004–2009 (Federal register, 2002).

In Canada, Phase I of the Benzene Canada-wide Standard was signed by the federal and most provincial environment ministers in June 2000 and was designed to reduce benzene emissions by 30 percent by the end of 2000. Part of this plan includes benzene reductions from mobile and industrial sources. Specific measures to reduce benzene from industrial sources include the Strategic Options Process for the Steel Manufacturing Sector: Environment Codes of Practice, a Benzene Memorandum of Understanding between Environment Canada and the Canadian Chemical Producers Association, and negotiated company-specific benzene targets in Environmental Management Agreements with both Dofasco and Algoma Steel. Phase II of the Benzene Canada-wide Standard was signed in October 2001.

Regulations in Mexico

Benzene reduction programs in Mexico focus on mobile sources. The primary measure, begun in 1997, has been to reduce the hydrocarbon content of gasoline. Currently, there are two types of gasoline sold, Premium and Magna, both of which show a concentration of one percent benzene by volume. In addition, all vehicles bought after 1991 must be equipped with a catalytic converter, which also reduces benzene emissions.

Mexico has not enacted specific standards related to benzene from industrial sources. Indirectly, benzene is controlled through VOC emissions standards.

In all, six emissions standards relating to mobile sources or their required fuel quality have been published since 1993, as well as one standard with specifications for liquid and gaseous fuels, one related to the water-oil separators in petroleum refineries, one for vapor recovery systems at gas stations and two standards related to the production and application of paints.

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Key Findings

Mercury and Mercury Compounds

- Reporting on mercury and its compounds changed for the 2000 reporting year in both NPRI and TRI. The threshold for reporting was lowered from approximately 10 tonnes to approximately 5 kg, giving a more complete picture of releases and transfers of mercury from industrial sources.
- All three countries have developed mercury emissions inventories to help provide an overview of sources of mercury to air. In Canada, the major source of air emissions of mercury is estimated to be base metal smelting; in Mexico, it is gold mining and refining; and in the US, it is combustion, particularly from coal-fired power plants. Each country has promulgated regulations to set limits on mercury emissions from specific industrial sectors.
- 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 when these are consumed.
- In 2000, 1,617 facilities in North America reported on releases and transfers of mercury and its compounds. Under the higher threshold in 1999, 76 facilities had reported.
- Reporting on releases and transfers of mercury under the higher threshold can be compared from 1995 to 1999. Total releases on- and off-site decreased by 62 percent from 1995 to 1999. However, on-site releases increased by 40 percent, and air emissions increased by 1 percent during that same time period.

Dioxins and Furans

- 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 are not comparable.
- All three countries have dioxin inventories that estimate releases of dioxins and furans from most sources. Air releases are the major type of release, and waste incinerations and backyard barrel burning are the major sources.
- The inventories show that releases have been decreasing in recent years. Programs in all three countries have helped to reduce releases of dioxins and furans from some major industrial sources.
- Human exposure to dioxins and furans occurs largely through food. Dioxins and furans become incorporated into food when airborne dioxin falls onto plants that are in turn eaten by animals or when waterborne dioxins contaminate fish and aquatic food chains.
- TRI and NPRI reporting requirements for dioxins and furans differ, so the data are not comparable.
- About five percent of all TRI facilities reported on dioxins and furans in 2000. All TRI facilities (that is, manufacturing facilities, electric utilities, and hazardous waste management facilities) with more than 10 employees and meeting a reporting threshold of 0.1 grams per year are required to report on dioxins and furans.
- About 13 percent of all NPRI facilities reported on dioxins and furans in 2000. Depending on their activities or the processes they use, only certain NPRI facilities must report on dioxins and furans. The activities include types of metal smelting, combustion of fossil fuel to generate electricity, certain combustion processes used by the pulp and paper sector, manufacture of portland cement, and others. All amounts are reportable for facilities with 10 employees or more. Other activities (wood preservation and incineration) have no employee limit.

Hexachlorobenzene

- Reports on hexachlorobenzene (HCB) 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 hexachlorobenzene are not comparable.
- A US air emissions inventory of hexachlorobenzene indicated that the manufacture of industrial inorganic chemicals such as silicone products contributed over half of the total of 0.9 tonnes from the US in 1996. The preliminary 1999 Canadian inventory estimated 0.057 tonnes released from all media. Mexico has not yet developed an inventory.
- Hexachlorobenzene stays in the atmosphere a long time and can be transported long distances. Human exposure occurs mainly through eating contaminated fish and plants, breathing HCB in urban air, or contact with pesticides containing HCB. The use of HCB as a pesticide was cancelled in the US in 1984.
- Hexachlorobenzene is a probable carcinogen and considered by some to be among the top 10 percent of compounds most hazardous to ecosystems and human health.
- TRI chemical manufacturers accounted for 81 percent of the total reported releases and transfers of hexachlorobenzene in 2000. One chemical facility reported 25 percent of the US total, all of it transferred to energy recovery.
- The NPRI electric utility sector accounted for 39 percent of the total reported releases and transfers of hexachlorobenzene in 2000 and for half of all air emissions. One primary metals facility accounted for 25 percent of the NPRI total reported amounts, most of which was transferred to treatment.

Polycyclic Aromatic Compounds

- Reports on polycyclic aromatic compounds (PACs) were required for the first time in NPRI at an alternative threshold. Under its PBT program, TRI added two PACs and lowered the threshold for others in 2000. However, reporting requirements differ so the PRTR data on PACs are not comparable.
- The main sources of PACs are combustion byproducts, although some are in use as commercial chemicals. Human exposure to PACs can occur through a variety of means that include breathing air contaminated by sources such as wood stoves, agricultural burning, certain industrial facilities, vehicles, and tobacco smoke.
- Almost 84 percent of the total releases and transfers of PACs listed on NPRI were on-site air emissions.
- For the PACs listed on TRI at the lower thresholds, half of the total releases and transfers were off-site releases (transfers to disposal) and 29 percent were on-site air releases.

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 on the NPRI and TRI lists and are subject to lower reporting thresholds than other chemicals on these lists. However, except for mercury and its compounds, their reporting requirements differ, so the NPRI and TRI data are presented separately and cannot be compared.

10.2 Mercury and its Compounds

For the 2000 reporting year, both NPRI and TRI lowered the reporting threshold for mercury and its compounds from approximately 10 tonnes to approximately 5 kg. This change increased the number of facilities and the amount of mercury reported, resulting in an improved picture of releases and transfers of mercury. Elemental mercury and its inorganic compounds were on the list of chemicals to be reported under the voluntary RETC program for the 2000 reporting year. The following section provides background information on mercury and its compounds and the matched data.

10.2.1 What is Mercury and its Compounds?

Mercury is commonly seen as a shiny, silver-white, odorless, liquid metal. Mercury can exist in a number of different forms but is usually released into the environment as a metal or inorganic compound. Mercury can by converted by bacteria into an organic form, methylmercury, which is one of the most toxic forms of mercury.

10.2.2 Sources of Mercury

Major sources of mercury releases to the environment include incinerators, coal-fired power plants, mining, smelters, cement plants, chlor-alkali plants, and the disposal of consumer products such as switches, thermometers, and lamps. Mercury also can be released from natural sources, such as erosion from mercury-containing rocks and volcanoes.

Mercury is also present in soil and sediments as a result of historical contamination, and these “reservoir” sources can release mercury into the environment. In addition, long-range atmospheric transport of mercury can result in the chemical being deposited in soils and in water from sources that are often very distant.

Mercury has been used in a wide variety of products such as batteries, thermostats, cathode-ray tubes, small appliances, thermometers, barometers, hearing aides, and dental amalgam. The use of mercury in some of these products is declining.

Canada, Mexico and the US have all developed mercury inventories to help provide an overview of sources of mercury to the air. The general principles used to develop these three inventories are similar, but the level of certainty for specific sectors varies widely both within and among these inventories.

In Canada, according to its national mercury inventory, the total amount of mercury emitted to the air was estimated to be 12 tonnes in 2000. The six sectors that accounted for the largest amounts of Canada’s emissions were base metal smelting (2.57 tonnes per year), coal-fired power generation (1.1 tonnes per year), hazardous waste incineration, biomedical waste incineration, municipal solid waste incineration, and sewage sludge incineration (incineration total of 1.2 tonnes per year, CCME 2000).

In the Mexico national mercury inventory, the total estimated amount of mercury emitted to the air was 39.9 tonnes in 1999. Mercury emitted from gold mining and refining was the largest source (11.3 tonnes per year), followed by secondary mercury mining and refining (9.7 tonnes per year), medical waste incinerators (7.2 tonnes per year), chlor-alkali plants (4.9 tonnes per year) and residential boilers (2.3 tonnes per year) (Acosta y Asociados 2001).

In the US, based on the 1997 Mercury Report to Congress, total mercury emissions to the air from anthropogenic sources were 144 tonnes. About 87 percent of this was from combustion sources, including coal-fired electric utilities (33 percent), municipal waste combustion (19 percent), commercial/industrial boilers (18 percent), and medical waste incineration (10 percent). Manufacturing sources, including chlor-alkali production, smelting, secondary mercury production, equipment manufacturers, and other processes accounted for another 10 percent. Area sources such as landfills, paints, mobile sources, and lamp breakage made up 2 percent (EPA 1997).

10.2.3 Health and Environmental Effects of Mercury

Mercury is a persistent bioaccumulative toxic compound, a neurotoxin, and a developmental toxin. Mercury bioaccumulates up the food chain, and so fish and mammals can become highly contaminated. Eating contaminated fish, mammals, or shellfish is one of the main routes of human exposure. Children also can be exposed to mercury *in utero* and through breast milk. Mercury in fish is the most frequent basis for fish consumption guidelines. Large, long-lived predator fish such as swordfish, shark, king mackerel, and some tuna may also be contaminated. Nearly all of the mercury that accumulates in fish is methylmercury.

During the 1950s in Minimata Bay, Japan, people regularly ate fish highly contaminated with methylmercury from an industrial plant. Although mothers often showed no sign of mercury poisoning, their infants showed a range of neurological damage, including mental retardation; impaired speech, sucking, swallowing, and walking; and abnormal reflexes. Children are particularly vulnerable to the toxic effects of mercury because they can receive relatively high doses on a per-kilogram basis, their blood/brain barrier is not completely developed, and their bodies are often in critical windows of development.

Recent epidemiological studies of fish- or mammal-eating populations suggest that lower doses of mercury are associated with more subtle neurological and developmental damage such as impairment of language, attention, and memory. Mercury may cause cancer and damage the stomach, large intestine, brain, kidneys, and lungs (EPA 2002).

The US EPA has set a reference dose—an estimate of the maximum daily exposure level over a lifetime in which no appreciable risks are expected to occur—for methylmercury at 0.1 ug per kg per day. About seven percent of US women of childbearing age consume methylmercury in excess of this dose.

In some communities, such as those in the US and Canadian Arctic and in First Nations lands, fish and mammals make up an important part of the diet. This reliance on fish and mammals can increase the exposure of these residents to mercury. Similarly, some communities in Mexico have increased exposure as a result of historical contamination from mining or smelting.

Mercury contamination can also affect fish-eating wildlife such as otters and loons.

10.2.4 Are Mercury Levels Increasing or Decreasing?

In general, concentrations of mercury in the environment have increased since pre-industrial times but have been decreasing since the 1970s. Concentrations of mercury in air and marine waters in Canada have increased approximately three-fold since pre-industrial times (CCME 2000).

According to studies by the US, it is uncertain whether overall atmospheric mercury levels are currently increasing, decreasing, or stabilizing. Measurements over remote areas in the Atlantic Ocean show increasing levels up until 1990 and a decrease for the period from1990 to 1994. Elemental mercury can stay in the atmosphere for up to a year but may be released back into the atmosphere from the ocean or inland waters. Thus, even if all industrial sources ceased, mercury would continue to be re-emitted from oceans and inland waters for a long period of time. It has been estimated that even if all anthropogenic sources of mercury emissions ceased it would take 15 years or longer to reach pre-industrial levels of mercury in the atmosphere (EPA 1997).

Emissions of mercury from many sources have decreased. In the US, it is estimated that from 1990 to 1995, emissions from municipal-waste incinerators decreased by 50 percent and those from medical waste incinerators declined by 75 percent (EPA 1997). TRI has collected information on mercury releases from large manufacturing facilities since 1988. Total releases from these facilities, including releases to air, water, and land, decreased by 74 percent from 1988 to 1999.

10.2.5 Actions to Reduce Mercury Emissions

The health and environmental effects of mercury have been recognized for many years, and our increasing knowledge of the more subtle health effects of mercury has driven a wide variety of programs to reduce releases of mercury to the environment.

In 1997, Canada and the US signed the Great Lakes Binational Toxics Strategy, committing each country to a 50-percent reduction in the deliberate use of mercury by 2006 and in national releases of mercury to the air and water in the Great Lakes basin (US EPA and Environment Canada, *Great Lakes Binational Toxics Strategy*).

In Canada, the Canadian Council of Environment Ministers has been developing Canada-Wide Standards for mercury, both for sectors emitting significant amounts of mercury and also for products containing mercury. Guidelines for limiting mercury emissions from existing and new sources such as base metal smelters and incinerators have been approved, as have guidelines for products such as mercury-containing lamps and dental amalgam wastes.

In the US, the 1997 EPA Mercury Report to Congress provided a foundation for action. Regulations were passed to control emissions from municipal, medical-waste, and hazardous waste incinerators. Under its PBT program, the EPA is developing a revised National Action Plan for Mercury, which will outline further activities to reduce mercury emissions and contamination.

A number of regulations in Mexico have set limits on mercury emissions from certain sectors such as some incinerators.

A number of international activities are also helping to reduce emissions and exposures. The CEC's Sound Management of Chemicals Program has developed a North American Regional Action Plan for mercury, which commits Canada, the US and Mexico to specific activities. The New England Governors/Eastern Canadian Premiers developed a mercury action plan designed to virtually eliminate the discharge of anthropogenic mercury into the environment. The United Nations Economic Commission for Europe has developed a Convention on Long-range Transboundary Air Pollution, which sets out reporting requirements for mercury, lead, and cadmium.

10.2.6 PRTR Data on Releases and Transfers of Mercury and its Compounds from Industrial Sources, NPRI and TRI

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 threshold for reporting. 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.

Table 10–1. Summary of Total Reported Amounts of Releases and Transfers in North America for Mercury and its Compounds, NPRI and TRI, 2000

	North America		NPRI*		TRI		NPRI as % of North American	TRI as % of North American
	Number		Number		Number		Total	Total
Total Facilities	1,617		150		1,467		9	91
Total Forms	1,645		150		1,495		9	91
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**		
On-site Releases	**151,870**	**22**	**8,372**	**13**	**143,498**	**23**	**6**	**94**
Air	74,150	11	5,510	9	68,640	11	7	93
Surface Water	1,103	0.2	67	0.1	1,037	0.2	6	94
Underground Injection	1,090	0.2	26	0.04	1,064	0.2	2	98
Land	75,527	11	2,770	4	72,757	11	4	96
Off-site Releases	**432,870**	**62**	**25,495**	**40**	**407,375**	**64**	**6**	**94**
Transfers to Disposal (except metals)	0	0	0	0	0	0	--	--
Transfers of Metals**	432,870	62	25,495	40	407,375	64	6	94
Total Reported Releases On- and Off-site	**584,740**	**84**	**33,867**	**53**	**550,873**	**87**	**6**	**94**
Off-site Releases Omitted for Adjustment Analysis***	23,758		1,736		22,022		7	93
Total Releases On- and Off-site (adjusted)**	**560,982**		**32,131**		**528,851**		**6**	**94**
Off-site Transfers to Recycling	**113,616**	**16**	**30,546**	**47**	**83,070**	**13**	**27**	**73**
Total Reported Amounts of Releases and Transfers	**698,356**	**100**	**64,413**	**100**	**633,943**	**100**	**9**	**91**

Note: Canada and US data only. Mexico data not available for 2000. 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.

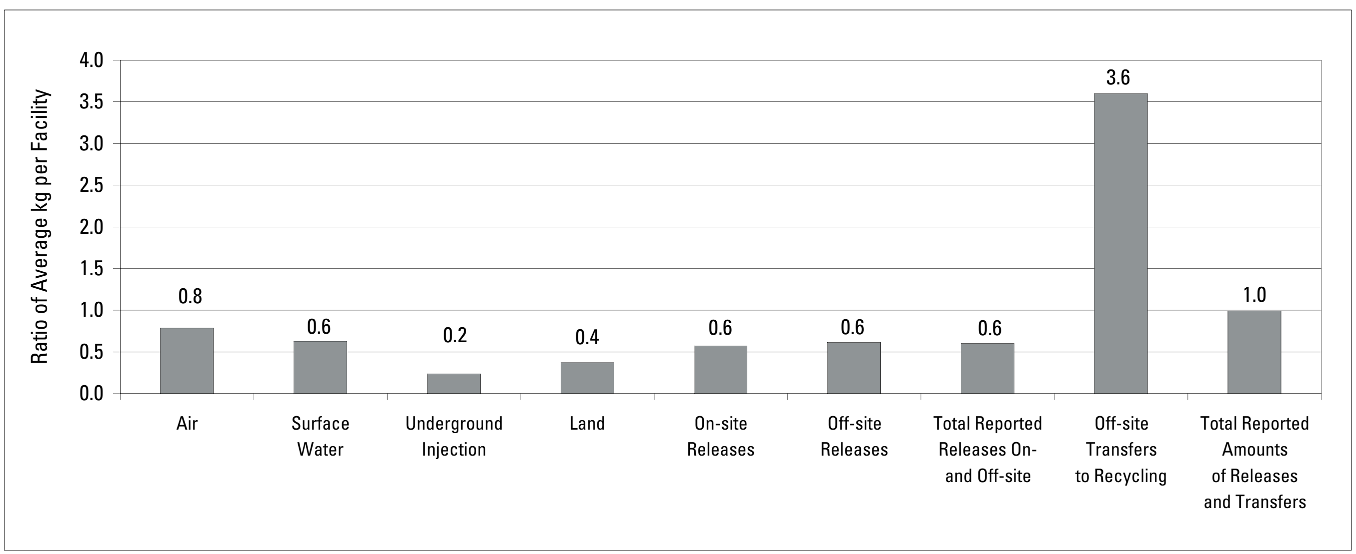
* The sum of air, surface water, underground injection and land releases in NPRI does not equal the total on-site releases because in NPRI on-site releases of less than 1 tonne may be reported as an aggregate amount.

** 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 10–1. NPRI/TRI Ratio of Average Releases and Transfers of Mercury and its Compounds per Facility, 2000



Releases and Transfers, 2000

- In 2000, 1,617 facilities—150 in NPRI and 1,467 in TRI—reported over 698,000 kg of mercury and its compounds released or transferred.
- Total reported releases were 84 percent of the total, including 11 percent as on-site air emissions and less than one percent each as releases to water and underground injection.
- Almost 433,000 kg were sent off-site for disposal, accounting for 62 percent of all reported releases and transfers. Another 76,000 kg (11 percent of the total) were on-site land releases.
- Sixteen percent of the total (114,000 kg) was sent off-site for recycling. NPRI facilities reported one-quarter of all transfers to recycling (31,000 kg). Almost half (47 percent) of the total reported releases and transfers of mercury and its compounds reported by NPRI facilities was sent for recycling.

Overall, NPRI and TRI facilities reported approximately the same average releases and transfers of mercury and its compounds per facility.

- However, NPRI facilities reported more than 3.5 times the transfers to recycling on average than did TRI facilities.
- Total releases on- and off-site for NPRI facilities were just over half the average per facility of that for TRI facilities.
- Average on-site air emissions per facility were closer to the same in TRI and NPRI, with average per-facility air emissions of 37 kg in NPRI and 47 kg in TRI, a ratio of 0.8.

Ten states and provinces accounted for three-quarters of the total reported amounts of releases and transfers of mercury and its compounds in 2000.

- One state, Texas, reported a total of almost 279,000 kg or 40 percent of all releases and transfers. Texas facilities reported the largest air emissions, with 9,000 kg or 12 percent of the total air emissions for 2000. They also reported the largest off-site releases.
- Alabama reported the largest on-site land releases, with over 15,000 kg or 20 percent of all on-site land releases.
- Massachusetts and Quebec both reported transferring over 17,000 kg to recycling.

Table 10–2. Releases and Transfers of Mercury and its Compounds in North America, States/Provinces with Largest Total Reported Amounts, 2000

	On-site Releases					
State/Province	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)
Texas	9,001	29	312	3,755	13,097	263,600
Massachusetts	155	0	0	2	157	27,613
Illinois	2,723	8	0	4,749	7,481	28,792
Pennsylvania	4,528	11	0	3,791	8,330	27,253
Quebec	911	17	0	190	1,119	7,927
Ontario	1,398	9	0	2,146	3,553	9,535
Washington	264	23	0	100	388	11,482
Alabama	2,989	23	9	15,297	18,318	1,106
Oregon	209	0	0	7,281	7,491	168
Ohio	5,415	46	336	2,289	8,086	2,428
Subtotal	**27,595**	**167**	**657**	**39,601**	**68,020**	**379,902**
% of Total	**37**	**15**	**60**	**52**	**45**	**88**
Total	**74,150**	**1,103**	**1,090**	**75,527**	**151,870**	**432,870**

Note: Canada and US data only. Mexico data not available for 2000. 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 10–2. (*continued*)

Total Reported Releases On- and Off-site		Total Off-site Transfers to Recycling	Total Reported Amounts of Releases and Transfers	
kg	Rank	(kg)	kg	Rank
276,697	1	2,136	278,833	1
27,769	4	17,897	45,666	2
36,272	2	2,938	39,210	3
35,583	3	888	36,471	4
9,046	12	17,497	26,542	5
13,087	7	11,691	24,778	6
11,869	8	8,900	20,769	7
19,425	5	30	19,455	8
7,659	15	11,441	19,100	9
10,514	9	8,429	18,943	10
447,922		**81,847**	**529,769**	
77		**72**	**76**	
584,740		**113,616**	**698,356**	

- Hazardous-waste management facilities reported the largest amounts of releases and transfers of mercury and its compounds in 2000, with over 453,000 kg or 65 percent of the total.
- Electric utilities reported the second-largest total and the largest on-site releases to air of mercury and its compounds (almost 45,000 kg or 61 percent of total air releases).

Table 10–3. Releases and Transfers of Mercury and its Compounds in North America, Industries with Largest Total Reported Amounts, 2000

		On-site Releases					
US SIC Code	Industry	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)
495/738	Hazardous Waste Mgt./Solvent Recovery	741	1	868	40,493	42,103	347,520
491/493	Electric Utilities	44,997	599	0	21,806	67,402	8,146
33	Primary Metals	7,032	188	0	4,091	11,312	42,048
28	Chemicals	9,565	85	33	4,689	14,372	15,690
36	Electronic/Electrical Equipment	662	0	0	0	662	3,053
--	Multiple codes 20–39*	676	13	0	113	802	11,041
30	Rubber and Plastics Products	5	0	0	0	5	73
32	Stone/Clay/Glass Products	5,799	1	116	1,132	7,048	28
29	Petroleum and Coal Products	2,601	51	4	107	2,763	2,726
38	Measurement/Photographic Instruments	30	2	0	13	45	663
	Subtotal	**72,108**	**941**	**1,020**	**72,445**	**146,514**	**430,987**
	% of Total	**97**	**85**	**94**	**96**	**96**	**100**
	Total	**74,150**	**1,103**	**1,090**	**75,527**	**151,870**	**432,870**

Note: Canada and US data only. Mexico data not available for 2000.
* Multiple SIC Codes reported only in TRI.

Table 10–3. (*continued*)

Total Reported Releases On- and Off-site		Total Off-site Transfers to Recycling	Total Reported Amounts of Releases and Transfers	
kg	Rank	(kg)	kg	Rank
389,623	1	63,845	453,468	1
75,548	2	1,263	76,812	2
53,360	3	7,863	61,222	3
30,062	4	8,787	38,849	4
3,715	8	15,286	19,001	5
11,843	5	560	12,403	6
78	18	11,316	11,394	7
7,076	6	107	7,183	8
5,490	7	364	5,854	9
708	11	3,352	4,060	10
577,502		**112,742**	**690,244**	
99		**99**	**99**	
584,740		**113,616**	**698,356**	

One hazardous waste facility in Texas reported almost 262,000 kg or 38 percent of total reported amounts of releases and transfers of mercury and its compounds in North America in 2000. This facility, Waste Management Inc. in Port Arthur, Texas, reported transferring mercury for disposal to another facility owned by the same company located in Carlyss, Louisiana. The Waste Management facility in Carlyss did not report to TRI for 2000.

Table 10–4. Facilities in US and Canada with Largest Total Releases and Transfers of Mercury and its Compounds, 2000

					On-site Releases					
North American Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)
	US									
1	Waste Management Inc.	Port Arthur, TX		495/738	391	0	0	0	391	261,555
2	Clean Harbors of Braintree Inc., Clean Harbors Inc.	Braintree, MA		495/738	0	0	0	0	0	26,532
3	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	59	0	0	0	59	24,535
4	Clean Harbors Services Inc., Clean Harbors Inc.	Chicago, IL		495/738	0	0	0	0	0	20,634
5	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	0	0	0	14,523	14,523	824
	Canada									
6	Services Safety-Kleen (Québec) Ltée, Centre de transfert de Thurso	Thurso, QC	77	495/738	0	0	0	0	0	4,372
14	Ivaco Rolling Mills	L'Orignal, ON	29	33	2	0	0	0	2	6,068
18	Stablex Canada Inc., Centre de traitement de résidus industriel	Blainville, QC	77	495/738	0	0	0	49	49	0
22	GE Lighting, Canada, Oakville Lamp Plant	Oakville, ON	33	36	42	0	0	0	42	108
23	Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	Thorold, ON	49	495/738	0	0	0	0	0	283

Table 10–4. (*continued*)

Total Reported Releases On- and Off-site (kg)	Total Off-site Transfers to Recycling (kg)	Total Reported Amounts of Releases and Transfers (kg)
261,946	0	261,946
26,532	17,728	44,260
24,594	0	24,594
20,634	2,164	22,799
15,347	0	15,347
4,372	9,280	13,652
6,069	251	6,320
49	5,000	5,049
151	4,139	4,290
283	3,894	4,177

Releases and Transfers, 1998–1999

The amounts of mercury and its compounds reported in 1999 do not compare with those reported in 2000 because of differences in threshold and in facilities required to report in 2000 but not in 1999.

- For 1999, 76 facilities in the matched industry sectors reported on releases and transfers of mercury and its compounds, while 1,617 facilities reported under the lowered thresholds in 2000.
- In the one year from 1998 to 1999, total releases and transfers of mercury and its compounds more than doubled, from over 195,000 kg to almost 400,000 kg.
- TRI facilities reported an overall increase of 167,000 kg, mainly as on-site land releases and off-site releases (including transfers to land disposal). One hazardous waste management facility, the Safety-Kleen Grassy Mountain facility in Grantsville, Utah, reported an increase of 163,000 kg in on-site land releases.
- For NPRI facilities, the increase was mainly in transfers to recycling, which rose from 4,000 kg in 1998 to 34,000 kg. One hazardous waste management facility, Stablex Canada, Inc., in Blainville, Quebec, reported transfers to recycling of 30,000 kg in 1999 and none in 1998. Both off-site releases and on-site air emissions more than doubled in NPRI from 1998 to 1999.

Table 10–5. Total Releases and Transfers of Mercury and its compounds in North America, 1998–1999

	North America			
	1998	1999	Change 1998–1999	
	Number	Number	Number	%
Facilities	53	76	23	43
Forms	53	77	24	45
	kg	kg	kg	%
On-site Releases*	**94,637**	**219,330**	**124,693**	**132**
Air	7,529	7,957	428	6
Surface Water	136	95	-41	-30
Underground Injection	0	0	0	--
Land	86,955	211,268	124,313	143
Off-site Releases (Transfers of Metals)	**31,702**	**84,004**	**52,302**	**165**
Total Reported Releases On- and Off-site	**126,339**	**303,334**	**176,995**	**140**
Off-site Transfers to Recycling	**69,107**	**96,296**	**27,189**	**39**
Total Reported Amounts of Releases and Transfers	**195,446**	**399,630**	**204,184**	**104**
	NPRI			
	1998	1999	Change 1998–1999	
	Number	Number	Number	%
Facilities	7	12	5	71
Forms	7	12	5	71
	kg	kg	kg	%
On-site Releases*	**514**	**1,717**	**1,203**	**234**
Air	437	1,621	1,184	271
Surface Water	60	20	-40	-67
Underground Injection	0	0	0	--
Land	0	66	66	--
Off-site Releases (Transfers of Metals)	**4,904**	**9,881**	**4,977**	**101**
Total Reported Releases On- and Off-site	**5,418**	**11,598**	**6,180**	**114**
Off-site Transfers to Recycling	**3,513**	**34,268**	**30,755**	**875**
Total Reported Amounts of Releases and Transfers	**8,931**	**45,866**	**36,935**	**414**
	TRI			
	1998	1999	Change 1998–1999	
	Number	Number	Number	%
Facilities	46	64	18	39
Forms	46	65	19	41
	kg	kg	kg	%
On-site Releases	**94,123**	**217,613**	**123,490**	**131**
Air	7,092	6,336	-756	-11
Surface Water	76	75	-1	-1
Underground Injection	0	0	0	--
Land	86,955	211,202	124,247	143
Off-site Releases (Transfers of Metals)	**26,798**	**74,123**	**47,325**	**177**
Total Reported Releases On- and Off-site	**120,921**	**291,736**	**170,815**	**141**
Off-site Transfers to Recycling	**65,594**	**62,028**	**-3,566**	**-5**
Total Reported Amounts of Releases and Transfers	**186,515**	**353,764**	**167,249**	**90**

Note: Canada and US data only. Mexico data not available for 1998–1999. Data include 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.

Table 10–6. Total Releases On- and Off-site of Mercury and its compounds in North America, 1995–1999

	North America						
	1995	1996	1997	1998	1999	Change 1995–1999	
	Number	Number	Number	Number	Number	Number	%
Facilities	40	42	38	42	55	15	38
Forms	41	42	38	42	56	15	37
	kg	kg	kg	kg	kg	kg	%
On-site Releases*	**8,104**	**8,331**	**7,501**	**9,924**	**11,364**	**3,260**	**40**
Air	7,472	7,828	6,637	7,223	7,576	104	1
Surface Water	155	253	195	136	95	-59	-38
Underground Injection	3	4	19	0	0	-3	-100
Land	473	244	645	2,548	3,682	3,209	679
Off-site Releases (Transfers of Metals)	**119,633**	**28,868**	**26,975**	**21,040**	**36,624**	**-83,009**	**-69**
Total Releases On- and Off-site	**127,737**	**37,200**	**34,476**	**30,964**	**47,988**	**-79,749**	**-62**
	NPRI						
	1995	1996	1997	1998	1999	Change 1995–1999	
	Number	Number	Number	Number	Number	Number	%
Facilities	7	9	8	7	12	5	71
Forms	7	9	8	7	12	5	71
	kg	kg	kg	kg	kg	kg	%
On-site Releases*	**46**	**37**	**244**	**514**	**1,540**	**1,494**	**3,248**
Air	26	27	52	437	1,510	1,484	5,708
Surface Water	6	8	2	60	20	14	233
Underground Injection	0	0	0	0	0	0	--
Land	12	0	184	0	0	-12	-100
Off-site Releases (Transfers of Metals)	**19,259**	**9,617**	**3,486**	**4,904**	**9,676**	**-9,583**	**-50**
Total Releases On- and Off-site	**19,305**	**9,654**	**3,730**	**5,418**	**11,216**	**1,306**	**39**
	TRI						
	1995	1996	1997	1998	1999	Change 1995-1999	
	Number	Number	Number	Number	Number	Number	%
Facilities	33	33	30	35	43	10	30
Forms	34	33	30	35	44	10	29
	kg	kg	kg	kg	kg	kg	%
On-site Releases	**8,058**	**8,294**	**7,257**	**9,410**	**9,824**	**1,766**	**22**
Air	7,446	7,801	6,585	6,786	6,066	-1,380	-19
Surface Water	149	245	193	76	75	-73	-49
Underground Injection	3	4	19	0	0	-3	-100
Land	461	244	461	2,548	3,682	3,221	699
Off-site Releases (Transfers of Metals)	**100,374**	**19,251**	**23,489**	**16,136**	**26,948**	**-73,426**	**-73**
Total Releases On- and Off-site	**108,432**	**27,546**	**30,746**	**25,546**	**36,772**	**-71,660**	**-66**

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 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.

Releases On- and Off-site, 1995–1999

Data on releases on- and off-site of mercury and its compounds have been collected from the manufacturing industries since 1995. These data do not include reporting from electric utilities, hazardous-waste facilities and coal mines, since they did not have to report to TRI until 1998.

- From 1995 to 1999, total releases on- and off-site of mercury and its compounds decreased by 62 percent because of a decrease in off-site releases. Much of this decrease was due to reporting by one facility, Zinc Corp. of America's Monaca Smelter in Monaca, Pennsylvania, which reported 85,000 kg in off-site releases in 1995 and 7,000 kg in 1999.
- On-site releases of mercury and its compounds increased by 40 percent from 1995 to 1999, mainly as increases in on-site land releases by TRI facilities and on-site air emissions by NPRI facilities.

10.3 Dioxins and Furans

This year, for the first time, both TRI and NPRI required the reporting of dioxins and furans. The following section provides background information on dioxins and furans and analyses this first year of dioxin-and-furan data from TRI and NPRI.

10.3.1 What are Dioxins and Furans?

Dioxins and furans are a family of 210 substances often formed as a byproduct of combustion. Dioxins and furans are persistent, bioaccumulative and toxic compounds (PBTs). Some 17 members of the dioxins and furans family are considered more toxic than the others. Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) are among the most toxic compounds of the group of dioxins and furans. The 2,3,7,8-PCDDs are known carcinogens and evidence suggests that other dioxin-like compounds may be as well. PCDDs and PCDFs have been linked to developmental, respiratory, reproductive, and cardiovascular disorders. They are also suspected endocrine disrupters.

10.3.2 Sources of Dioxins and Furans

Dioxins and furans are often formed during incomplete combustion. Based on dioxin inventories, two sources stand out as major contributors to total air releases of dioxins and furans:

- waste incineration (25 percent in Canada, 55 percent in US) and
- backyard barrel burning (20 percent in Canada, 21 percent in US and 22 percent in Mexico)

Other common sources of dioxins and furans include residential wood burning stoves, metallurgic process such as iron sintering, coke production, electric arc furnaces, foundries and smelters, some chemical manufacturing processes, industrial boilers, and utilities. Dioxins and furans can also be contaminants in some pesticides and chlorinated solvents. Other sources of dioxins and furans include natural sources such as forest fires and volcanoes, contaminated soils and sediments, and long-range transboundary air pollution.

The relative importance of a particular source varies from region to region and country to country. For example, conical burners, which burn waste in Newfoundland, contributed 27 percent of Canada's total dioxin air releases in 1999. This unique source makes Newfoundland the second-highest province for releases of dioxins and furans in Canada, after Ontario. Pulp and paper mills in British Columbia burning wood that has been soaking in salt water contribute five percent of Canada's total air releases. Incineration accounts for a higher percentage of the US total amount of dioxins and furans than in Canada or Mexico, probably due the larger number of incineration facilities. In Mexico, agricultural waste burning accounted for 48 percent of the total estimated amount of dioxins and furans released in 2000. Twenty percent of the dioxin-and-furan releases from agricultural burning come from two states, Chiapas and Jalisco (Cenica 2002).

Canada, Mexico and the US have developed inventories of dioxin sources. These inventories are constantly updated as knowledge of the sources improves and as existing sources reduce their emissions. They also provide a useful starting point in prioritizing actions and programs to reduce dioxin emissions to the environment. The categories used to describe the sources differ among inventories. The time periods, methods, and assumptions used to estimate releases also vary from inventory to inventory. For these reasons, it is difficult to compare the dioxin inventories in the three countries.

Canada's inventory covers releases of dioxins and furans to air, land, and water, and in solid waste, estimated for three years, 1990, 1997 and 1999. In 1999, total dioxin and furan releases to air, land and water were 186 grams-iTEQ.[1] Conical burners accounted for 27 percent and waste incineration for 25 percent of releases to air. It was also estimated that an additional 1,000 grams-iTEQ of dioxins and furans was released in solid waste from pentachlorophenol (used as a wood preservative), in ash from the burning of salt-laden wood by the pulp and paper sector, and from out-of-service landfills in 1999. To download Canada's inventory, see <www.ec.gc.ca/dioxin>.

The US inventory of sources presents dioxins and furans release estimates for 1987 and 1995. The US inventory presents results in both grams and iTEQ. Total dioxin-and-furan releases to air, land, and water were approximately 3,000 grams-iTEQ in 1995. Municipal solid waste incinerators accounted for 38 percent, backyard refuse barrel burning for 19 percent, and medical waste incineration for 14 percent of dioxin-and-furan releases in 1995. The US inventory is available at <www.epa.gov/ncea/dioxin.htm>.

In Mexico, INE's National Environmental Research and Training Center (Cenica) has developed a draft inventory of dioxins and furans. Total estimated emissions in Mexico were 461 grams-iTEQ for 2000. The most important sources were agricultural burning (48 percent), residential landfill burning (25 percent) and backyard trash burning (22 percent) (Cenica 2002).

According to the US and Canadian inventories, most dioxins and furans released into the environment are released to air (88 percent in Canada and 95 percent in US). However, the amounts in the inventories are not directly comparable as they are based on different categories, time periods, and estimation methods.

[1] TEQ is the amount in grams of each individual dioxin/furan congener multiplied by a toxic equivalency factor (an index number that compares the toxicity of each congener to that of the most toxic). These individual TEQs for each congener are then added together to give one overall number, the total TEQ for the mixture.

In addition to national inventories, ambient air monitoring of dioxins and furans is also in place in the US and Canada, and is starting in Mexico. The US has established a National Dioxin Air Monitoring Network to measure dioxins in ambient air at several locations across the US. The results for 1998–1999 illustrate a six-fold variation in the amount of dioxins in the air at different rural and agricultural sites, with average annual air concentrations ranging from 4 femtograms (1 fg=10^{-15} grams) per cubic meter of dioxins and furans at Lake Scott in Kansas—expressed as TEQ WHO (toxic equivalence expressed using toxic equivalency factors developed for the World Health Organization)—to 25 fg/m^3 at Monmouth, Illinois. Dioxin concentrations at all sites also varied throughout the year, with concentrations increasing up to nine times for some sampling weeks in the winter (Cleverly *et al.,* 2000). This may be due to changes in weather patterns, which bring dioxins from urban areas into rural areas.

10.3.3 Health and Environmental Effects of Dioxins and Furans

Dioxins and furans are a family of chemicals with the potential to produce a range of adverse effects in humans and wildlife. Some members of this family are considered to be carcinogens and suspected to be neurotoxicants, developmental toxicants, and endocrine disruptors. Dioxins and furans can alter the fundamental growth and development of cells and so cause adverse reproductive and developmental effects, cancer, immune-system suppression, and chloracne (a severe acne-like condition that can persist for years). For more information on the potential health effects of these chemicals see US EPA, *2002 Priority PBTs; Dioxins and Furans*. Office of Pollution Prevention and Toxics. Persistent, Bioaccumulative and Toxic (PBT) Program, available at <www.epa.gov/pbt/> and Scorecard *About the Chemicals*, available at <www.scorecard.org>.

Human exposure to dioxins occurs largely through food, especially those rich in fat; dairy products, meat, fish, and eggs are primary sources of exposure. Ingestion of contaminated soil, breathing of contaminated air, and adsorption through the skin are minor sources of exposure (Environment Canada 2002). Dioxins and furans become incorporated into food through airborne dioxin falling onto plants eaten by animals, through feedstock, and through fish and aquatic food chains.

Dioxins can be transferred to newborns through breast milk. Because of their small size and the potential for dioxin to accumulate in the fat of breast milk, newborns can have some of the highest exposures to dioxins and furans. It is estimated that a breast-fed infant can exceed the US ATSDR's recommended limit for chronic exposure by a factor of 34-53 (GBPSR 2002). Similarly, Canadian exposure estimates indicate that exclusively breastfed infants under 6 months of age living in the Great Lakes region are likely to be exposed to almost six times the Tolerable Daily Intake of dioxin of 10 picograms per kg per day (Haines 1998).

Based on recent assessments, dioxins and furans are now considered more hazardous than previously. Newer estimates of the lifetime cancer risk from dioxins have increased 10 fold over earlier estimates. The new lifetime cancer risk from dioxins is considered as high as between 1 in 1,000 and 1 in 100 (EPA 2000). The Tolerable Daily Intake has recently been revised downward from 10 picograms per kg per day to between one and four picograms per kg per day.

Most people have detectable levels of dioxins in their body that have accumulated over their lifetime. Some individuals, such as people who eat a lot of fish or live in areas such as the Arctic, are often exposed to dioxins at higher concentrations.

The US Dioxin Exposure initiative is filling critical gaps regarding the sources of dioxins that contribute to human exposure. The goal is to quantitatively link dioxin sources to general population exposure. Two approaches are being followed. The first approach, called Sources Forward, identifies sources and follows along pathways of transport and deposition. The second approach, called Human Exposure Backwards, starts with the identification of human body burdens and works backwards to model intake. Under this program, significant new information on sources, pathways and dioxin contamination in food has been published. See <www.epa.gov/ncea/dioxin.htm>.

For more information on the potential health effects of these chemicals see US EPA, *2002 Priority PBTs; Dioxins and Furans,* Office of Pollution Prevention and Toxics, Persistent, Bioaccumulative and Toxic (PBT) Program, available at <www.epa.gov/ pbt/> and Scorecard, *About the Chemicals*, available at <www.scorecard.org>.

10.3.4 Are Levels of Dioxins and Furans Increasing or Decreasing?

In North America, starting around the 1920s, dioxin-and-furan levels increased significantly. This increase continued until the 1960s and early 1970s, but levels have generally declined since then. However, concentrations of dioxins and furans can remain high in certain areas historically affected by point-source emissions, and dioxins and furans can travel far from their source.

According to the US dioxin inventories, the total estimated amount of dioxins released to air, land, and water was 3,044 grams-iTEQ in 1995 in the US. This was a 77-percent decrease from the 12,829 grams-iTEQ released in 1987. Similarly, Canada has seen an 80-percent decrease in estimated emissions of dioxins and furans to air, land, and water, from 900 grams-iTEQ in 1990 to 186 grams-iTEQ in 1999. In Mexico, estimated emissions of dioxins and furans have decreased by approximately 20 percent, from 582 grams-iTEQ in 1995 to 461 grams-iTEQ in 2000 (Cenica 2002). The amounts in the inventories are not directly comparable as they are based on different categories, time periods, and estimation methods.

10.3.5 Actions to Reduce Emissions of Dioxins and Furans

In the past decade, a great number of programs have been developed to reduce emissions of dioxins and furans. Based on an assessment of dioxins and furans, the government of Canada declared PCDDs and PCDFs toxic under the Canadian

Environmental Protection Act in 1990 and slated them for virtual elimination of releases to the environment. A Canada-wide Standard for Dioxin and Furans was developed by the provincial and federal environment ministers as a plan to reduce dioxin and furan emissions. Six sectors accounting for about 80 percent of national emissions were identified as a priority for action. These six sectors are waste incineration, burning salt-laden wood in coastal pulp and paper boilers in British Columbia, residential wood combustion, iron sintering, electric arc furnace steel manufacturing, and conical waste combustion in Newfoundland.

The EPA has regulations for major well-defined industrial sources of dioxins under its Clean Air Act, Clean Water Act, and Resources Conservation and Recovery Act. In 1994, the EPA released a draft of the dioxin reassessment, a comprehensive overview of sources, exposure estimates, health assessment and risk characterization. Based on reviews, these documents were revised and released in 2001. This effort is expected to help determine if additional actions or regulations are needed.

Actions to Reduce Emissions from Incinerators

In Canada, under the Canada-wide Standards process, emission guidelines have been developed for new and existing facilities that are expected to reduce emissions by 86 percent from this sector.

In the US, emission limits for dioxins based on maximum achievable control technology were passed in 1995 for municipal waste incinerators and, in 1997, for medical waste incinerators, with an expected reduction in dioxin emissions of over 95 percent. New regulations to limit dioxin emissions from hazardous waste incinerators, cement kilns burning hazardous waste, and some lightweight aggregate kilns will also drive down dioxin emissions.

Mexico is developing regulations to reduce emissions of toxins from waste incineration and cement kilns. In 2002, Mexico published a standard that regulates kilns burning mixtures of fuels, such as used tires or formulated fuel. The emissions limit for dioxins and furans is 0.2 ng TEQ per cubic meter.

Actions to Reduce Emissions from Pulp And Paper Mills

Both Canada and the US have required reductions of releases of dioxins and furans to water from pulp and paper mills. In Canada, these emissions have been reduced by more than 99 percent as a result of federal and provincial regulations and voluntary company initiatives passed in the 1990s. It is expected that dioxin discharges to water will be reduced by 96 percent in the US as a result of pulp and paper regulations proposed in 1993 and promulgated in 1998.

10.3.6 PRTR Data on Releases and Transfers of Dioxins and Furans from Industrial Sources, NPRI and TRI, 2000

Dioxins and furans were added to the NPRI and TRI lists for 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, including reporting threshold, which industry sectors report, and what is reported. Therefore, direct comparison of the data on dioxins and furans is not possible.

What is Reported

For TRI, dioxins and furans are reported in total grams for the 17 congeners and the distribution of the 17 congeners is 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 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 for each of the 17 congeners are shown in **Table 10–7**. Thus, the amount in grams of each congener present is multiplied by its TEF. The sum of the individual TEQs for all 17 congeners is reported to NPRI. This is done for each type of release and transfer.

Table 10–7. 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 10–8. 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, 2000
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	
32	Stone/Clay/Glass Products	X
33	Primary Metals	X
34	Fabricated Metals Products	X
35	Industrial Machinery	X
36	Electronic/Electrical Equipment	X
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	
5171	Petroleum Bulk Terminals	X

Reporting Threshold

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 byproduct 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.

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. 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.

Industry Sectors Required to Report

For TRI, all facilities with 10 or more employees that are required to report to TRI for any listed substance 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.

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.

Table 10–9. NPRI Dioxin/Furan Reporting Requirements

Reporting Threshold: 0 grams

Amounts Reported in grams-iTEQ

Industrial Activities: reporting restricted to certain activities

Specific activities (10-employee threshold):	**Primary Industry Sectors Reporting these Activities in 2000**
Base metals smelting (copper, lead, nickel, zinc)	Metal mining, Primary metals
Smelting of secondary lead or secondary aluminum	Primary metals
Sintering process in manufacture of iron	Primary metals
Electric arc furnace in steel making and steel foundries	Primary metals
Production of magnesium	Primary metals
Manufacture of Portland cement	Stone/Clay/Glass Products
Production of chlorinated organic solvents	Chemicals
Combustion of fossil fuel to produce electricity	Electric utilities, Paper products
Combustion of salt-laden logs in pulp and paper sector	Paper products
Combustion of fuel in kraft liquor boilers in pulp and paper sector	Paper products
Specific activities (No employee threshold):	
Wood preservation using pentachlorophenol	Lumber and wood products
Non-hazardous/hospital/hazardous waste/sewage sludge incineration	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 2000 <www.ec.gc.ca/pdb/npri/documents/Guide_2000.pdf> for complete description of activities.

* Facilities not required to report under TRI.

Table 10–10. Facilities Reporting Dioxins/Furans, TRI and NPRI, 2000

		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 TRI Facilities Reporting Dioxins/Furans			Number of NPRI Facilities Reporting Dioxins/Furans	
US SIC Code	Industry	Number of Facilities Reporting to TRI	Number of Facilities	% of all Facilities	Number of Facilities Reporting to NPRI	Number of Facilities	% of all Facilities
	Manufacturing Industry Sectors						
20	Food Products	1,710	24	1	129	1	0.8
21	Tobacco Products	27	2	7	0	0	0
22	Textile Mill Products	292	1	0.3	10	0	0
23	Apparel	15	0	0	3	0	0
24	Lumber and Wood Products	857	103	12	154	64	42
25	Furniture and Fixtures	324	2	0.6	23	0	0
26	Paper Products	496	164	33	140	51	36
27	Printing	202	0	0	23	0	0
28	Chemicals	3,745	135	4	445	9	2
29	Petroleum and Coal Products	550	58	11	37	0	0
30	Rubber and Plastics Products	1,888	2	0.1	175	0	0
31	Leather	75	0	0	4	0	0
32	Stone/Clay/Glass Products	757	112	15	58	14	24
33	Primary Metals	1,948	110	6	179	48	27
34	Fabricated Metals Products	2,893	1	0.0	196	3	2
35	Industrial Machinery	1,109	2	0.2	38	1	3
36	Electronic/Electrical Equipment	1,197	1	0.1	55	1	2
37	Transportation Equipment	1,302	5	0.4	122	2	2
38	Measurement/Photographic Instruments	257	1	0.4	1	0	0
39	Misc. Manufacturing Industries	302	0	0	75	2	3
--	Multiple Manufacturing Codes 20–39*	1,248	42	3	--	--	--
	Other Industry Sectors						
08	Forestry Products	NA			2	1	50
09	Fishing, Hunting, Trapping	NA			1	1	100
10	Metal Mining**	97	10	10	59	5	8
12	Coal Mining	81	1	1	1	0	0
13	Oil and Gas Exploration	NA			110	2	2
14	Nonmetallic Minerals Mining	NA			15	1	7
47	Transportation Services	NA			1	1	100
49	Sewerage Systems	NA			86	7	8
491/493	Electric Utilities	706	465	66	43	33	77
495/738	Hazardous Waste Mgt./Solvent Recovery	215	16	7	37	6	16
50	Wholesale Durable Goods	NA			28	1	4
5169	Chemical Wholesale Distributors	467	0	0	6	0	0
5171	Petroleum Bulk Terminals	566	2	0.4	1	0	0
80	Health and Allied Services	NA			3	2	67
95	Air, Water, & Solid Waste Management	NA			53	41	77
--	No codes 20–39***	158	11	7	--	--	--
	Total	**23,484**	**1,270**	**5**	**2,313**	**297**	**13**

NA = Not applicable (Sector not required to report).
* Multiple SIC codes reported only in TRI.
** Metal mining sector must report chemicals in waste rock in TRI but not in NPRI.
*** Includes US Federal Facilities and facilities reporting no SIC code or an invalid SIC code.

For the 2000 reporting year, 1,270 TRI facilities and 297 NPRI facilities reported on dioxins and furans—about five percent of all TRI facilities and about 13 percent of NPRI facilities. Despite the difference in reporting requirements in the various sectors, about one-third of pulp and paper facilities in both TRI and NPRI reported on dioxins and furans. Also, two-thirds of TRI electric utilities and over three-quarters of NPRI electric utilities reported. Sectors with a higher percentage reporting to NPRI than to TRI included lumber and wood products, primary metals, stone/clay/glass products, and hazardous waste management facilities.

In NPRI, over three-quarters 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 2000, 1,270 TRI facilities reported almost 99,900 grams of dioxins and furans of on- and off-site releases. Of these facilities, 827 reported their distribution of the 17 congeners. These 827 facilities reported almost 96,800 grams of dioxins and furans, or 97 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*, it has been assumed that the distribution applies to total releases at the facility. The 827 facilities, then, released on and off-site the equivalent of 1,098 grams-iTEQ of dioxins and furans in 2000.

Table 10–11. Total Releases On-site and Off-site of Dioxin/Furans in Grams-iTEQ, TRI, 2000 (Ordered by Grams-iTEQ)

		All Forms Submitted for Dioxins/Furans		Forms with Dioxins/Furans Distribution					
		Total Releases On- and Off-site in Grams		Total Releases On- and Off-site in Grams			Total Releases On- and Off-site in Grams-iTEQ*		
US SIC Code	Industry	Number of Facilities	Grams	Number of Facilities	Grams	% of Total	Number of Facilities	Grams-iTEQ*	% of Total
28	Chemicals	135	89,134.54	94	87,864.43	91	94	682.49	62
33	Primary Metals	110	4,309.90	79	4,168.30	4	79	214.46	20
491/493	Electric Utilities	465	2,039.70	306	1,577.99	2	306	111.65	10
32	Stone/Clay/Glass Products	112	506.55	52	293.26	0.3	52	39.86	3.6
26	Paper Products	164	491.07	140	376.89	0.4	140	14.15	1.3
--	Multiple codes 20–39**	42	1,254.98	28	1,169.70	1	28	13.50	1
495/738	Hazardous Waste Mgt./Solvent Recovery	16	776.08	10	73.69	0.1	10	12.03	1.1
57	Petroleum Bulk Terminals	2	102.80	1	102.80	0.11	1	2.69	0.24
29	Petroleum and Coal Products	58	52.23	21	33.21	0.03	21	2.12	0.2
10	Metal Mining	10	16.79	9	16.09	0.02	9	2.08	0.19
24	Lumber and Wood Products	103	1,116.02	65	1,087.79	1	65	1.98	0
20	Food Products	24	19.24	16	8.41	0.01	16	0.42	0.04
38	Measurement/Photographic Instruments	1	5.54	1	5.54	0.01	1	0.18	0.02
37	Transportation Equipment	5	1.61	2	1.19	0.001	2	0.10	0.01
--	No codes 20–39	11	4.99	2	0.95	0.001	2	0.05	0.005
34	Fabricated Metals Products	1	0.82	1	0.82	0.001	1	0.03	0.003
35	Industrial Machinery	2	12.64	ND	ND	--	ND	ND	--
12	Coal Mining	1	5.67	ND	ND	--	ND	ND	--
25	Furniture and Fixtures	2	3.11	ND	ND	--	ND	ND	--
36	Electronic/Electrical Equipment	1	1.00	ND	ND	--	ND	ND	--
30	Rubber and Plastics Products	2	0.94	ND	ND	--	ND	ND	--
21	Tobacco Products	2	0.45	ND	ND	--	ND	ND	--
22	Textile Mill Products	1	0.12	ND	ND	--	ND	ND	--
	Total	**1,270**	**99,857**	**827**	**96,781**	**100**	**827**	**1,098**	**100**

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.

Table 10–12. Total Releases On- and Off-site of Dioxins/Furans, TRI, Industries (US 4-digit SIC code) with Largest Grams-iTEQ, 2000

US SIC Codes 4-digit	Industry	Number of Facilities Reporting to TRI	Number of Facilities Reporting Dioxin/ Furan TEQ Distribution	Total Releases On- and Off-site Grams-iTEQ*	Total Releases On- and Off-site % of Total
2816	Inorganic Pigments	39	12	360.06	33
Multiple within 28	Inorganic Pigments and other chemicals		3	29.49	3
	Subtotal for 2816	**62**	**15**	**389.54**	**35**
2869	Industrial Organic Chemicals, nec	354	15	172.30	16
Multiple within 28	Industrial Organic Chemicals and other chemicals		29	137.72	13
2869 and 26	Chemicals/Paper		2	0.24	0.02
2869 and 22	Chemicals/Textiles		1	0.05	0.005
2869 and 20	Chemicals/Food		1	0.03	0.003
2869 and 34	Chemicals/Fabricated Metals		1	0.03	0.002
	Subtotal for 2869	**713**	**49**	**310.36**	**28**
3341	Secondary Nonferrous Metals	60	40	150.72	14
Multiple within 33	Secondary Nonferrous Metals and other primary metals		6	0.69	0.06
3341 and 30/34/35/36	Primary Metals/Plastics/Fabricated Metals/ Industrial Machinery/Electric Equipment		4	9.62	1
	Subtotal for 3341	**220**	**50**	**161.03**	**15**
	Total	**23,484**	**831**	**1,097.81**	**100**

* Grams-iTEQ calculated from reported weight, congener distribution, and toxic equivalency factors developed by international convention adopted in 1989.

The industries with the largest amounts of grams-iTEQ reported were the chemical sector, with 682 grams-iTEQ, and the primary metals sector, with 214 grams-iTEQ. Within the chemical manufacturing sector, facilities reporting as manufacturers of inorganic pigments reported a total of 390 grams-iTEQ, or over 57 percent of the total for the chemical manufacturing sector.

The facility with the largest reported grams-iTEQ of dioxins and furans was the Oxy Vinyls L.P. La Porte VCM Plant in La Porte, Texas, which reported the equivalent of 162 grams-iTEQ under the US SIC code 2869 (Industrial Organic Chemicals).

Within the primary metals sector, the secondary nonferrous metals sector (smelting and refining copper, zinc, nickel or lead from scrap metals) reported 151 grams-iTEQ or 70 percent of the total for the primary metals sector. The facility within this sector with the largest reported grams-iTEQ of dioxins and furans was Imco Recycling, Inc., in Morgantown, Kentucky, with 25 grams-iTEQ.

The 25 facilities with the largest releases (grams-iTEQ) in 2000 accounted for 81 percent of total releases of dioxins and furans reported to TRI.

Table 10–13. TRI Facilities with Largest Releases On- and Off-site of Dioxins/Furans (Grams-iTEQ), 2000

										Total Releases On- and Off-site	
Rank	Facility Name	City/State	US SIC Codes						NPRI Reporting (based on US SIC Code)	Grams*	Grams-iTEQ**
1	Oxy Vinyls L.P. LaPorte VCM Plant, Occidental Petroleum Corp.	LaPorte, TX	2869							6,384.22	162.12
2	DuPont Edgemoor	Edgemoor, DE	2816						Such a facility probably would not be required to report under NPRI reporting parameters.	38,676.09	96.30
3	Millennium Inorganic Chemicals Inc., Hawkins Point Plant, Millennium Chemicals Inc.	Baltimore, MD	2816						Such a facility probably would not be required to report under NPRI reporting parameters.	2,663.79	89.32
4	DuPont Delisle Plant	Pass Christian, MS	2816						Such a facility probably would not be required to report under NPRI reporting parameters.	19,493.17	82.70
5	DuPont Johnsonville Plant	New Johnsonville, TN	2816						Such a facility probably would not be required to report under NPRI reporting parameters.	6,100.88	71.32
6	Dow Chemical Co. Freeport	Freeport, TX	2812	2813	2819	2821	2869	2891		4,678.06	71.08
7	Northern States Power Co.	Becker, MN	4911							724.73	68.33
8	PPG Inds. Inc.	Lake Charles, LA	2812	2816	2869					210.10	24.82
9	Imco Recycling Inc.	Morgantown, KY	3341							251.30	24.66
10	TXI Ops. L.P., Hunter Cement Plant, TXI Ops. L.P.	New Braunfels, TX	3241							145.51	22.79
11	City of Fremont Department of Utilities, Lon D. Wright Power	Fremont, NE	4931							429.00	19.77
12	Waupaca Fndy. Inc., Plant 5, Budd Co.	Tell City, IN	3321							106.70	18.37
13	Imco Recycling of Ohio Inc., Imco Recycling Inc.	Uhrichsville, OH	3341							167.01	16.37
14	Dow Chemical Co., Louisiana Div., Dow Chemical Co.	Plaquemine, LA	2812	2821	2869					1,590.56	15.71
15	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	3339							2,284.00	13.87
16	Dow Chemical Co. Midland Ops.	Midland, MI	2899	2819	2821	2834	2869	2879		326.75	12.87
17	Wabash Alloys L.L.C., Connell L.P.	Wabash, IN	3341							130.69	12.05
18	Bethlehem Steel Corp. Sparrows Point Div., Bethlehem Steel Corp.	Sparrows Point, MD	3312	3316						76.80	10.81
19	Southwire Co.	Carrollton, GA	3341	3357	3569					1,093.04	9.59
20	Bethlehem Steel Corp. Burns Harbor Div., Bethlehem Steel Corp.	Burns Harbor, IN	3312							82.20	8.95
21	Safety-Kleen (Aragonite) Inc., Safety-Kleen Corp.	Aragonite, UT	4953							19.10	8.95
22	Louisiana Pigment Co. L.P.	Westlake, LA	2816						Such a facility probably would not be required to report under NPRI reporting parameters.	349.76	8.48
23	Millennium Chemicals Ashtabula Plant 2, Millennium Chemicals Inc.	Ashtabula, OH	2816						Such a facility probably would not be required to report under NPRI reporting parameters.	160.88	7.95
24	Wabash Alloys L.L.C., Connell L.P.	Benton, AR	3341							28.68	7.65
25	Formosa Plastics Corp. Louisiana, Formosa Plastics Corp. USA	Baton Rouge, LA	2821	2869	2812					441.01	7.47
	Subtotal									**86,614.02**	**892.30**
	% of Total									**87**	**81**
	Total									**99,856.78**	**1,097.81**

* Grams are reported to TRI. For breakdown by media of releases in grams see www.epa.gov/triexplorer.

** Calculation of grams-iTEQ based on distribution of dioxin/furan congeners reported to TRI and toxic equivalency factors developed by international convention adopted in 1989. Breakdown by media of releases in grams-iTEQ not available.

Table 10–14. Total Releases On- and Off-site of Dioxins/Furans by Industry, NPRI, 2000

US SIC Code	Industry	Number of Forms	Total Reported Releases On- and Off-site Grams-iTEQ*	% of Total
26	Paper Products	51	129.03	36
33	Primary Metals	48	117.49	33
95	Air, Water, & Solid Waste Management	41	50.98	14
28	Chemicals	9	36.10	10
491/493	Electric Utilities	33	10.69	3
495/738	Hazardous Waste Mgt./Solvent Recovery	6	6.33	2
24	Lumber and Wood Products	64	4.59	1
49	Sewerage Systems	7	1.91	1
32	Stone/Clay/Glass Products	14	1.85	1
34	Fabricated Metals Products	3	0.05	0
50	Wholesale Durable Goods	1	0.04	0
08	Forestry Products	1	0.01	0
10	Metal Mining	5	0.01	0
13	Oil and Gas Exploration	2	0.00	0
37	Transportation Equipment	2	0.00	0
39	Misc. Manufacturing Industries	2	0.00	0
80	Health and Allied Services	2	0.00	0
09	Fishing, Hunting, Trapping	1	0.00	0
14	Nonmetallic Minerals Mining	1	0.00	0
20	Food Products	1	0.00	0
35	Industrial Machinery	1	0.00	0
36	Electronic/Electrical Equipment	1	0.00	0
47	Transportation Services	1	0.00	0
	Total	**297**	**359.08**	**100**

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.

NPRI Reporting on Dioxins and Furans

The paper products industry in NPRI reported the largest total releases of grams-iTEQ of dioxins and furans in 2000, followed by the primary metals sector and the air, water and solid waste management sector.

Of the 59 pulp mills reporting to NPRI in 2000, 38 mills reported on dioxins and furans. These mills reported a total of 67 grams-iTEQ of releases, or over half of the total reported by the NPRI paper products industry. Thirty of the pulp mills reported combusting fuel in Kraft liquor boilers. There were 10 NPRI facilities in the pulp and paper sector that reported combusting salt-laden logs, all located in British Columbia.

Within the primary metals industry, the secondary nonferrous metals sector reported the largest total releases. This is the same subsector that reported the largest releases (grams-iTEQ) in TRI. The four facilities in this subsector reported 79 grams-iTEQ or two-thirds of the total releases reported by the NPRI primary metals industry. One of the four was a secondary lead smelter, and three were secondary aluminum smelters.

Forty-one municipal incinerators (in the air, water and solid waste management industry) reported releases of dioxins and furans totaling 51 grams-iTEQ in 2000. Thirty-five of the 41 were located in Newfoundland and accounted for all but 0.20 grams-iTEQ from this industry. Municipal incinerators do not report to TRI.

Table 10–15. Total Releases On- and Off-site of Dioxins/Furans, Industry Sectors with Largest Reported Amounts, NPRI, 2000

US SIC Code		NPRI Facilities	NPRI Facilities Reporting Dioxins/ Furans	Total Releases On- and Off-site	
4-digit	Industry	Number	Number	Grams-iTEQ*	% of Total
2611	Pulp Mills	59	38	67.23	19
2621	Paper Mills	37	9	60.88	17
2676	Sanitary Paper Products	6	1	0.88	0.2
2631	Paperboard Mills	10	2	0.03	0.01
2679	Converted Paper Products, nec	5	1	0.01	0.003
	Subtotal	**117**	**51**	**129.03**	**36**
3341	Secondary Nonferrous Metals	8	4	78.60	22
3312	Blast Furnaces and Steel Mills	18	12	27.60	8
3325	Steel Foundries, nec	11	5	6.02	2
3339	Primary Nonferrous Metals, nec	14	12	3.09	1
3313	Electrometallurgical Products	3	1	1.46	0.4
3324	Steel Investment Foundries	9	4	0.27	0.1
3365	Aluminum Foundries	7	2	0.26	0.1
3331	Primary Copper	2	2	0.19	0.1
3321	Gray and Ductile Iron Foundries	15	3	0.00	0
3353	Aluminum Sheet, Plate, and Foil	5	1	0.00	0
3354	Aluminum Extruded Products	7	1	0.00	0
3399	Primary Metal Products, nec	12	1	0.00	0
	Subtotal	**111**	**48**	**117.49**	**33**
9511	Air, Water, & Solid Waste Management	57	41	50.98	14
	Total for all Dioxins/Furans Reports	**2,419**	**297**	**359.08**	**100**

* Grams-iTEQ as reported are based on toxic equivalency factors developed by international convention adopted in 1989.

Table 10–15. (*continued*)

Type of Activity								
Incineration	Base metals smelting	Secondary lead or aluminum smelting	Sintering process to manufacture iron	Electric arc furnace	Produce magnesium	Combust fossil fuel in boiler unit for electricity	Combust salt-laden logs/pulp & paper sector	Combust fuel in Kraft liquor boilers/pulp & paper sector
Number	Number	Number	Number	Number	Number	Number	Number	Number
8	0	0	0	0	0	6	7	30
2	0	0	0	0	0	0	2	6
0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
11	**0**	**0**	**0**	**0**	**0**	**6**	**10**	**38**
0	0	4	0	0	0	0	0	0
0	0	2	1	9	0	0	0	0
0	0	0	0	5	0	0	0	0
0	8	3	0	0	3	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	0	4	0	0	0	0
0	0	2	0	0	0	0	0	0
0	2	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0
0	11	13	1	20	3	0	0	0
41	0	0	0	0	0	0	0	0
130	**14**	**16**	**1**	**21**	**3**	**43**	**10**	**39**

The NPRI facility reporting the largest releases of dioxins and furans was the Wabash Alloys plant in Mississauga, Ontario. This secondary aluminum smelter reported releasing 54 grams-iTEQ of dioxins and furans in 2000. The facility with the second-largest releases was a paper mill, Pacifica Papers in Port Alberni, British Columbia, reporting 41 grams-iTEQ from the combustion of salt-laden logs. The 25 facilities with the largest releases on- and off-site (grams-iTEQ) in 2000 accounted for 85 percent of total releases of dioxins and furans reported to NPRI.

Table 10–16. NPRI Facilities with Largest Releases On- and Off-site of Dioxins/Furans (Grams-iTEQ), 2000

Rank	Facility Name	City	Number of Employees	SIC Codes Canada	SIC Codes US	Comparable TRI Reporting	Activity Reported
1	Wabash Alloys	Mississauga, ON	73	2999	3341		Smelting of secondary aluminum
2	Pacifica Papers, Alberni Specialties	Port Alberni, BC	840	2712	2621		Combustion of salt-laden logs
3	Howe Sound Pulp and Paper Limited Partnership	Port Mellon, BC	588	2711	2611		Combustion of salt-laden logs, combustion of fossil fuel in a boiler unit to produce electricity, combustion of fuel in kraft liquor boilers
4	Dow Chemical Canada Incorporated	Fort Saskatchewan, AB	1,695	3711	2812		Production of chlorinated organic solvents, combustion of fossil fuel in a boiler unit to produce electricity
5	Wabash Alloys	Guelph, ON	32	2999	3341		Smelting of secondary aluminum
6	Pacifica Papers Inc.	Powell River, BC	917	2712	2621		Non-hazardous solid waste incineration, combustion of salt-laden logs, combustion of fuel in kraft liquor boilers
7	AltaSteel Ltd.	Edmonton, AB	347	2919	3312		Operation of electric arc furnace in steel manufacture
8	Skeena Cellulose Inc., Skeena Pulp Operations	Port Edward, BC	750	2711	2611		Combustion of salt-laden logs, combustion of fossil fuel in a boiler unit to produce electricity, combustion of fuel in kraft liquor boilers, non-hazardous solid waste and sewage sludge incineration
9	Exploits Regional Services Board, Solid Waste Disposal Site	Grand Falls-Windsor, NF	3	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
10	Conception Bay North Incinerator Association	Harbour Grace, NF	5	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
11	Pope & Talbot Ltd., Harmac Pulp Operations	Nanaimo, BC	608	2711	2611		Combustion of salt-laden logs, combustion of fuel in kraft liquor boilers
12	Stelco Inc., Hilton Works	Hamilton, ON	6,800	2919	3312		Manufacture of iron using sintering process
13	Canadian Waste Services Inc., SWARU Incinerator	Hamilton, ON	38	4911	4911	Facility not required to report under TRI	Non-hazardous solid waste incineration
14	Ispat Sidbec Inc., Aciérie	Contrecoeur, QC	331	2912	3325		Operation of electric arc furnace in steel manufacture
15	Gerdau MRM Steel Inc.	Selkirk, MB	465	2919	3312		Operation of electric arc furnace in steel manufacture
16	Norske Skog Canada Mackenzie Pulp Ltd., Mackenzie Pulp Operations	Mackenzie, BC	242	2711	2611		Combustion of fuel in kraft liquor boilers
17	Norske Skog Canada Limited, Crofton Pulp and Paper	Crofton, BC	1,100	2711	2611		Combustion of salt-laden logs, combustion of fossil fuel in a boiler unit to produce electricity, combustion of fuel in kraft liquor boilers
18	Norske Skog Canada, Elk Falls Mill	Campbell River, BC	1,000	2711	2611		Combustion of salt-laden logs, combustion of fuel in kraft liquor boilers
19	Town of Wabush Incinerator	Wabush, NF	2	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
20	Selkirk Forest Products	Galloway, BC	20	2591	2491		Wood preservation using pentachlorophenol
21	Town of Marystown, Waste Disposal Site Jean de Baie	Marystown, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
22	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	594	4911	4911		Combustion of fossil fuel in a boiler unit to produce electricity
23	Town of Holyrood Incinerator	Holyrood, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
24	Town of Channel - Port aux Basques - Incinerator	Port aux Basques, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
25	Town of Deer Lake Incinerator	Deer Lake, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
	Subtotal						
	% of Total						
	Total						

Note: Grams-iTEQ are reported to NPRI and are based on toxic equivalency factors developed by international convention adopted in 1989.

Table 10–16. NPRI (*continued*)

On-site Releases						
Air Grams-iTEQ	Surface Water Grams-iTEQ	Underground Injection Grams-iTEQ	Land Grams-iTEQ	Total On-site Releases Grams-iTEQ	Total Off-site Releases Grams-iTEQ	Total Releases On- and Off-site Grams-iTEQ
2.51	0.00	0.00	0.00	2.51	51.02	53.53
0.96	0.00	0.00	0.00	0.96	39.90	40.86
1.23	0.00	0.00	35.35	36.57	0.00	36.57
0.02	0.00	18.57	16.94	35.53	0.00	35.53
1.58	0.00	0.00	0.00	1.58	23.48	25.06
0.30	0.00	0.00	0.00	0.30	19.45	19.75
0.20	0.00	0.00	5.63	5.82	4.77	10.59
9.17	0.00	0.00	0.00	9.17	0.00	9.17
8.01	0.00	0.00	0.00	8.01	0.00	8.01
7.17	0.00	0.00	0.00	7.17	0.00	7.17
0.09	0.88	0.00	5.98	6.95	0.00	6.95
6.25	0.00	0.00	0.00	6.25	0.00	6.25
5.49	0.00	0.00	0.00	5.49	0.00	5.49
3.69	0.00	0.00	1.09	4.78	0.00	4.78
0.65	0.00	0.00	3.67	4.31	0.00	4.31
0.00	0.00	0.00	4.20	4.20	0.00	4.20
0.67	0.00	0.00	3.22	3.89	0.00	3.89
0.55	0.00	0.00	3.16	3.71	0.00	3.71
3.52	0.00	0.00	0.00	3.52	0.00	3.52
0.00	0.00	0.00	0.00	0.00	3.42	3.42
3.26	0.00	0.00	0.00	3.26	0.00	3.26
0.01	0.00	0.00	3.22	3.23	0.00	3.23
2.58	0.00	0.00	0.00	2.58	0.00	2.58
2.56	0.00	0.00	0.00	2.56	0.00	2.56
2.56	0.00	0.00	0.00	2.56	0.00	2.56
63.03	**0.88**	**18.57**	**82.46**	**164.91**	**142.04**	**306.95**
61	**75**	**100**	**95**	**78**	**95**	**85**
103.92	**1.17**	**18.57**	**86.60**	**210.25**	**148.83**	**359.08**

Comparing the Two Approaches to Reporting

The reporting of dioxins and furans differs between TRI and NPRI. This provides a unique opportunity for countries to learn from each other's PRTRs. Looking at NPRI reporting, municipal incinerators are identified as an important source of dioxins and furans. However, this sector does not report to TRI. By specifying particular activities that are required to report dioxins and furans, the NPRI approach can obtain information from these sources; however, it may miss other less known sources of dioxins and furans. An examination of the TRI reporting suggests that inorganic pigments facilities are sources of dioxins and furans and that they should be considered for addition to the NPRI list.

Also, reporting in grams plus a distribution of the congeners, as is done under TRI, provides the opportunity to calculate TEQ based on the most recent information available. TEQs have been updated through research into the effects of the different congeners in recent years. When facilities only report grams-TEQ as under NPRI, then if the TEQ basis were to change, the amounts would no longer be comparable from year to year. Both TRI and NPRI are investigating the units of reporting for dioxins and furans.

The three countries annually review progress and have developed an *Action Plan To Enhance the Comparability of Pollutant Release and Transfer Registers in North America*. As part of this process, the dioxin/furan data will be reviewed.

10.4 Hexachlorobenzene

This year for the first time, NPRI required the reporting of hexachlorobenzene (HCB) and TRI lowered the threshold for this chemical. HCB is on the list of chemicals to be reported under the RETC program, to which reporting has been voluntary. The following section provides background information on hexachlorobenzene and analyses the first year of hexachlorobenzene data from TRI and NPRI.

10.4.1 What is Hexachlorobenzene?

Hexachlorobenzene is a white, crystalline solid created by the chlorination of benzene. HCB is a persistent, bioaccumulative and toxic compound. It degrades very slowly, having a half-life of from three to six years in soil and up to four years in the air.

10.4.2 Sources of Hexachlorobenzene

HCB is an inadvertent byproduct of the manufacturing of some pesticides, silicone products, the surface coating of metal cans, and chemical solvents and other chlorine containing chemicals; it is created during the production of metallic magnesium and during removal of hydrogen gas from molten aluminum at aluminum foundries; and it is produced during incineration of municipal and hazardous wastes, during petroleum refining, and in the chlorinating treatment of process water and wastewater. HCB is a trace contaminant in pesticides such as pentachlorophenol, used for treating wood. In the past, HCB was commonly used as a fungicide on wheat and other seeds and as a pesticide used to prevent wheat smut. In addition, HCB was used in industrial processes, to make fireworks and ammunition, and to manufacture synthetic rubber.

Because of its persistence, HCB can be transported long distances from its source. Global sources may therefore contribute loadings of HCB to North America.

In 1996, US air emissions of hexachlorobenzene were estimated to be 0.9 tonnes, with almost half of this total, 0.43 tonnes, emitted from the manufacturing of industrial inorganic chemicals such as silicone products. Over 20 percent of the total air HCB emissions came from emissions from the surface coating of metal cans (0.19 tonnes), 11 percent from pesticide application (0.10 tonnes), and 7 percent from chlorine production (0.06 tonnes) (EPA 2000).

In Canada, a preliminary HCB inventory estimated releases of HCB to all media to be 0.057 tonnes in 1999 (Environment Canada 1999). A HCB inventory has not yet been developed for Mexico.

10.4.3 Health and Environmental Effects of Hexachlorobenzene

HCB is considered a probable carcinogen. It is suspected of acting as a cardiovascular or blood toxicant, an endocrine toxicant, a gastrointestinal or liver toxicant, an immunotoxicant, a kidney toxicant, a neurotoxicant, a reproductive toxicant, and a skin or sense organ toxicant (Scorecard 2002). According to Scorecard's hazard rankings, HCB is considered one of the most hazardous compounds (worst 10 percent) to ecosystems and human health.

People can be exposed to HCB through a variety of pathways; these include eating contaminated fish and shellfish, eating foods or drinking milk from animals that have been exposed to HCB-contaminated feed, breathing HCB in urban air, or contact with some commonly used pesticides that contain HCB. Infants can be exposed during pregnancy and through breast milk.

HCB bioaccumulates in fish, birds, and animals that eat lichens or fish. Historically, concentrations of HCB in fish and wildlife have been high in the Great Lakes, the Gulf region, and the Arctic.

10.4.4 Actions to Reduce Hexachlorobenzene Emissions

In 1994, HCB was declared toxic under the Canadian Environmental Protection Act. As a Track 1 substance, the goal is virtual elimination of HCB from the environment. Canada has proposed a ban on the manufacture, use or import of HCB and of products containing HCB above a specified concentration. HCB levels in pesticides are being reviewed.

Identification and control of HCB contamination is a newer issue in Mexico. Mexico's actions will be guided by several international commitments such as the Stockholm Convention and the CEC's North American Regional Action Plan on

Dioxins, Furans and Hexachlorobenzene (under development). Many of the actions that reduce dioxin and furan releases, such as reductions of emissions from incinerators and cement kilns, may also help to reduce HCB emissions.

In the US, the use of HCB as a pesticide was voluntarily cancelled in 1984. HCB is no longer commercially produced in the US and is targeted for reduction under the PBT program. In 2000, the EPA developed a draft National Action Plan for HCB that summarizes the sources and effects of HCB as well as the country's HCB-reduction programs.

HCB is targeted for reduction under a number of national and international programs.

Canada and the US, under the Great Lakes Binational Toxics Strategy, are targeting HCB for virtual elimination. Canada, Mexico and the US are signatories to the Stockholm Convention, which seeks to reduce emissions of HCB to below 1990 levels. As mentioned above, the three countries have also developed a draft North America Regional Action Plan for dioxin and furans and HCB under the Commission for Environmental Cooperation.

HCB is also one of the chemicals targeted for action under the UN ECE Persistent Organic Pollutants Protocol under the Convention on Long Range Transboundary Air Pollution, which encourages the development and improvement of HCB emission inventories and the reduction of HCB to baseline emission levels.

10.4.5 PRTR Data Releases and Transfers of Hexachlorobenzene from Industrial Sources, NPRI and TRI

Hexachlorobenzene has been reported to TRI since the program's inception. However, for the 2000 reporting year TRI lowered the threshold. NPRI added HCB to its list for the 2000 reporting year. Reporting to NPRI does not depend on a threshold. Other aspects of the reporting requirements in the two countries also differ, such as industry sectors required to report. Therefore, direct comparison of the data on hexachlorobenzene is not possible.

For TRI, the reporting threshold is 10 lbs (4.5 kg). This threshold applies to each of the amounts manufactured, processed or otherwise used.

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.

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 10–2**).

For TRI, 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.

Facilities Reporting, 2000

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, while 13 percent of NPRI facilities did. However, the percentage of facilities reporting some amount of releases and transfers of HCB in 2000 was far lower—0.4 percent (84 facilities) in TRI and 5.5 percent in NPRI (127 facilities).
- TRI chemical manufacturers had the highest number of facilities reporting on HCB of any industry sector in TRI. Over one-third of TRI facilities reporting releases and transfers of hexachlorobenzene were in the chemical manufacturing sector. Only chemical manufacturers of chlorinated organic solvents or chlorinated monomers are required to report to NPRI. The hazardous waste management sector had the second-highest number of facilities reporting releases, and the lumber and wood products industry ranked third. These three sectors accounted for over three-quarters of all TRI facilities reporting releases and transfers of hexachlorobenzene.
- In NPRI, almost three-quarters of the facilities in the air, water and solid waste management sector reported releases and transfers of hexachlorobenzene. These include municipal waste incinerators, which are not required to report to TRI. Electric utilities were the sector with the second-largest number of facilities reporting releases and transfers to NPRI.

Table 10–17. Facilities Reporting Hexachlorobenzene, TRI and NPRI, 2000

		US TRI—for facilities meeting reporting threshold of 4.5 kg or more and 10 employees or more				Canadian NPRI—for facilities meeting threshold of 10 employees or more except for wood preservation or incineration and conducting certain activities			
			Number of TRI Facilities Reporting Hexachlorobenzene				Number of NPRI Facilities Reporting Hexachlorobenzene		
US SIC Code	Industry	Number of Facilities Reporting to TRI	Number of Facilities	% of all Facilities	Number of Facilities Reporting Releases and Transfers of Hexachlorobenzene	Number of Facilities Reporting to NPRI	Number of Facilities	% of all Facilities	Number of Facilities Reporting Releases and Transfers of Hexachlorobenzene
	Manufacturing Industries								
20	Food Products	1,710		0		129	1	1	0
21	Tobacco Products	27		0		0		0	
22	Textile Mill Products	292		0		10		0	
23	Apparel	15		0		3		0	
24	Lumber and Wood Products	857	23	3	9	154	64	42	10
25	Furniture and Fixtures	324		0		23		0	
26	Paper Products	496		0		140	51	36	14
27	Printing	202		0		23		0	
28	Chemicals	3,745	36	1	35	445	9	2	3
29	Petroleum and Coal Products	550		0		37		0	
30	Rubber and Plastics Products	1,888	3	0.2	3	175		0	
31	Leather	75		0		4		0	
32	Stone/Clay/Glass Products	757	2	0.3	1	58	14	24	13
33	Primary Metals	1,948	6	0.3	6	179	48	27	7
34	Fabricated Metals Products	2,893		0		196	3	2	1
35	Industrial Machinery	1,109		0		38	1	3	0
36	Electronic/Electrical Equipment	1,197		0		55	1	2	1
37	Transportation Equipment	1,302		0		122	2	2	2
38	Measurement/Photographic Instruments	257		0		1		0	
39	Misc. Manufacturing Industries	302		0		75	2	3	1
--	Multiple codes 20–39*	1,248	2	0.2	2	--			
	Other Industry Sectors								
08	Forestry Products	NA				2	1	50	0
09	Fishing, Hunting, Trapping	NA				1	1	100	1
10	Metal Mining**	97		0		59	5	8	1
12	Coal Mining	81		0		1		0	
13	Oil and Gas Exploration	NA				110	2	2	1
14	Nonmetallic Minerals Mining	NA				15	1	7	0
47	Transportation Services	NA				1	1	100	1
49	Sewerage Systems	NA				86	7	8	4
491/493	Electric Utilities	706	8	1.1	8	43	33	77	22
495/738	Hazardous Waste Mgt./Solvent Recovery	215	18	8	18	37	6	16	3
50	Wholesale Durable Goods	NA				28	1	4	1
5169	Chemical Wholesale Distributors	467		0		6		0	
5171	Petroleum Bulk Terminals	566		0		1		0	
80	Health and Allied Services	NA				3	2	67	2
95	Air, Water, & Solid Waste Management	NA				53	41	77	39
--	No codes 20–39***	158	2	1	2	--			
	Total	**23,484**	**100**	**0.4**	**84**	**2,313**	**297**	**13**	**127**

NA = Not applicable (Sector not required to report).
* Multiple SIC codes reported only in TRI.
** Metal mining sector must report chemicals in waste rock in TRI but not in NPRI.
*** Includes US Federal Facilities and facilities reporting no SIC code or an invalid SIC code.

TRI Releases and Transfers, 2000

TRI facilities reported 70,000 kg of total releases and transfers hexachlorobenzene in 2000.

- In TRI, more than one-third of the total releases and transfers of HCB was transferred for energy recovery, and another 30 percent was in releases on-site to land and off-site (on-site land releases were 15 percent and off-site releases were 15 percent).
- The chemical manufacturing industry in TRI reported the largest releases and transfers in 2000, with almost 57,000 kg, or 81 percent of the total. This sector accounted for almost all of the transfers to energy recovery.

Table 10–18. Summary of Releases and Transfers of Hexachlorobenzene, TRI, 2000

		On-site Releases						
US SIC Code	Industry	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
28	Chemicals*	294	149	9	2,439	2,891	6,288	9,178
495/738	Hazardous Waste Mgt./Solvent Recovery	26	2	13	7,579	7,620	150	7,770
491/493	Electric Utilities	27	0	0	0	28	4,379	4,406
33	Primary Metals	110	0	0	277	387	15	402
30	Rubber and Plastics Products	149	0	0	0	149	12	161
32	Stone/Clay/Glass Products	0	0	0	0	0	0	0
--	Multiple codes 20–39**	7	0	0	0	7	0	7
24	Lumber and Wood Products	0	0	0	0	0	0	0
--	No codes 20–39***	32	0	0	0	32	0	32
	Total	**647**	**150**	**22**	**10,295**	**11,114**	**10,843**	**21,957**

* Only manufacturers of chlorinated organic solvents or chlorinated monomers are required to report to NPRI.
** Multiple SIC codes reported only in TRI.
*** Includes US Federal Facilities and facilities reporting no SIC code or an invalid SIC code.

Table 10–18. (*continued*)

Total Off-site Transfers to Recycling (kg)	Other Transfers for Further Management: Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers (kg)
6,087	25,636	16,046	5	41,687	56,952
0	5	586	0	592	8,362
0	0	0	0	0	4,406
0	0	125	0	125	527
0	0	0	0	0	161
0	21	0	0	21	22
0	0	2	0	2	9
0	0	1	0	1	1
0	0	0	0	0	32
6,087	**25,663**	**16,760**	**5**	**42,428**	**70,471**

- One TRI facility reported one-third of the total releases and transfers of HCB reported by all TRI facilities in 2000. The Amvac Chemical Corporation in Los Angeles, California, reported 25,600 kg of HCB transferred to energy recovery. This facility makes agricultural chemicals, including pesticides.
- The TRI facility with the second-largest amount was Occidental Chemical Corporation in Niagara Falls, New York, with 9,800 kg transferred to treatment. This facility makes chlorine, gypsum, hydrogen, sodium hypochlorite (bleach), and sodium hydroxide (caustic soda).

Table 10–19. TRI Facilities with Largest Total Reported Amounts of Releases and Transfers of Hexachlorobenzene, 2000

				On-site Releases						
Rank	Facility	City, State	US SIC Codes	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
1	Amvac Chemical Corp., American Vanguard Corp.*	Los Angeles, CA	2879 2869	1	0	0	0	1	0	1
2	Occidental Chemical Corp. Niagara Plant, Occidental Petroleum Corp.*	Niagara Falls, NY	2812 2865 2819 2869	0	0	0	0	0	0	0
3	GB Biosciences Corp.*	Houston, TX	2879 2819	0	0	0	0	0	5,482	5,482
4	Chemical Waste Management, Lake Charles Facility, Waste Management Inc.	Sulphur, LA	4953	0	0	0	4,989	4,989	0	4,989
5	Cambria Cogen Co., El Paso Corp.	Ebensburg, PA	4911	1	0	0	0	1	4,379	4,379
6	Oxy Vinyls L.P., LaPorte VCM Plant, Occidental Petroleum Corp.*	LaPorte, TX	2869	2	8	0	0	10	0	10
7	Dow Chemical Co. Freeport	Freeport, TX	2812 2813 2819 2821 2869 2891	107	4	0	110	222	0	222
8	DuPont Delisle Plant*	Pass Christian, MS	2816	0	20	5	1,440	1,465	0	1,465
9	Solutia Inc., Delaware River Plant, Solutia Inc.*	Bridgeport, NJ	2869	22	5	0	0	27	0	27
10	Clariant LSM (Florida) Inc.*	Gainesville, FL	2869	0	0	0	0	0	273	273
	Subtotal			133	38	5	6,538	6,715	10,133	16,847
	% of Total			21	25	25	64	60	93	77
	Total			**647**	**150**	**22**	**10,295**	**11,114**	**10,843**	**21,957**

* Based on SIC codes, such a facility probably would not be required to report on hexachlorobenzene under NPRI reporting parameters.

Table 10–19. (*continued*)

	Other Transfers for Further Management				
Total Off-site Transfers to Recycling (kg)	Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers (kg)
0	25,635	0	0	25,635	25,636
0	0	9,814	3	9,818	9,818
0	0	459	0	459	5,941
0	0	0	0	0	4,989
0	0	0	0	0	4,379
4,206	0	98	0	98	4,314
0	0	1,544	0	1,544	1,766
0	0	0	0	0	1,465
0	0	1,353	0	1,353	1,380
0	0	890	1	891	1,163
4,206	**25,635**	**14,159**	**4**	**39,799**	**60,852**
69	**99.9**	**84**	**91**	**94**	**86**
6,087	**25,663**	**16,760**	**5**	**42,428**	**70,471**

NPRI Releases and Transfers, 2000

NPRI facilities reported 48.50 kg of total releases and transfers hexachlorobenzene in 2000.

- In NPRI, more than three-quarters of the total releases and transfers of HCB was on-site air emissions and 21 percent was transferred to treatment.
- The electric utilities sector in NPRI reported the largest amount of releases and transfers in 2000, with almost 19 kg or 39 percent of the total. This sector accounted for almost half of the air emissions.
- The primary metals sector had the second largest total releases and transfers and almost all of the transfers to treatment.

Table 10–20. Summary of Releases and Transfers of Hexachlorobenzene, NPRI, 2000

		On-site Releases						
US SIC Code	Industry	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
491/493	Electric Utilities	18.26	0.00	0.00	0.49	18.76	0.00	18.76
33	Primary Metals	3.14	0.17	0.00	0.00	3.31	0.07	3.39
49	Sewerage Systems*	8.04	0.00	0.00	0.00	8.04	0.00	8.04
95	Air, Water & Solid Waste Management*	2.52	0.00	0.00	0.00	2.52	0.00	2.52
32	Stone/Clay/Glass Products	2.09	0.00	0.00	0.00	2.09	0.00	2.09
495/738	Hazardous Waste Mgt./Solvent Recovery	1.28	0.00	0.00	0.00	1.28	0.00	1.28
37	Transportation Equipment	0.51	0.00	0.00	0.00	0.51	0.00	0.51
50	Wholesale Durable Goods*	0.42	0.00	0.00	0.00	0.42	0.00	0.42
28	Chemicals	0.36	0.00	0.00	0.00	0.36	0.00	0.36
24	Lumber and Wood Products	0.19	0.00	0.00	0.00	0.19	0.05	0.24
26	Paper Products	0.18	0.00	0.00	0.00	0.18	0.11	0.29
36	Electronic/Electrical Equipment	0.05	0.00	0.00	0.00	0.05	0.00	0.05
39	Misc. Manufacturing Industries	0.03	0.00	0.00	0.00	0.03	0.00	0.03
34	Fabricated Metals Products	0.03	0.00	0.00	0.00	0.03	0.00	0.03
47	Transportation Services*	0.01	0.00	0.00	0.00	0.01	0.00	0.01
	Total	**37.13**	**0.17**	**0.00**	**0.49**	**37.80**	**0.24**	**38.04**

* Industry sector not required to report to TRI.

Table 10–20. (*continued*)

Total Off-site Transfers to Recycling (kg)	Other Transfers for Further Management: Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers (kg)
0.20	0.00	0.00	0.00	0.20	18.96
0.05	0.00	10.13	0.00	10.18	13.57
0.00	0.00	0.00	0.00	0.00	8.04
0.00	0.00	0.00	0.00	0.00	2.52
0.00	0.00	0.00	0.00	0.00	2.09
0.00	0.00	0.00	0.00	0.00	1.28
0.00	0.00	0.00	0.00	0.00	0.51
0.00	0.00	0.00	0.00	0.00	0.42
0.00	0.00	0.00	0.00	0.00	0.36
0.00	0.00	0.08	0.00	0.08	0.32
0.00	0.00	0.00	0.00	0.00	0.29
0.00	0.00	0.00	0.00	0.00	0.05
0.00	0.00	0.00	0.00	0.00	0.03
0.00	0.00	0.00	0.00	0.00	0.03
0.00	0.00	0.00	0.00	0.00	0.01
0.25	**0.00**	**10.21**	**0.00**	**10.46**	**48.50**

- One NPRI facility accounted for 25 percent of the total releases and transfers of HCB reported by all NPRI facilities in 2000. The Norsk Hydro Canada Inc. facility in Bécancour, Quebec, and owned by Hydro Magnesium Canada, reported 12.21 kg of HCB, most of which was transferred to treatment. This primary metals facility smelts and refines non-ferrous metals. The company makes magnesium products.
- Two other NPRI facilities accounted for another 25 percent. The Communauté urbaine de Québec facility, a regional incinerator in Québec City, Québec, reported 8.00 kg, and TransAlta Corporation's Sundance Thermal Generation Plant in Duffield, Alberta, reported 5.49 kg. Both of these facilities reported only air emissions of HCB.

Table 10–21. NPRI Facilities with Largest Total Reported Amounts of Releases and Transfers of Hexachlorobenzene, 2000

			SIC Codes		On-site Releases						
Rank	Facility	City, Province	Canada	US	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
1	Norsk Hydro Canada Inc., Hydro Magnesium Canada	Bécancour, QC	29	33	1.91	0.17	0.00	0.00	2.08	0.00	2.08
2	Communauté urbaine de Québec, Incinérateur régional	Québec, QC	49	49	8.00	0.00	0.00	0.00	8.00	0.00	8.00
3	TransAlta Corporation, Sundance Thermal Generation Plant	Duffield, AB	49	491/493	5.49	0.00	0.00	0.00	5.49	0.00	5.49
4	Edmonton Power Inc., Genesee Thermal Generating Station	Warburg, AB	41	491/493	2.11	0.00	0.00	0.00	2.11	0.00	2.11
5	TransAlta Corporation, Keephills Thermal Generating Plant	Duffield, AB	49	491/493	2.01	0.00	0.00	0.00	2.01	0.00	2.01
6	Sheerness Generating Station, Transalta Utilities Corporation	Hanna, AB	49	491/493	2.01	0.00	0.00	0.00	2.01	0.00	2.01
7	Atco Electric, Battle River Generating Station	Forestburg, AB	49	491/493	1.65	0.00	0.00	0.00	1.65	0.00	1.65
8	Canadian Waste Services Inc., Swaru Incinerator	Hamilton, ON	49	495/738	1.23	0.00	0.00	0.00	1.23	0.00	1.23
9	TransAlta Corporation, Wabamun Thermal Generating Plant	Wabamun, AB	49	491/493	1.19	0.00	0.00	0.00	1.19	0.00	1.19
10	Nova Scotia Power Inc., Lingan Generating Station, Emera Inc.	New Waterford, NS	41	491/493	1.00	0.00	0.00	0.00	1.00	0.00	1.00
	Subtotal				**26.61**	**0.17**	**0.00**	**0.00**	**26.78**	**0.00**	**26.78**
	% of Total				**72**	**100**	**--**	**--**	**71**	**0**	**70**
	Total				**37.13**	**0.17**	**0.00**	**0.49**	**37.80**	**0.24**	**38.04**

Table 10–21. (*continued*)

Total Off-site Transfers to Recycling	Other Transfers for Further Management: Transfers to Energy Recovery	Transfers to Treatment	Transfers to Sewage	Total Other Transfers for Further Management	Total Reported Amounts of Releases and Transfers
(kg)	(kg)	(kg)	(kg)	(kg)	(kg)
0.00	0.00	10.13	0.00	10.13	12.21
0.00	0.00	0.00	0.00	0.00	8.00
0.00	0.00	0.00	0.00	0.00	5.49
0.00	0.00	0.00	0.00	0.00	2.11
0.00	0.00	0.00	0.00	0.00	2.01
0.00	0.00	0.00	0.00	0.00	2.01
0.00	0.00	0.00	0.00	0.00	1.65
0.00	0.00	0.00	0.00	0.00	1.23
0.00	0.00	0.00	0.00	0.00	1.19
0.00	0.00	0.00	0.00	0.00	1.00
0.00	**0.00**	**10.13**	**0.00**	**10.13**	**36.91**
--	**--**	**99**	**--**	**97**	**76**
0.25	**0.00**	**10.21**	**0.00**	**10.46**	**48.50**

10.5 Polycyclic Aromatic Compounds

For the 2000 reporting year, NPRI added PACs at an alternative threshold. Also for the 2000 reporting year, 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 currently voluntary RETC program.

This section provides background information on PACs, as they are commonly known in the US, or polycyclic aromatic hydrocarbons (PAHs), as they are commonly known in Canada, and an overview of TRI and NPRI reporting.

10.5.1 What are Polycyclic Aromatic Compounds?

Polycyclic aromatic compounds (PACs) are a family of chemicals that share a similar chemical structure. PACs are made up of hydrogen and carbon atoms grouped into at least two condensed aromatic ring structures. Pure PACs are usually colored, crystalline solids at room temperature (Government of Canada 1994). Generally PACs are present in complex mixtures in the environment. PACs are considered a subset of a larger group of chemicals known as polycyclic organic matter (POM).

10.5.2 Sources of PACs

PACs are often inadvertent byproducts of incomplete combustion. PACs can therefore be found in combustion processes such as electricity generation, cement manufacturing, coke ovens, aluminum production, and pulp and paper production (Environment Canada 2000). PACs are also released from other combustion processes such as residential heating using wood, agricultural burning, and smoking tobacco. PACs can also be released from natural combustion sources such as forest fires.

Many PACs are also naturally present in many fossil fuels. Byproducts of coal processing and petroleum refining such as heavy oils, tars, coal distillates, and residues can contain PACs. Transportation such as cars, trucks and off-road vehicles can also be a source of PACs to the environment.

PACs are also found as contaminants in some materials such as creosote (used to preserve wood for railroad ties and pilings), tar and asphalt. Some PACs are used as commercial chemicals.

PACs can be released from historically contaminated soil and sediments. Because PACs can travel long distances from their sources, global sources of PACs may contribute to North American loadings.

In the 1996 US National Toxics Inventory, total air emissions of 16 PACs were estimated at 18,953 tonnes. Most of these emissions came from area and other sources (15,608 tonnes), with major sources emitting 3,221 tonnes and all mobile sources emitting 124 tonnes (US EPA 2002).

10.5.3 Health and Environmental Effects of PACs

Many PACs are persistent, bioaccumulative, and toxic compounds. Some PACs, such as benzo(a)pyrene, are probable carcinogens. Other PACs are considered to have a range of human health effects including suspected developmental, gastrointestinal, immunological, skin, and endocrine toxicity (Scorecard 2002).

People can be exposed to PACs in a number of ways including by breathing contaminated air from sources such as wood stoves, agricultural burning, certain industrial facilities, vehicles, and tobacco smoke.

PACs are widely distributed in the environment. PACs bind strongly to particulates and sediments and are generally of low volatility. PAC contamination in sediments has been associated with death of sensitive aquatic invertebrates. Liver tumors in fish have been observed in areas of high polycyclic aromatic hydrocarbon contamination (Government of Canada 1994).

10.5.4 Actions to Reduce PAC Emissions

In Canada, polycyclic aromatic hydrocarbons have been declared toxic under the Canadian Environmental Protection Act. Many activities, designed to reduce dioxin and furan emissions, such as the development of emission guidelines for iron and steel manufacturing facilities, may also help to reduce some PAC emissions.

In the US, a draft national action plan is under development for one of the PACs, benzo(a) pyrene, which will outline sources, effects, and activities to reduce emissions. Some PACs have been evaluated under the 1996 National Air Toxic Assessment, which maps with emissions, exposure, and risk for 16 PACs by state or county.

Many of the US regulations limiting emissions from a number of industrial sources such as chemical plants, steel mills, incinerators, and smelters may help to reduce some PAC releases. In addition, some of the regulations requiring cleaner fuels and cleaner vehicles may help to reduce some PACs.

Some PACs such as benzo(a) pyrene, perylene, and phenanthrene are targeted for virtual elimination under the Canada-US Great Lakes Binational Toxics Strategy.

The UN ECE Persistent Organic Pollutants Protocol requires reporting of four individual PACs—benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-c,d)pyrene—and calls for the reduction of emissions of PACs to below 1990 levels. Canada, Mexico and the US are signatories to this Convention.

10.5.5 PRTR Data on Releases and Transfers of Polycyclic Aromatic Compounds from Industrial Sources, NPRI and TRI

Some PACs have been reported to TRI since 1995; others were added under the PBT program for the reporting year 2000. 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 on separately. If the amounts for

Table 10–22. 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,j)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.

the individual PACs are not known, the amounts for the group or any combination of the 17 can be reported. The list of PACs to report on differs for NPRI and TRI, as seen in **Table 10–22**.

In addition, NPRI and TRI define 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 released and/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.

NPRI Releases and Transfers of PACs, 2000

For the year 2000, 936 forms were submitted by NPRI facilities reporting on one or more polycyclic aromatic compounds.

- Total releases and transfers of PACs were 617,000 kg, 84 percent of which were on-site air emissions and 14 percent, off-site releases.
- The 12 PACs plus benzo(g,h,i)perylene that are also listed as PACs and reported under lower thresholds in TRI accounted for half of the total.

Table 10–23. NPRI Releases and Transfers of Polycyclic Aromatic Compounds (PACs), by Chemical, 2000*

			On-site Releases						
CAS Number	Chemical	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
	NPRI PAC Chemicals included in TRI PAC Group								
206-44-0	Benzo(j,k)fluorene (Fluoranthene)	68	96,978	42	0	183	97,202	16,157	113,359
205-99-2	Benzo(b)fluoranthene	64	45,538	4	0	131	45,672	6,263	51,936
56-55-3	Benzo(a)anthracene	63	29,048	7	0	259	29,314	5,602	34,916
50-32-8	Benzo(a)pyrene	64	22,024	21	0	367	22,412	7,871	30,282
207-08-9	Benzo(k)fluoranthene	63	17,327	3	0	115	17,444	2,016	19,460
193-39-5	Indeno(1,2,3-CD)pyrene	60	10,831	8	0	13	10,852	4,496	15,348
205-82-3	Benzo(j)fluoranthene	41	8,842	1	0	111	8,954	7	8,961
218-01-9	Benzo(a)phenanthrene	52	5,310	2	0	251	5,563	3,071	8,634
53-70-3	Dibenzo(a,h)anthracene	60	5,393	9	0	12	5,415	1,421	6,836
189-55-9	Benzo(r,s,t)pentaphene (Dibenzo(a,i)pyrene)	35	3,193	2	0	2	3,197	72	3,269
194-59-2	7H-Dibenzo(c,g)carbazole	30	41	1	0	28	70	0	70
224-42-0	Dibenzo(a,j)acridine	32	50	1	0	20	71	0	71
	Subtotal	**632**	**244,574**	**100**	**0**	**1,492**	**246,166**	**46,976**	**293,142**
	NPRI PAC Chemicals not included in TRI PAC Group but reported separately to TRI								
85-01-8	Phenanthrene**	72	144,150	92	0	2,116	146,359	18,754	165,112
191-24-2	Benzo(g,h,i)perylene***	62	10,459	7	0	57	10,524	3,984	14,507
	NPRI PAC Chemicals not included in TRI PAC Group and not reported to TRI								
129-00-0	Pyrene	69	81,001	19	0	220	81,240	12,814	94,055
192-97-2	Benzo(e)pyrene	44	31,399	1	0	20	31,420	4,490	35,910
198-55-0	Perylene	39	1,227	3	0	2	1,231	971	2,202
--	PACs, Total****	18	4,786	30	0	108	4,924	69	4,993
	Total	**936**	**517,597**	**252**	**0**	**4,016**	**521,865**	**88,058**	**609,923**

* 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 10–23. (*continued*)

Total Off-site Transfers to Recycling (kg)	Other Transfers for Further Management: Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers: kg	% of Total
20	0	1,122	62	1,203	114,562	19
7	0	4	147	158	52,093	8
7	0	70	50	127	35,044	6
4	0	21	53	78	30,361	5
2	0	1	5	7	19,468	3
1	0	11	26	38	15,386	2
0	0	2	0	2	8,963	1
6	0	14	0	20	8,655	1
2	0	4	5	11	6,847	1
0	0	4	0	4	3,273	1
10	0	0	0	10	80	0.0
8	0	0	0	8	79	0.01
69	**0**	**1,252**	**348**	**1,669**	**294,811**	**48**
56	0	1,706	6	1,768	166,881	27
83	0	7	31	121	14,629	2
41	0	2,147	49	2,237	96,292	16
25	0	6	0	31	35,941	6
0	0	1	35	36	2,238	0.4
21	0	1,543	0	1,564	6,558	1
296	**0**	**6,662**	**469**	**7,428**	**617,350**	**100**

For 2000, 694 forms were submitted by NPRI facilities reporting on the 12 PACs plus benzo(g,h,i)perylene that are also listed as PACs on TRI.

- Eight industry sectors reported total releases and transfers of 309,000 kg for this set of PACs.
- The primary metals sector accounted for over 90 percent of the total and almost 99 percent of the on-site air emissions.

Table 10–24. Releases and Transfers of Polycyclic Aromatic Compounds (PACs) for NPRI PAC Chemicals also on TRI List, by Industry, 2000*

US SIC Code	Industry	Number of Forms	On-site Releases: Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
33	Primary Metals	92	252,223	23	0	0	252,246	29,387	281,633
28	Chemicals	37	293	0	0	0	293	21,281	21,574
29	Petroleum and Coal Products	191	459	10	0	1,325	1,794	207	2,001
26	Paper Products	246	1,374	74	0	116	1,565	84	1,649
24	Lumber and Wood Products	21	4	0	0	0	4	1	5
49	Electric Utilities	60	575	0	0	108	683	0	683
32	Stone/Clay/Glass Products	23	94	0	0	0	94	0	94
13	Oil and Gas Exploration**	24	11	0	0	0	11	0	11
	Total	**694**	**255,033**	**107**	**0**	**1,550**	**256,690**	**50,960**	**307,650**

* Includes 12 PACs common to NPRI and TRI list plus benzo(g,h,i)perylene.
** Industry sector not required to report to TRI.

Table 10–24. (*continued*)

Total Off-site Transfers to Recycling	Other Transfers for Further Management: Transfers to Energy Recovery	Transfers to Treatment	Transfers to Sewage	Total Other Transfers for Further Management	Total Reported Amounts of Releases and Transfers	
(kg)	(kg)	(kg)	(kg)	(kg)	kg	% of Total
0	0.00	0	379	379	282,012	91.1
0	0.00	418	0	418	21,991	7.1
97	0.05	37	0	37	2,135	0.7
9	0.00	0.6	0	0.6	1,658	0.5
0	0.00	804	0	804	809	0.3
46	0.00	0	0	0	729	0.2
0	0.00	0	0	0	94	0.03
0	0.00	0	0	0	11	0.004
152	**0.05**	**1,259**	**379**	**1,638**	**309,440**	**100**

- Ten facilities accounted for 98 percent of the total releases and transfers of the 12 PACs plus benzo(g,h,i)perylene that are also listed as PACs on TRI. However, TRI facilities report one amount for a group of 21 PACs; TRI and NPRI reporting thus cannot be compared.
- Combined, three primary metals facilities owned by the Alcan Primary Metals Group reported almost 215,000 kg, or 69 percent of the total. These facilities are located in Quebec and British Columbia.

Table 10–25. NPRI Facilities with Largest Total Reported Amounts of Releases and Transfers of PACs for NPRI PAC Chemicals also on TRI List, 2000*

			SIC Codes			On-site Releases						
Rank	Facility	City, Province	Canada	US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
1	Alcan Groupe Métal Primaire, Usine Arvida	Jonquière, QC	29	33	9	103,543	0	0	0	103,543	0	103,543
2	Alcan Primary Metal Group - British Columbia, Kitimat Works	Kitimat, BC	29	33	8	31,519	0	0	0	31,519	28,750	60,268
3	Alcan Métal Primaire, Usine Shawinigan	Shawinigan, QC	29	33	9	51,032	0	0	0	51,032	0	51,032
4	VFT Inc.	Hamilton, ON	37	28	13	150	0	0	0	150	21,280	21,430
5	Alcan Métal Primaire, Usine de Beauharnois	Melocheville, QC	29	33	9	20,213	0	0	0	20,213	0	20,213
6	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	13	13,987	0	0	0	13,987	637	14,624
7	Société Canadienne de Métaux Reynolds Ltée, Aluminerie de Baie-Comeau	Baie-Comeau, QC	29	33	9	11,157	0	0	0	11,157	0	11,157
8	Stelco Inc., Hilton Works	Hamilton, ON	29	33	13	10,184	15	0	0	10,200	0	10,200
9	Lake Erie Steel Company	Nanticoke, ON	29	33	13	7,569	7	0	0	7,576	0	7,576
10	Algoma Steel Inc	Sault Ste. Marie, ON	29	33	6	2,796	0	0	0	2,796	0	2,796
	Subtotal				**102**	**252,151**	**23**	**0**	**0**	**252,173**	**50,667**	**302,840**
	% of Total				**15**	**99**	**21**	**--**	**0**	**98**	**99**	**98**
	Total				**694**	**255,033**	**107**	**0**	**1,550**	**256,690**	**50,960**	**307,650**

* Includes 12 PACs common to NPRI and TRI list plus benzo(g,h,i)perylene.

Table 10–25. (*continued*)

	Other Transfers for Further Management				
Total Off-site Transfers to Recycling (kg)	Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers (kg)
0	0	0	0	0	103,543
0	0	0	0	0	60,268
0	0	0	0	0	51,032
0	0	0	0	0	21,430
0	0	0	0	0	20,213
0	0	0	379	379	15,003
0	0	0	0	0	11,157
0	0	0	0	0	10,200
0	0	0	0	0	7,576
0	0	0	0	0	2,796
0	**0**	**0**	**379**	**379**	**303,219**
0	**0**	**0**	**100**	**21**	**98**
152	**0.05**	**1,259**	**379**	**1,790**	**309,440**

TRI Releases and Transfers of PACs, 2000

For the year 2000, 3,645 forms were submitted by TRI facilities for polycyclic aromatic compounds or benzo(g,h,i)perylene or phenanthrene. Except for nine chemicals (see **Table 10–22**), these chemicals are reported to NPRI under alternative thresholds.

- The total releases and transfers of PACs were 3.5 million kg, with 44 percent as off-site releases (transfers to disposal) and 26 percent as on-site air releases.
- The group of 21 PACs plus benzo(g,h,i)perylene that are reported under lower thresholds as PBTs in TRI accounted for 87 percent of this total. This set of chemicals does not include phenanthrene.

Table 10–26. TRI Releases and Transfers of Polycyclic Aromatic Compounds (PACs), by Chemical, 2000

			On-site Releases						
CAS Number	**Chemical**	**Number of Forms**	**Air (kg)**	**Surface Water (kg)**	**Underground Injection (kg)**	**Land (kg)**	**Total On-site Releases (kg)**	**Total Off-site Releases (kg)**	**Total Reported Releases On- and Off-site (kg)**
	TRI Chemicals Listed as PAC/PBT on NPRI and TRI								
--	Polycyclic aromatic compounds*	2,184	849,940	7,985	4,535	140,851	1,003,310	1,451,236	2,454,547
191-24-2	Benzo(g,h,i)perylene**	1,366	19,192	241	0	2,817	22,250	53,045	75,295
	Subtotal	**3,550**	**869,132**	**8,225**	**4,535**	**143,668**	**1,025,561**	**1,504,282**	**2,529,842**
	TRI Chemical Listed as PAC/PBT on NPRI Only								
85-01-8	Phenanthrene***	95	48,763	397	0	7,217	56,377	13,113	69,490
	Total	**3,645**	**917,895**	**8,623**	**4,535**	**150,885**	**1,081,938**	**1,517,395**	**2,599,333**

* 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.
** 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 10–26. (*continued*)

Total Off-site Transfers to Recycling (kg)	Other Transfers for Further Management: Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers: kg	Percent of Total
285,910	94,026	109,963	2,040	206,029	2,946,485	85
4,450	2,621	1,207	279	4,108	83,853	2
290,360	**96,648**	**111,170**	**2,319**	**210,137**	**3,030,339**	**87**
242,571	63,985	64,232	130	128,348	440,410	13
532,931	**160,633**	**175,402**	**2,449**	**338,484**	**3,470,748**	**100**

There were 3,550 forms submitted by TRI facilities reporting on the 21 PACs plus benzo(g,h,i)perylene that are reported under lower thresholds in TRI. Total releases and transfers for this group of chemicals amounted to 3.0 million kg, with half of that as off-site releases (transfers to disposal).

- The primary metals sector accounted for 51 percent of the total, 68 percent of off-site releases (transfers to disposal), and 54 percent of on-site air emissions.

Table 10–27. Releases and Transfers of Polycyclic Aromatic Compounds (PACs) for TRI PACs Group plus Benzo(g,h,i)perylene, by Industry, 2000*

			On-site Releases						
US SIC Code	Industry	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
33	Primary Metals	121	473,017	338	0	1,488	474,843	1,029,788	1,504,631
28	Chemicals	261	31,836	922	0	604	33,363	179,095	212,458
29	Petroleum and Coal Products	567	73,913	214	4,535	1,872	80,534	62,294	142,827
495/738	Hazardous Waste Mgt./Solvent Recovery	104	352	1	0	91,345	91,699	432	92,131
30	Rubber and Plastics Products	116	11,070	0	0	0	11,070	77,858	88,928
24	Lumber and Wood Products	75	1,951	1,155	0	0	3,106	47,199	50,304
20	Food Products	239	85,905	0	0	0	85,906	8	85,914
36	Electronic/Electrical Equipment	67	24,739	53	0	17,435	42,226	15,761	57,987
5171	Petroleum Bulk Terminals	550	7,264	341	0	38	7,644	61,702	69,345
--	Multiple codes 20–39**	137	28,780	121	0	484	29,385	15,592	44,977
26	Paper Products	295	53,210	654	0	1,164	55,028	534	55,561
491/493	Electric Utilities	638	5,180	4,411	0	29,033	38,624	13,403	52,027
22	Textile Mill Products	144	40,935	0	0	4	40,939	4	40,942
31	Leather Products	8	8,617	0	0	0	8,617	0	8,617
34	Fabricated Metals Products	40	5,678	0	0	0	5,678	39	5,718
38	Measurement/Photographic Instruments	27	5,167	1	0	0	5,168	37	5,205
37	Transportation Equipment	69	3,950	0	0	152	4,102	147	4,249
--	No codes 20–39	18	3,223	14	0	13	3,250	42	3,292
35	Industrial Machinery	16	2,445	0	0	14	2,459	0	2,459
39	Misc. Manufacturing Industries	17	550	0	0	0	550	54	604
32	Stone/Clay/Glass Products	27	737	0	0	22	759	294	1,053
10	Metal Mining	5	516	0	0	0	516	0	516
27	Printing and Publishing	6	97	0	0	0	97	0	97
25	Furniture and Fixtures	1	0	0	0	0	0	0	0
5169	Chemical Wholesalers	2	0	0	0	0	0	0	0
	Total	**3,550**	**869,132**	**8,225**	**4,535**	**143,668**	**1,025,561**	**1,504,282**	**2,529,842**

* Includes group of 21 PACs plus benzo(g,h,I)perylene. These are PACs listed on TRI under lower thresholds.
** Multiple SIC Codes reported only in TRI.

Table 10–27. (*continued*)

	Other Transfers for Further Management					
Total Off-site Transfers to Recycling (kg)	Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers kg	% of Total
28,963	9	2,430	100	31,502	1,536,133	51
17,774	45,099	37,878	27	100,778	313,236	10
70,626	37,013	8,528	1,468	117,635	260,463	9
61,509	2,917	632	0	65,058	157,190	5
64,675	1,135	214	47	66,071	154,999	5
6,173	4,221	59,849	92	70,335	120,639	4
368	7	0	0	375	86,288	3
11,880	4,975	124	4	16,983	74,970	2
2,406	770	400	0	3,577	72,922	2
25,692	82	151	0	25,925	70,902	2
26	59	3	559	647	56,208	2
163	328	2	6	499	52,526	2
0	0	1	0	1	40,944	1.4
0	0	0	0	0	8,617	0.3
0	0	0	0	0	5,718	0.2
0	1	0	0	1	5,206	0.2
0	0	0	0	0	4,249	0.1
58	0	0	16	73	3,366	0.1
0	8	4	0	12	2,471	0.1
0	0	952	0	952	1,556	0.1
0	24	0	0	24	1,077	0.04
46	0	0	0	46	562	0.02
0	0	0	0	0	97	0.003
0	0	0	0	0	0	0
0	0	0	0	0	0	0
290,360	**96,648**	**111,170**	**2,319**	**500,496**	**3,030,339**	**100**

- Ten facilities accounted for 63 percent of the total releases and transfers of the group of 21 PACs plus benzo(g,h,i)perylene that are listed under lower reporting thresholds on TRI. Twelve of the 21 PACs are also listed on NPRI, but PACs are not reported on individually under TRI and so cannot be compared to NPRI reporting.
- One primary metals facility owned by Alcoa Inc. and located in Longview, Washington, reported 864,000 kg of PACs, or 28 percent of the total for these chemicals in 2000.
- A second primary metals facility, this one owned by Ormet Corp. and located in Hannibal, Ohio, reported 491,000 kg, or 16 percent of the total for these chemicals.

Table 10–28. TRI Facilities with Largest Total Reported Amounts of Releases and Transfers of PACs for TRI PACs Group plus Benzo(g,h,i)perylene, 2000

				On-site Releases						
Rank	Facility	City, State	US SIC Code	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
1	Reynolds Metals Co., Longview Reduction Plant, Alcoa Inc.	Longview, WA	33	25,757	46	0	0	25,803	836,992	862,795
2	Ormet Primary Aluminum Corp., Ormet Corp.	Hannibal, OH	33	346,259	0	0	0	346,259	144,671	490,930
3	Koppers Inds., Follansbee Tar Plant, Koppers Inds. Inc.	Follansbee, WV	28	4,378	0	0	0	4,378	149,396	153,774
4	Lake Charles Carbon Co., Alcoa	Lake Charles, LA	29	5,195	0	0	0	5,195	27,831	33,026
5	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR	495/738	0	0	0	77,234	77,234	0	77,234
6	Michelin N.A. Ardmore Plant, Michelin Corp.	Ardmore, OK	30	0	0	0	0	0	28,118	28,118
7	Honeywell Intl. Inc.	Ironton, OH	28	423	59	0	0	481	2,193	2,674
8	Southland Oil - Vicksburg Terminal	Vicksburg, MS	5171	0	0	0	0	0	43,053	43,053
9	Koppers Inds. Inc.	Green Spring, WV	24	6	0	0	0	6	42,107	42,113
10	Tosco Wood River Refy., Tosco Corp.	Roxana, IL	29	16	5	0	0	20	0	20
	Subtotal			**382,033**	**109**	**0**	**77,234**	**459,375**	**1,274,361**	**1,733,736**
	% of Total			**44**	**1**	**0**	**54**	**45**	**85**	**69**
	Total			**869,132**	**8,225**	**4,535**	**143,668**	**1,025,561**	**1,504,282**	**2,529,842**

Note: Chemicals include PAC chemical category of 21 PACs plus benzo(g,h,i)perylene. These are PACs listed on TRI under lower thresholds.

Table 10–28. (*continued*)

Total Off-site Transfers to Recycling (kg)	Other Transfers for Further Management: Transfers to Energy Recovery (kg)	Transfers to Treatment (kg)	Transfers to Sewage (kg)	Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers (kg)
0	0	824	0	824	863,619
0	0	0	0	0	490,930
0	0	0	0	0	153,774
66,740	0	0	0	0	99,766
0	0	1	0	1	77,235
19,896	0	0	46	46	48,060
0	10,310	35,063	0	45,373	48,047
0	0	0	0	0	43,053
0	0	0	0	0	42,113
0	35,634	3,933	0	39,567	39,587
86,636	**45,944**	**39,821**	**46**	**85,812**	**1,906,183**
30	**48**	**36**	**2**	**41**	**63**
290,360	**96,648**	**111,170**	**2,319**	**210,137**	**3,030,339**

10.5.5 References

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Appendix A – A Comparison of Chemicals Listed under 2000 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-Dinitrophénol	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	Fentión	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 tributilestaño	X		
56-38-2	Parathion	Parathion	Paratión	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	Phénytoine	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	

* 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 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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		
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
72-20-8	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	Óxido 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	Propylènimine	Propilenimina	X		
75-56-9	Propylene oxide	Oxyde de propylène	Óxido 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-Methyllactonitrile	Acétonecyanhydrine	2-Metillactonitrilo	X		
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	Chloro-1,1,1-trifluoroéthane (HCFC-133a)	2-Cloro-1,1,1-trifluoroetano (HCFC-133a)	X		
76-01-7	Pentachloroethane	Pentachloroéthane	Pentacloroetano	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Hexaclorciclopentadieno	X	X	X
77-73-6	Dicyclopentadiene	Dicyclopentadiène	Dicloropentadieno	X	X	
77-78-1	Dimethyl sulfate	Sulfate de diméthyle	Sulfato de dimetilo	X	X	
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-Tributiltritiofosfato	X		
78-79-5	Isoprene	Isoprène	Isopreno		X	
78-84-2	Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído	X	X	
78-83-1	i-Butyl alcohol	2-Méthylpropan-1-ol	Alcohol i-butílico		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	Dimethylcarbamyl 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′-Isopropylidènediphénol	4,4′-Isopropilidenodifenol	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-methylanthraquinone	1-Amino-2-méthylanthraquinone	1-Amino-2-metilantraquinona	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	Butil bencil 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		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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 pícrico	X		
90-04-0	o-Anisidine	o-Anisidine	o-Anisidina	X		
90-43-7	2-Phenylphenol	o-Phénylphénol	2-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
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	Dihidrosafrol	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-diclorofenoxiacético	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	o-Phénylènediamine	1,2-Fenilendiamina	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-Cloro-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	Óxido 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	Solvente de amarillo 3	X		
98-07-7	Benzoic trichloride	Trichlorure de benzylidyne	Benzotricloruro	X		
98-82-8	Cumene	Cumène	Cumeno	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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-Nitrosopipéridine	N-Nitrosopiperidina	X		
101-05-3	Anilazine	Anilazine	Anilacina	X		
101-14-4	4,4′-Methylenebis(2-chloroaniline)	p,p′-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	p,p′-Méthylènedianiline	4,4′-Metilenodianilina	X	X	
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 diglycydile	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-Nonylphénoxyl) éthanol	Etanol 2-p(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-Fenilenodiamina	X	X	
106-51-4	Quinone	p-Quinone	Quinona	X	X	
106-88-7	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno	X	X	
106-89-8	Epichlorohydrin	Épichlorohydrine	Epiclorohidrina	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	Acrilonitrilo	X	X	X
107-18-6	Allyl alcohol	Alcool allylique	Alcohol alílico	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 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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-Fenilendiamina	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		
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	
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	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Malatión	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	Hidroquinona	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	Pyrène	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		
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 hidrocloruro	X		
134-32-7	alpha-Naphthylamine	alpha-Naphtylamine	alfa-Naftilamina	X		
135-20-6	Cupferron	Cupferron	Cupferron	X		
136-45-8	Dipropyl isocinchomeronate	Pyridine-2,5-dicarboxylate de dipropyle	Dipropilisocincomeronato	X		
137-26-8	Thiram	Thirame	Tiram	X		
137-41-7	Potassium N-methyldithiocarbamate	Méthyldithiocarbamate de potassium	N-Metilditiocarbamato de potasio	X		
137-42-8	Metham sodium	Métam-sodium	N-Metilditiocarbamato de sodio	X		
138-93-2	Disodium cyanodithioimidocarbonate	Cyanodithiocarbamate de disodium	Cianoditiocarbamato de disodio	X		
139-13-9	Nitrilotriacetic acid	Acide nitrilotriacétique	Ácido nitrilotriacético	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	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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(i)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)phénanthrène	Benzo(a)fenantreno	**	X	
224-42-0	Dibenzo(a,j)acridine	Dibenzo(a,j)acridine	Dibenzo(a,j)acridina	**	X	
298-00-0	Methyl parathion	Parathion-méthyl	Metilparatión	X		X
300-76-5	Naled	Naled	Naled	X		
301-12-2	Oxydemeton methyl	Oxydéméton-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		
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		

* 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 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
465-73-6	Isodrin	Isodrine	Isodrín	X		
492-80-8	C.I. Solvent Yellow 34	Indice de couleur Jaune de solvant 34	Solvente 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(chlorométhylique)	Bis(clorometil) 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	Chlorydrate de o-toluidine	o-Toluidina hidrocloruro	X		
639-58-7	Triphenyltin chloride	Chlorure de triphénylétain	Cloruro de trifenilestaño	X		
680-31-9	Hexamethylphosphoramide	Hexaméthylphosphoramide	Hexametilfosforamida	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		
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	Ametrín	X		
842-07-9	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvente	X	X	
872-50-4	N-Methyl-2-pyrrolidone	N-Méhyl-2-pyrrolidone	N-Metil2-pirrolidona	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
924-16-3	N-Nitroso-di-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	Cycloate	Ciclolato	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)	Cresol (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	Hexacloronaftaleno	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	Nitrofén	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	Fluométuron	Fluometurón	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 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	Trialato	X		
2312-35-8	Propargite	Propargite	Propargita	X		
2385-85-5	Mirex	Mirex	Mirex			X
2439-01-2	Chinomethionat	Chinométionate	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	Metilcarbamato 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-isocianto 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	Mercure	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		

* 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 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	
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 polyéthylèneglycol	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	Resméthrine	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		

* RETC list of chemicals for voluntary reporting in Section V of COA. *** Reported under TRI as part of diisocyanates group.

**** Vanadium is reported to TRI except when contained in an alloy. Vanadium (fume or dust) is reported to NPRI.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
13684-56-5	Desmedipham	Desmédiphame	Desmedifam	X		
14484-64-1	Ferbam	Ferbame	Ferban	X		
15646-96-5	2,4,4-Trimethylhexamethylene diisocyanate	Diisocyanate 2,4,4-Triméthylhexaméthylène	2,4,4-Trimethilhexametileno 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-Nitrosonornicotine	N-Nitrosonornicotine	N-Nitrosonornicotina	X		
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate	Diisocyanate 2,2,4-Triméthylhexaméthylène	2,2,4-Trimethilhexametileno diisocyanato	***	X	
17804-35-2	Benomyl	Bénomyl	Benomil	X		
19044-88-3	Oryzalin	Oryzalin	Orizalina	X		
19666-30-9	Oxydiazon	Oxydiazon	Oxidiazono	X		
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	Tetróxido de osmio	X		
20859-73-8	Aluminum phosphide	Phospure 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	Isophenphos	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	Fenotrina	X		
26027-38-3	p-Nonylphenol polyethylene glycol ether	p-Nonylphénol, éther de polyéthyèneglycol	Éter de p-nonilfenol polietilenglicol		X	
26471-62-5	Toluenediisocyanate (mixed isomers)	Toluènediisocyanate (mélange d'isomères)	Toluendiisocianatos (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	Norfurazona	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	Octacloroestireno	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	Tébuthiuron	Tebutiurón	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 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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 mononoylphénylique	Oxireno, metil-, polímero con oxireno, mono (nonilfenil) éter		X	
38727-55-8	Diethatyl 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	Profénofos	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	
42874-03-3	Oxyfluorfen	Oxyfluorfène	Oxifluorfeno	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 bromacílica	X		
53404-37-8	2,4-D 2-Ethyl-4-methylpentyl ester	(2,4-Dichlorophénoxy)acétate de 2-éthyl-4-méthylpentyle	2,4-D 2-Etil-4-metilpentil éster	X		
53404-60-7	Dazomet, sodium salt	Dazomet, sel de sodium	Sal de sodio diazomética	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 butilcarbamato	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 acifluorfeno	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	Dihydrogénobis(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 poychlorés (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		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Dicloropentafluoropropane	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		
	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	
	Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos	X	X	X
	Diisocyanates	Diisocyanates	Diisocianatos	X		
	Dioxins	Dioxines	Dioxinas			X
	Ethylenebisdithiocarbamic acid, salts and esters	Acide, sels et éthers éthylènebisdithiocarbamiques	Ácido etilenobisditiocarbámico, 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)	Níquel 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 poychlorés (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 composès	Vanadio y compuestos	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 2000 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
	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.

****** Xylene isomers are reported separately in TRI and aggregated in NPRI.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 2000

CAS Number	In 1995-2000 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	Hexacloroetano
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)	Dichlorotétrafluoroéthane (CFC-114)	Diclorotetrafluoroetano (CFC-114)
76-15-3		t	Monochloropentafluoroethane (CFC-115)	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)
77-47-4	X		Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorciclopentadieno

c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 2000 (*continued*)

CAS Number	In 1995-2000 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
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
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′-Isopropylidènediphénol	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
95-48-7	X		o-Cresol	o-Crésol	o-Cresol
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			Acetophenone	Acétophénone	Acetofenona
98-88-4	X		Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo
98-95-3	X	c,p	Nitrobenzene	Nitrobenzène	Nitrobenceno

c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 2000 (*continued*)

CAS Number	In 1995-2000 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
100-01-6	X		p-Nitroaniline	p-Nitroaniline	p-Nitroanilina
100-02-7			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
106-44-5	X	c,p	p-Cresol	p-Crésol	p-Cresol
106-46-7	X		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
106-88-7	X	c,p	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno
106-89-8	X	c,p,t	Epichlorohydrin	Épichlorohydrine	Epiclorohidrina
106-99-0	X	t	1,3-Butadiene	Buta-1,3-diène	1,3-Butadieno
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	Acrilonitrilo
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
108-39-4	X		m-Cresol	m-Crésol	m-Cresol
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	X		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		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

c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 2000 (*continued*)

CAS Number	In 1995-2000 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
120-80-9	X	c	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	Nitrilotriacetic acid	Acide nitrilotriacétique	Ácido nitrilotriacético
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	X	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		p	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvente
872-50-4		p	N-Methyl-2-pyrrolidone	N-Méhyl-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
1319-77-3	X		Cresol (mixed isomers)	Crésol (mélange d’isomères)	Cresol (mezcla de isómeros)

c = Known or suspected carcinogen.
p = California Proposition 65 chemical.
t = CEPA Toxic chemical.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 2000 (*continued*)

CAS Number	In 1995-2000 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
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 solvente
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
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)	Toluendiisocianatos (mezcla de isómeros)
28407-37-6		p	C.I. Direct Blue 218	Indice de couleur Bleu direct 218	Índice de color Azul directo 218
34077-87-7			Dichlorotrifluoroethane (HCFC-123 and isomers)	Dichlorotrifluoroéthane	Diclorotrifluoroetano
63938-10-3			Chlorotetrafluoroethane (HCFC-124 and isomers)	Chlorotétrafluoroéthane	Clorotetrafluoroetano
	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*
	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		Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos
	X	m,c,p,t	Lead and its compounds**	Plomb (et ses composés)**	Plomo y compuestos**
	X	m	Manganese and its compounds*	Manganèse (et ses composés)*	Manganeso y compuestos*
		m,p,t	Mercury and its compounds*	Mercure (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***

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.
** Includes tetraethyl lead which is listed separately in NPRI
*** 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, 2000 (*continued*)

CAS Number	In 1995-2000 Matched Data Set	Special Chemical Group	Chemical Name	Substance	Sustancia
		c,t	Polychlorinated alkanes (C10-C13)	Alcanes poychlorés (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*
	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.
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-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 that Appear in Tables

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
3M	Decatur	AL	35602MCMPNSTATE	5-9
3M Cottage Grove Center, 3M Co. Inc.	Cottage Grove	MN	55016MCHMLHIGHW	5-9
A.E. Staley Mfg. Co. Sagamore Ops.	Lafayette	IN	47902STLYM2245N	5-11
Abbott Health Prods. Inc., Abbott Labs.	Barceloneta	PR	00617BBTTCROADN	5-9
Abbott Labs., North Chicago Facility	North Chicago	IL	60064BBTTL1400N	5-9
Acme Steel Co., Riverdale Plant, Acme Metals Inc.	Riverdale	IL	60627CMSTL13500	4-8
Acordis Cellulosic Fibers Inc., Acordis US Holding Inc.	Axis	AL	36505CRTLDUSHIG	4-6 4-7 7-7
Aerovox, Aerovox Inc.	Huntsville	AL	35801RVXML2615M	5-11
AES Beaver Valley Inc., AES Corp.	Monaca	PA	15061SBVRV394FR	4-8
Aguaglass Corp., Masco Corp.	Adamsville	TN	38310QGLSSINDUS	9-10
Aimco Solrec Ltd.	Milton	ON	0000004893	5-9 8-6
Air Prods. & Chemicals Inc.	Geismar	LA	70734RPRDS36637	5-10
Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena	TX	77506RPRDC1423H	3-4 5-11 7-16
AK Steel Corp.	Rockport	IN	47635KSTLC6500N	4-6 4-7 7-10
AK Steel Corp.	Zanesville	OH	43701RMCDV1724L	4-8 6-14
AK Steel Corp., Butler Works (Rte. 8 S)	Butler	PA	16003RMCDVROUTE	3-4 4-6 4-7 7-10
Akzo Nobel Polymer Chemicals L.L.C., Akzo Nobel Inc.	Deer Park	TX	77536TXSLK730BA	5-10
Alabama Power Co., Plant Gaston, Southern Co.	Wilsonville	AL	35186LBMPWHWY25	9-19
Alabama Power Co., Plant Greene County, Southern Co.	Forkland	AL	36732LBMPWHWY43	4-6 4-7 6-8
Alcan Groupe Métal Primaire, Usine Arvida	Jonquière	QC	0000003406	9-19 10-25
Alcan Métal Primaire, Usine de Beauharnois	Melocheville	QC	0000004808	10-25
Alcan Métal Primaire, Usine Shawinigan	Shawinigan	QC	0000003057	10-25
Alcan Primary Metal Group - British Columbia, Kitimat Works	Kitimat	BC	0000002788	9-19 10-25
Alchem Aluminum Inc.	Coldwater	MI	49036LCHML368WG	8-22
Algoma Steel Inc	Sault Ste. Marie	ON	0000001070	9-27 10-25
Allegheny Energy Inc., Hatfield Power Station	Masontown	PA	15461HTFLDRD1BO	4-7
AltaSteel Ltd.	Edmonton	AB	0000001106	10-16
Amber Plating Works Inc.	Chicago	IL	60641MBRPL3100N	5-11
American Electric Power, Cardinal Plant, Cardinal Operating Co.	Brilliant	OH	43913CRDNL306CO	4-6 4-7
American Electric Power, Mitchell Plant	Moundsville	WV	26041MTCHLSTATE	4-6 4-7
American Insulated Wire, Leviton Corp. Mfg. Co. Inc.	Coffeyville	KS	67337MRCNN3297N	5-4
American Iron & Metal Company Inc.	Montréal-est	QC	--	8-10
Ameripol Synpol Corp.	Port Neches	TX	77651MRPLS1215M	7-7 9-10
Amvac Chemical Corp., American Vanguard Corp.	Los Angeles	CA	90023MVCCH4100E	10-19
Aquaglass Performance Plant, Masco Corp.	McEwen	TN	37101QGLSS155FO	9-10
Arco Alloys Corp.	Detroit	MI	48211RCLLY1891T	8-8
ASARCO Inc.	East Helena	MT	59635SRCNCSMELT	3-4 4-6 4-7 4-8 9-2 9-4 9-9 9-20
ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo México S.A. de C.V.	Hayden	AZ	85235SRCNC64ASA	3-4 4-6 4-7 6-11 7-13 9-2 9-4
Ashland Distribution Co., Ashland Inc.	Charlotte	NC	28208SHLND3930G	5-10
Atco Electric, Battle River Generating Station	Forestburg	AB	0000001033	10-21
Avaya Inc.	Omaha	NE	68137TTNTW120TH	5-4
Baldwin Energy Complex, Dynegy Inc.	Baldwin	IL	62217LLNSP1901B	6-8
BASF Corp.	Freeport	TX	77541BSFCR602CO	3-4 4-6 4-7 7-10
BASF Corp.	Geismar	LA	70734BSFCRRIVER	5-9
Bayer Corp.	New Martinsville	WV	26155MBYCRSTATE	7-10

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Bayer Corp., Baytown	Baytown	TX	77520MBYCR8500W	5-10 7-10
Belden Communications Div., Belden Inc.	Phoenix	AZ	85043TTTCH505NO	5-4
Bethlehem Steel Corp., Sparrows Point Div., Bethlehem Steel Corp.	Sparrows Point	MD	21219BTHLHDUALH	10-13
Bethlehem Steel Corp., Burns Harbor Div., Bethlehem Steel Corp.	Burns Harbor	IN	46304BTHLHBURNS	10-13
Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais	IL	60914BRMNGRR1BO	4-8
Boise Cascade Corp.	Saint Helens	OR	97051BSCSC1300K	5-11
Bowen Steam Electric Generating Plant, Southern Co.	Cartersville	GA	30120BWNST317CO	3-4 4-6 4-7 9-19
BP Amoco Polymers Inc., BP	Piedmont	SC	29602MCPRFPOBOX	5-4
BP Amoco, Texas City Business Unit, BP Amoco Corp.	Texas City	TX	77590MCLCM24015	7-7
BP Chemicals Inc., Green Lake Facility, BP America Inc.	Port Lavaca	TX	77979BPCHMTEXAS	4-6 4-7
BP Chemicals Inc., BP America	Lima	OH	45805BPCHMFORTA	4-6 4-7
Brandon Shores & Wagner Complex, Constellation Energy Group	Baltimore	MD	21226BRNDN1000B	4-6 4-7
Brass Craft Canada Ltd., Masco Corporation	St. Thomas	ON	0000004463	8-6
Bristol-Myers Squibb Co. Technical Ops.	East Syracuse	NY	13221BRSTLTHOMP	5-11
Bristol-Myers Squibb Mfg., Bristol Myers Squibb Co.	Humacao	PR	00661SQBBMSTATE	5-10
Browning-Ferris Industries - Arbor Hills Landfill	Northville	MI	--	8-22
C & D Techs. Dynasty Div.	Milwaukee	WI	53212JHNSN900EK	5-4
Calcasieu Refining Co.	Lake Charles	LA	70606CLCSRWESTE	9-30
Cambria Cogen Co., El Paso Corp.	Ebensburg	PA	15931CMBRC243RU	10-19
Camoplast Inc., Division Acton Vale	Acton Vale	QC	0000005444	9-10
Camoplast Inc., Division Roski I	Roxton Falls	QC	0000002561	9-10
Canadian Technical Tape, Montreal Plant	St-Laurent	QC	0000004399	9-14
Canadian Waste Services Inc., SWARU Incinerator	Hamilton	ON	0000005860	10-16 10-21
Cargill Corn Milling, Cargill Inc.	Cedar Rapids	IA	52406CRGLL17101	5-11
Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville	OR	97128CSCDS3200N	4-8
Celanese Canada Inc., Edmonton Facility	Edmonton	AB	0000001162	5-11
Celanese Ltd. Clear Lake Plant, Celanese Americas Corp.	Pasadena	TX	77507HCHST9502B	3-4 5-9 5-11 7-16
Cerro Metal Products	Bellefonte	PA	16823CRRMTBOX38	8-9 8-22
Cerro Wire & Cable Co., Inc.	Hartselle	AL	35640CRRWR201TH	5-4 7-13
CH Resources Niagara Falls, Central Hudson Enterprises Inc.	Niagara Falls	NY	14304CHRSR5300F	4-8
Chaparral Steel Midlothian L.P., Texas Inds. Inc.	Midlothian	TX	76065CHPRR300WA	5-4
Chemfirst Fine Chemicals Inc., Chemfirst Inc.	Tyrone	PA	16686QLTYCINDUS	5-10
Chemical Solvents Denison Avenue Facility	Cleveland	OH	44109CHMCL1010D	5-9
Chemical Specialties Inc., Laporte Inc.	Harrisburg	NC	28075MNRLRHWY49	5-10
Chemical Waste Management Inc., Waste Management Inc.	Kettleman City	CA	93239CHMCL35251	3-4 4-6 4-7 6-11 9-20
Chemical Waste Management, Lake Charles Facility, Waste Management Inc.	Sulphur	LA	70665CHMCL7170J	10-19
Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington	OR	97812CHMCL17629	3-4 4-6 4-7 6-11 10-28
Chemical Waste Management, Waste Management Inc.	Emelle	AL	35459CHMCLHWY17	3-4 4-6 4-7 6-11 10-4
Chemrec Inc.	Edmonton	AB	0000005369	8-10
Chevron Phillips Chemical Co., Chevron Corp.	Port Arthur	TX	77640CHVRN2001S	5-4 Section 9.8.4
Ciba Specialty Chemical Corp.	McIntosh	AL	36653CBGGYGEIGY	5-10
Ciba Specialty Chemicals	West Memphis	AR	72301CPSCHBRIDG	5-9 5-10
Ciba Specialty Chemicals Corp.	Newport	DE	19804CBGGYJAMES	5-11
Citgo Petroleum Corp.	Lake Charles	LA	70602CTGPTHIGHW	9-30
City of Fremont Department of Utilities, Lon D. Wright Power	Fremont	NE	68025CTYFF2701E	10-13

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Clariant LSM (Florida) Inc.	Gainesville	FL	32602PCRNC5002S	10-19
Clariant LSM America Inc., Clariant Corp.	Rock Hill	SC	29731TRYBR2550V	5-10
Clean Harbors of Braintree Inc., Clean Harbors Inc.	Braintree	MA	02184CLNHR385QU	10-4
Clean Harbors Services Inc., Clean Harbors Inc.	Chicago	IL	60617CLNHR11800	10-4
Coastal Chem Inc., Coastal Corp.	Cheyenne	WY	82007WYCNC8305O	4-7
Cognis Corp., Cincinnati Plant	Cincinnati	OH	45232HNKLC4900E	5-11
Communauté urbaine de Québec, Incinérateur régional	Québec	QC	0000000211	10-21
Conception Bay North Incinerator Association	Harbour Grace	NF	0000005036	10-16
Condea Vista Lake Charles Chemical Complex	Westlake	LA	70669VSTCHOLDSP	9-30
Conoco Lake Charles Refy.	Westlake	LA	70669CNCLKOLDSP	9-30
Corning Inc.	Danville	VA	24541CRNNGROUTE	5-11
Corus Tuscaloosa, Corus Group PLC	Tuscaloosa	AL	35404TSCLS1500H	4-8
Co-Steel Lasco	Whitby	ON	0000003824	5-4 6-17 7-13 8-6 9-2 9-20
Co-Steel Raritan	Perth Amboy	NJ	08862RRTNR225EL	5-4
CP&L Mayo Electric Generating Plant, Progress Energy	Roxboro	NC	27573MYLCT10660	4-7
CP&L Roxboro Steam Electric Plant, Progress Energy	Semora	NC	27343RXBRS1700D	3-4 4-6 4-7 9-19
CRI Environment Inc	Coteau-du-Lac	QC	--	8-23
Crompton Mfg. Co. Inc., Crompton Corp.	Geismar	LA	70734NRYLCPOBOX	5-9
Crystal Clean Services L.L.C.	Indianapolis	IN	46222CRYST3970W	6-17
CSC Ltd., Reserve Group	Warren	OH	44482CPPRW4000M	4-8
Cytec Inds. Inc. Fortier Plant	Westwego	LA	70094MRCNC10800	4-6 4-7
DDE Louisville, DuPont Dow Elastomers	Louisville	KY	40216DDLSV4242C	5-10
Degussa-Huls Corp.	Theodore	AL	36590DGSSCDEGUS	5-9
Delphi Packard Electric Sys., N. River Road Facility, Delphi Automotive Sys.	Warren	OH	44483GMCPCNORTH	8-7
Demenno / Kerdoon, World Oil Corp.	Compton	CA	90222DMNNK2000N	5-11
Detroit Edison, Monroe Power Plant, DTE Energy Co.	Monroe	MI	48161DTRTD3500E	4-6 4-7
Disposal Systems Inc., GNI Group Inc.	Deer Park	TX	77536DSPSL2525B	5-9 Section 9.8.4
DK Environmental Inc., Demenno Kerdoon	Vernon	CA	90023DKNVR3650E	4-8 5-10 6-14
DMC-2, Degussa AG	South Plainfield	NJ	07080MTZMT3900S	5-11 7-16
Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum	MO	63048HRCLN881MA	3-4 4-6 4-7
Doe Run Co. Recycling Facility, Renco Group Inc.	Boss	MO	65440BCKSMHIGHW	4-8 9-9
Dofasco Inc., Dofasco Hamilton	Hamilton	ON	0000003713	3-4 4-6 4-8 7-13 8-6 9-2 9-4 9-9 9-27 10-25
Dominion Castings Ltd., ABC NACO Inc.	Hamilton	ON	0000004739	9-15
Dominion Colour Corporation, Ajax Plant	Ajax	ON	0000001495	5-11
Dominion Nickel Alloys Ltd.	Burlington	ON	--	8-23
Douglas Battery Mfg. Co.	Winston-Salem	NC	27107DGLSB500BA	5-4
Dow Chemical Canada Incorporated	Fort Saskatchewan	AB	0000000280	10-16
Dow Chemical Co. Freeport	Freeport	TX	77541THDWCBUILD	10-13 10-19
Dow Chemical Co. Louisiana Div., Dow Chemical Co.	Plaquemine	LA	70765THDWCHIGHW	10-13
Dow Chemical Co. Midland Ops.	Midland	MI	48667THDWCMICHI	5-10 10-13
Dow Corning Corp.	Carrollton	KY	41008DWCRNUSHIG	8-7
Dow Corning Corp.	Midland	MI	48686DWCRN3901S	5-9 5-10
DuPont Beaumont Plant	Beaumont	TX	77704DPNTBSTATE	5-10
DuPont Chambers Works	Deepwater	NJ	08023DPNTCRT130	5-10
DuPont Delisle Plant	Pass Christian	MS	39571DPNTD7685K	4-6 4-7 10-13 10-19

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
DuPont Edgemoor	Edgemoor	DE	19809DPNTD104HA	4-8 10-13
DuPont Johnsonville Plant	New Johnsonville	TN	37134DPNTJ1DUPO	10-13
DuPont LaPorte Plant	LaPorte	TX	77571DPNTL12501	5-10
DuPont Mobile Plant	Axis	AL	36505DPNTMHIGHW	5-10
DuPont Victoria Plant	Victoria	TX	77902DPNTVOLDBL	4-6 4-7
Duke Energy Belews Creek Steam Station	Belews Creek	NC	27052DKNRGPINEH	4-6 4-7
Duke Energy Marshall Steam Station	Terrell	NC	28682DKNRG8320E	3-4 4-6 4-7 9-19
DuPont Agricultural Caribe Inds. Ltd.	Manati	PR	00701DPNTGHIGHW	5-9 5-10
Edmonton Power Inc., Genesee Thermal Generating Station	Warburg	AB	0000000267	10-21
Elementis Chromium L.P., Elementis Inc.	Corpus Christi	TX	78407MRCNC3800B	4-8 6-11 9-15
Emballages Smurfit-Stone Canada Inc., Usine de la Tuque	La Tuque	QC	0000003140	7-10
EME Homer City Generation L.P., Edison Intl.	Homer City	PA	15748MHMRC1750P	6-8
Encycle Texas Inc., ASARCO Inc.	Corpus Christi	TX	78407NCYCL5500R	8-7
Engelhard Corp.	Erie	PA	16503CLSCT1707G	5-11
Engineered Controls Intl. Inc.	Whitsett	NC	27377NGNRD1239R	5-4
Envirite of Ohio Inc., Envirite Corp.	Canton	OH	44707NVRTF2050C	4-8
Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon	OH	43616NVRSF876OT	3-4 4-6 4-7 6-11 9-20
EQ Resource Recovery Inc., EQ Holding Co.	Romulus	MI	48174MCHGN36345	5-10 8-7
Equistar Chemicals Bayport Chemicals Plant	Pasadena	TX	77507QSTRC5761U	5-11
Equistar Chemicals L.P. LaPorte Plant	LaPorte	TX	77571QNTMC1515M	5-9
Equistar Chemicals L.P. Lake Charles Plant	Sulphur	LA	70663CCDNTHIGHW	9-30
Equistar Chemicals L.P. Victoria Facility	Victoria	TX	77902CCDNTOLDBL	3-4 5-9
Eramet Marietta Inc., Eramet Manganese Alliage	Marietta	OH	45750LKMMTROUTE	4-7
Essex Group Inc., Superior Telecom Inc.	Columbia City	IN	46725SSXWRPOBOX	5-4
Essex Group Inc., Superior Telecom Inc.	Franklin	TN	37064SSXGR120SE	5-4
Eveready Battery Co. Inc., Energizer Holdings Co. Inc.	Marietta	OH	45750VRDYBCOUNT	4-8
Exide Corp.	Bristol	TN	37620XDCRP364EX	4-8 6-17 7-13 9-9
Exide Corp.	Dunmore	PA	18512GNBNCONEDU	8-7
Exide Corp.	Fort Smith	AR	72901GNBNC4115S	8-7
Exide Corp.	Kankakee	IL	60901GNBNC2500W	8-7
Exide Corp.	Leavenworth	KS	66048GNBNC1901S	5-4
Exide Corp.	Shreveport	LA	71129GNBNC6901W	5-4
Exide Corp. Burlington, Exide Techs.	Burlington	IA	52601XDCRP3400W	5-4
Exide Corporation	Reading	PA	--	8-22
Exide Techs.	Manchester	IA	52057XDCRPSOUTH	5-4
Exploits Regional Services Board, Solid Waste Disposal Site	Grand Falls-Windsor	NF	0000005034	10-16
Extruded Metals Inc.	Belding	MI	48809XTRDD302AS	8-8 8-22
Falconbridge Ltd.	Falconbridge	ON	0000001236	8-23
Falconbridge Ltd. , Kidd Metallurical Division	Timmins	ON	0000002815	8-11 8-23
Federal-Mogul Friction Prods., Federal-Mogul Corp.	Manila	AR	72442SBRKPONESI	6-14
First Chemical Corp., Chemfirst Inc.	Pascagoula	MS	39567FRSTC1001I	5-11
Firstenergy, W.H. Sammis Plant	Stratton	OH	43961FRSTNSTATE	6-8
Fisher Cast Limited, Otonabee Plant, Fisher Gauge Limited	Peterborough	ON	0000002744	8-6
FMC Corp.	Baltimore	MD	21226FMCCR1701E	5-10
Formosa Plastics Corp. Louisiana, Formosa Plastics Corp. USA	Baton Rouge	LA	70805FRMSPGULFS	10-13

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Formosa Plastics Corp. Texas, Formosa Plastics Corp. USA	Point Comfort	TX	77978FRMSPPOBOX	5-4
Fuji Photo Film Inc.	Greenwood	SC	29648FJPHT211PU	5-11
Gage Prods. Co.	Ferndale	MI	48220GGPRD625WA	5-9 8-8
Gallatin Steel Co., Dofasco Gallatin Inc./Co-Steel C.M.S. Corp.	Warsaw	KY	41096GLLTNUS42W	5-4
GB Biosciences Corp.	Houston	TX	77015FRMNT2239H	10-19
GE Co., Erie Plant GETS	Erie	PA	16531GNRLL2901E	5-4
GE Co., Silicone Prods., GE Co.	Waterford	NY	12188GNRLL260HU	8-7
GE Lighting, Canada, Oakville Lamp Plant	Oakville	ON	0000001281	10-4
General Motors of Canada Limited, Delphi Canada Inc., Oshawa Battery	Oshawa	ON	0000003221	5-4 9-2
General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa	ON	0000003893	9-14
George Inds., Valmont Inds. Inc.	Los Angeles	CA	90063GRGND4116W	5-11
Georgia Gulf Lake Charles L.L.C.	Westlake	LA	70669GRGGL1600V	5-4
Gerdau MRM Steel Inc.	Selkirk	MB	0000001651	9-20 10-16
Grace Davison Cincinnati Plant, W. R. Grace & Co.	Cincinnati	OH	45229WRGRC4775P	5-11
Green Tree Chemical Techs. Inc., Nitrocellulose Div.	Parlin	NJ	08859GRNTR50SMI	5-11 7-16
Gulf Power Co., Plant Crist, Southern Co.	Pensacola	FL	32514GLFPW11999	3-4 4-6 4-7 6-8
Heat Treatment Services Inc., Rhodia Inc.	Dallas	TX	75212HTNRG4460S	5-9
Hercules Inc., Parlin Plant	Parlin	NJ	08859HRCLSSOUTH	5-11 7-16
Hercules, Hercules Inc.	Hopewell	VA	23860QLNCM1111H	5-11
Heritage Environmental Services L.L.C.	Indianapolis	IN	46231HRTGN7901W	4-8
Holnam Inc.	Clarksville	MO	63336DNDCMPOBOX	8-22
Honeywell Intl. Inc.	Ironton	OH	45638LLDSG3330S	10-28
Howe Sound Pulp and Paper Limited Partnership	Port Mellon	BC	0000001419	10-16
Hukill Chemical Corp.	Bedford	OH	44146HKLLC7013K	5-9 5-10
Hydrite Chemical Co.	Cottage Grove	WI	53527HYDRT150WD	5-9
IBP Inc.	Lexington	NE	68850BPNC 1500S	7-10
Imco Recycling	Coldwater	MI	49036MCRCY267NO	8-22
Imco Recycling Inc.	Morgantown	KY	42261MCRCY609GA	10-13
Imco Recycling of Ohio Inc., Imco Recycling Inc.	Uhrichsville	OH	44683MCRCY7335N	10-13
Imperial Home Decor Group ULC, IHDG Brampton	Brampton	ON	0000002263	9-14
Inco Limited	Thompson	MB	0000001473	8-23
Inco Limited, Copper Cliff Smelter Complex	Copper Cliff	ON	0000000444	9-15
Ingot Metal Co., Limited	Weston	ON	--	8-23
International Paper, Camden Mill, International Paper Co.	Camden	AR	71701NTRNT1944A	7-7
International Paper, Erie Mill	Erie	PA	16533HMMRM1540E	5-11
Intertape Polymer Group, Columbia Div.	Columbia	SC	29205NCHRC2000S	9-14
Ipsco Steel Inc., Ipsco Inc.	Muscatine	IA	52761PSCST1770B	4-8
Irving Pulp & Paper Limited / Irving Tissue Company	Saint John	NB	0000002604	7-10
ISP Chemicals Inc.	Assonet	MA	02702PLRDC238SO	5-10
ISP Van Dyk Inc., International Specialty Prods.	Belleville	NJ	07109VNDYKMAINW	5-9
Ispat Sidbec Inc., Aciérie, Ispat International Ltd.	Contrecoeur	QC	0000003649	9-4 9-20 10-16
Ispat Sidbec Inc., Sidbec-Feruni (Ispat) Inc., Contrecoeur	Contrecoeur	QC	0000003655	9-20
Ivaco Rolling Mills	L'Orignal	ON	0000001520	4-8 9-4 9-9 10-4
J & L Specialty Steel Inc.	Louisville	OH	44641JLSPC1500W	3-4 5-4
J.M. Stuart Station, Dayton Power & Light Co.	Manchester	OH	45144DYTNP745US	3-4 4-6 4-7

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
J.R. Simpolot Co., Heyburn Food Group, J.R. Simplot Co.	Heyburn	ID	83336JRSMPHIGHW	7-10
Jayhawk Fine Chemicals Corp.	Galena	KS	66739LLCCH22MIS	4-6 4-8 6-14
Jessop Steel Co., Allegheny Techs. Inc.	Washington	PA	15301JSSPS500GR	5-4
John E. Amos Power Plant, American Electric Power	Winfield	WV	25213JHNMS1530W	3-4 4-6 4-7 9-19
Johnson Controls Battery Group Inc., Johnson Controls Inc.	Middletown	DE	19709JHNSNRD170	8-7
Johnson Controls Battery Group Inc., Johnson Controls Inc.	Saint Joseph	MO	64502JHNSN4722P	5-4
Johnson Controls Battery Group Inc., Johnson Controls Inc.	Tampa	FL	33612JHNSN10215	5-4
Karmax Heavy Stamping, Cosma International Inc.	Milton	ON	0000003949	3-4 5-4 9-2
Kemet Electronics Corp.	Simpsonville	SC	29681KMTLC2835K	5-9 6-20
Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna	UT	84006KNNCT8362W	3-4 4-6 4-7 6-11 9-2 9-4 9-15 9-20
Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria	IL	61641KYSTN7000S	4-8
Koppers Inds., Follansbee Tar Plant, Koppers Inds. Inc.	Follansbee	WV	26037KPPRSKOPPE	10-28
Koppers Inds. Inc.	Cicero	IL	60650KPPRS3900S	4-8 6-14
Koppers Inds. Inc.	Green Spring	WV	26722KPPRSRAILR	10-28
Kuntz Electroplating Inc.	Kitchener	ON	0000003111	5-10
L&M Precision Products Inc.	Toronto	ON	0000005924	8-6
Lake Charles Carbon Co., Alcoa	Lake Charles	LA	70605LKCHR3943G	10-28
Lake Erie Steel Company	Nanticoke	ON	0000003855	10-25
LaPorte Methanol Co. L.P.	LaPorte	TX	77571LPRTM11603	5-10
Lasco Bathware Inc.	Cordele	GA	31015PHLPS210SO	9-10
Lasco Bathware Inc.	Yelm	WA	98597PHLPS801NO	9-10
Lenzing Fibers Corp.	Lowland	TN	37778LNZNGTENNE	3-4 4-6 4-7 7-7
Les Produits Chimiques Delmar Inc., Laboratoires Pharmedical SA	Lasalle	QC	0000004321	5-10
Lilly Tech. Center, Eli Lilly & Co.	Indianapolis	IN	46285LLLLY1555K	5-10
Lofthouse Brass Manufacturing Limited, Burks Falls	Burks Falls	ON	0000003854	8-6
Louisiana Pigment Co. L.P.	Westlake	LA	70669KRNSL3300B	10-13
LTV Steel Co. Inc., Pittsburgh Works	Pittsburgh	PA	15207PTTSB4650S	6-14
Lyondell Chemical Co., Bayport Facility	Pasadena	TX	77507RCCHM10801	5-9 5-11
Lyondell-Citgo Refining L.P.	Houston	TX	77017LYNDL12000	5-11
MAAX, MAAX Inc. - Division Fibre de Verre Moderne - Usine 5	Tring-Jonction	QC	0000004916	9-10
MAAX, MAAX Westco Armstrong	Armstrong	BC	0000005123	9-10
Magnesium Corp. of America, Renco Group Inc.	Rowley	UT	84074MXMGNROWLE	3-4 4-6 4-7 6-8 7-7 10-13
Marathon Pulp Inc.	Marathon	ON	0000000462	7-10
Marisol Inc.	Middlesex	NJ	08846MRSLN125FA	3-4 5-9 5-10
MDA Mfg. Inc.	Decatur	AL	35601MDMNFSTATE	5-10
MEMC Electronic Materials Inc., St. Peters Plant	O'Fallon	MO	63376MNSNT501PE	5-11
Merck & Co. Inc.	Albany	GA	31708MRCKC3517R	5-9
Merck & Co. Inc.	Rahway	NJ	07065MRCKC126EL	5-9 7-16
Metal Chem	Pittsburgh	PA	--	8-22
Metal Chem, Inc.	Pittsburgh	PA	--	8-9
Methanex Corporation, Medicine Hat Plant	Medicine Hat	AB	0000001782	7-7
Michelin N.A. Ardmore Plant, Michelin Corp.	Ardmore	OK	73402THNRY1101U	10-28
Midwest Zinc	Chicago	IL	60622MDWST1001W	8-22
Millennium Chemicals Ashtabula Plant 2, Millennium Chemicals Inc.	Ashtabula	OH	44004SCMCH2426M	10-13
Millennium Inorganic Chemicals Inc. Hawkins Point Plant, Millennium Chemicals Inc.	Baltimore	MD	21226SCMCH3901G	10-13

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Millennium Petrochemicals Inc. LaPorte Plant, Millennium Chemicals Inc.	LaPorte	TX	77571QNTMC11603	5-9
Milsolv Brenntag Corp., Brenntag Inc.	Menomonee Falls	WI	53051MLSLV14765	5-9
Mississippi Power Co. Plant Watson, Southern Co.	Gulfport	MS	39502MSSSSINTER	4-6 4-7
Mitsubishi Polyester Film L.L.C.	Greer	SC	29651HCHSTHOODR	3-4 5-4
Monsanto Luling, Pharmacia Corp.	Luling	LA	70070MNSNTRIVER	4-6 4-7
Mueller Brass Co.	Port Huron	MI	48060MLLRB1925L	5-4 8-8
National Steel Corp., Greatlakes Ops.	Ecorse	MI	48229GRTLKNO1QU	4-6 4-8
Nexans Canada Inc., Simcoe Plant	Simcoe	ON	0000000953	8-6
Noranda, Horne Smelter	Rouyn-Noranda	QC	0000003623	8-10 8-23
Noranda Inc, Brunswick Smelter	Belledune	NB	0000004024	9-9
Noranda Inc., CEZinc, Usine d'extraction de zinc	Valleyfield	QC	0000002938	5-4
Noranda Inc., Affinerie CCR	Montréal-est	QC	0000003916	5-4
Norsk Hydro Canada Inc., Hydro Magnesium Canada	Bécancour	QC	0000000747	8-23 10-21
Norske Skog Canada Limited, Crofton Pulp and Paper	Crofton	BC	0000001266	10-16
Norske Skog Canada Mackenzie Pulp Ltd., Mackenzie Pulp Operations	Mackenzie	BC	0000001486	10-16
Norske Skog Canada, Elk Falls Mill	Campbell River	BC	0000000333	10-16
North East Chemical Corp., TBN Holdings Inc.	Cleveland	OH	44113NRTHS3301M	6-20
North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta	OH	43515NRTHS6767C	3-4 5-4
North Star Recycling, Cargill Inc.	Saint Paul	MN	55119NRTHS1678A	4-8
Northern States Power Co.	Becker	MN	55308NRTHR13999	10-13
Nova PB Inc.	Ste-Catherine	QC	0000004402	8-10 8-23
Nova Scotia Power Inc., Lingan Generating Station, Emera Inc.	New Waterford	NS	0000003992	10-21
Nucor Corp., Nucor Steel Div.	Plymouth	UT	84330NCRST7285W	4-8
Nucor Steel Arkansas, Nucor Corp.	Blytheville	AR	72315NCRST7301E	3-4 4-8 5-4
Nucor Steel Nebraska	Norfolk	NE	68701NCRSTRURAL	4-8
Nucor Steel, Nucor Corp.	Crawfordsville	IN	47933NCRST400SO	3-4 4-6 4-8
Nucor Steel, Nucor Corp.	Huger	SC	29450NCRST1455H	4-8 7-13
Nucor-Yamato Steel Co., Nucor Corp.	Blytheville	AR	72316NCRYM5929E	3-4 4-6 4-8 6-17 7-13 9-9
Occidental Chemical Corp. Niagara Plant, Occidental Petroleum Corp.	Niagara Falls	NY	14302CCDNT4700B	10-19
Occidental Chemical Corp., Occidental Petroleum Corp.	Convent	LA	70723CCDNTHIGHW	5-10
Olin Corp. Zone 17 Facility	East Alton	IL	62024LNCRPLEWIS	3-4 5-4
Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke	ON	0000001861	3-4 4-6 4-7 6-8 9-19 10-16
Onyx Environmental Services L.L.C.	Azusa	CA	91702LSLVN1704W	5-9
Onyx Environmental Services L.L.C.	West Carrollton	OH	45449CWMRS4301I	5-9 5-10 6-20
Oregon Steel Mills Inc.	Portland	OR	97203RGNST14400	4-8
Organichem Corp.	Rensselaer	NY	12144STRLN33RIV	5-11
Ormet Primary Aluminum Corp., Ormet Corp.	Hannibal	OH	43931RMTCRPOBOX	10-28
Outokumpu American Brass	Buffalo	NY	14207MRCNB70SAY	8-22
Oxy Vinyls L.P. LaPorte VCM Plant, Occidental Petroleum Corp.	LaPorte	TX	77571LPRTC2400M	5-10 10-13 10-19
P4 Production L.L.C., Pharmacia Corp.	Soda Springs	ID	83276MNSNTHIGHW	9-15
Pacifica Papers Inc.	Powell River	BC	0000000723	10-16
Pacifica Papers, Alberni Specialties	Port Alberni	BC	0000001593	10-16
Parker Hannifin Brass Div.	Otsego	MI	49078PRKRH300PA	5-4
Pecan Grove Marine Terminal	Sulphur	LA	70663PCNGR2115D	9-30
Penford Prods. Co., Penford Corp.	Cedar Rapids	IA	52406PNFRD1001F	5-11 7-16

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Penick Corp., Penick Holding	Newark	NJ	07114PNCKC158MT	5-11
Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria	IL	61615PRDSP4349W	3-4 4-6 4-7
Perstorp Polyols Inc.	Toledo	OH	43612PRSTR600MA	5-9
Petro-Canada-Raffinerie de Montréal	Montréal-est	QC	0000003897	
Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit	MI	48214PTRCH421LY	3-4 5-9 5-10 6-20 8-22
Pfizer Inc., Groton Site	Groton	CT	06340PFZRNEASTE	5-10
Pfizer Inc., Parke-Davis Div.	Holland	MI	49424PRKDV188HO	3-4 5-9 6-20
Pharmacia & Upjohn Caribe Inc., Pharmacia Corp.	Arecibo	PR	00617THPJHHIGHW	5-10
Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo	MI	49001THPJH7171P	3-4 5-9 5-10 5-11 6-20 7-16
Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas	NM	88009PHLPSHIDAL	6-11
Phelps Dodge Refining Corp.	El Paso	TX	79998PHLPSNORTH	8-22
Phenolchemie Inc.	Theodore	AL	36582PHNLC7770R	5-9
Philip Services Inc., Fort Erie Facility	Fort Erie	ON	0000005646	4-8 8-6 9-15
Philip Services Inc., Parkdale Avenue Facility	Hamilton	ON	0000005645	3-4 4-8 5-9 6-14 6-17 8-23
Philip Services Inc., Rexdale Facility	Etobicoke	ON	0000005648	6-14
Philip Services Inc., Yard 3 Facility	Hamilton	ON	0000001928	6-17
Philips Services, Inc.	Barrie	ON	0000005647	8-23
Philips Services, Inc.	Hamilton	ON	--	8-23
Philips Services/Waxman	Hamilton	ON	--	8-23
Philips Services/Waxman	Hamilton	ON	--	8-23
Phillips Environmental (Waxman Resources)	Hamilton	ON	--	8-11
Pollution Control Inds.	East Chicago	IN	46312PLLTN4343K	6-20
Pope & Talbot Ltd., Harmac Pulp Operations	Nanaimo	BC	0000001383	10-16
Port Arthur A&O Plant, Huntsman Corp., Huntsman Petrochemical Corp.	Port Arthur	TX	77641TXCCHGATE2	7-7
Potlatch Corp., MN P & P Div.	Cloquet	MN	55720PTLTCNORTH	5-11
PPG Inds. Inc.	Lake Charles	LA	70669PPGNDCOLUM	10-13
PQ Corp.	Kansas City	KS	66105PQCRP17THS	5-11
Price Pfister Inc., Black & Decker Corp.	Pacoima	CA	91331PRCPF13500	5-4
Procter & Gamble Mfg. Co., Procter & Gamble Co.	Sacramento	CA	95826PRCTR8201F	5-11
Production Prods. Co., John Mezzalingua Associates	East Syracuse	NY	13057THNWR6176E	5-4
Produits Shell Canada Raffinerie de Montréal-est	Montréal-est	QC	0000003127	
PSI Energy, Gibson Generating Station, Cinergy Corp.	Princeton	IN	47670PSNRGHWY64	4-7
QP Memphis Corp., Quebecor World Inc.	Memphis	TN	38116MXWLL828EA	9-14
Quanex Macsteel, Quanex Corp.	Fort Smith	AR	72902QNXMC4700P	5-4
Quebecor World	Dickson	TN	37055MXWLLOLDCO	9-14
Quebecor World Corinth, Quebecor World	Corinth	MS	38834KRGRRONEGO	9-14
Quebecor World Inc., Quebecor World Islington	Etobicoke	ON	0000003447	9-14
Rea Magnet Wire Co.	Lafayette	IN	47905RMGNT2800C	5-4
Recmix of Pennsylvania, Inc.	Canonsburg	PA	15317RCMXF586PL	8-9
Reliant Energies Inc., Keystone Power Plant	Shelocta	PA	15774KYSTNRTE21	3-4 4-6 4-7 6-8
Republic Techs. Intl., Canton Facility	Canton	OH	44704LTVST26338	3-4 5-4
Resolution Performance Prods., Deer Park Plant	Deer Park	TX	77536RSLTN5900H	5-9
Resolution Performance Prods. L.L.C.	Bedford Park	IL	60501SHLLC8600W	5-10
Revere Smelting & Refining Corp.	Middletown	NY	10940RVRSMRD2BA	8-22
Reynolds Metals Co., Longview Reduction Plant, Alcoa Inc.	Longview	WA	98632RYNLD4029I	10-28

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Rhodia Inc., Rhodia SA	Charleston	SC	29415LBRGH2151K	5-11
Rineco	Benton	AR	72015RNC001007V	3-4 5-9 6-20
Roanoke Electric Steel Corp.	Roanoke	VA	24017RNKLC102WE	4-8
Roche Colorado Corp., Syntex USA Inc.	Boulder	CO	80301SYNTX2075N	5-9
Roche Vitamins Inc., Hoffmann-La Roche Inc.	Freeport	TX	77541HFFMN1000C	5-10
Rohm & Haas Texas Inc., Rohm & Haas Co.	Deer Park	TX	77536RHMND6600L	5-10
Rome Cable Corp., Rome Group Inc.	Rome	NY	13440RMCBL421RI	5-4
Romic Environmental Techs. Corp., U.S. Liquids Inc.	East Palo Alto	CA	94303RMCNV2081B	5-9
Rouge Steel Co., Rouge Inds. Inc.	Dearborn	MI	48121RGSTL3001M	6-17 7-13
Rutgers Organics Corp., Rutgers AG	State College	PA	16801RTGRS201ST	5-10
S.D. Warren Co., Sappi Ltd.	Muskegon	MI	49443SDWRR2400L	5-11
Safety-Kleen (Aragonite) Inc., Safety-Kleen Corp.	Aragonite	UT	84029SFTYK11600	10-13
Safety-Kleen (Baton Rouge) Inc., Safety-Kleen Corp.	Baton Rouge	LA	70807SFTYK13351	5-10
Safety-Kleen (Mississauga) Ltd.	Mississauga	ON	0000004948	8-23
Safety-Kleen Canada Inc., Centre de Recyclage de St-Constant	St-Constant	QC	0000005421	5-9 8-6
Safety-Kleen Corp.	Denton	TX	76208SFTYK1722C	5-9 5-10
Safety-Kleen Envirosystems Co. of Puerto Rico Inc.	Manati	PR	00674SFTYKKM510	3-4 5-9 5-10
Safety-Kleen Ltd., Lambton Facility	Corunna	ON	0000002537	3-4 4-6 4-7 6-11 8-11 8-23 9-2 9-4 9-20
Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	Thorold	ON	0000005625	9-9 9-15 10-4
Safety-Kleen Oil Recovery Co., Safety-Kleen Corp.	East Chicago	IN	46312SFTYK601RI	5-4 6-14
Safety-Kleen Sys. Inc.	Dolton	IL	60419SFTYK633E1	5-9
Safety-Kleen Sys. Inc.	Smithfield	KY	40068SFTYK3700L	3-4 5-9 5-10 6-20
Saft America Inc.	Valdosta	GA	31601SFTMR711IN	5-11
Saint-Gobain Ceramics Materials	Niagara Falls	NY	14304NRTNW6600W	5-11
Sam Adelstein & Co., Ltd.	St. Catharines	ON	--	8-23
Sam Adelstein & Company Ltd.	St. Catharines	ON	--	8-11
Scherer Steam Electric Generating Plant	Juliette	GA	31046SCHRR10986	4-7
Schilberg Integrated Metals Corp.	East Hartford	CT	--	8-22
Seh-America Inc.	Vancouver	WA	98682SHMRC4111N	5-11
Selkirk Forest Products	Galloway	BC	0000005156	10-16
Seminole Generating Station	Palatka	FL	32177SMNLGUSHWY	6-8
Services Safety-Kleen (Québec) Ltée, Centre de transfert de Thurso	Thurso	QC	0000005455	5-10 10-4
Sheerness Generating Station, Transalta Utilities Corporation	Hanna	AB	0000001036	10-21
Shepherd Chemical Co.	Cincinnati	OH	45212THSHP4900B	5-11
Shurtape Techs. Inc. Hickory Tape Plant, STM Inc.	Hickory	NC	28601SHFRDLIGHL	9-14
Simpson Pasadena Paper Co., Simpson Investment Co.	Pasadena	TX	77506SMPSNNORTH	7-16
Sistersville Plant, Crompton Corp.	Friendly	WV	26175NNCRBSTATE	5-10
Skeena Cellulose Inc., Skeena Pulp Operations	Port Edward	BC	0000002158	10-16
Slater Stainless Corp., Aciers Inoxydables Atlas, Slater Steel Inc.	Sorel-Tracy	QC	0000003953	4-8 9-15
Slater Steels Inc., Hamilton Specialty Bar Division	Hamilton	ON	0000002161	4-8
Société Canadienne de Métaux Reynolds Ltée, Aluminérie de Baie-Comeau	Baie-Comeau	QC	0000002038	9-19 10-25
Solutia Inc.	Cantonment	FL	32533MNSNT3000O	3-4 4-6 4-7
Solutia Inc.	Springfield	MA	01151MNSNT730WO	5-11
Solutia Inc., Delaware River Plant	Bridgeport	NJ	08014SLTNCRTE13	10-19
Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment Co.	Sumter	SC	29151STHST755IN	3-4 5-9

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Southland Oil - Vicksburg Terminal	Vicksburg	MS	39180STHLN2600D	10-28
Southwire Co.	Carrollton	GA	30119CPPRDCENTR	4-8 10-13
Stablex Canada Inc.	Blainville	QC	0000005491	8-10 8-23 10-4
Steel Dynamics Inc.	Butler	IN	46721STLDY4500C	3-4 4-6 4-8 6-17 7-13 9-4
Stelco Inc., Hilton Works	Hamilton	ON	0000002984	9-27 10-16 10-25
Stelco McMaster Ltée	Contrecoeur	QC	0000002986	4-8 9-4
Stone Container Corp., Smurfit-Stone Container Corp.	Hopewell	VA	23860STNHP910IN	5-11
Stone Container Corp., Smurfit-Stone Container Corp.	Panama City	FL	32401STNCN1EVER	5-11
Stora Enso N.A. Wisconsin Rapids Pulp Mill	Wisconsin Rapids	WI	54494CNSLD950FO	5-10
Sud-Chemie Inc. West Plant	Louisville	KY	40210NTDCT1227S	5-11 7-16
Sun Chemical Corp. Newark Plant, DIC Americas Inc.	Newark	NJ	07105SNCHM185FO	5-11
Sunoco Inc. Frankford Plant	Philadelphia	PA	19137LLDSGMARGA	5-11
Systech Environmental Corp., Lafarge Corp.	Demopolis	AL	36732SYSTCARCOL	6-20
Systech Environmental/Lafarge	Alpena	MI	49707LFRGCFORDA	8-8 8-22
Tamco	Rancho Cucamonga	CA	91739TMC 12459	5-4
Tetra Micronutrients Inc., Tetra Techs.	Fairbury	NE	68352GLPCHPOBOX	4-8
Teva Pharmaceuticals USA Inc., Teva Pharmeucital Inds. Ltd.	Mexico	MO	65265BCRFT5000C	5-9
Thomas & Betts Corp.	Horseheads	NY	14845LRCLC224NM	5-4
Timken Co. Faircrest Steel Plant	Canton	OH	44706THTMK4511F	4-8
Timken Co. Harrison Steel Plant	Canton	OH	44706HRRSNHARRI	4-8
Tippecanoe Labs., Eli Lilly & Co.	Lafayette	IN	47905LLLLYLILLY	5-10
Tolko Manitoba Kraft Papers, Tolko Industries Ltd.	The Pas	MB	0000002051	7-7
Tonolli Canada Limited	Mississauga	ON	0000002256	9-9
Toray Plastics (America) Inc.	North Kingstown	RI	02852TRYPL21CRI	5-4
Tosco Wood River Refy., Tosco Corp.	Roxana	IL	62084SHLLLRTE11	9-27 10-28
Town of Channel - Port aux Basques - Incinerator	Port aux Basques	NF	0000005028	10-16
Town of Deer Lake Incinerator	Deer Lake	NF	0000005031	10-16
Town of Holyrood Incinerator	Holyrood	NF	0000005037	10-16
Town of Marystown, Waste Disposal Site Jean de Baie	Marystown	NF	0000005040	10-16
Town of Wabush Incinerator	Wabush	NF	0000005054	10-16
TransAlta Corporation, Keephills Thermal Generating Plant	Duffield	AB	0000002286	10-21
TransAlta Corporation, Sundance Thermal Generation Plant	Duffield	AB	0000002284	9-19 10-21
TransAlta Corporation, Wabamun Thermal Generating Plant	Wabamun	AB	0000002282	10-21
Triple M Metal	Brampton	ON	--	8-23
Two Wastewater Treatment Unit, Treated Water Outsourcing (Two) L.L.C.	Oregon	OH	43616TWWST1819W	5-4
TXI Ops. L.P. Hunter Cement Plant, TXI Ops. L.P.	New Braunfels	TX	78132TXPRT7781F	10-13
US Filter Recovery Services (CA) Inc., U.S. Filter Corp.	Vernon	CA	90058SFLTR5375S	5-10 5-11
US Mint, US Department of the Treasury	Denver	CO	80204NTDST320WE	5-4
US Mint, US Department of the Treasury	Philadelphia	PA	19106NTDST151NI	3-4 5-4 9-2
US Sugar Corp., Bryant Mill	Bryant	FL	33438NTDSTOFFUS	9-27
US TVA Johnsonville Fossil Plant, US Tennessee Valley Authority	New Johnsonville	TN	37134STVJH535ST	4-6 4-7 6-8
US TVA Paradise Fossil Plant, US Tennessee Valley Authority	Drakesboro	KY	42337STVPR13246	4-7
Union Carbide Corp., Institute WV Plant Ops.	Institute	WV	25112NNCRBRTE25	5-9 8-22
Union Carbide Corp., Texas City Plant	Texas City	TX	77592NNCRB33015	5-11 8-22
Union Electric Steel Corp., Ampco-Pittsburgh Corp.	Burgettstown	PA	15021NNLCTPOBOX	4-8 9-15

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
UOP L.L.C.	Chickasaw	AL	36611NNCRBLINDE	4-8 6-14
US Ecology Idaho Inc., American Ecology Corp.	Grand View	ID	83624NVRSF1012M	4-6 4-7 6-11 9-20
USS Gary Works, USX Corp.	Gary	IN	46402SSGRYONENO	3-4 4-6 4-7
USS Mon Valley Works Edgar Thomson Plant, USX Corp.	Braddock	PA	15104SSDGRBRADD	4-8
Ventra Plastics, Peterborough, Ventra Group Inc.	Peterborough	ON	0000002656	7-7 9-14
VFT Inc.	Hamilton	ON	0000002070	10-25
Vickery Environmental Inc., Waste Management Inc.	Vickery	OH	43464WSTMN3956S	3-4 4-6 4-7 9-15
Wabash Alloys	Guelph	ON	0000001067	10-16
Wabash Alloys	Mississauga	ON	0000005732	10-16
Wabash Alloys L.L.C., Connell L.P.	Benton	AR	72015WBSHLOFFHW	10-13
Wabash Alloys L.L.C., Connell L.P.	Wabash	IN	46992WBSHLOLDUS	10-13
Waltec Forgings Incorporated, Wallaceburg Plant	Wallaceburg	ON	0000004432	5-4
Warrenton Copper	Streetsboro	OH	--	8-22
Waste Management Inc.	Port Arthur	TX	77643WSTMNHWY73	4-8 6-17 10-4
Waupaca Fndy. Inc., Plant 5, Budd Co.	Tell City	IN	47586WPCFN9856S	10-13
Wayne Disposal Inc., EQ Holding Co.	Belleville	MI	48111WYNDS49350	4-6 4-7 4-8
Westlake Petrochemicals Corp.	Sulphur	LA	70663WSTLK900HW	9-30
Westlake Styrene Corp.	Sulphur	LA	70663WSTLK900HA	9-30
Westvaco Corp., Fine Papers Div.	Luke	MD	21540WSTVC300PR	5-11
Wheeling-Pittsburgh Steel Corp., Mingo Junction	Mingo Junction	OH	43952WHLNGMCLIS	4-8
Whitewater Specialties Ltd., Whitewater West Industries Ltd.	Kelowna	BC	0000005179	9-10
WRR Environmental Services Co. Inc., Caribou Corp.	Eau Claire	WI	54701WRRNV5200S	5-9 5-10
Wyckoff Inc. (dba DSM Catalytica Pharmaceuticals), DSM Catalytica Pharmaceutical	South Haven	MI	49090WYCKF1421K	5-9
Zalev Brothers Ltd.	Windsor	ON	0000004980	8-11 8-23
Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca	PA	15061ZNCCR300FR	3-4 4-6 4-8 6-17 7-13 8-9 8-22 9-2 9-4 10-4
Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton	PA	18071ZNCCRFOURT	8-7 8-9 8-22 9-9

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/>
- *Chemical Fact Sheets* distributed by the Office of Pollution Prevention and Toxics of the US Environmental Protection Agency <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>

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.
1344-28-1	Aluminum oxide (fibrous forms)	NJDOH	Inhalation can irritate the lungs, can also irritate eyes, nose and throat.	Same as acute.
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 ***cancer*** 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.	Nerve changes in workers. Effects on brain, liver, 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.

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
--	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 ***known human carcinogens***, 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.
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 ***cancer*** in laboratory studies.
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 ***cancer*** 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 causes 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 ***cancer*** in exposed workers.

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
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.
--	Lead (and its compounds)	ATSDR	Exposure can affect almost every organ and system; most sensitive is central nervous system, particularly in children. Kidneys and immune system also affected. Premature births, growth deficits and mental impairment in offspring of exposed mothers.	Effects are more commonly observed after higher exposures; effects of low levels in adults are uncertain.
--	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, and 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.
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. ***Cancer*** 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.

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
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, nosebleeds and stomach upset, as well as erosion and pitting of teeth. Evidence of increased ***cancer*** 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.
--	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 <http://www.chemexpo.com/news/PROFILE.cfm#menu>
- ToxFAQs, Agency for Toxic Substances and Disease Registry <www.atsdr.cdc.gov/>
- OPPT Chemical Fact Sheets, EPA Office of Pollution Prevention and Toxics <www.epa.gov/chemfact/>
- Chemical Backgrounders, Environment Writer, National Safety Council’s Environmental Health Center <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.
1344-28-1	Aluminum oxide (fibrous forms)	Most aluminum oxide is used in production of aluminum. Also used in flame-retardant fillers, preparation of aluminum compounds, pigments, adsorbents, catalysts, ceramics, refractories and abrasives.
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.

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
--	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 manufacture, film processing, food processing and production of pesticides, synthetic fibers, paints and coatings. No longer widely used as an aerosol propellant.
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 andiron 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). Also used 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.
--	Lead (and its compounds)	Most important use is in the producing batteries. Also used in ammunition, metal products (solder and pipes), roofing and devices to shield X-rays. Uses in gasoline, paints and ceramic products, caulking and pipe solder have been dramatically reduced. Lead compounds appear in dyes, explosives, asbestos brake linings, insecticides and rodenticides, ointments and other products. Also used as catalysts, cathode material, flame retardant, metal and wire coating, agent or constituent in glass manufacture and agent for recovering precious metals, notably gold.

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
--	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.
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-sytrene 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, thermoplatics 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.
--	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 Approved OMB Number: 2070-0093
Approval Expires: 01/31/2003

Page 1 of 5

EPA
United States
Environmental Protection
Agency

FORM R

TOXIC CHEMICAL RELEASE
INVENTORY REPORTING FORM

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 (Answer question 2.2; Attach substantiation forms) ☐ No (Do not answer 2.2; Go to Section 3)

2.2 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.

4.6 Latitude	Degrees	Minutes	Seconds	Longitude	Degrees	Minutes	Seconds

4.7 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.	a.	a.	a.
b.	b.	b.	b.

SECTION 5. PARENT COMPANY INFORMATION

5.1 Name of Parent Company NA ☐

5.2 Parent Company's Dun & Bradstreet Number NA ☐

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EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION

TRI Facility ID Number	
Toxic Chemical, Category or Generic Name	

SECTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you completed Section 2 below.)

1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	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 speciation 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.)

2.1	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:	3.3 Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import		
If produce or import:	a. ☐ As a reactant	a. ☐ As a chemical processing aid
c. ☐ For on-site use/processing	b. ☐ As a formulation component	b. ☐ As a manufacturing aid
d. ☐ For sale/distribution	c. ☐ As an article component	c. ☐ Ancillary or other use
e. ☐ As a byproduct	d. ☐ Repackaging	
f. ☐ As an impurity	e. ☐ As an impurity	

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ONSITE AT ANY TIME DURING THE CALENDAR YEAR

4.1 ☐ (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
5.1	Fugitive or non-point air emissions	NA ☐			
5.2	Stack or point air emissions	NA ☐			
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
	Stream or Water Body Name				
5.3.1					
5.3.2					
5.3.3					

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.

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EPA FORM R
PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number

Toxic Chemical, Category or Generic Name

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE (Continued)

		NA	A. Total Release (pounds/year*) (enter range code** or estimate)	B. Basis of Estimate (enter code)
5.4.1	Underground Injection onsite to Class I Wells	☐		
5.4.2	Underground Injection onsite to Class II-V Wells	☐		
5.5	Disposal to land onsite			
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3	Surface Impoundment	☐		
5.5.4	Other disposal	☐		

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.

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EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number

Toxic Chemical, Category or Generic Name

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (Continued)

A. Total Transfers (pounds/year*) (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. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

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 (pounds/year*) (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. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

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 ?
7A.1a	7A. 1b 1 2 3 4 5 6 7 8	**7A. 1c**	**7A. 1d** %	**7A. 1e** Yes ☐ No ☐
7A.2a	7A. 2b 1 2 3 4 5 6 7 8	**7A. 2c**	**7A. 2d** %	**7A. 2e** Yes ☐ No ☐
7A.3a	7A. 3b 1 2 3 4 5 6 7 8	**7A. 3c**	**7A. 3d** %	**7A. 3e** Yes ☐ No ☐
7A.4a	7A. 4b 1 2 3 4 5 6 7 8	**7A. 4c**	**7A. 4d** %	**7A. 4e** Yes ☐ No ☐
7A.5a	7A. 5b 1 2 3 4 5 6 7 8	**7A. 5c**	**7A. 5d** %	**7A. 5e** Yes ☐ No ☐

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.
8.10.2		a.	b.	c.
8.10.3		a.	b.	c.
8.10.4		a.	b.	c.
8.11	Is additional information on source reduction, recycling, or pollution control activities included with this report ? (Check one box)			YES ☐ NO ☐

* For Dioxin or Dioxin-like compounds, report in grams/year

*** Report releases pursuant to EPCRA Section 329(8) 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.

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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
2000 *Guide for Reporting to the National Pollutant Release Inventory*.

A1.0	Reporting Year:	2000
A1.1	NPRI ID:	
A1.4	Web Site Address:	http:// (Optional)
A1.5	D&B D-U-N-S Number:	__ __ - __ __ __ - __ __ __ __ (Optional)

A2.0	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:	

A3.0	PARENT COMPANY INFORMATION	
A3.1	Is the facility controlled by another company or companies?	( ) Y ( ) N If YES, please use Appendix A.

A4.0	FACILITY PUBLIC CONTACT (Optional)			
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:			

A5.0	FACILITY PUBLIC CONTACT ADDRESS (Optional)			
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

A6.0	FACILITY TECHNICAL CONTACT			
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:			

A7.0	FACILITY TECHNICAL CONTACT ADDRESS			
Is the mailing address for the technical contact in A6.0 different from the facility's site address in A2.0?		( ) Y ( ) N 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:			

A8.0	COMPANY COORDINATOR (Optional)			
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:			

A9.0	COMPANY COORDINATOR ADDRESS (Optional)			
Is the mailing address for the company coordinator in A8.0 different from the A2.0 facility site address?		( ) Y ( ) N 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

A10.0	STANDARD INDUSTRIAL CLASSIFICATION CODE (SIC) AND THE NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM CODE (NAICS)	
A10.2	4-Digit Canadian SIC Code:	__ __ __ __
A10.3	4-Digit American SIC Code:	__ __ __ __
A10.6	6-Digit NAICS Code:	__ __ __ __ __ __

A11.0	NUMBER OF FULL-TIME EMPLOYEES OR EQUIVALENT	
A11.1	Number of Employees:	
A11.2	ACTIVITIES FOR WHICH THE 20 000-HOUR EMPLOYEE THRESHOLD DOES NOT APPLY	
A11.2.1	Was the facility used for: (Check the choices that apply)	
a)	( )	Non-hazardous solid waste incineration (>=100 tonnes / year)
b)	( )	Biomedical or hospital waste incineration (>=100 tonnes / year)
c)	( )	Hazardous waste incineration
d)	( )	Sewage sludge incineration
e)	( )	Wood preservation
f)	( )	None of the above

A12.0	ACTIVITIES RELEVANT TO REPORTING DIOXINS/FURANS AND HEXACHLOROBENZENE		
A12.1	Was the facility engaged in: (Check the choices that apply)		
a)	( )	Non-hazardous solid waste incineration (>=100 tonnes / year)	
b)	( )	Biomedical or hospital waste incineration (>=100 tonnes / year)	
c)	( )	Hazardous waste incineration	
d)	( )	Sewage sludge incineration	
e)	( )	Base metals smelting (including copper, lead, nickel and zinc)	
f)	( )	Smelting of secondary lead	
g)	( )	Smelting of secondary aluminum	
h)	( )	Manufacturing of iron using a sintering process	
i)	( )	Operation of electric arc furnaces in steel manufacturing	
j)	( )	Operation of electric arc furnaces in steel foundries	
k)	( )	Production of magnesium	
l)	( )	Manufacturing of portland cement	
m)	( )	Production of chlorinated organic solvents or chlorinated monomers	
n)	( )	Combustion of fossil fuel in a boiler unit to produce electricity (Δ25 MW)	
o)	( )	Combustion of salt-laden logs in pulp and paper sector	
p)	( )	Combustion of fuel in kraft liquor boilers in pulp and paper sector	
q)	( )	None of the above	
A12.2	Was the facility used for wood preservation using pentachlorophenol?		( )Y ( )N

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.

A13.0	ACTIVITIES RELEVANT TO THE REPORTING OF PAHs	
A13.1	Was the facility used for wood preservation using creosote?	( )Y ( )N

A14.0	OTHER ENVIRONMENTAL REGULATIONS AND PERMITS (Optional)	
A14.1	Do you report under other environmental regulations or permits?	( ) Y ( ) N If YES, please use Appendix B.

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PART A - FACILITY IDENTIFICATION

A15.1	COMMENTS ON THE FACILITY (Optional)

A15.2	COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)

A16.0	COMPANY OFFICIAL CERTIFYING SUBMISSION			
A16.1	Title:	Dr. ( ) Mr. ( ) Mrs. ( ) Miss ( ) Ms. ( )		
A16.2	First Name:			
A16.3	Last Name:			
A16.4	Position:			
A16.5 - 6	Telephone No:	( ) -	Ext.:	
A16.7 - 8	Facsimile No:	( ) -		
A16.8	E-mail Address:			

A17.0	COMPANY OFFICIAL ADDRESS			
Is the mailing address for the company official in A16.0 different from the A2.0 facility site address?		( ) Y ( ) N If YES, please provide the address below.		
A17.1	Company Name:			
A17.2	Facility Name:			
A17.3	Mailing Address:			
A17.4	Mailing Address:			
A17.5	City / District:			
A17.6 - 7	Province/Territory:		Postal Code:	
A17.8 - 9	State:		Zip Code/Other:	
A17.10	Country:			

End of Form

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2000 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, 2001)**
______________________	______________________
Telephone	**Facsimile**

(Please include area code)

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 2000 *Guide for Reporting to the National Pollutant Release Inventory* and the *Supplementary Guide for Reporting to the National Pollutant Release Inventory.*

B1.0	SUBSTANCE IDENTITY			
B1.1	CAS Registry Number:			
B1.2	Substance Name:			
B1.3	NPRI substance category declared on this form (check one):			
a)	( )	Schedule 1, Part 1 Substance	UNITS:	tonnes (t)
b)	( )	PAHs	UNITS:	kilograms (kg)
c)	( )	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)	( )	For On-Site Use / Processing
b)	( )	For Sale / Distribution
c)	( )	As a By-product
d)	( )	As an Impurity
B2.2	PROCESS THE SUBSTANCE	
a)	( )	As a Reactant
b)	( )	As a Formulation Component
c)	( )	As an Article Component
d)	( )	Repackaging Only
e)	( )	As a By-product
B2.3	OTHERWISE USE THE SUBSTANCE	
a)	( )	As a Physical or Chemical Processing Aid
b)	( )	As a Manufacturing Aid
c)	( )	Ancillary / Other Use
d)	( )	As a By-product

B10.0	ON-SITE RELEASES TO THE ENVIRONMENT	
B10.1	Do you release this substance on-site?	( ) Y ( ) 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?	( ) Y ( ) N If YES, go directly to section B12.5

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Part B / Page 1

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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			
B12.1	AIR RELEASES	BASIS OF ESTIMATE (Select one method)	RELEASES (Units* / Year)	
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	BASIS OF ESTIMATE (Select one method)	SURFACE WATER BODY CODES (Appendix B)	RELEASES (Units* / Year)
a	Direct Discharges	C / E / M / O		
b	Spills	C / E / M / O		
c	Leaks	C / E / M / O		
B12.4	RELEASES TO LAND	BASIS OF ESTIMATE (Select one method)	RELEASES (Units* / Year)	
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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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	( )	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
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B14.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)
B14.2		COMMENTS ON RELEASES (Optional):

B15.0	ANTICIPATED RELEASES (Units* / Year)					
B15.1	2001		2002		2003	
	a)		b)		c)	
	2004 (Optional)		2005 (Optional)			
	d)		e)			

B20.0	DO YOU TRANSFER THIS SUBSTANCE TO OFF-SITE LOCATIONS	
B20.1	For Disposal?	( ) Y ( ) N
B20.2	For Recycling?	( ) Y ( ) 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	( )	Production Residues
b	( )	Off-specification Products
c	( )	Expiration Date Passed
d	( )	Contaminated Materials
e	( )	Unusable Parts or Discards
f	( )	Pollution Abatement Residues
g	( )	Machining or Finishing Residues
h	( )	Site Remediation Residues
i	( )	Other

* As specified in field B1.3

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PART B - DECLARATION FORM FOR SCHEDULE 1, PART 1 SUBSTANCES, MERCURY (AND ITS COMPOUNDS) AND PAHs

B22.0	OFF-SITE TRANSFERS FOR DISPOSAL Fill in this section if you answered YES at question B20.1			
B22.1	DISPOSAL METHOD	BASIS OF ESTIMATE (Select one method)	AMOUNT (Units* / Year)	OFF-SITE CODES (See Appendix C)
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		
B22.2	TOTAL QUANTITY DISPOSED			

B23.0	REASONS FOR CHANGES IN QUANTITIES DISPOSED FROM PREVIOUS YEAR (Select at least one reason)	
B23.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B23.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)
B23.2	COMMENTS ON DISPOSALS (Optional)	

B24.0	ANTICIPATED DISPOSALS (Units* / Year)					
B24.1	2001		2002		2003	
	a)		b)		c)	
	2004 (Optional)		2005 (Optional)			
	d)		e)			

* As specified in field B1.3

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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	2001		2002		2003	
	a)		b)		c)	
	2004 (Optional)		2005 (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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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 2000 *Guide for Reporting to the National Pollutant Release Inventory* and the 2000 *Supplementary Guide for Reporting to the National Pollutant Release Inventory*.

B1.0	**SUBSTANCE IDENTITY**			
B1.1	**CAS Registry Number:**			
B1.2	**Substance Name:**			
B1.3	**NPRI substance category declared on this form (check one):**			
d)	**( )**	**Dioxins/Furans**	**UNITS:**	**grams TEQ (g TEQ)**
e)	**( )**	**Hexachlorobenzene (HCB)**	**UNITS:**	**grams (g)**

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)	**( )**	**For On-Site Use / Processing**
b)	**( )**	**For Sale / Distribution**
c)	**( )**	**As a By-product**
d)	**( )**	**As an Impurity**
B2.2	**PROCESS THE SUBSTANCE**	
a)	**( )**	**As a Reactant**
b)	**( )**	**As a Formulation Component**
c)	**( )**	**As an Article Component**
d)	**( )**	**Repackaging Only**
e)	**( )**	**As a By-product**
B2.3	**OTHERWISE USE THE SUBSTANCE**	
a)	**( )**	**As a Physical or Chemical Processing Aid**
b)	**( )**	**As a Manufacturing Aid**
c)	**( )**	**Ancillary / Other Use**
d)	**( )**	**As a By-product**

B10.0	**ON-SITE RELEASES TO THE ENVIRONMENT**	
B10.1	**Do you release this substance on-site?**	**( ) Y ( ) N** **If NO, go directly to section B14.0**

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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**	RELEASES (Units* / Year)
a	Landfill	C / E / M / O / NA / NI	AL / BL / BQ	
b	Land Treatment	C / E / M / O / NA / NI	AL / BL / BQ	
c	Spills	C / E / M / O / NA / NI	AL / BL / BQ	
d	Leaks	C/ E / M / O / NA / NI	AL / BL / BQ	
e	Other	C / E / M / O / NA / NI	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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PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B14.0	REASONS FOR CHANGES IN QUANTITIES RELEASED FROM PREVIOUS YEAR (Select at least one reason)	
B14.1 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
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B14.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)
B14.2	COMMENTS ON RELEASES (Optional):	

B15.0	ANTICIPATED RELEASES (Units* / Year)					
B15.1	2001		2002		2003	
	a)		b)		c)	
	2004 (Optional)		2005 (Optional)			
	d)		e)			

B20.0	DO YOU TRANSFER THIS SUBSTANCE TO OFF-SITE LOCATIONS	
B20.1	For Disposal?	( ) Y ( ) N
B20.2	For Recycling?	( ) Y ( ) 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	( )	Production Residues
b	( )	Off-specification Products
c	( )	Expiration Date Passed
d	( )	Contaminated Materials
e	( )	Unusable Parts or Discards
f	( )	Pollution Abatement Residues
g	( )	Machining or Finishing Residues
h	( )	Site Remediation Residues
i	( )	Other

* As specified in field B1.3

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PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B22.0	OFF-SITE TRANSFERS FOR DISPOSAL Fill in this section if you answered YES at question B20.1				
B22.1	DISPOSAL METHOD	BASIS OF ESTIMATE (Select one method)	DETAIL CODE**	AMOUNT (Units* / Year)	OFF-SITE CODES (See Appendix C)
a	Physical Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
b	Chemical Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
c	Biological Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
d	Incineration / Thermal	C / E / M / O / NA / NI	AL / BL / BQ		
e i	Containment: Landfill	C / E / M / O / NA / NI	AL / BL / BQ		
e ii	Containment: Other Storage	C / E / M / O / NA / NI	AL / BL / BQ		
f	Municipal Sewage Treatment Plant	C / E / M / O / NA / NI	AL / BL / BQ		
g	Underground Injection	C / E / M / O / NA / NI	AL / BL / BQ		
h	Land Treatment	C / E / M / O / NA / NI	AL / BL / BQ		
B22.2	TOTAL QUANTITY DISPOSED				

B23.0	REASONS FOR CHANGES IN QUANTITIES DISPOSED FROM PREVIOUS YEAR (Select at least one reason)	
B23.1 a	( )	Changes in Production Levels
b	( )	Changes in Estimation Methods
c	( )	Pollution Prevention Activities
d	( )	Changes in On-site Treatment
f	( )	Changes in Off-site Transfers for Recycling
g	( )	Other (specify in comments field B23.2)
h	( )	No Significant Change (i.e. < 10%) or No Change
i	( )	Not Applicable (first year reporting this substance)

B23.2	COMMENTS ON DISPOSALS (Optional)

B24.0	ANTICIPATED DISPOSALS (Units* / Year)

* 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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PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B24.1	2001		2002		2003	
	a)		b)		c)	
	2004 (Optional)		2005 (Optional)			
	d)		e)			

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)	DETAIL CODES**	RECYCLING (Units* / Year)	OFF-SITE CODES (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		
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)

* 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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PART B - DECLARATION FORM FOR DIOXINS/FURANS AND HEXACHLOROBENZENE

B26.2	COMMENTS ON RECYCLING (Optional)

B27.0	ANTICIPATED RECYCLING (Units* / Year)					
B27.1	2001		2002		2003	
	a)		b)		c)	
	2004 (Optional)		2005 (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

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:			

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

APPENDIX B
REGULATIONS & PERMITS AND SURFACE WATER BODIES

NPRI ID:

REGULATIONS OR PERMITS (Section A12.0) (Optional)		
	ID Number	Government Department, Agency or Program Name

	SURFACE WATER BODIES (Codes to be used in section B12.3)	
	Alphabetical Code	Name Surfacewater Body Name
	A	
	B	
	C	
	D	
	E	
	F	
	G	
	H	
	I	
	J	
	K	

Environment Canada Environnement Canada

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

Environment Canada Environnement Canada

SEMARNAP

COA Form

ANNUAL CERTIFICATE FOR THE OPERATION OF INDUSTRIAL FACILITIES UNDER FEDERAL JURISDICTION FOR THE YEAR 2000

To be completed by SEMARNAP	
1) APPLICATION NUMBER:	**2) ENVIRONMENTAL REGISTRATION NUMBER:**
3) RECEIVED BY: Name and signature	(Signature with date received)
4) License Number:	

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	
5) TRADE NAME OF THE FACILITY: 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. **PLACE AND DATE:**	Name and signature of the legal representative Name and signature of the technical officer

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.

1) NAME OR FACILITY NAME: ____ **RFC:** ____

2) SIEM REGISTRATION NUMBER: ____ **3) COMMERCE CHAMBER AND NUMBER:** ____

4) PRIMARY INDUSTRIAL ACTIVITY OF THE FACILITY[2]: ____ **CMAP CODE[3]:** ____ **ENVIRONMENTAL CODE[3]:** ____

5) ADDRESS (Append map according to General Instructions)

Industrial Port ( ) Specify: ____
Town ( ) Street: ____
Outer/inner number: ____ Colonia: ____
State: ____ Postal code: ____
Municipality: ____ Federal entity: ____
Telephone Fax: E-mail:

6) Address to hear or receive notifications (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:

7) DATE OF START OF OPERATIONS: Day ☐☐ Month ☐☐ Year ☐☐☐☐

8) EQUIVALENT NUMBER of EMPLOYEES[4]

Employees: ____ Workers: ____ Total: ____

9) WORKING SHIFTS (indicate worked hours)

Monday to Friday ____ h/d Saturday ____ h/d
Sunday ____ h/d Total ____ h/wk.

10) AVERAGE NUMBER of WORKERS, by DAY and WORKED SHIFT (Consider a shift for every different schedule. DO NOT Leave blanks. If there is not information, write NA/ not applicable)

Shifts		Average number of workers						
Nr.	Schedule	M	T	W	T	F	S	S

11) Is it a Maquiladora of temporary importation regime?
Yes ( ) No ( )

12) Is it part of a corporation?[5] Yes ( ) No ( )
Specify:

13) CAPITAL PARTICIPATION: Only national ( ) Mostly national ( ) Mostly foreign ( ) Only foreign ( )

14) NAME OF AGENT OR LEGAL PROMOTER (present document): ____ **RFC:** ____

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 LGEEPA 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.

Name[1]			Consumption Point[2]	Physical state[3]	Type of storage[4]	Annual consumption	
Commercial	Chemical	CAS Number				Amount[5]	Unit[6]

1 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.
2 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.
3 Physical State Codes may be found in Table 1 of the General Code Catalogue.
4 According to Table 2 of the General Code Catalogue.
5 Indicate the amount consumed during the year reported.
6 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[1]	Type storage[2]	Annual production	
			Amount	Unit[3]

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[1]	Annual consumption	
	Amount	Unit[2]

1 Indicate whether the employed fuels natural gas (NG), LP gas, fuel oil (FO), gasoil (GO), diafano (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[1]	Annual consumption	
	Amount	Unit[2]

1. Indicate whether the consumed electric energy comes from external supplier (EE) or is generated at the facility site by burning fossil fuels (CF), burninng cane sugar pulp, cellulose, wood, other wastes (CDR) or other alternative energy sources (OM).
2. Units suchs as: J/s (joules/second), MJ/hr (megajoules/hour), W (watts), KW (kilowatts) or MW (megawatts) can be used.

SECTION II. ATMOSPHERIC POLLUTION

Pursuant to Article 19 and 21 of the LGEEPA Regulations on Atmospheric Pollution Prevention and Control, the following data shall be provided the first time this reporting form is used or when the facility data are different from those reported in the Single Environmental License, the Release Inventory or the last Operating Certificate.

2.1 GENERATION of POLLUTANTS (odors, gases and/or liquid or solid particles)

2.1.1 Characteristics of the machinery, equipment or activity that generates pollutants

Name of machinery, equipment or activity[1]	Release point[2]	Length of Operation[3]	Type of emission[4]	Only for combustion equipment				
				Capacity of equipment[6]		Annual fuel consumption(s)[7]		
				Amount	Unit[6]	Type[7]	Amount	Unit[7]

1 Indicate the name of the equipment (process, machinery or activity) for pollutant release points.
2 Indicate the identification number of the machinery, equipment or activity for pollutant release points according to the General Operating Diagram and summary table of section 1.3.
3 Indicate length of equipment performance or how long the activity took place during a year's time (hours per year).
4 Indicate whether the emission is point source (C) or fugitive (F).
5 This section shall be reported whenever dealing with external-combustion equipment (boilers, furnaces, etc.) or internal-combustion (energy generation plants with diesels, gas turbines, compressors, etc.).
6 Indicate the nominal thermal capacity of the combustion as defined by the manufacturer in: cc (boiler power), MJ/hr (megajoules/hour), kcal/hr (kilocalories/hour), BTU/hr (British Thermal hour/Unit) or lb/hr (pounds of steam/hour).
7 Indicate whether the employed fuel is natural gas (NG), LP gas, fuel oil (FO), gasoil (GO), diafano (DF), diesel (DI), gasoline (GA), coal (CA), burned wastes (BW) or others and the annual consumption in mass: ton (metric tons), kg (kilograms) or lb (pounds); or units of volume: gal (gallons), brl (barrels), lt (liters), m^3 (cubic meters) or ft^3 (cubic feet).

2.1.2 Characteristics of chimneys and release ducts

Duct or chimney[1]	Release point[2]	Related release points [3]	Height (m)[4]	Inner diameter (m)	Gas flow speed (m/seg)[5]	Output temperature (ºC)

1 Indicate name or identification number used at the facility to identify the chimney or duct that is being reported. If it does not apply, indicate by NA (not applicable).
2 According to the General Operating Diagram and Summary Table No. 1.3 indicate the identification number of the duct or chimney at which releases are generated.
3 Indicate each generation point (refer to the equipment table, machinery or activity, see Table 2.1.1) for each reported release point.
4 Height in meters of the release chimney or duct, starting from the ground level.
5 Indicate in m/seg (the average speed of output gas flow under normal performance circumstances). The data shall correspond to the gas and particle sampling at chimneys whenever the parameters of NOM-085-ECOL-1994 are applied. In the cases in which this norm is not applicable and the gas output speed is unknown as well as when dealing with vent ducts, it shall be indicated by NA (not applicable).

2.2 POLLUTANTS AND PARAMETERS UNDER REGULATION

Emission Point[1]	Equipment or Process subject to norm[2]	Norm to Apply[2]	Parameters[2]	Maximum permissible value		Emission[3]		Estimation method[4]
				Amount	Unit[2]	Amount	Unit	

1 Indicate the identification number of duct or chimney at which releases are generated, according to the General Operating Diagram and summary table requested in section 1.3.
2 Make a list of operations and equipment for each release point, according to table 2.1.2, and indicate the pollutant or normed parameter and the number of the corresponding norm, according to the following list:

Equipment or operation	Norm	Normed parameter	Units	Observations
Combustion	NOM-085-ECOL-1994	Particles	mg/m^3 ó $kg/10^6Kcal$	Corrected at 5% O_2 when referenced in concentrations
Combustion	NOM-085-ECOL-1994	SO_2	ppm ó $kg/10^6Kcal$	Corrected at 5% O_2 when referenced in concentrations
Combustion	NOM-085-ECOL-1994	NOx	ppm ó $kg/10^6Kcal$	Corrected at 5% O_2 when referenced in concentrations
Combustion	NOM-085-ECOL-1994	Excess of air	%	Equipment less than 5,200 Mj/h
Combustion	NOM-085-ECOL-1994	Smog density	Unites	Equipment less than 5,200 Mj/h
Particle releases	NOM-043-ECOL-1993	Particles	mg/m^3	In relation to gas flow
Cement	NOM-040-ECOL-1993	Particles	kg/m^3	Calcination furnace
Clinker furnace	NOM-040-ECOL-1993	Particles	mg/m	Crushing, grinding and cooling
Glass production	NOM-097-ECOL-1994	Particles, NOx	kg/ton	kg/ton of melted glass
Sulfuric acid	NOM-039-ECOL-1993	Mists of SO_2, H_2SO_4/SO_3	kg/ton	kg/ton of H_2SO_4 at 100%
Dodecylbenzene sulfonic acid	NOM-046-ECOL-1993	Mists SO_2, H_2SO_4/SO_3	g/kg	g/kg of dodecilbencen sulfuric acid at 100%
Cellulose production	NOM-105-ECOL-1996	Particles, totally reduced S (as H_2S)	mg/m^3	Corrected at 8% O_2 in recovering furnace and 10% O_2 in lime furnace
Automobile industry	NOM-121-ECOL-1998	VOC's	g/m^2	m^2 of covering area

3 Indicate the value obtained during the last smapling of the reporting year. The sampling register must be kept as well as the technical papers related to show in case it is required by INE or PROFEPA. Report the average value of the last month, in case of every day or weekly measurements of excess of air are taken to fulfill the NOM-085-ECOL-1994 requirements.
4 Indicate the method used to perform the reported measurement, according to the respective technical norm.

2.3 ANNUAL EMISSIONS

The requested data in the following tables correspond to the release points reported in Table 2.1.1 and can be estimated either from the results of measurements or through the application of estimation methods, mass balances or mathematical models of emissions. The corresponding calculation report should be kept and made available in case INE or PROFEPA requests it. In cases in which methods or emission control equipment are not applied, indicate NA (not applicable) in the corresponding columns. This is not a subject of sanctions at all. The information requested in Tables 2.3.4, 2.3.5 and 2.3.6 is not compulsory until the corresponding Official Mexican Norms are issued. The information that is requested in the table 2.3.7 should be submitted by those facilities that submitted *el programa de obras y acciones* to reduce the emissions of Volatile Organic Compounds, as requested in the Operating License or the Single Environmental License.

2.3.1 Sulfur dioxide

Release point[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

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 method used to estimate efficiency, according to Table 4 of the General Code Catalogue.

2.3.2 Nitrogen oxides

Release point[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

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[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

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[1]

Release points[2]	Annual emission			Control equipment or method		
	Amount[3]	Unit[4]	Estimation method[5]	Code[6]	Efficiency (%)[7]	Estimation method[8]

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 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.

2.3.5 Carbon monoxide

Release points[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

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[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

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[1]

Release points[2]	Annual emission			Control equipment or method		
	Amount[3]	Unit[4]	Estimation method[5]	Code[6]	Efficiency (%)[7]	Estimation method[8]

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[1]	Concession or assignment license number[2]	Concession entity[3]	Annual water used	
			Amount[4]	Unit[5]

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 assignation, according to jurisdictional area of source used.
3 Indicate the name of administrative entity that granted concession or assignation.
4 Indicate the annual total amount of water used from each extracting source.
5 Volume units such as: lt. (liters), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) shall be used.

3.2 DISCHARGE of WASTEWATERS

3.2.1 General Discharge Data

Discharge type[1]	Release point[2]	Discharge number[3]	Hydrological region[4]	Modifications[5]		Discharge frequency[7]	Crop irrigation[8]	Annual *in situ* treatment		
				Permits and records	REPDA[6]			Code[9]	Amount[10]	Unit[11]

1 According to Table 5 of the General Code Catalogue.
2 Number corresponding to the Operating Diagrams and Summary Table, as requested in section 1.3.
3 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).
4 According to Table 11 of the General Code Catalogue and the map of Hydrologic Regions.
5 When applicable, indicate the modifications to the permits or registers of the authorized discharges.
6 When applicable, indicate the certificate number of modification from the Public Registry of Water Rights (PRWR).
7 Indicate if it is continuous (C), intermittent (I) or occasional (O).
8 When it is used for watering crops, indicate if it is of restrictive (R) or non-restrictive type (N).
9 According to Table 6 of the General Code catalogue.
10 Report the annual total volume of treated water at the facility.
11 Volume units such as: lt. (liters), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) shall be used.

3.2.2 Wastewater discharge quality description[1]

Parameter[3]	Release point[2]							
Annual volume [cubic meters]								
Hydrogen potential (pH)								
Temperature [ºC]								
Fats and oils [mg/l]								
Floating matter (present or absent)								
Sedimentable solids [ml/l]								
Total suspended solids [mg/l]								
Biochemical oxygen demand (DBO_5) [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]								

1 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.
2 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).
3 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[1]

Generation point[2]	Waste identification		Annual generation		*In situ* treatment[7]		
	NOM-052-ECOL-93[3]	Code[4]	Amount[5]	Unit[6]	Code[8]	Annual treated amount	Unit[6]

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^3 (cubic meters), ft^3 (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[1]	Waste identification		Storage							
							Storage characteristics[8]			
	NOM-052-ECOL-93[2]	Code[3]	Form[4]	Annual amount[5]	Unit[6]	Time[7] (days)	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^3 (cubic meters), ft^3 (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[1]

Generation point[2]	Waste identification		Handling company[5]	Total annually transfered	
	NOM-052-ECOL-93[3]	Code[4]		Amount[6]	Unit[7]

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^3 (cubic meters), ft^3 (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[3]	Annual total handled	
NOM-052-ECOL-93[1]	Code[2]		Amount[4]	Unit[5]

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^3 (cubic meters), ft^3 (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[2]	Annual amount[3]	Unit[4]
Name[1]	Code[1]			

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[1]

Identification of listed substance		Generator identification[3]	Annual received amount	
Name[2]	Code[2]		Amount[4]	Unit[5]

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[1]	Code[1]	Release point[2]	Amount[3]	Unit[4]	Estimation method[5]

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[2]			
Name[1]	**Code[1]**	**Release point[3]**	**Amount[4]**	**Unit[5]**	**Estimation method[6]**

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[2]			
Name[1]	**Code[1]**	**Release point[2]**	**Amount[3]**	**Unit[4]**	**Estimation method[5]**

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[2]	Amount[3]	Unit[4]	Estimation method[5]
Name[1]	**Code[1]**				

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[2]	Handling company[3]	Treatment or disposal method code[4]	Annual amount[5]	Unit[6]	Estimation method[7]
Name[1]	**Code[1]**						

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[2]	Annual amount[3]	Unit[4]	Estimation method[5]
Name[1]	Code[1]				

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[4]	
		Previous year		Current Reporting year		Next year projection			
Name[1]	Code[1]	Amount[2]	Unit[3]	Amount[2]	Unit[3]	Amount[2]	Unit[3]	Previous year	Reporting year

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^3 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[2]	Control activities[3]	In situ treatment			
Name[1]	Code[1]			Method´s code(s)[4]	Estimated efficiency (%)[5]	Amount[6]	Unit[7]

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).